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Şefika Şule Erçetin
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Chaos, Complexity and Leadership 2013

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I commemorate all the days of my mother, Mübeccel Erçetin that teaches me;

to be as strong as to burn the ships, the ports and me at time and to build up ships, ports thousands times with the remaining sides of me;

to live with pain, happiness, burden, responsibility, accident, mishaps, and everything in life;

not to be overwhelmed by the fear of which I have the most although almost nobody has it;

not to ask for anything that I do not deserve; and to get happiness and love, feel it and to re-present it in a new fresh way…

To, My mother, things we lost in love, things we lost in fire!

Şefika Şule Erçetin

To Prof. Kamel Ariffin Mohd Atan

Santo Banerjee

Preface

This book is one of a series of best chaos and complexity in leadership evidence-based syntheses commissioned by the International Science Association. It is part of a commitment to strengthen the chaos and complexity in the leadership evidence base that informs operations of the various knowledge and academic fields in view of science, leadership, politics, economics, and education in the academia and the knowledge society in general. It aims to contribute to an ongoing evidence-based discourse amongst policy makers, educators, and researchers in the academia regarding chaos and complexity in leadership in the contemporary world.

The need to ensure high quality leadership has become one of the dictates of the knowledge society. The framework for effective leadership underscores the importance to provide adequate initial leadership education, continuous professional development for leaders and trainers, and to make leadership an attractive career choice for all people of different walks of life.

In this structural context, we are pleased to present the 2013 edition of Chaos and Complexity in Leadership of the Springer publication, which gives an exhaustive picture of researches relating to the leadership dimension from various walks of knowledge bases. It examines important aspects of chaos and complexity and how they relate to the distinct forms of knowledge ranging from science to humanities or arts.

Chaos and complexity in Leadership makes a valuable contribution to the debate on the plight of leaders and academics alike at both the theoretical and practical levels. Based on studies conducted through varying research models abound, the book provides standardized and readily comparable quantitative and qualitative perspectives which offer a wide-ranging overview of key issues related to chaos and complexity in leadership at all levels.

Chaos and complexity has also wide applications in the field of science and engineering. Especially in control and communication, it has significantly increasing amount of research in the last two decades.

Many social phenomena can be modeled into nonlinear systems; the corresponding dynamics are highly complex and chaotic in nature. Some social models are not in completely disorder but highly nonlinear in nature and are on the

edge of chaos. The nonlinear nature can be observed in social networks, opinion formations, models for business cycles, democratic voting, arms races, etc.

The content of the book is twofold. We have a small part of the applications of chaos and complexity in science, engineering, and other fields. The rest are the dynamics in leadership.

We recommend chaos and complexity in leadership to all practitioners and policymakers affiliated to the field of leadership mainly. We are confident that the volume will be of great use to those responsible for designing policies and those charged with implementing them. We are indebted to our esteemed researchers for having accorded Chaos, Complexity, and Leadership the due and timely attention they merit and so exhaustively at that.

Enjoy reading through

Turkey Şefika Şule Erçetin
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Chapter 1
Solution to Chaotic Situations in Higher Education: New Generation Universities as Intelligent Organizations

A. Murat Tuncer and Şuay Nilhan Açıkalın

Abstract Higher education institutions have been affected by three major developments since 1980s: globalization, growing requirements to lifelong learning and fast and intense developments in information and communication technologies. In this chapter we focus on technology, chaos, new generation and how they interact each other. We try to answer the question of whether new generation universities as intelligent organizations could be a solution to the current chaotic situations of universities or not? New generation was born in a technological world and hence are substantially different from the generations before them. Now, in the twenty-first century, all organizations, whether it to be on the macro scale such as nations or the micro scale such as universities, are trying to find ways of overcoming the challenges created by the technological revolution. At the individual level, researchers, analysts, presidents alike try to create new solutions to deal with these challenges by multidimensional cooperation. The most important characteristic of new generation universities is that they are intelligent organizations. In this chapter, we discuss new generation universities as intelligent organizations on five dimensions as solution to cope with research and development challenges (1) Research and development; (2) teaching, virtualization, mobility; (3) professionalization; (4) organizational culture; (5) glocal citizenship; (6) publication level.

Keywords Technology · Higher education · Chaos · New generation · New generation universities

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1.1 Introduction

The way the world has evolved to come into how we know it today, lifestyles, destinies, as well as paradigms and viewpoints, has been through a continuous process of change. Powerful change has always brought chaos and challenges such as industrial revolution, World Wars and globalisation and has never left any area untouched. All aspects of life, including the way we see and think about the world, has been challenged. Consequences of these catastrophic events completely changed not only international system but also our daily life. Even still it is not easy to predict possible effects of "globalization". So, in such a natural chaotic environment, there is no doubt perception of "university" is evolved. Evolving of universities has been shaped paralleling with demands of societies and global trends.

Especially, after 90's a different era has started for everyone; with accumulation of scientific knowledge and scientific developments booming. This era had definitely profound effects on 21st century and right now in the middle of 21st century, world is trying to adapt themselves to a completely new generation and their unique features. That's why this chapter focuses on relationship of technology, higher education and chaos through the question: Whether *new generation universities as intelligent organizations could be a solution to chaotic situations in today's Universities or not?*

1.2 New Generation

Veen and Staalduinen (2010) named the new generation as "Homo Zappiens" and Facer (2011) named them as digital natives. In this chapter, we refer to them as the new generation.

According to Veen and Staalduinen (2010) Homo Zappiens is the new generation that is growing up with modern communication technologies shaping their views on the world around them. New generation was born in a technological world and hence they are substantially different than the generations before them whose interactions with technology has been limited. The new generation has no recollection of white-black TVs, short-wave radios, dial-up telephones, gramophones or stone plaques. By the same token, the previous generations are as equipped and familiar as the new generation in the use of technology. We define the prominent characteristics of new generation below, they:

- use technology in an effortless manner
- learn new technological instruments without help
- share networks and cooperates in social media easily
- access information efficiently
- create innovations with help of technology
- eager to learn to develop new skills

However, the world is different from before in the era of technology and so is the new generation. As much as in other fields, this requires a new way forward in education. New generation can be considered as mirror to shaping future world and for education in the future. We should create some solutions to be prepared for the new image of the new generation.

1.3 New Generation Universities

World has changed. We live in a society that has fewer and fewer boundaries (Juárez 2013). As each new technology and each new generation of learners have arrived, researchers and educators have been asking what these new digital resources for children's informal learning might mean for the future of schooling (Facer 2011). At the individual level, researchers, scientist, analysts, educators try to create new solutions to deal with these changes by multidimensional cooperation. In the twenty-first century, after the technological revolution, all of us try to learn how to adapt to chaotic system.

The next decade promises to bring some significant challenges to the way we think about schools (Facer 2011; OECD 2008):

1. Children's participation in digital cultures raises a set of questions about how and whether we should police the boundary between formal education and informal learning.
2. The potential to set up online schools combined with an impoverished national debate about education is opening up the possibility for a fragmentation of state education, raising questions about who should govern schools.
3. The 'ecosystem' of education outside the school is becoming increasingly complex, as new folk educators are beginning to make their presence felt and as workplaces become sites for formal accreditation of learning, raising questions about the institutional and economic arrangements that should underpin education.
4. Within some restrictions, as set out by the academic profession in international conventions, students have a great deal of autonomy. They often study abroad and take courses offered exclusively online, which can be completed anywhere.

In adopting to and coping with fast- pace technological development, universities have attempted to transform themselves as well. New technologies have brought about changes in approaches to teaching, especially at the undergraduate level, with universities changing their educational offer to standardised courses often delivered online, and different use of classroom time with more small seminars and interactive discussions, and more time spent with students on their individual projects (OECD 2008). The higher education institution of the future, for example, in the year 2030 (London Darden 2009; Veen and Staalduinen 2010) will have a new position:

- The higher education institutions will be easily distinguishable from our current institutions. We now have lots of buildings that are all very much related to

certain curriculum. They serve particular functions for the students, everything from administration to science labs to dormitories in a university setting. Because technology is linking everything; many devices are converging and functionality is being transferred from traditionally separate devices into combined single units.

- Technology is increasingly organized in a distributed, parallel network, relying on the contribution of many different parts to increase its usefulness and addition to our lives. So the comprehensive university or even the comprehensive community college of the future would then take on a totally different meaning than our current model.
- Technology is becoming ever more open sourced; in the true sense of sharing, many new and emerging technologies are being developed by the community instead of being patented and protected, subject to development in small teams behind closed doors. In the future, more than half of the learning will most likely be happening at home, wherever "home" may be. Learning will be delivered virtually to the residences of the students, whether that residence is in a dormitory room or in a home. However, the actual facilities of learning for higher education institutions will be completely different.
- There may very well be an educational mall that has outlet stores specializing in the best programs for each of the major universities. Other partners will include all of the communication and media companies. It is obvious that it's inevitable to have one huge virtual college where there are partnerships and buy-ins from all the major universities of the world, and that they will share and partner in the whole concept.
- The reason this makes sense is because the cost of delivering higher education continues to go up. It will only be possible for institutions of higher education to pay for what students need and want by having enough students enrolled. In the university of the future, everybody will be paid according to their specialty. That's why it will be much more important for a faculty member to have a special. Additionally, it is going to be much more important for faculty and staff to be experts in technology.

1.4 Chaotic Situations in Today's Universities

Higher education institutions have been affected by three major developments since 1980s: globalization, growing demands of lifelong learning and fast and intense developments in information and communication technologies. Future of higher education institutions in Turkey and in the world have been discussed intense in terms of purposes, structure and other dimensions (Erçetin 2001a, b, c, 2002).

While organizational role, responsibility, identity and their success creating brand value have always been discussed in the past, new questions such as the role of universities in promoting entrepreneurship through their own research activities

as well as part of their teaching offer has come into the discussion (Etzkowitz et al. 2000). Realizing that we need a flexible structure to organize ourselves and the world around us, we can look at Homo Zappiens for a clue (Veen and Staalduinen 2010).

Since universities' ultimate responsibility to prepare human resource pool for the challenges of a constantly changing future, universities must change and continuously develop in accordance with this changing environment. Higher education institutions will evolve towards institutions that will function as hubs in knowledge networks, serving students working in fluid communities of research or learning on subjects of their interest (Veen and Staalduinen 2010). These changing conditions, adaptation to these conditions, preparation to the future is the greatest cause of chaos for todays' universities. Other chaotic situations include (Fishman 2013):

1. Funding and costs: One of the biggest barriers to provide online technologies is funding. Given the diminishing support from state appropriations, many public institutions are increasing tuition fees to provide their students with the status quo of services. If institutions did not already have the infrastructure in place to fully support online courses and services, it can be difficult to find new funds necessary to do so.
2. Faculty buy-in and quality concerns: Faculty buy-in is integral to supporting online offerings. One way to build faculty buy in is to be transparent with faculty and include them in the planning and development process of online courses and degree programs. In Minnesota's State College and University System, administrators have found that the more faculty involvement developing and teaching online courses, the more positively they view online student learning outcomes. Another way to gain faculty buy-in is through offering or mandating training in the development and teaching of online courses. A related faculty concern is that the development and teaching of an online course may require much more time than a comparable face-to-face course. This indicates that faculty develop and teach online courses in spite of their institution's incentives, not because of them. Accordingly, institutions may able to utilize an entirely new set of incentives like assigning great weight to online study for promotion and tenure purposes.
3. Meeting the needs of next generation students, serving diverse students: While online and hybrid courses are taken by traditional and nontraditional students alike, online degree programs tend to serve a more nontraditional student population. Institutions need to put relevant support structures in place for these students in order for their degree programs to be stable and successful.

With the conception of universities constantly changing as the environment around them is changing, universities should fully comprehend the dynamics of these changes and then develop reflexes accordingly. In this context, Ernst and Young (2012) reveal the dynamics of change and five basic tendencies in their study (Fig. 1.1).

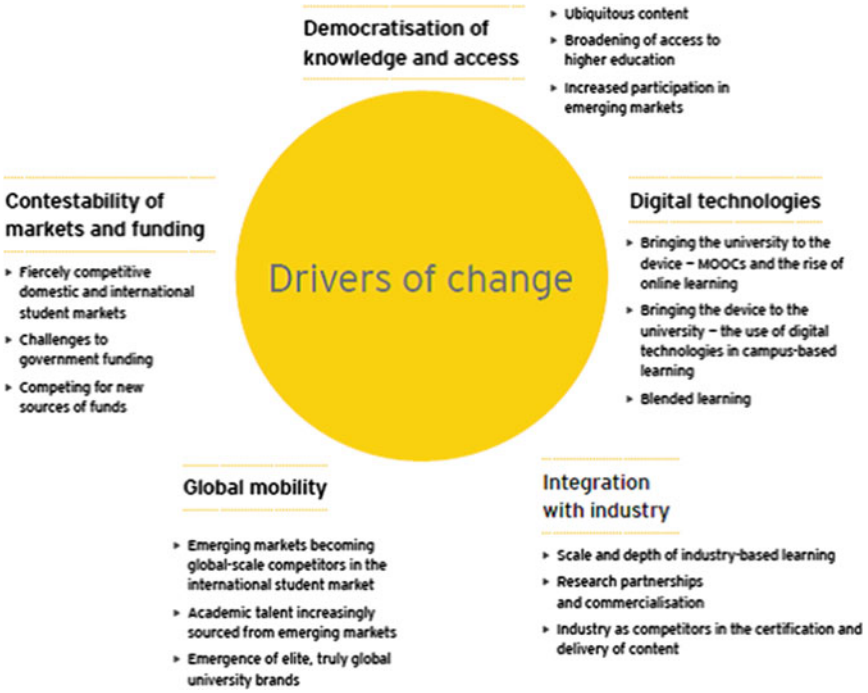

Fig. 1.1 Drivers of change. *Source* Ernst and Young Research Team (2012)

1.5 New Generation Universities as Intelligent Organizations to Solve Chaotic Situations in Higher Education

The most important characteristics of new generation universities is that they are intelligent organizations. New generation universities as intelligent organizations should strengthen themselves within dimensions of a) research and development, b) teaching, virtualization, mobility, c) professionalization, d) organizational culture, e) globe-local citizenship, f) publications.

(a) *Research and Development*:

- To have education, practice and research centers
- To ensure effective use of technopolis
- To have institutionalized and individualized formation on research and project production
- To carry out projects and researches that are determinative of need for change by multi-disciplinary fields with unique studies and causing for pragmatic changes and transformations by results

(b) *Teaching, Virtualization, Mobility*:

- To provide social and individual learning opportunities in the context of lifelong learning approach to all potential stakeholders in multimedia by using information and communication technologies in an effective way
- To provide instant feedback on performance.
- To have clear, simple, pure and instant accessibility via media
- To perform reporting on all processes
- To restructure as multicultural universities by providing learners and academic staff exchange with ease
- To create application areas in the labor market for each field of teaching
- To organize teaching and learning, knowledge generation, transfer information to a wide audience, integration processes that in order to perform *"intellectual capital"*
- To diversify as possible as social activities

(c) *Professionalization*:

- To offer unique productions to the field to demand in both national and international scale
- To prepare scientific activities with national and international participation

(d) *Organizational Culture*:

- To sustain productivity no matter what level of success
- Being trustworthy according to stakeholders
- Characteristics of the sciences to become agents of corporate culture
- To attain administrative and financial autonomy
- Energy, imagination, sincerity, joy, ideally, be able to take risks, to have a vision at the organizational level
- Being democratic, fair, decisive, unbiased, respectful for human rights, to have special interests, supportive, courage, modest, synergic, diligent, planning, sensitive, self-confident, reliable, objective, self-giving, respectful, patient, creative, enthusiastic, not to be jealous and to support characteristics such as cooperation, honesty, perseverance, cooperation

(e) *Glocal Citizenship*:

- To be aware of national and international social responsibilities, cooperate with relevant institutions, organizations and non-governmental organizations to perform these responsibilities
- To be aware of local and global problems and create solutions to these problems
- To be aware of economic, commercial and financial markets that influence local balance
- To have power of international competition

- To make accurate predictions in terms of qualitative and quantitative viewpoint about necessary manpower in future by the help of these owning national and international knowledge (Erçetin et al. 2013a, b).

(f) *Publications*:

- To share practical and theoretical information with various and rich methods at the glocal level.

1.6 Conclusion

As Duderstadt (2007) wrote in his groundbreaking biographical overview on the life of a university president, *A View from the Helm*:

> Today, there is an urgent need to reconnect the university presidency with the academic values and public purpose of higher education, to link university presidents tightly to the institutional saga that animates and shapes the evolution of their institution. The pace and nature of change affecting the higher education enterprise both in America and worldwide in the years ahead will require such strong, informed, and courageous leadership. True, it is sometimes difficult to act for the future when the demands of the present can be so powerful and the traditions of the past so difficult to challenge. Yet such academic leadership will be the most important role of the university president in the years ahead, as we navigate our institution through the stormy seas of a changing world. (Duderstadt 2007, p. 375)

Being an effective leader in new generation universities as intelligent organizations is crucial in this chaotic period now and in future. Leaders in universities should direct and manipulate their universities through organizing scientific activities, workshops, discussions to adapt new generation and technology paralleling with demands of new generation. Leaders of universities should not only provider of this changing patterns but also determinant of futures of new generation universities. In other words, leaders of universities should not only follow trends but also determinant of trends or it can be considered that leaders of universities should be pioneer in new generation universities. All in all, the most important factor in these adaptation and change process is that know new generation, their dreams, future goals, requests, life style should be main pillar of new generation universities. If we do not know them, we can not get conclusion from anything that make their future better. To sum up, leaders of universities should implement demands of new generation in their universities. Learn with them, work with them and work for them is the only way to be new generation universities.

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Chapter 2
From Chaos to Cosmos: Strategic Depth and Turkish Foreign Policy in Syria

Hüseyin Bağcı and Şuay Nilhan Açıkalın

Abstract Wars and conflicts have been a key determinant of international system dynamics. The end of the Cold War was especially noteworthy as a new era for all actors in terms of policy making and international dynamics. Then 9/11 completely changed perception of war and American unilateralism triumph shaped the system based on security. As former President Bush said "a new era has started", in this new order Turkey became more vital for US in its war on terrorism. Although Turkey has never been considered as great power, due its geographical position and historical legacy Turkey is a unique partner. That's why Turkey's foreign policy has been influenced and is also influential. That's why war, peace or any social events in real life should be considered and reanalyzed by nonlinearity and chaos theory. Balance of power and keeping the status quo have been the determinant elements of Turkish foreign policy for the last 50 years.

Keywords Chaos Theory · Cosmos · Strategic depth · Foreign policy · Syria · Turkey

Abbreviations

MFA	Ministry of Foreign Affairs
TFP	Turkish Foreign Policy
AK Party	Justice and Development Party
NATO	North Atlantic Treaty Organization
UNSC	United Nations Security Council
SNC	Syrian National Council
NCC	National Coordination Council

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2.1 Introduction

In 2002, AK Party government came to power with a multidimensional and active foreign policy as their key vision. AK Party government took over a politically and economically unstable country that's why in the first years of AK Party period, TFP was not as active as they assumed. Ahmet Davutoğlu can be considered as an architect of the new Turkish foreign policy under AK Party period. Until he became MFA he worked as an advisor to the Prime Minister Erdoğan, then Davutoğlu was appointed to the Ministry of Foreign Affairs in 2009. He is academician who worked in different universities in both Turkey and foreign countries.

His book "Strategic Depth" can be considered as a summary of vision of new Turkish foreign policy. Most of the scholars claim that Ahmet Davutoğlu and his political paradigms would have been completely new and fresh in Turkish foreign policy. On the other hand, through the years, Turkish foreign policy has been criticized on the basis of "shifting" or unreal policies. When the Arab Spring started, especially on the advent of the Syrian crisis, criticism was unleashed on Turkish foreign policy. By the time this article was written at the beginning of January 2014, Syria was being considered the vicious circle of Turkey in foreign policy. In light of this, this paper aims at analyzing Turkey's foreign policy in Syria as a chaotic environment based on Strategic Depth. There will be three main parts which are key tenets of Strategic Depth; characteristics of Syrian crisis based on chaos theory, Turkey's foreign policy during crisis, and in epilogue, there will be an evaluation of Turkish foreign policy under strategic depth and the Syria case.

2.2 The Main Tenets of Strategic Depth

2.2.1 Chaos to Cosmos

Strategic Depth by Ahmet Davutoğlu was first published in 2001 and in Turkey only it has been published 42 times. His book Strategic depth is an asset of his foreign policy paradigms for Turkey. It is kind of theoretical background for the new Turkish Foreign Policy. He expounded on his book in a conference at the Oxford University thus: "It is a re-interpretation of Turkey's history and geography in accordance with the new international context". The main purpose of this book is to suggest and prescribe methods of how to achieve the new Turkish Foreign Policy. "The significance of the book stems from its prescriptive nature and its introduction of the concept of Strategic Depth as a factor that should characterize the Turkish foreign policy" (Kirişçi 2009). Especially after he became Minister of Foreign Affairs in 2009, Strategic Depth has been the main reference book on new Turkish foreign policy. The main idea of the book is composed of geostrategic position and historical depth which show value and credibility of any state in the international system. For this chapter, beginning of the book has been main reference of analysis. He categorizes the

societies within the dynamic international system. Davutoğlu claims that there are three types of behaviors of societies which are in the process of evolving.

The first type of societies is those which adopt a static behavior, these countries prefer to wait until dynamism ends in the international system. This static behavior limits its dynamism too. To Davutoğlu, if a society has no self-confidence to lead its dynamism and is even afraid of its dynamism, they would generally prefer to behave in a static way. Second type of societies considers itself as an ordinary actor and because of this they leave their fate in the course of dynamism of the international system under the shadow of great powers. Third and last group of societies is of those which can transform their own potential dynamism as a power indicator into dynamism of the international system. This choice of behavior is the result of understanding and explaining of elements, mechanisms and flow of the dynamic international system.

Davutoğlu furthers that while the first and second type of societies are struggling with self-confidence and identity problem, the third type of societies who have power from their self-confidence by history and geography can put across a determinant performance to transform dynamism into balance in the international system. Although the behavior of the third type of society seems risky, third type of societies considers dynamism as an advantage to determine the future. In addition to this, first two types of societies try to inhibit internal dynamism and start to alienate from their culture and be part of global trends. Despite this, third type of societies will try to use all different internal dynamics in suitable moments to strengthen their power. In other words, Davutoğlu suggests that the third type of societies try to build up a meaningful relationship between their existence and global existence. Davutoğlu concludes that, the first type of society tries to protect itself from chaos, the second type of society prefers letting itself into chaos and the third type of society aims to be an actor of transformation from chaos to cosmos. Our analysis of Turkey's Syrian policy based on his categorization of societies in the dynamic international system and his vision is that Turkey has the capability to transform chaos to cosmos.

In this framework, Davutoğlu suggests that Turkey is now at crossroads and Turkey should combine its cultural, historical depth and potential dynamics with strategic policies. Thanks to its unique geographical position, cultural and historical depth Turkey should be a core country. In other words, Davutoğlu claims that Turkey should be the third type of society given its characteristics. It is kind of necessary for Turkey to design her foreign policy and regional policy as a center state in the international system. Because of her historical and geographical depth Turkey should take responsibility of being a core country. "The premise of this argument is that Turkey should not be dependent upon any one actor and should actively seek ways to balance its relationships and alliances so that it can maintain optimal independence and leverage on the global and regional stage" (Walker 2007). These assumptions of Davutoğlu in Strategic Depth have been the main columns of the Turkish Foreign Policy in his era. Beginning with his categorization of societies, the analysis will continue with the main principles and tenets of his theoretical background of the new Turkish foreign policy.

2.3 From Theory to Practice of Strategic Depth

As Davutoğlu mentioned in the introduction part of the book, Turkish foreign policy and power parameters need to be revisited. For him, there are some tools which are a must for Turkey to use to achieve Turkey's real power capability in the dynamic international system. Firstly, as a third type of societies, Turkey should understand and transform dynamic interpretation of her power parameters. In other words, in order to have transition of Turkey from chaos to cosmos there should be a clear description of her dynamic parameters. Secondly, depending on the dynamic interpretation, Turkey should have a multidimensional foreign policy. Turkey's constant and potential parameters can turn into kinetic and dynamic parameters through a multidimensional foreign policy formulation.

Ahmet Davutoğlu continues that only two methods can be understood and realized through historical assets and geographical depth of Turkey because history and geography make Turkey unique. "The analysis of an international relations sphere without penetrating its historical depth is similar to a psychological analysis ignoring the person's memory records" (Davutoğlu 2001). In his book, Davutoğlu defined Turkey as neither a history maker nor an outcome of the existing system. Turkey is unique country as an outcome of the Ottoman Empire. As an inheritor of the Ottoman Empire, Turkey is a mono-religious country with a multiethnic population. Meanwhile, religious leadership and imperialism were replaced by nationality based transformation when Turkey was founded. These domestic changes were reflected as Westernization in foreign policy. Not only Turkey's domestic sphere but also global scale events such as Soviet aggression and Cold War made Turkey part of the Western block. In other words, Davutoğlu claims in his book that, Turkey had to leave its influential zones which were inherited from the Ottoman Empire. He calls this situation of Turkey a "break off from historical continuity" and he furthers that this break off caused instabilities in domestic policy of Turkey (2001). Although Turkey had this unnatural transformation, he notes that the historical assets of the Ottoman Empire are still potential assets for Turkey.

Geographical depth of Turkey is a second vital element of new Turkish Foreign Policy in dynamic international relations. According to Davutoğlu, geography is a stable power parameter when it combines with politics, a potential power parameter, they both lead to geopolitics. "Geopolitics" as a term and a body of knowledge was introduced to Turkey for the first time during World War II in a series of articles published in the newspapers (Bilgin 2007). That's why geopolitics as a potential power assessment cannot deal with static behavior choice. Davutoğlu links Turkeys historical assets with her geographical depth, Turkey lies at crossroads of many geopolitical dynamic areas from her historical inheritance. In other words, Turkey's geopolitical depth is based on her identity which is basically Turkish, Ottoman and Islam (Bilgiç and Bilgin 2011). In light of these, Davutoğlu explains three major "regional areas of influence" which are (1) near land basin, the Balkans, the Middle East and the Caucasus; (2) near maritime basin, the Black Sea, the Eastern Mediterranean Sea, the Gulf and the Caspian; and (3) near continental

basin, Europe, Northern Africa, Southern Asia, the Middle and Eastern Asia (2001). In the near land basin, the Balkans, the Middle East and the Caucasus, Turkey ought to increase its cultural, economic and political power by transitivity and interdependency in these regions. That's why regional cooperation and cultural integration are necessary to strengthen Turkey's power in the near land basin. Davutoğlu suggests that Turkey's influence power in the near land basin is guarantee of politics in near maritime basin and near continental basin.

Within this theoretical and practical framework of Strategic Depth, Davutoğlu concludes that Turkey with her unique history and geographical position requires a comprehensive and complex foreign policy (Bağcı and Sinkaya 2006). Also, he furthers that new Turkish foreign policy should meet requirements of time and place dimensions. As Davutoğlu suggests, Turkey needs to establish a widespread network of interrelations, which include maximum diversity with sufficient co-operational depth and harmony (2001). In other words, Turkey should have a highly complex and effective foreign policy to transform and manage chaos to cosmos. Syrian crisis in Arab Spring would be the first and toughest test for Davutoğlu.

2.4 Syrian Crisis—The Most Chaotic Case of Arab Spring

Just three years ago since the Arab Spring started with Muhammed Bauzazi burning himself, it was named an ordinary uprising in Tunisia yet it was indeed more than that. It was only a kind of trigger of upcoming events (Açıkalın and Bölücek 2014). Arab Spring was a result of the demand for democracy, human rights and economic justice. Just like other Arab Spring countries, Syria has been ruled by Assad family for a long time. From Hafız Assad, Syrian people lived under oppressive regime. Although there are many similarities between Syria and other Arab Spring countries, uprisings in Syria are surprising. There are three important reasons why Syrian people's uprising can be considered as a surprise. Firstly, actually no one really expected Bashar al Assad as president after his father however when his older brother died in a car accident, Bashar Al Assad was called from Damascus. The new era of Bashar al Assad expected to be a "Damascus Spring" because he had been known as a reformer in his country (Gelvin 2012). Secondly, in the beginning of the Arab Spring in Tunisia, Bashar al Assad did not expect uprisings to spill over to his country because the young population which has been the backbone of uprisings did not become popular in Syria at first (Gelvin 2012). Thirdly, after Hama Massacre as a regime reaction to uprisings in 1982, no one really expected any rebellious movement. So, unpredictability is also part of the chaotic nature of the Syrian crisis. Also, the analysis of the Syrian crisis with chaos theory will highlight Davutoğlu's categorization of countries in the Strategic Depth, which imply Turkey should be the center state to transform chaos into cosmos.

First of all, notions of chaos and chaotic systems are terms generally associated with physics, meteorology, biology and mathematics rather than international political relations (Grebogi and Yorke 1997). The dynamics of social systems are

not linear therefore it is more unpredictable. Events in real life are generally complicated, it is made up of various elements and faceted into various aspects. In other words, each event is linked to other events. "It is extremely difficult, therefore, if not impossible, to gain an in depth understanding of them" (Bertuglia and Vaio 2005). Furthermore, there are limitations of linear models to having long-term predictions and solutions to real life events. Linear models have capacity to produce stable solutions and predict however they are not able to encompass the whole range of possible long term consequences within the field of social science (Bertuglia and Vaio 2005). That's why war, peace or any social events in real life should be considered and reanalyzed by nonlinearity and chaos theory. Firstly, chaotic systems are composed of non-linear and various elements. Non-linearity and various elements directly increase impossibility of forecasting in the long run.

As mentioned in the introduction, although chaos theory has not been used in international relations so often, Diana Richards in her 1993 paper, "A Chaotic Model of Power Concentration in the International System", outlined the first detailed assessment of and suggestion that chaotic dynamics may exist in international political interactions (Richards 1993). From minor interactions at individual level in international relations to system level interactions, it completely seems independent but would be interdependent in long term. Secondly, the most well-known feature of chaos theory is butterfly effect which implies small events will lead to large scale consequences. It is also interpreted as sensitiveness to initial conditions which means forecasting is impossible. Paralleling with first characteristics of chaotic systems, within various nonlinear elements, "Prediction, at least in the long term, becomes impossible and attempts to forecast future realities become probabilistic at best and misguided at worst" (Lorenz 1979, 56). When it comes to international relations, as Kissane suggests that there are other few analyses about historical and international events which focused on small individual event its long-term consequences. At its most basic level, the assumption of a chaotic system forces the scholar to consider events at the domestic and individual levels of analysis and their potential impact on the wider global system (2010). Also Kissane suggests that every element of the system has the potential to play the role of 'the butterfly' and effect significant change across the system (2006).

In light of these chaotic system suggestions, it is also possible to analyze Syria as a chaotic environment. Syria can be revisited by chaos theory in terms of two important features of chaotic systems. Firstly, as mentioned in chaos theory, there are different and independent and also very interdependent non-linear elements in the system. Although imprisonment of a group of children triggered off civil war, there are numerous and effective interest groups which can be categorized religiously, ethnically and politically. Basically, Syria is a kind of heterogeneous country in terms of religion. Despite Assad family and elites who are 11 % of population belonging to Alawites, 75 % of Syrian people are Sunni and there are Christian minorities too. Ethnically, Syria has been the homeland of Kurds, Turks, ethnic Armenians, Arabs and Circassians. So, ethnic and religious breakdowns are just one part of Syria's complexity (Fisher 2013).

This diversity of ethnic and minority groups in Syria turned into a nightmare because not only local groups but also some other regional and foreign interest groups intervened in conflicts in Syria. Also, this ethnic and religious diversity is composed of political groups. In Northeast Syria, there is de facto Kurdish Autonomy which gained power after the Syrian army's retreat from this area. Free Syrian Army is the forces group which emerged from the street protests and former Syrian army members; there are also some fractions within it. Interestingly, majority of Free Syrian Army are composed of the Sunni population of Syria. Jabhat Al Nusra is a radical Islamic force that has pledged allegiance to Al Qaeda, composed of militant Muslims from around the world. They also receive money and weapons from supporters and have become the rebels' most effective fighting force. They aim to impose Sharia law in areas they occupied.

There are also two different political opposition bodies in the Syrian case which are Syrian National Council and National Coordination Council. Syrian National Council is based in İstanbul, they emerged as the main political opposition to Assad and searching for international recognition as the legitimate representative of the uprising, despite rifts with other Syrian factions. On the contrary, National Coordination Council is kind of opposition of Syrian National Council. There are main differences between SNC and NCC. Members of the National Coordination Body are committed to three principles: "No" to foreign military intervention, "No" to religious and sectarian instigation, and "No" to violence and the militarization of the revolution (National Coordination Body for Democratic Change 2014). Diversity of opposition groups makes the nature of Syrian civil war more chaotic, these groups have different independent interests while they also have similar and interdependent interests.

Secondly, sensitiveness to initial conditions- with the famous name butterfly effect. Like in the starting point of Arab Spring which was of Muhammed Bauzazi burning himself, the Damascus demonstration did not make so much noise too. However a few days later a group of children aged between 10–15 were imprisoned because they wrote "Down with the Nizam" on the wall which was used in the Egyptian revolution, their families tried to take their children back and took out people to streets, during protests opening a fire which caused casualties. As expected but also unexpected by government, the next day funerals became the scene of 20,000 protesters. Next days, protests started in the city of Bania and it spread to almost all cities of Syria. So, children in a small city of Daraa were never expected to be a reason for a huge civil war, it is definitely butterfly effect of Syrian protests. Thus, Syrian's multilayered social and political structure is the main reason behind how small protests in Syria turned into chaos. In such a diverse and complex social strata, a sparkle from the Daraa would be enough to fire the whole country. The importance of Syria to Turkey is unquestioned that's why Turkish foreign policy has been influential in the Syrian crisis. The next part will be about Turkish foreign policy in Syria since AK Party government came to power until today.

2.5 Turkey's Foreign Policy in Arab Spring and Syria-Far from Cosmos

Although Turkey's foreign policy has been both criticized and praised, it is also important to understand how Turkish foreign policy changed in Middle East after Davutoğlu until Arab Spring. It was direct implications of Davutoğlu's Strategic Depth book and its framework "It would be a pivotal state with global significance. Turkey would become not only Europe and North America's bridge to the Middle East, but also the world's civilizational conduit to the Muslim East" (Waldman 2011). Turkey started to pursue more proactive foreign policy in the region. Turkey became popular within Arab countries, regionally and internationally. Turkey has signed numerous political initiatives and cultural agreements with its Arab neighbors, has enhanced its role in the Organization of Islamic Conference and has joined the Arab League as an observer (Ennis and Momani 2013).

Turkey's proactivity can be considered a result of Davutoğlu and his assumptions. Especially, Turkey had had good relationship with Syria as one of the longest border countries of Turkey. Both countries initiated cooperation and agreements at almost all levels of cooperation. Military-Education Cooperation treaty was signed in June 2002. Also, they signed bilateral Free Trade Agreement together. Also, Turkey and Syria had agreement to build common dam on Asi River issue which was totally problematic for a long time. "In conclusion there have been agreements upon the development of banking services, tourism, highways, energy, transportation, custom trade and construction field" (Özer 2007). Even in the year 2011 during their last meeting in the Northem Syrian city of Aleppo, the two countries' leaders were inaugurating the "friendship dam," straddling the Syria-Turkey border, to be built jointly (Ayman 2013). Even both countries decided to organise common council of ministers.

When Arab Spring started in Tunisia and spilled over in other countries of the region, Turkish government rhetorically supported anti-regime groups but practically designed different policies for different regimes. During this time, Turkey showed different attitudes towards each regime according to her interests (Ennis and Momani 2013). According to the West, thanks to Turkey's successful economic and political performance in the last ten years, it has made her a model country to Arab countries. We can say that Arab Spring enhanced Turkey's role model identity at the beginning. "The Arab Spring in particular has vaulted Turkey into a key regional role" (Paul and Seyrek 2011). AK Party government and its moderate Islam model became much more desirable for people in those countries who demand more freedom and human right until the Tunisian protests spread to Syria which has the longest border with Turkey and accordingly the whole situation changed for Turkey. "The case of Syria is perhaps the most difficult one for Turkey, given the considerable investment of the AK Party government in building good relations with Bashar al-Assad over the past decade" (Dalacaura 2012).

Historical and political ties of Turkey with Syria make it unique and different for Turkey. According to Bağcı, Turkey had three main national interests in Syria; (1) to

prevent establishment of any Kurdish government in Northern Syria, (2) to control radical Islamist groups in Syria, (3) to have a new government in Syria which can be controlled by Turkey (http://aybekgazete.com/yazarlar/prof-dr-huseyin-bagci/suriyeye-mudahale-kararinda-akil-mi-vicdanmi-daha-agir-basiyor/61/). So, Turkey's attitude was mainly shaped by these three national interests in Syria. "The Turkish government wanted to prevent an environment that would lead to the dissolution of the Syrian state that would trigger ethnic and sectarian conflict and its spillover effects to Turkey" (Ayman 2013). It can be considered the main reason why Turkey has been vigilant in the case of Syria. So, from the beginning until now, within 2 years, Turkish foreign policy for Syria has experienced ups and downs. As Davutoğlu mentioned in his book, can Turkey manage to be transformed from chaos to cosmos? Or will Syrian uprisings become a vicious circle of Turkish foreign policy? In the next part, there will be a discussion of the Turkish Foreign policy in Syria chronologically since the beginning of protests until today.

2.6 From March 2011 to the Present Day: Turkish Foreign Policy on the Edge of Chaos

In March 2011 when Syrian uprisings started Turkey- Syria relations reached peak level everyone knows that Syria would not be same as other Arab Spring countries for Turkey. Paralleling to Strategic Depth assumptions and new era in TFP, since 2005, Erdoğan demanded political and economic reforms from Assad and suggested having better relations with opposition groups in Syria. However, Syria had been slow on reform making. In the wake of the Arab Spring in February 2011, Erdoğan once more tried to convince him to make reforms as soon as possible. One month later in March 2011, protests against government spread to all regions of Syria. In April 2011, Davutoğlu visited Syria and he had three suggestions which were abolishment of state of emergency, giving national identity to Kurdish population and preventing any military intervention in the protests. Even Turkey sent a task speech to Assad based on his request. Actually, Davutoğlu was not so optimistic about Assad's promises. In other words, failure of making reforms was not a surprise for Turkey. However, Erdoğan as a close friend of Bassar al-Assad, announced that he would talk with Assad and counseled him on implementation of social, economic, and political reforms, while offering Turkish help to achieve the changes. "Erdoğan hoped that his close friendship could be effective in the regional change" (Taşpınar 2012).

Once more, Turkey believed that Turkey's historical and geographical position and proactive policies in the last years were enough to play a central state role in the Syrian crisis and region. Unfortunately, Erdoğan's demand for reforms from Bashar al-Assad in Syria was left unanswered. "Ankara realized that the Syrian government was unwilling to resolve the problems through reforms and would continue to use force against its citizens." (Aras 2009).

November 2011 was remarkable because, Erdoğan changed his rhetoric very sharply and declared a clear stance against the Assad regime in Syria. Erdoğan declared that "Without spilling any more blood, without causing any more injustice, for the sake of peace for the people, the country and the region, you should finally step down" (Burch 2011). Not rhetorically, but also practically Turkey started to support opposition groups in Syria and built up refugee camps in border cities. On 29th April 2011, the first group of refugees comprising 252 Syrian citizens crossed the Turkish border. Although Davutoğlu officially said that they still support reform period in Syria, in the same month opposition groups which consisted of different groups such as Kurds, Muslim Brotherhood and young Syrian people gathered in Antalya (Davutoğlu, TRT May 2011). In June, many of army officers started to escape and formed the "Free Syrian Army". In August 2011, the last time Davutoğlu visited Damascus, after a 6 h meeting, they agreed on a fourteen point reform road map which is about reform schedule and action plan for the Syrian government. However, the news from Syria and events in Hama completely disappointed Turkey. Turkey's optimism would be ended, once more Syria failed the reforms initiatives and even increased the level of violence against Syrian people.

After August 13, Turkey and Syria demerged each other. It was a kind of turning point for Turkish foreign policy, Turkey started to search support from United Nations, NATO and of course United States. UNSC meeting in October 2011 couldn't draft any imposing decisions due to Russia and China veto. In February 2012, after the bloodiest event happened in Hama, almost 500 people were killed. Next day, UNSC gathered for the second time with two vetos but UNSC announced that they would agree on Arab League' decisions about Syria. So, Turkish foreign policy towards Syrian crisis changed its face during this period.

> Between March 2011 and May 2012, Turkey's overall Syrian policy can be separated into 3 periods: a) pressure on the Bashar al-Assad government for constitutional reform b) attempts at unifying dissident groups under a single roof and promoting international sanctions c) a return to efforts towards a UN-based solution (the Annan Plan) (Ertuğrul 2012).

Since June 2012, Turkey and Syria relations got worse and the next month a Turkish fighter jet was shot down by Syrian Air Forces. As expected, Turkey requested consultations under article 4 of NATO's founding Washington Treaty. It was important to internationalize the Syrian crisis since the Syrian problem had become directly related with Turkish security and sovereignty rights as a member of NATO. From June 2012 to May 2013 when Reyhanlı bombing happened, Turkey's insistence on US or NATO intervention in Syria became the priority of Turkey's agenda. Turkish officials said that Syrian intelligence service was responsible for Reyhanli bombing. Even Davutoğlu blamed the world's inaction on the Syrian conflict for the "barbarian act of terrorism" that claimed dozens of lives near the border. Then, Turkey suggested the situation about chemical weapons which was '*the redline*' of Obama administration. Davutoğlu obviously said that "We call on the international community in this situation where the red line was crossed long ago to intervene as soon as possible". Geneva meetings and developments showed

that Turkey didn't find any support for international intervention. Even US and Russia agreed on destruction of chemical weapons in Syria, directly showing that unfortunately Turkey became much more lonely in her Syrian policy.

2.7 Challenges to Turkish Foreign Policy in Syria

Actually, security concerns and economic ties with Syria make the situation quite unique that's why Turkey wanted to be more active; however, it is not as easy as imagined. As easily noticed in last two years in the Syrian crisis, Turkey faced three main challenges. Firstly, Turkey built a very sensitive relationship economically since 2002 with Syria because of this, when Turkey pursued her national interest, it faced an interest versus ethical dilemma. "First in the direction of political reform within the parameters of the existing al-Assad regime and, once this solution proved to be unworkable, changing course and promoting regime transformation by active support for the opposition forces" (Öniş 2014). Öniş claims that having a prodemocracy position and providing active support for popular resistance to the established regimes may jeopardize Turkey's important economic relations in the region.

On the other hand, possible support to the authoritarian regimes, when protests reached peak point, would undermine Turkey's popularity within Arab people to play a regional leadership role. In the chaotic environment, interest versus ethical dilemma put Turkey in a tough position because as mentioned due to various elements and butterfly effect in Syria. In other words, Turkey's economic interests hindered Turkey to have more multidimensional foreign policy. Even in Tunisia, Libya and Egypt, Turkey jeopardized its economic interests in order to pursue ethic-based foreign policy. Some scholars claim that Turkey actually endangered economic relations in Syria because compared to other Arab Spring countries, Turkey had more intensified economic relations with Syria and Syria is the opening door to the whole region of trading.

Secondly, similar to the first challenge, Turkey faced discourse versus capacity problem. From the beginning, Turkey has been showed as a model country or main actor who can persuade al-Assad. Furthermore, contrast to Turkey's powerful position in UN and NATO, Turkey could not find any support for international intervention. US, Russia and EU took a different position which tends to be a more diplomatic way of solutions rather than any military intervention. Unfortunately, Turkey's soft power but also hard power capacity became questionable because of Turkey's insisting on peaceful foreign policy. Especially Reyhanlı blast and jack down of Turkish fighter jet opened Turkey's deterrence power to discussion.

> Turkey's inability to retaliate in the face of an escalating crisis shaped by the crashing of a Turkish fighter jet near Syria's territorial waters, the terrorist attacks on Turkey's border gate in Reyhanlı, and the casualties of citizens in Ceylanpınar due to shelling by forces loyal to the Assad regime all but left a black mark on Turkey's image and deterrence (Kınıklıoğlu 2014)

The last challenge to Turkish foreign policy is the "precious loneliness" paradigm. Davutoğlu said that Turkey's ethical stand in Syrian crisis can be named as precious loneliness in the international system. Divergence between Turkey and US positions on Syrian crisis is the main reason behind Turkey's precious loneliness. As mentioned in the last six months of Turkish foreign policy, it is obviously revealed that Turkey and US became apart in the Syrian crisis. Actually, US had been skeptical about reconciliation of Turkish- Syrian relations since 2002. Especially from the Bush era, Syria had been considered as pillar of axis of evil that's why reconciliation of Turkish- Syrian relationship really disturbed the US policy makers for a long time. In 2005, American diplomats shared their views with US policy makers in Washington "Turkey share US strategic goals on Syria but they have different tactics" (Çongar 2005 qtd in Zengin). Also Soli Özel claims that Turkey pursued her Syrian policy despite US's position (Özel 2012). However, within the next years American diplomats noticed that Turkey's Syrian policy had been consistent with American interests. Again in Yasemin Çongar's book, wikileaks documents of Charles Hunter note that "In the long term, increasing confidence between Assad and Erdoğan will be the only way to protect Syria from Iranian influence". Just a year later in 2010, US removed travel warnings to Syria and Robert Ford was appointed as an ambassador after a long time.

The 2010 winter protests in Tunisia would reverse the atmosphere in the Syrian, Turkish and American relations. Although Obama administration recognized SNC and opposition group legitimacy, since the Syrian protests began, US seems not to be involved in Syria after Iraq and Afghanistan disappointment. Including US citizens, this time no one was willing to intervene in Syria. Even Obama's redline was crossed by Syrian government in case of chemical weapons. US has been more negative to any intervention or military actions such as no fly zone. Actually, divergence between US and Turkey on Syria started from the very beginning. Proactive Turkish foreign policy and passive Obama administration draw fragmented positions. Also, after use of chemical weapons by Assad regime, somehow Obama ignored his redline and accepted to deal with Russia in order to destroy chemical weapons. It can be considered as momentum between Turkey and US. Once more Turkey was left alone in case of Syria in the eyes of Davutoğlu. Of course, long term policy differences between US and Turkey drag Turkey to deadlock because although Davutoğlu started to have more flexible and independent foreign policy, US is still the key alliance of Turkey in foreign policy. It is impossible to expel US influence on Turkish foreign policy. So, interests and attitudes differences of those old friends left Turkey alone in the international system.

2.8 Epilogue—No Cosmos for Syria and the Region

There is no doubt Davutoğlu has changed Turkish foreign policy in terms of theory and practice. His book Strategic Depth mainly suggests a new Turkish foreign policy that would be more flexible and more active. Davutoğlu categorized states as

actors in the international systems and he pointed out some characteristics of foreign policy attitude. He suggests that these countries can have complex and deep foreign policy which can transform chaos to cosmos. Furthermore, these countries should consider foreign policy depending on both potential dynamics of international system and their internal dynamics. According to his classification and suggestions, Turkey should be center a state that has capability to transform chaos to cosmos. In order to be a center state, Turkey should redefine its power parameters and annotate paralleling with dynamics and parameters of the international system. In addition to this Turkey should have multidimensional and proactive foreign policy. Davutoğlu suggests that there are two methods to achieve idealized Turkish foreign policy, historical depth and geographical assets. Turkey's historical legacy and geographical assets would give a unique advantage to Turkey in policy making.

Arab Spring can be considered a test for Davutoğlu's center state vision, Arab Spring is the most chaotic and complex event in new Turkish foreign policy. At the beginning of Arab Spring protests, Turkey stood position to support democracy and human rights, against authoritarian regimes. However the Syrian case would be the most different and tough for Turkey. Within such a chaotic movement in MENA, Syria is the most chaotic case for Turkey. How we define Syria as a chaotic environment is the key to understanding Turkish foreign policy in Syria. Chaos is generally associated with physics, mathematics and weathercasting. Two important features of chaos have been applicable in the Syrian case;

Firstly, all actors in the system have the potential to lead to major consequences. It is known as sensitiveness to initial conditions which make forecasting impossible. In other words, initial conditions of any event would be determinant of a system. The famous butterfly effect was derived from this unpredictability characteristic. Use of a slogan from the Egyptian protests by a group of children in Daraa was the beginning of Syrian protests. They were arrested then killed in prison. Their funerals turned into mass protests then it went like snowball. Unexpected children's' death would lead to massive protests and then civil war. Syrian butterfly effect story went like that.

Secondly, non-linearity of system is another feature of chaotic systems. Variety and interdependency of actors also influence predictability. Syrian protesters include different ethnic minority and religious sectarians. Not only Syrian citizens but also different interest groups have been fighting against Assad regime in Syria. Kurds, Al Nusra, Turkmens and other groups have different interests and influence. In light of these, Syria can be defined as a chaotic environment. Furthermore, Assad regime never expected such uprisings in Syria because despite his father, Bashar Al Assad had been considered a reformist in his country. Also, Assad family belongs to minority Alawite sect of Syria but rights of minority groups have been under guarantee of government.

Syria has been always different for Turkish foreign policy makers. Turkey had long and bumpy relationship with Syria. In the AK Party era foreign policy had been kind of reconciliation and enhancement in case of Syria. Spreading of protests to Damascus and whole Syria alarmed Turkey. Although Turkey supported possible reforms by Assad in Syria in the beginning, Syria seemed far from any reforms and

even protests turned into civil war. Turkey has had a more vocal reaction to the Syrian regime since March 2011; even Turkey called on the UN, NATO and especially US to take action in Syria. However, agreement between US and Russia on destroying chemical weapons in Syria disappointed and left Turkey alone. As mentioned above, Turkey should be a central state and have a complex web of relationships with all actors. However, in the period between March 2011 and May 2012, Turkey tried to play a central state role to convince Assad regime with her soft power ability however Erdoğan and his close friendship was not enough to convince Assad to make reforms. "Clearly, the biggest disappointment for the Turkish government has been the Assad regime's refusal to set the country on a peaceful course and its brutal crackdown on non-violent demonstrators." (Cebeci and Üstün 2012). It is obvious that Turkey's zero problem policy doesn't work anymore.

There are realities for Turkey, which is 600,000 Syrian refugees and wastage of almost 2 billion dollars on them. Turkish cities which are located on the Syrian border of Turkey have security issues and even sometimes conflicts threaten Turkish sovereignty and national security. "Turkish foreign policy prioritized soft-power, aimed at a state of "zero-problem" with neighbors and established dialogue with all actors; however, this policy has dramatically changed with the Syrian crisis and taken a direction to adopt a sharp discourse although it suffers the capacity of implementation and has been nurtured by ideological motives rather than a strategic mind" (Dalay 2014)

So, despite the rigorous efforts of Turkey unfortunately Syrian case turned into dead end in Damascus Street. Unfortunately, Turkey's position is far from being a soft power and model country. In other words, at least in the Syria couldn't be a center state or third model of Davutoğlu's categorization which can have capacity to transform chaos to cosmos and seize the dynamics of the international system. Partially, based on Turkey's position in Syria also would cause continuity of instability and unpredictability of the whole region. In 2011, when protests reached the peak in Syria Davutoğlu said that "Turkey never let Syria in chaos" however, just two years later because of ethic vs dilemma, capacity versus rhetoric and divergence between Turkey and US challenges.

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Chapter 3
History, Development and Trend of Fractal Based Biometric Cryptography

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Abstract This article has been originated to institute for obtaining the History and the trend of Development of Fractal based Biometric Cryptography. Here we endeavour to assemble the bygone information for representing the trend of progress of cryptography operated with the perception of Fractal. On a whole, Fractal is a geometric figure of non-integer dimension that has two properties: First, most amplified images of fractals are approximately identical from the unamplified version, called self-similarity. Second, fractals have fractional dimensions. Barnsley's Iterated Function Systems (IFS) form on the self-similarity of fractal sets can produce the Fractal Image Coding Scheme by using the principle of affine transformation. To encode digital grey level images, Fractal image coding has been used successfully.

Keywords Fractal · Encryption · Fractal image

3.1 Introduction

This article has furnished a brief background, Progress and trend of Biometric Cryptography based on Fractal.

Different Bodily features are measured as a method of distinct identity is known to date back to the ancient Egyptians. Archaeological evidence says that fingerprints being used to associate a person with some event or transaction is also said to date

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back to ancient China, Babylonia and Assyria. But until the end of the 19th century, the study of biometrics did not enter the domain of crime detection. A French police clerk, Alphonse Bertillon and anthropologist pioneered a method of recording multiple body measurements for criminal identification purposes known as Bertillonage was adopted by many police authorities worldwide during the 1890s, but soon became obsolete once it was recognized and thus the requirements of the encryption of body Image had become crucial (Alarcon-Aquino 2011; Alfalou et al. 2011; Alfalou and Brosseau 2009; Al-Saidi and Said 2014).

Mandelbrot, in the 1970s, devised the term fractal and originated the inception of 'Fractal Geometry' from 1975 but stipulated that objects now considered as fractal prevailed long before that decade. During formulation of the word fractal, Benoit Mandelbrot mentioned, "I coined fractal from the Latin adjective fractus. The corresponding Latin verb frangere means to break to create irregular fragments. It is therefore sensible and how appropriate for our needs!—that, in addition to fragmented, fractus should also mean irregular, both meanings being preserved in fragment."The theory, fractals is an active branch of nonlinear science starting from the 1970s become modern practice in Biometric Cryptography and attempt a new approach to enquiry the self-similarity objects and irregular phenomena. For its suitable applications in many fields particularly in image processing, Fractal has been accepted as a convinced technology in the world of Cryptosystem. Euclidean geometry fails to explain some geometrical structures whereas fractal geometry can interpret with. Fractal theory and its methodology provide people a new view and new idea which potentially be used in Biometric Cryptosystem (Al-Saidi and Said 2009; Alfaris et al. 2008).

Fractal geometry deals with objects in non-integer dimensions, at the same time the classical Euclidean geometry functions with objects which subsist in integer dimensions. Euclidean geometry is a illustration lines, circles, cuboids etc. Fractal geometry, regardless, is outlined in algorithms, a collection of instructions by what means to design a fractal.

Our world so as to appear is made up of objects which occur in integer dimensions, single dimensional points, one-two-three dimensional bodies. However, many things in nature are described better with dimension being part of the way between two whole numbers. While a straight line has a dimension of exactly one, a fractal curve will have a dimension between one and two, depending on how much space it takes up as it curves and twists. The more a fractal fills up a plane, the closer it approaches two dimensions. In the same manner of thinking, a wavy fractal scene will cover a dimension somewhere between two and three. Hence, a fractal landscape which consists of a hill covered with tiny bumps would be closer to two dimensions, while a landscape composed of a rough surface with many average sized hills would be much closer to the third dimension (Al-Saidi et al. 2011; Cavoukian and Stoianov 2011; Dang and Chau 2000).

Fractal Image storing based on image description in concise form of iterated function system is become possible because of Barnsley's Iterated Function Systems (IFS) form on the self-similarity of fractal sets. Barnsley's shows that numerous objects can firmly be estimated by self-similarity objects that can also be developed by the application of IFS transformations and thus the Biometric

Cryptosystem, a class of materealizing technologies, based on Fractal, can securely give birth to a digital key therefore no biometric image or template or digital key can be retrieved from the server.

Development in computer science and communications has been making demand to increase security system for last 20 years. In response to this demand, countywide security systems in computer science and communications have been improved by using modern cryptosystems. Thus the trend of development of Biometric Cryptosystem based on Fractal Image Coding Scheme is increasing and this is how seven major biometric technologies already been established as:

- Fingerprint recognition;
- Hand geometry recognition;
- Facial recognition;
- Iris and retina recognition;
- Voice recognition;
- Keystroke recognition;
- Signature recognition (Dhawan 2011; Das 2011; Gaddam and Lal 2010).

Brief History, Trend of Development of Biometric Cryptography based on Fractal Image Coding Scheme.

As only Biometric features in security aspect became obsolete meanwhile, the quest for a physical identifier that was unique to each individual gained significant ground when British anthropologist, Sir Francis Galton, worked on the principle that fingerprints were permanent throughout life, and that no two people had identical fingerprints. Galton calculated the odds of prints from two people being identical to be 1 in 64 billion and also identified characteristics known as minutiae that are still used today to demonstrate that two impressions made by the same finger match.

Galton's model provided the basis of the first fingerprint file established in 1891 by Juan Vucetich, an Argentine police officer, who became the first to use a bloody fingerprint to prove the identity of a murderer during a criminal investigation. In 1897, Sir Edward Henry, a British police officer serving as Inspector General of the Bengal Police in India, also developed an interest in the use of fingerprints for identifying criminals, even though the Bengal Police was at that time using Bertillonage. Based on Galton's observations, Henry and colleagues established a modified classification system allowing fingerprints captured on paper forms using an ink pad to be classified, filed and referenced for comparison against thousands of others. By 1901, Henry's fingerprinting system had been adopted in the UK by Scotland Yard and its use then spread through most of the world to become a standard method of identity detection and verification in criminal investigations (Jain and Karthik 2012; Jain et al. 2011; Kaur et al. 2010).

In the mid-1960s, the Royal Canadian Mounted Police (RCMP) adopted an automated video tape-based filing system allowing identification officers to make fingerprint comparisons on-screen. A similar 'Videofile System' was installed at New Scotland Yard in 1977. Around the same time, the USA's Federal Bureau of Investigation (FBI) was working with industry to build the first automated fingerprint card reader, which was implemented in 1974. Over the next 5 years, the FBI

and other organizations in Canada, Japan and the UK, developed further core technologies including fingerprint matching hardware, plus automated classification software and hardware. By the early 1980s, this culminated in the automatic fingerprint identification system (AFIS), which allowed the automatic matching of one or many unknown fingerprints against an electronic database of known prints; another major forward step in the world of crime detection and international security. Such systems have since reduced the manual capture, store, search and match processes for fingerprints from weeks and months, to hours and minutes, and have led to AFIS being deployed by law enforcement agencies in Europe and world-wide.

With the advent of computers and digital technology in the 1970s, fingerprinting took on a new dimension. As a result, the UK's fingerprint service now records 120,000 sets of fingerprints each year as volume of records that was simply untenable before computerization. Within a century, biometrics had evolved from tape measure, ink and pad techniques requiring vast manual filing and archiving resources, to an automated biometric digital scanning process using computerized storage, automated search and find/match techniques, plus extensive archiving and access systems with worldwide links. Such technology now provides for the capture and processing of biometrics information and has transformed fingerprinting techniques and procedures (Khan et al. 2007, 2005; Liu and Sun 2010).

But all this biometric process is converting Biometric Encryption process and we hope that all security system will depend on Biometric Encryption System 1 day and that is not so far.

3.2 Progress of Fractal Based Biometric Encription as a Commercial Commodities

The concept of Biometric Encryption (BE) was first introduced in the mid-90s by G. Tomko et al. Biometric Encryption is a process that securely binds a digital key to a biometric or generates a key from the biometric. The Acceptance for biometric airport scans has become very high after Malaysia Airlines disappearance. Many countries in the world now using biometric Encryption process in area such that: Crime and Fraud Prevention, Detection, and Forensics, Attendance Recording, Payment Systems, Access Control, Border Security Control. So all kind of developments, the technological, Research as well as commercial are proceeding in the same fashion.

3.3 How to Installed Fractal Geometry on Biometric Cryptography

The goal of FIC is to be able to store an image as a set of IFS transformation instead of storing individual pixel data. The local iterated function systems are used because we work on a section of the image instead of the whole image.

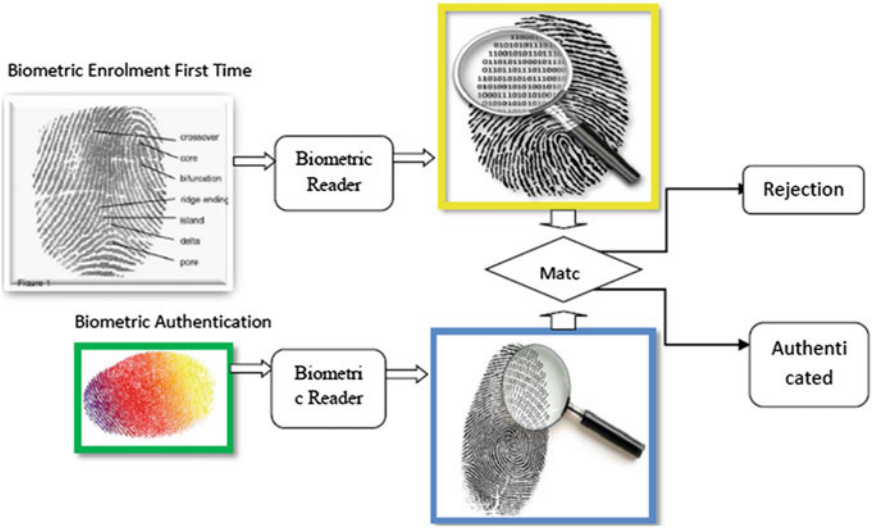

Fig. 3.1 Biometric enrolment and authentication diagram Secret key encryption

Fractal geometry deals with objects in non-integer dimensions, at the same time the classical Euclidean geometry functions with objects which subsist in integer dimensions,. Euclidean geometry is a illustration lines, circles, cuboids etc. Fractal geometry, regardless, is outlined in algorithms', a collection of instructions by what means to design a fractal.

In Fig. 3.1 it shows how Biometric enrolment and authentication system produce Secret key encryption.

3.4 Advantages of Biometric Encryption Over Other Biometric System

Technological Biometric Encryption approaches have extensive prospective to enhance privacy and security. The following are the key merits of this technology:

1. Memorizing of the biometric image or template is not required
2. Different level of identifiers as Multiple, cancellable and revocable
3. Authentication security enhanced much

- No substitution attack
- No tampering
- No masquerade attack
- No Trojan horse attacks
- No overriding Yes/No response

4. Personal data and communications secured more.
5. Public confidence, acceptance, and use are increasing; compliance with privacy laws is greater than before
6. For large-scale applications is very Suitable (Rahman 2010)

3.5 Conclusion

Biometric technologies surely add a modern degree of authentication and identification to applications, but risks and challenges are still here. There have crucial methodological confrontations such as perfection, authenticity, data defense, user consent, cost, and interoperability and overall provocations linked with certifying effective privacy protections. Security vulnerabilities of biometric systems include:

Spoofing; replay attacks; substitution attacks; tampering; masquerade attacks; Trojan horse attacks; and overriding Yes/No response.

Still the important of Identification and authentication are sharply increasing in both the online and offline worlds. Public and private sector entities are demanding to know who they are dealing with. The current security model for the verification of identity, protection of information, and authorization to access premises or services is based on using a token which allows access to information, premises or services. This modern token is a biometric (something you are). In this case, the details of the token is held by a third party whose function is to authorize and at times allow the transaction to proceed if the details of an individual's token match those stored in a database. The biometric is increasingly viewed as the ultimate form of authentication or identification, supplying the third and final element of proof of identity. Besides this Public key systems grounded on IFS transformation execute more actively than RSA cryptosystems in respect to key size and key space. So Biometric Encryption based on fractal iterative function system is very demanding. Accordingly, it is being rolled out in many security applications (Ratha et al. 2001; Shakhnarovich and Moghaddam 2011).

Though Biometrics has recently been awarding attention in popular media, it is extensively concluded that biometrics will be a momentous component of the identification technology as (i) the cost of biometrics sensors start to fall (ii) the root technology becomes more mature, and (iii) the public becomes appreciative of the strengths and limitations of biometrics. And laterally our expectation goes, in applications including Law enforcement, Banking, Security the usage of Biometric encryption will increase.

Unisys (www.Unisys.com) Surveys that Consumers worldwide support biometrics nearly 70 %.The Unisys research also found 66 % of consumers worldwide favored biometrics as the ideal method to combat fraud and identity theft as compared to other methods such as smart cards and tokens. In the future, no one will need pockets (Rathgeb and Uhl 2011; Sabena et al. 2010; Xi 2011).

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Chapter 4
The Incorporation of Fractals into Educational Management and Its Implications for School Management Models

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Abstract This paper intends to demonstrate a certain level of methodological innovation in school management systems. Its main purpose thus is to introduce and apply the fractal theory to urge and catalyze the new thinking of administrative organization method and hope to build up an effective, efficient and appropriate school management model under the guidance of fractals. The paper therefore erodes any fears that usually curtail efforts towards transformation of systems since these fears normally hinge on self-doubt as to whether the proposed ideas are commensurate with the established and accepted realms as well as custodians of knowledge. Paper thus contends that without taking giant strides and risks, educational management and school leadership cannot and will never be improved since the same old systems and weak points will remain in force and get entrenched further. Accordingly therefore, the paper has examined a number of aspects related to changing paradigms in educational management which bring about acute chaos and complexity both in terms of the concept as well as management or leadership structure. The concept of fractals is thus identified as a way forward to achieving transformation of the education management system. However at this level it became imperative to examine the relationship between Fractals, chaos theory, crisis theory, self-organizing systems, disorderly structures and complex adaptive systems. Equally, the place of Fractals in management theory and school leadership

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models was explored and how these obtain in proposed model based on fractal systems alongside the benefits of the proposed model to school management.

Keywords Fractals · Educational management · School management models · Leadership

4.1 Introduction

Without innovation, harmonious society cannot be built up, because many new problems must be solved with new methods. Indeed according to Yan-zhong (2005) it is contended that in the process of social development, various problems will appear, including the ones that have never been encountered before, so there is no choice but for continuous innovation. Along the same line of argument it is claimed that a disharmonious society usually results from unreasonable structure of supporting society, inconsonant social running mode and methods. Therefore, innovative systems and methods must be utilized to make it reasonable and harmonious. The innovation of system and method plays a decisive role in building up a harmonious society (Raye 2012). In order to realize this though, many specific systems, mechanisms, modes and methods are needed to guarantee the harmony of society, such as those related to compulsory education, public health, social security, relief of the poor, social credit, etc.

4.2 Changing Paradigms in Educational Management

Education has undergone a paradigm shift in recent years. Systems that obtain in the education field are no longer the way they were and they should not be indeed given that we are living in changing times. When subjected to educational management and school leadership in particular, the story even gets more intriguing. In fact, Yan-zhong (2005) argued that administration system is a system of complexity and chaos; the insensible disturbed motion in operation process sometimes can give rise to a dramatic fluctuation. If administrative system lacks a proper corresponding mechanism, it must be subject to the harm of systematic deficiency. It is this deficiency that ought to be addressed through new techniques and initiatives in order to achieve transformation of systems for the better.

Saad and Lassila (2004) on their part contend that today's complex, unpredictable and unstable marketplace requires flexible manufacturing systems capable of cost-effective high variety-low volume production in frequently changing product demand and mix. To them, in fractal organizations, system flexibility and responsiveness are achieved by allocating all manufacturing resources into multifunctional cells that are capable of processing a wide variety of products. In their paper

therefore, various fractal cell configuration methods for different system design objectives and constraints are proposed. The authors then conclude that these parameters determine the level of interaction between the cells, the distribution of different product types among the cells and the similarity of cell capabilities.

Meanwhile, Garmston and Bruce (1995) opine that Information from quantum mechanics, chaos theory, fractal geometry, and the new biology can help educators rethink school-improvement approaches. Chaos and order exist simultaneously. Adaptability, the central operating principle of successful organizations, stems from five human energy fields: efficacy, flexibility, craftsmanship, consciousness, and interdependence. To them thus, adaptive schools are complex, nonlinear systems.

Indeed issues like crisis, social, media-related and technological changes in the environment of education are now a visible phenomenon of this generation. But the most interesting aspect is that more than any other, one concept has a bearing on all these challenging issues in the education system; this is fractals. In this paper therefore, as a way of dealing with such unpredictable concepts and challenges in today's education system, more so in management circles, fractals are being tipped as a way forward to transformation of the school management models for proper adaptability that can ultimately inform effective leadership.

It would prove very abstract indeed if the place of fractals in educational management and school leadership is discussed without exploring the concept of fractals first, as a way of raising the curtain especially given that it boasts of an intricate meaning that challenges both nonscientists and scientists alike in the contemporary generation of knowledge.

4.3 Description of Fractals

The word "fractal" often has different connotations for laypeople than mathematicians, where the layperson is more likely to be familiar with fractal art than a mathematical conception. Indeed according to *Wikipedia*, the free encyclopedia, the mathematical concept is difficult to formally define even for mathematicians, but key features can be understood with little mathematical background. And many scholars and researchers alike have endeavored to describe the concept of fractals while steering clear of mathematical and hyper scientific modes and connotations.

Trygestad (1997) citing other prominent works especially Glieck (1987) writes to the effect that a fractal is infinitely complex (http://fractalfoundation.org/resources/). That is, if you observe any part of the fractal you will always find more detail. Each stage tends to have the same form as the original. So the fractal lacks a fully-fledged scale. A small portion of the fractal is just as detailed as the original. The amazing thing about fractals is that the formulae used to generate them are often extremely simple. A simple formula can lead to complex images. These images are sensitive to the initial conditions.

Fryer and Ruis (2004) set the tone for understanding fractals without their mathematical connotations but rather in a simple and comprehendible manner by

classifying them as a concept, system and theory. As a concept therefore, Fryer and Ruis (2004) assert that Fractality is the study of the behavior of macroscopic collections of such units that are endowed with the potential to evolve in time. Simply put, a fractal is a geometric object that is similar to itself on all scales. Mendelson and Blumenthal (2003) argue that if you zoom in on a fractal object it will look similar or exactly like the original shape. However, it is important to note here that, by merely looking at or exploring features already influenced by fractal emerging patterns, we may not be able to realize the original similarity carried by the fractals.

As a system, a fractal system is a complex, non-linear, interactive system which has the ability to adapt to a changing environment. In addition to unpredictable behavior of systems in chaos, they have fractal patterns that symbolize strange attractors (Erçetin 2001). Such systems are characterized by the potential for self-organization, existing in a non-equilibrium environment. This view applies in the same way as far as the Wikipedia, the free encyclopedia is concerned.

Meanwhile as a theory, Fryer and Ruis (2004) argue that Fractal theory is a theory based on relationships, emergence, patterns and iterations. A theory that maintains that the universe is full of systems, weather systems, immune systems, social systems, etc. and that these systems are complex and constantly adapting to their environment. Crucially, Wikipedia, the free encyclopedia shares the same view regarding the description of fractal theory. Examples of phenomena known or anticipated to have fractal features include; Clouds, river networks, fault lines, mountain ranges, craters, lightning bolts, coastlines, Mountain Goat horns, animal coloration patterns, Romanesco broccoli, heart rates, heartbeat, earthquakes, snowflakes, crystals, blood vessels and pulmonary vessels, ocean waves, DNA, various vegetables (cauliflower and broccoli), soil pores, Psychological subjective perception and many others.

Nevertheless, examples of fractal systems cannot be explored within one attempt of a study and in the case of this paper; the identified fractal systems include living organisms, the nervous system, the immune system, the economy, corporations, societies, and education systems. It is important to point out that fractal systems also happen in day to day life situations though normally go unnoticed.

4.4 Properties of Fractal Systems

Fractals are home to a number of characteristics, herein coined as properties that distinguish them from other features. Yan-zhong (2005) while reflecting on the major characteristics of fractal administrative organization pointed out the following:

- Self-similarity. The self-similarity of fractal administrative organization includes self-similarity of administrative organization structure and that of function, i.e. the function of a small fractal unit can be in harmony with that of the large one.

- Iteration. Large amount of fractal geometry examples are the figures produced by mathematical methods, especially by iteration and recursion arithmetic. The symmetry of different scale of fractal self-similarity means the iteration and recursion of pattern: pattern nesting in patterns, subdivision created on more and more detailed scaling, forming infinite delicate structure.
- Self-organization, which is the remarkable character of system internal structure with fractal feature, in different scale, whose structure has the feature of self-similarity and self-copy, appear to be a new structure on macro-scale under open system through systemic cooperation, i.e. external environment only provides some conditions but does not carry out any specific intervention and it is formed by the system itself.
- Dynamic process. Fractal means a series of dynamic processes which reflect the growth and evolution of structure. It portrays not only the still form but also the important evolutional mechanism of dynamics.
- Simple regularization in complexity. Along with economic development, social progress and societal rising hierarchy, people's needs and requirement become more and more complex, this follows that administrative management becomes more and more complex.

Following up from the above analysis, it is imperative to note that Fractal systems have many properties and the other important ones are summarized in the following forms for easy understanding and comprehension; Emergence (neither planned nor controlled), Co-evolution (exist alongside other systems in the environment), Sub-optimal (less perfect but effective), Requisite variety (cannot be in one single setting), Connectivity (interact and connect with one another), Simple rules (though complex, they follow simple rules e.g. water flow), Edge of chaos (close to chaos structure) and Nested systems (each system is a sub-system of another)

4.5 Fractals and Chaos Theory

Fryer and Ruis (2004) base on the intricate nature of fractal properties to claim that Fractal theory is not the same as chaos theory, which is derived from pure mathematics. But they go ahead to opine that chaos does have a place in fractal theory in that systems exist on a spectrum ranging from equilibrium to chaos. A system in equilibrium does not have the internal dynamics to enable it to respond to its environment and will slowly (or quickly) die. A system in chaos ceases to function as a system. The most productive state to be in is at the edge of chaos where there is maximum variety and creativity, leading to new possibilities. Gleick (1987) cited by Trygestad (1997) also conform to the above assertion.

Accordingly, Mendelson and Blumenthal (2003) opine that as fractals continue to emerge, they edge closer to chaos and cause some elements of instability in the organism or in this case organization. Once detected, they may inform the

organization on what patterns are required for transformation or improvement of the system. Since they have the potential to evolve in time, Fryer and Ruis (2004) contend that fractals can easily and steadily drag the system to the edge of chaos.

4.6 Fractals and Crisis Theory

Topper and Lagadec (2013) observe that Fractal crisis theory teaches us that crises happen on all scales and that the built-in invariants imply that leaders and decision makers will be impacted by effects just as those who are closer to the situation area. That is to say, taking the decision power away from those closest to the ground, best able to evaluate their needs, and giving it to people far from ground level and supposedly less impacted by the crisis is a fallacy.

In keeping with Topper and Lagadec (2013) thus, what is at play here is the conflict between the way decisions circulate and the way information flows. And this has been a challenge in the education system for so long now. That is why a full top-down or a full bottom-up approach cannot work. It all happens exactly as for a fractal pattern: every time you switch to a different scale, you have the sensation of seeing the same thing, but in reality the resolution has changed and what looks the same is in fact different.

The blur effect created by sense-making invariance forbids someone on one step of the decision ladder to communicate freely with someone on another step. As fractals teach us, the information flowing, at any scale, that is to say going up or down the ladder, gets distorted.

4.7 Fractals and Self-Organizing Systems

To Fryer and Ruis (2004) there is no hierarchy of command and control in a fractal system. There is no planning or managing, but there is a constant re-organizing to find the best fit with the environment. A classic example is that if one were to take any western town and add up all the food in the shops and divide by the number of people in the town there will be near enough two weeks supply of food, but there is no food plan, food manager or any other formal controlling process.

The system is continually self-organizing through the process of emergence and feedback. Indeed Fractal systems are characterized by the potential for self-organization, existing in a non-equilibrium environment. Most importantly though is the fact that we may not be able to detect the state of non-equilibrium but the fractals can do on their own. Since most organizations, schools inclusive, fall prey to dictates of circumstances, fractals may be the way forward in order to restructure the management systems so that the schools can adopt and adapt to self-organizing ability.

4.8 Fractals and Disordered Structures

Again Fryer and Ruis (2004) claim that Fractal systems appear to be disorderly, even random. But they are not. Beneath the seemingly random behaviour is a sense of order and pattern. Truly random systems are not chaotic. The orderly systems predicted by classical physics are the exceptions.

Sometimes systems may appear disorganized but actually they are organized indeed. The example of an office seemingly disorganized may suffice here in that the owner understands the way things are positioned that way; if you try to put them in order, he may not be able to know where something is. This implies that there is order in disorderliness.

Fractal systems depict a disorganized form when many sub-systems seem to emerge and confuse the structure or organizational set-up (especially as the emerging patterns are always small in size). But when looked at critically you find that a lot of organized structures and sequences are actually housed in the fractal systems and these can be used to better the processes within the organization (especially coordination and interaction). This behavior exhibited by Fractals is also supported by the views of Gleick (1987) largely cited by Trygestad (1997).

Fractals and disordered systems have recently become the focus of intense interest in research and thus many books and other related works are being directed towards this subject (Bunde and Havlin 2012).

4.9 Fractals and Complex Adaptive Systems

Oswaldo et al. (2010) assert that one of the most important properties of systems is complexity. In a simple way, we can define the complexity of a system in terms of the number of elements that it contains the nature and number of interrelations and the number of levels of embeddedness. The theory of complexity emphasizes that the relationships in the complex systems such as organizations are not linear, and have a structure revealing unexpected results and arising choices in which the events cannot be predicted (Erçetin et al. 2013). When a high level of complexity exists in a system, it is considered a complex system. It should be noted however that complex systems can be soft systems and hard systems.

Issuing from the above premise, some people draw a distinction between complex adaptive systems and complex evolving systems. Where the former continuously adapt to the changes around them but do not learn from the process. And where the latter learn and evolve from each change enabling them to influence their environment, better predict likely changes in the future, and prepare for them accordingly.

Fractal systems are as well adaptive as evolving which defines them more as complex adaptive systems.

Meanwhile, Shoham (2005) conducted a study whose analysis relied on five criteria based on the functioning of the complex system and included

synchronization of the goals of each employee as a fractal with the system as a whole, the ability to cope with the environment, decentralization of resources, work processes and knowledge transfer, and self-development of each fractal. It is important to note at this level therefore, that if these criteria are the way to go in order to promote proper planning and functioning of a complex system like a school, then the old management models cannot survive the contemporary tests of time and thus call for a review and transformation.

The conclusion of their study is that organizations that possess the characteristics of a complex adaptive system will achieve proven knowledge management capabilities, while improving the processes of knowledge performance and integration between employees. To them therefore, these organizations will be better able to respond correctly and quickly to dynamic changes in the environment.

Indeed even Mendelson and Blumenthal (2003) write that most systems are nested within other systems and many systems are systems of smaller systems. They continue that, complexity can occur in natural and man-made systems, as well as in social structures and human beings. Complex dynamical systems may be very large or very small, and in some complex systems, large and small components live cooperatively. A complex system is neither completely deterministic nor completely random and it exhibits both characteristics.

In a bid to make the case more clear, one of the appropriate examples in this case offered by Mendelson and Blumenthal (2003) reflects a classroom. The classroom is itself a system with its teachers, learners, teaching materials, and relationships. It also belongs to the school system and the larger education system of that country. It belongs to the social system and probably many more. Therefore it is part of many different systems most of which are themselves part of other systems. Each level seeks to adopt and adapt to the expectations and dictates of the other preferably larger system. Indeed a Fractal system has the ability to adapt to a changing environment of educational management and administration.

4.10 Fractals and Management Theory

Management in business and organizations means to coordinate the efforts of people to accomplish goals and objectives using available resources efficiently and effectively (Wikipedia, the free encyclopedia). But as well-known too, Management comprises planning, organizing, staffing, leading or directing, and controlling an organization or initiative to accomplish a goal. Resourcing encompasses the deployment and manipulation of human resources, financial resources, technological resources, and natural resources.

But today's management poses a rather more critical challenge since it obtains within organizations which can be viewed as systems, management reflects human action as a catalyst that facilitates the production of useful outcomes from a system. In this case therefore, management requires self-management as a prerequisite to attempting to manage others.

4.11 Fractals and Administrative Organization

For the concept of fractal management administrative organization, at the moment, there is no academic material to rely on. As an opinion though, Raye (2012) claims that fractal administrative organization refers to a kind of fashion of administrative organization; that administrative system has:

- Fractal self-similarity on administrative organization framework setup,
- Administrative organization constitution design,
- Administrative organization operation and
- Administrative organization function

Meanwhile Yan-zhong (2005) opines that Fractal theory should have a broad application prospect in the future in administrative field, because self-similarity and fractional dimension can be discovered in administrative organization system, thereby, the application of fractal theory can be expanded in administrative management. The author also continues that nowadays, the non-linear, changeable, virtual resource function such as knowledge, database etc. will become more and more important, on the other hand, team cooperation replacing management control will become the fundamental guarantee of effective operation for administrative organization.

Based on his view therefore, the old system and models of management which feature superiority and inferiority within power ranks will cease to exist or hold any value in contemporary educational management systems since cooperation and sharing or exchange of ideas between all stakeholders has taken over as driving forces in Management.

Yan-zhong (2005) indeed puts forward the concept of fractal administrative organization herein so as to distinguish it from traditional pyramid bureaucracy or linear section system and the so-called flat organization of knowledge economy age, according to fractal theory. He opines that administrative fractal organization is the way to go in today's challenging leadership world.

Similarly, in her seminal book entitled 'Leadership and the New Science', Margaret Wheatley as cited by Raye (2012) introduced the concept of the fractal organization in the following words:

> The very best organizations have a fractal quality to them. There is a consistency and predictability to the quality of behavior. Fractal organizations, though they may never have heard the word fractal, have learned to trust in natural organizing phenomena. (Wheatley 1994, 132 cited by Raye 2012).

A fractal administrative system thus consists of a number of comparatively independent administrative organization units which are called "fractal units", large fractal units can contain a number of small fractal units, and small fractal units can contain a number of even smaller fractal units, ratiocinate and extend in such a way. Using the principle of self-similarity therefore, the same aims, goals and purpose as well as approach or methodology can be maintained within the emerging smaller fractal units.

So as a matter of fact, when humans are open with perspectives and engaged with participation in collective creative efforts, we naturally thrive and create best outcomes together. The emergent collective behavior has pattern integrity, which generates trust both internally with members and externally with the public. All of the information necessary for making good decisions is available and flowing throughout the organization's structure, which ensures better use of resources and greater success.

It is being claimed here that education systems all over the world and school management systems everywhere should and must borrow a leaf or indeed take the lead in transforming organizational structure and performance. This can only be realized through adopting a more complex and effective approach to their management designs or structures and indeed nothing will prove more worthy in this case than fractal systems.

4.12 Fractals and Leadership Systems

The free encyclopedia, Wikipedia defines Leadership as "a process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task". Although Leadership is reflected within a number of myths; where it is considered as innate, possessing power over others, being positively influential, controlling group outcomes, having a group (s) following and most importantly housing group members who resist leaders, one key aspect of leadership is innovation. Leadership thus lives and dies with innovation.

Nonakaa et al. (2013) ask a fundamental question; how can a company become sustainably innovative? In keeping with this kind of question and borrowing a leaf from Sandkuhl and Kirikova (2011), whose study focused on fractal organizations and business, it is imperative to consider the following questions to investigate the relationship between fractals and leadership:

- Does it make sense to apply fractal organization when analyzing educational leadership models?
- What are the potential benefits and limitations of doing this?

As a way out of this rather complex jig-saw born of intricate questions, Mrówka and Mikołaj (2011) offer a critical view when they assert that organizational structures of global organizations are evolving into more network- in-nature, virtual, fractal-in-nature. They go ahead to argue that new types of organization will be undergoing a change in the definition of hierarchy, which will divert into heterarchical and hyperarchical structures. The duo's paper outlays an analysis of leadership dispersion in global organizations using new types of organizational structures. In such organizations, Mrówka and Mikołaj (2011) claim that demand for leadership is inclining.

Notwithstanding, leadership should be considered as a combination of multiple approaches and attitudes. Leadership should be associated with many people

scattered all over the world and carrying out their day-to-day tasks and duties. Authors of this paper focus their attention on a thesis that there will be a growing demand for lower levels of leadership. But to get to this level though, there must be a model of management or leadership to direct and guide execution of leadership roles.

Accordingly therefore, understanding fractals has significant implications for how you and your organization describe and create leadership and the structure underpinning it. That is why Fryer and Ruis (2004) insist that if you and your organization are still looking a triangle, thinking it's a good analogy of a mountain, then you're behind the times, and will be left behind like a dinosaur. It is time to move on and keep up with the leading edge of understanding. Successful organizations in the modern information era will acknowledge this shift in paradigm brought about by fractals and instigate a mass evolution in its collective psyche in order to flourish. Fractal leadership models are indeed very conceptual, very creative and very pragmatic.

In keeping with the above view, Raye (2012) actually notes that Fractal Organizations have flat hierarchies and distribute responsibility and accountability throughout the organization. A few examples of Organizations with Fractal Models as discussed by Raye (2012) and equally highlighted by Fryer and Ruis (2004) are in the Fortune 500 (such as Nucor and SAIC) as well as the Fortune 100 Best Places to Work (such as Zappos.com and W. L. Gore). These companies are open systems where employees' feedback information to central leadership, enabling continual adaptation to changing conditions.

4.13 Benefits of Fractals to Leadership

Studies of leadership have produced theories involving traits, situational interaction, function, behavior, power, vision and values, charisma, and intelligence, among others. This implies that the ingredients of leadership are many and thus the qualities of leadership equally enormous.

Similarly, the qualities of a fractal organization are indeed unlimited no matter the perspective from which they are evaluated. To Raye (2012) for example, they include shared purpose and values that create pattern integrity; universal participation in ideas and solutions for continuous improvement; decision making at functional levels; leadership devoted to employee development as a source of intellectual capital; and competition energy directed outward instead of inward.

Meanwhile on his part, Yan-zhong (2005) contends that in fractal organizations, resource allocation is based on desired outcomes and information is shared efficiently through daily interactions and regular conversations, which generate ideas and enable economic development and delivery of products and services. He further argues that relationship development enables the effective flow of information between individuals and among teams. At all scales of a fractal organization,

members share information iteratively and make decisions collectively in response to changing conditions.

Whereas Li examined business oriented structures in economic systems, not far away from the same analysis, it is a fact that educational management and schools in particular are close to a factory or industry with input, processes and output issues to deal with. Topper and Lagadec (2013) also opine that the power of the fractal approach is that it allows you to get rid of a linear and stable vision of the world, an approach inconsistent with the field of crisis. And rightly so put by Topper and Lagadec, these crisis fields are eating up the education system especially in the realm of leadership. Fractal theory indeed opens up the possibility of envisioning and navigating multiple, unsettled domains, multiple layers and dynamics within a system.

Even beyond Mandelbrot's (1983) own work, it is possible to claim that the crucial advance offered by fractal theory is the possibility to envision, capture and handle very unstable, blurred and hyper-complex states of the world. This is what the contemporary field of school management and leadership needs and not sooner or later but now indeed. However a clear and outlined view of the relevance of fractal organizations and systems presented by Topper and Lagadec (2013) reveals that:

- They will live by values, not regulations
- They promote understanding not subordination
- They bring about inspiration, not exploitation
- They empower members to function independently
- They reduce dependency on managerial overhead
- They bring a common sense of purpose and ownership of responsibility amongst all staff
- They reduce turnover because personal growth is encouraged
- They reduce Health care costs since there is no stress
- They allow a wise use of resources due to sense of ownership

A closer examination of the relevancies of fractals above points to one major aspect indeed: the old school management models are archaic and outdated and thus cannot help sustain development and progress in the school system in particular or educational management in general. It calls for efforts to rethink, review, redesign, rebuild and reconstruct the school management system which only gets better with an innovative school management model based on Fractals.

4.14 Proposing a Model of School Management Based on Fractal Systems

4.14.1 Justification

The need for this new school management model stems from the analysis of existing inconsistencies at school level regarding key management and leadership decisions. According to various studies (Raye 2012; Yan-zhong 2005), the

inconsistencies are generated by an incorrect delimitation or even the absence of well distributed responsibilities absolutely necessary for effective decision making process, and not only, this model, developed as a support tool for educational decision making is founded on a fractal philosophy.

Raye (2012) asserts that to change the perspective of limited room at the top and vanquish the personal agenda, a new structure is needed to replace the top-down model; different types of organizations will display a variety of organizational structures. Many organizations already have flattened their hierarchies in an effort to deal with systemic issues, and sometimes this effort is good enough. In a hospitality company, for example, fewer layers of management are necessary as most of the work is functional and customer-oriented. To further diminish the tendency toward internal competition, forward-thinking organizations may adopt an "in-out" pattern instead of top-down.

Yan-zhong (2005) also joins in by opining that, it is a must to treat the diversity and materiality of administrative organization system as complex issues. Therefore, administrative organization should design a system of precise, concrete, perfect, inter-supporting and interpenetrating arrangement and structure; design a systemic content of different type, different content, corresponding and coordinating to specify the administrative organization action of sufficient diversity and complexity in different hierarchy. The view put across by Li (2005) is that these systems, such as defining "responsibility" rule for fractal unit (including working staff or administrative organs) in dividing work; defining the rule what the fractal unit can do and cannot do; in regards to penalty and incentive mechanism; in regard to rule for authority, responsibility, plan and funds etc.

Issuing from the above premise therefore, the whole administrative institution has a good self-similarity and self-organization from superior to subordinate hierarchy and from subordinate to superior hierarchy, and takes on fractal structure. The administrative organization can do well in the innovation of organizational system and optimization of different hierarchy.

Furthermore, each concrete arrangement in the system also assumes hierarchy and structure of preciseness and interpenetration. For example, funds system, large fractal unit (the whole administrative organization) sets up a series of principal conditions under the guidance of principle; small fractal units (various departments, units or undertaking departments in an administrative organization) will make feasible measures according to fund principle and own concrete condition of units.

In fact according to Raye (2012) and supported by Yan-zhong (2005) an administrative organization has not only formal system arrangement, but also informal system supervision, including concept of value, ethic, morality, ideology etc. Informal system supervision, which is expansion, subdivision and restriction to formal system arrangement, reduces the cost for balance and implementation so as to realize the formal system arrangement supervision. Same as formal system arrangement, informal system also assumes structural fractal, whose structural arrangement exists between various hierarchies inside administrative organization, and takes on self-similarity between their hierarchies.

It is important to recall however that this informal system does not offer specific terms as that of formal system, so fractal design appears to be especially important. Administrative organization system, as fractal body, performs fractal with complex operation (process). Herghiligiu et al. (2013) are quick to remind us that in the administrative organization system, there not only exists structural fractal reflecting systemic design arrangement, but also exists perfect and effective system implementation mechanism, without implementation mechanism, any mechanism will be nothing but an empty shell.

The implementation of system arrangement runs through multiple hierarchies and a non-linear dynamic process, whose content displays concrete operation and implementation of system structure in different hierarchies and parts of administrative organization. System implementation mechanism is the fundamental guarantee for running of administrative organization, the process of system implementation is the operational process of this system.

It is imperative to point out that most of the proposals for incorporation of fractals are reflected in business settings and general administrative organizations and not in schools or educational management for that matter. As part of extending fractal influence and opening up within education management and school leadership therefore, a new and innovative model is being proposed for transformation of the system based on fractals.

4.14.2 The Particular Models in Question

A Management model is simply the set of choices made by executives about how the work of management gets done about how they define objectives, motivate effort, coordinate activities, and allocate resources. The flow of activities and the individuals charged with this flow is a critical aspect in management indeed.

This also determines the structure in which such operations and processes are executed in the organization. Regarding schools though, management structures define the levels of responsibility and accountability as well as the flow of power and authority in the school system.

Credaro (2006) postulates that management structures in educational institutions are organized on many levels, from the individual classroom under the management of a single teacher, to groups of classrooms supervised by a Head Teacher or Executive Teacher, to a whole-school structure, under the guidance of the principal. Independent or private schools generally report to a School Board.

There are two school management models presented in this paper, these are:

- The top-down school management model
- The count-down school management model

The two models are represented in the Fig. 4.1 below:

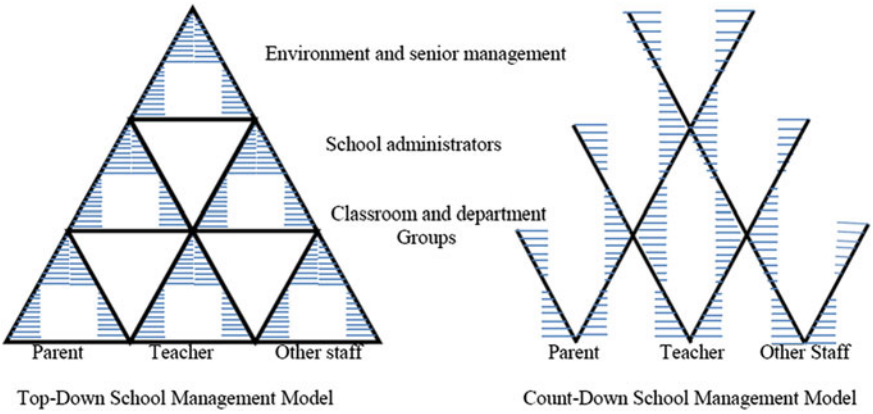

Fig. 4.1 Comparative view of two distinct school management models

4.14.3 The Top-Down School Management Model

In management and organizational arenas, the term "top-down" is used to indicate how decisions are made and executed. The power, authority and orders normally trickle down the system coming from the top of the hierarchy. And all actions taken within the system must go through the vetting system of the ones who hold power in the organization. Schools being key social systems and organizations thus, fall prey to the same description.

A "top-down" approach according to Wikipedia, the free encyclopedia, is one where an executive, decision maker, or other person or body makes a decision. This approach is disseminated under their authority to lower levels in the hierarchy, who are, to a greater or lesser extent, bound by them. For example, a structure in which decisions either are approved by a manager, or approved by his or her authorized representatives based on the manager's prior guidelines, is top-down management.

The model is based on one of the Pythagorean forms; the pyramid as reflected in the Fig. 4.2:

- In the model represented by Fig. 4.3 there is a certain and clear structure of power and authority in the school management system.
- Also, parents, teachers and other employees are at the foot of the structure and thus having to respond to the school administrators and senior management of the school
- Accountability lies with the top administration of the school
- Decision making is largely vested with the top administrators
- All decisions taken at lower levels have to be vetted by top administration
- The number of those with authority in the school is largely limited as represented by the narrowness of the pyramid at the higher levels

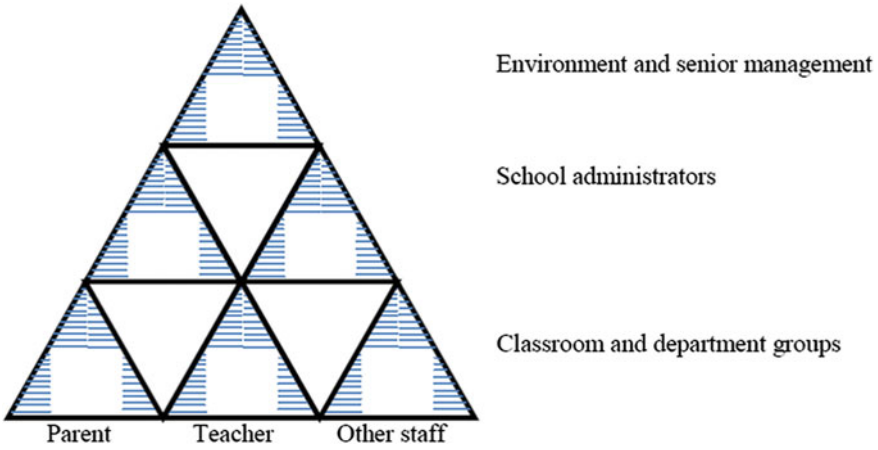

Fig. 4.2 The top-down school management model (conventional model of the pyramid)

- Those with less or no authority and power in the school is high as represented by the wideness of the pyramid at the lower levels

It is however important to note that this kind of model is now outdated as it curtails creativity and transformation in the school system for betterment.

Indeed Raye (2012) opines that top-down hierarchies are typically characterized by command-and-control systems of authority that create harmful stress and internal competition for advancement within organizations. The pervading perception is of "limited room at the top," where positions of authority become scarce resources. Accordingly therefore, in this kind of model or system, members withhold or hoard information by focusing competition energy internally rather than externally, creating silos of information and causing the negative stress reflected in absenteeism and higher healthcare costs. Voluntary turnover creates brain drain as creative individuals tire of internal politics and seek more harmonious work environments.

In fact it is important to recall at this level that according to Mandelbrot (1983), the triangular shapes of top-down hierarchies are non-random and limited, which may explain why top-down organizations typically grow through acquisitions rather than by expanding from within.

Management in the 21st century therefore has accordingly taken a new orientation. It is increasingly founded on the ability to cope with constant change and not stability in the system per se since stability is unpredictable and hard to guarantee at any moment in time, management is also organized around networks and not hierarchies, it is equally built on shifting partnerships and alliances and not self-sufficiency, and constructed on technological advantage and not bricks and mortar (Carnall 2003 cited by Jamali 2004:104). Moreover it is also important to note that new organizations (to which educational institutions ascribe) are networks of intricately woven webs that are based on virtual integration rather than vertical

integration, interdependence rather than independence, and mass customization rather than mass production (Greenwald 2001 cited by Jamali 2004:104).

4.14.4 The Count-Down School Management Model

The second model is influenced by Fractal systems. In the construction of administrative organization, the fractal of organ setup, the fractal of institutional components and their running, the fractal of functional direction, all of them will establish logic premises and valid preconditions for fractal theory penetrating the discipline of administrative organization as well as upcoming application of the theory to governance (Raye 2012). What is being proposed in this paper though is "a school management model based on fractals". In some way or other, differentiating traditional pyramided bureaucracy or linear mechanism and so-called flat organization in knowledge economy, this kind of nonlinear organizational fashion is provided with the property of self-similarity, iteration, self-organizing, dynamic process, simple regularity in complexity, etc.

The second model thus is reflected in the Fig. 4.3:

In the fractal based school management model in Fig. 4.3 therefore;

- The normal pyramid structure is extended i.e. more fractal pyramids emerge and evolve
- There are many pyramids within the model but signifying different aspects of leadership
- There are no linear settings in the school management or leadership model and thus outer definitive lines are excluded from the model in particular (Leadership cannot easily be limited in terms of spectrum)
- The hierarchies of power are distributed throughout the model and in different directions

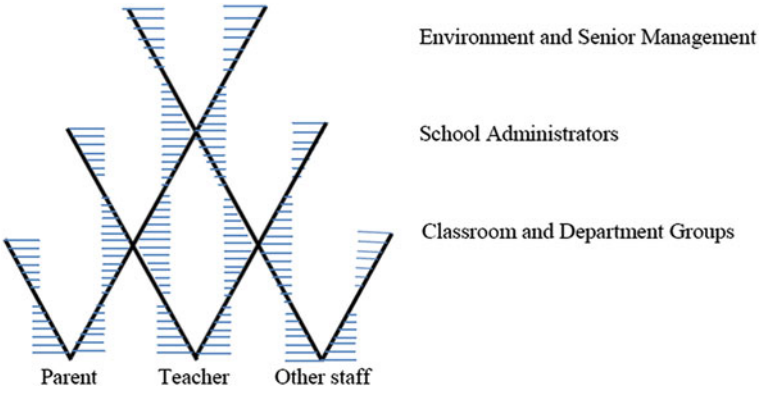

Fig. 4.3 The Count-down school management model (fractal based management model)

- In order for central or core leaders to make big-picture decisions, they obtain information about what is happening at the edges of their organization.
- School administrators respond to parents, teachers and other employees
- There are a lot of inter-relationships in the school management system as the pyramids seem to cross over to different directions
- There is no one at the foot of the model (what matters is direction and position of individuals)
- Authority, power and decision making lies everywhere in the system and the only noticeable difference being the amount and impact of the power one possesses
- School administrators are a moderating variable in management affairs between the environment alongside senior management and the parents, teachers as well as other employees. According to Max Depree, '*The first responsibility of a leader is to define reality, the last is to say thank you; in between the leader is a servant*' (Forbes magazine)
- System management moves either side or direction of the management spectrum i.e. no specific lower level or higher level as in conventional structures
- Power is born out of many centers and flows anywhere
- Ideas of school management can trickle in from various angles
- There is no monotony of doing work and executing processes in the school system

Given advances in knowledge and science, this kind of model is the way to go as it allows flexibility and calls for emergence of transformation drives in the school management system.

Important to note about Fractal leadership models is that:

- There are no top down hierarchies
- There is no scale of power since even a smaller spectrum of power or authority has a similar impact on the system
- Everyone has a level of authority to preside over
- Everyone is equally responsible to the organization
- Everyone is equally accountable to the organization
- Work is distributed equally
- All levels have a desirable number of members
- Everyone reports to another
- There is no over-dependency syndrome
- Everyone acts and reacts upon another
- Self-supervision or peer supervision is highly promoted

Generally therefore, as claimed by Raye (2012), in top-down hierarchies, systemic issues such as internal competition, unwanted turnover, and unhealthy workers are commonplace, whereas fractal organizations are distinguished by happy, healthy employees because of their emphasis on positive information flows and relationship structures that create best outcomes. In keeping with Raye's view,

we realize that these are often the organizations voted "Best Places to Work," as their members share a purpose and core values that unite their efforts and create the pattern of integrity or self-similarity that characterizes a fractal organization.

Raye also contends that the members in such organizations always feel appreciated for their efforts and supported by their workplace family, which boosts health naturally (the old adage goes that 'a happy heart is a healthy heart')

It is therefore being argued that the school management model proposed can go a long way in changing the status-quo and transforming not only school management but the education system as a whole. Dwelling on the viewpoint of Herghiligiu et al. (2013) on the conceptual framework for the environmental decision making, it is hereby opined that the most important benefits of the proposed school management model built on the principles of fractal philosophy are:

- School management decisions can be generated based on a series of aspects relevant for this process and involving all stake holders
- Information redundancy concerning school management data can be eliminated
- The storage space and costs necessary for school management data, information and reports is reduced since everyone is virtually information in a way and at the same time has information about the school
- The analysis and coding process of school management data is simplified
- The response time for the management decision diminishes
- The number of connections established during the management decision process is reduced
- School management decision methodologies can be developed with a particular character in order to streamline the process

For this to work though, there must be a fundamental change to which Garmston and Wellman (1995) claim that shifting decision making authority to the people most influenced by the decision is the way to go since Schools, like weather systems, are nonlinear systems that change radically with the unfolding and refolding of feedback into themselves.

To them this is based on 5 states; efficacy, flexibility, craftsmanship, consciousness and interdependence, while to Raye (2012) other critical states such as; frontline members, centered power systems, Interconnection, democracy and collective decisions are profound. Sandkuhl and Kirikova (2011) meanwhile highlight the following states; flexibility, robustness and easy adaptation. We must thus seek patterns of order beneath the surface chaos and search for structures and patterns of interaction that can transform systems.

In the paper therefore, the major focus was on educational management and specifically school management where in an innovative model premised on fractals was proposed and justified. There is no gain saying therefore, that with such innovation being adopted in the school systems, management and leadership would go a long in realizing the expected transformation deemed worthwhile in the contemporary educational and global movements.

4.15 Conclusions and Recommendations

In the near future educational management and administration should expect, just like economics, to introduce mathematic models and symbolic analysis to get rid of the fault of obscurity and coarseness so as to help in development and maturity because as put and argued by Yan-zhong (2005), it is imperative to go further into discussion and research of public service and governance for deep-going and sustainable societal harmony. There is nowhere more critical in trying to achieve this than the school system. This thus goes without saying that incorporating fractals into the process of developing school management (leadership) models is long overdue. The proposed model is thus a ground breaking move in the right direction.

Topper and Lagadec (2013) also contend that a lot remains to be done to test the feasibility of the fractal approach, to assess what it can bring to the field, and last but not least, to detect the limitations of this line of thought. They also lay claim that we are only at the beginning of the intellectual brainstorming required by the age of mega crises. On the research agenda, therefore, as a consequence of the paper in question, it is being modestly pleaded that research projects, case studies, training methods, operational guidelines, theoretical lines of thought, seminars and workshops be launched to shed some additional light and to promote innovative knowledge in the field of emerging educational and school management crises.

We should not fear nor despair by holding back and giving into self-disbelief. We should believe that in the event of school management crisis we can reconceive the system by designing models that are transformation laden and relevant for the contemporary times. After all, it is known that tackling the unknown is the very object of research and theory. The proposed model in the study is thus deemed ground breaking indeed.

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Chapter 5
Cleopatra's Nose and Complex International Politics

Dylan Kissane

Abstract This chapter outlines what a theory of international politics founded on this assumption of complexity would involve. It begins by discussing the attributes and properties of a complex political system, with particular attention paid to the actors, their interrelationships and how one theorises what, for Waltz and others, which has always appeared impossible. It continues by applying this proposed theory to three key cases that have been denied consistent explanation by realist theorists in international relations. These three cases, namely the outbreak of World War One, the political integration of the European continent and the post-Cold War security landscape in Europe, demonstrate the utility of a complex approach in cases where realist theory has significant difficulty in explaining fully the catalysts and circumstances of international political evolution. The discussion that follows the presentation of these three cases highlights the efficacy of the complex approach while also admitting to the important problems that the approach also engenders for the theorist, particularly in relation to medium-term and long-term prediction. Though real and valid criticisms of the proposed paradigm are prevalent, it will be argued that they are insufficient to invalidate the approach as a whole, particularly when the long realist record of prediction is so woeful. In concluding the chapter it will be argued that the complex approach proposed offers the theorists real advances over predominant realist theories and that theoretical transition and paradigmatic shift is not only possible, but necessary.

Keywords Complexity · International relations theory · Realism · Structural realism · Neorealism · Anarchy · Chaos

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5.1 Introduction

> Le nez de Cléopâtre, s'il eût été plus court, toute la face de la terre aurait changé.
> Blaise Pascal

Lorenz (1963) first described what would later become popularly known as 'the butterfly effect' in a short article in the *Journal of Atmospheric Sciences* nearly fifty years ago. His explanation of sensitive dependence to initial conditions and his suggestion that, in deterministic nonperiodic systems, precise long term forecasting was impossible were ground breaking in studies of the weather and were quickly applied, in congruent or analogical form, to fields as diverse as biology, physics and, indeed, international politics (Skinner et al. 1992; Stöckmann 1999; Kissane 2006). Yet the notion that very small events could have very significant implications is nothing new; indeed, folklore holds that something as simple as a single horseshoe nail could be enough to see a kingdom fall to a rival in battle (Gleick 1987). In the realm of the historical, Pascal's famous suggestion that, had Cleopatra's nose been shorter, the face of the world would have changed draws on similar inspiration, if supported more with philosophical flourish than Lorenzian differential equations. One of the central theorists in the discipline of international politics, Morgenthau (1970), sympathised with Pascal's proposition, yet demanded to know how such thing might be systematised and integrated into a theory of politics. Lacking an answer, Morgenthau's theoretical ambitions were dampened, according to Waltz (1988), who himself would go on to argue that it was not the role of theory "to explain the accidental or account for unexpected events".

Yet if such events are essential parts of a wider, wholly complex system, then to exclude them from a theory will render that same theory unreliable. The very theories that Morgenthau and Waltz put forward, respectively realism and structural realism, have proved themselves unable to predict either the very small that they would reject as impossible to systematize or the very large, such as the collapse of a superpower, which had been described in terms that would make it beyond unlikely just a few years before it would become a reality. Waltz (1979), famously, argued in his canonical structural realist book *Theory of International Politics* that "few states die", citing the Soviet Union as an example of an entity likely to last at least 100 years; the USSR would fall little more than a decade later. The realists who would diverge from Morgenthau and Waltz, among them John Mearsheimer, Fareed Zakaria and Stephen Walt, fared little better in explaining and predicting the international system. Mearsheimer's oft-cited article on Europe's likely post-Cold War geopolitical landscape, 'Back to the Future: Instability in Europe after the Cold War' (1990), rests as an example of fundamentally flawed strategic analysis from an offensive realist perspective. Zakaria's neoclassical realist approach "returns repeatedly to a core claim of democratic peace theory", an approach that is far from realist, far from rigorously theoretical and problematic in its implications (Legro and Moravcsik 1999). Even realists who found their work on the more rigorous and fundamentally realist game theory of the prisoners dilemma find that the anarchy they describe does not match the realist world they seek to describe, this is clearly

evidenced by clear moves among proponents to adjust games to reflect the emergent cooperation so often encountered.

All these different realist approaches fail in similar ways to explain international relations. What explains realism's predicative failures? What accounts for the problems that realists encounter in explaining international politics in anything other than the short-term? And why have adjustments to fundamental realist assumptions failed to overcome these problems, even when such adjustments render the realist approach, at least in the eyes of some (Legro and Moravcsik 1999), not even realist at all? This chapter argues that the fundamental reason that realists cannot consistently explain or predict international relations is because they make an incorrect assumption about the nature of the international system. It is not, as is claimed by every realist and, indeed, many liberalists and constructivists, too, anarchic. Instead, the international system is essentially and profoundly complex. This complex international system has qualities that are significantly different to those systemic qualities assumed by realists to exist in anarchy. It is a system, for example, where assessments of state actors alone are insufficient to explain and predict the international politic. Indeed, it is a system where broadening the realm of theoretically significant actors to include international institutions, security alliances and even non-governmental organisations is still too narrow to account for the change—evolutionary or revolutionary—in the system and amongst the actors. Instead it is a system with properties that demand the theorist to consider all elements of the international environment including those that seem so small as to be impossible to operationalize. The assertion of a complex international system such as this, then, demands an attention to political detail that Blaise Pascal might have endorsed, systematising both the details and the broad strokes to deliver an analysis that better describes, explains and predicts what is encountered in the international system.

This chapter outlines what a theory of international politics founded on this assumption of complexity would involve. It begins by discussing the attributes and properties of a complex political system, with particular attention paid to the actors, their interrelationships and how one theorises what, for Waltz and others, which has always appeared impossible. It continues by applying this proposed theory to three key cases that have denied consistent explanation by realist theorists in international relations. These three cases, namely the outbreak of World War One, the political integration of the European continent and the post-Cold War security landscape in Europe, demonstrate the utility of a complex approach in cases where realist theory has significant difficulty in explaining fully the catalysts and circumstances of international political evolution. The discussion that follows the presentation of these three cases highlights the efficacy of the complex approach while also admitting to the important problems that the approach also engenders for the theorist, particularly in relation to medium-term and long-term prediction. Though real and valid criticisms of the proposed paradigm, it will be argued that they are insufficient to invalidate the approach as a whole, particularly when the long realist record of prediction is so woeful. In concluding the chapter it will be argued that the complex approach proposed offers the theorists real advances over predominant

realist theories and that theoretical transition and paradigmatic shift is not only possible, but necessary.

5.2 A Complex International System

In a 2003 interview Waltz argued that the first step in theorising international politics was to define the zone of study, that is, the system under investigation. The difficulty in doing this for the international political system is that politics is, almost by definition, a sprawling landscape. As Waltz (2003) puts it:

> International politics is something that's influenced by everything else – a national economy, national politics, international politics – and it's all interrelated, there's no way of separating it. So the first requirement was to develop an idea of the structure of international politics, which would make it possible to think of international politics as a subject matter that could be studied in its own right.

Waltz alludes to this complexity but, in seeking theoretical parsimony, aligns his structural realist approach with existing paradigms of international relations that saw the international system as simply anarchic. Indeed, while admitting to the complexity of the system, Waltz chooses to ignore most of it and instead develops a theory based on state actors under anarchy. Influential as it has been—and Mearsheimer (2006) claims that since publishing *Theory of International Politics* almost every theorist in the field has been either agreeing with or responding to Waltz—it is clearly a denial of the complexity that even the strictest of realists knows that it exists in the international system. Thus, while Waltz is correct to assert that the first step in theorising international politics is to develop a notion of its structure, his understanding of the structure and assertion of an anarchic world system is wrong.

Instead of anarchy which, classically, implies a lack of overarching authority for actors in the international system, the international system must be thought of as complex. But what is complexity and what does one mean when a system is described as complex or complexly interdependent? Bernard Pavard (2002) provides a very useful definition of a complex system in a 2002 article:

> A complex system is a system for which it is difficult, if not impossible to restrict its description to a limited number of parameters or characterising variables without losing its essential global functional properties.

In a later collaboration with Julie Dugdale, Pavard (COSI Project 2005) adds that it is necessary:

> …appropriate to differentiate between a complicated system (such as a plane or computer) and a complex system (such as ecological or economic systems). The former are composed of many functionally distinct parts but are in fact predictable, whereas the latter interact non-linearly with their environment and their components have properties of self-organisation which make them non-predictable beyond a certain temporal window.

Pavard and Dugdale's definitions of a complex system serve as a useful basis for theorising the complex nature of international politics, though there are a number of terms utilised in the extracts above that deserve some further explanation in the context of inter-state and international system level political interactions.

The first of these terms is 'system' itself. As Jay Goodman (1965) argued half a century ago, the word system has often been deployed in international theory in varying ways and led to a situation where, even then, there was a danger of the 'fire' of the system "more smoke than light on the nature of international politics". Goodman contends that the word system is deployed in one of three ways: the descriptively, as in the pointing to a group of bonded units; explanatively, where the system is assumed to have an impact on the elements in the system; and methodologically, wherein a theorist claims to elaborate or utilise a particular system of investigation. For Waltz and the structural realists the word system is always employed explanatively and, in assuming a complex system, the same use of the word is implied. The nature of the international system affects the interactions of the elements within it and understanding the nature of the system is essential to theorising, describing, explaining and predicting events within the system.

The second term requiring definition and clarification is Pavard and Dugdale's reference to 'parameters and characterising variables'. In the context of a complex international system the parameters must include the bounded system itself—though this is obviously wider than the state system assessed by the realists and neorealists, for example—and the actors considered significant within that bounded theoretical space. In a system where, in Waltz's own words, the subject of the theory is "affected by everything else" then these actors cannot be limited to only the states, as realists argue, or to states and institutions, as some liberals argue. Instead, it must include any actor, be it state, institution, corporation, NGO, terrorist group or even a single individual, which impacts, with or without intent, the international political system. The number of actors in a complex system is essentially unknown; certainly if individual humans are included then the system counts its constituent actors in the billions rather than the hundreds of states typically assessed by realists, or the half-dozen major powers that some, including this author (Kissane 2005), have held to define the international landscape in the past.

The third term requiring clear definition is the reference Pavard and Dugdale make to a complex system's 'global functional properties'. This is, in a way, a confirmation that, of Goodman's three uses of the word system in international relations theory, a complex system implies adherence to the explanative sense. This is not a novelty, of course: as stated earlier neorealists and offensive realists, among others, have argued that the properties of the international system affect the actions and interactions of the elements within it. Yet it is necessary to bear in mind that the properties of a complex system affect all of the actors in the system (that is globally) and that the particular properties of the system are significant in their own right. Indeed, just as the implications of anarchy are held to be significant drivers of state actions by realists and liberals alike, the properties of a complex international political system are held to have significant effect on the actors within that system, the decisions those actors make and the ramifications of those decisions on other

actors and the stability of the system as a whole. Thus, having defined the system as complex, identified the actors within the system and noted that the properties of the system impact directly on those actors, it is necessary to outline exactly what the particular properties of a complex system are.

Pavard and Dugdale have argued, and this author has previously endorsed, four key properties of a complex system: non-determinism and nontractibility, limited functional decomposability, distributed nature of information and representation, and emergence and self-organisation (Kissane 2011). Each of these separately are significant but, in combination, speak to a system that is fundamentally different to the anarchy of the realists, liberals and even constructivists.

Turning first to non-determinism and nontractibility, it is clear that the reductionist turn in international political theory is being rejected in its entirety. As Pavard and Dugdale note, in a complex system "it is impossible to anticipate precisely the behaviour of such systems even if we completely know the function of its constituents" (Kissane 2011). Obviously, then, assessments of the state or the institution in international politics and attempts to classify such actors based on the basis of their presumed behaviour is unlikely to be rewarding if the system is complex. Indeed, knowing all about the actors, their functions, their capabilities, their needs, desires and goals, their national interests or their history of previous interactions is all of little use to understanding and predicting the behaviour and interactions of those actors in a complex future. The non-deterministic nature of the international system means that prediction in anything other the very short term is likely to be fraught with risk and—in the long term—of no practical use at all. A complex system cannot be predicted, this reality being just one of a number of departures from the reductionist, positivist anarchic systems beloved and endorsed by traditional theories of international relations.

The systemic property of limited functional decomposability reinforces this anti-reductionist, post-positivist position. When Pavard and Dugdale state that the system cannot be decomposed they mean that it cannot be taken apart, understood in its separate parts then reassembled in part or in whole in order to provide an understanding of the greater system. They offer the example of a car as a simple system: it can be broken down into its various components—transmissions, wheels, motor, doors and chassis—and when the function and working of each of these are understood separately and in relation to each other it is possible to both predict and understand the working of the entire vehicle (Kissane 2011). A complex system denies such decomposition; instead we can allude to its complexity, as Douglas Adams did, with reference to an animal: should you decide to take a cat apart and see how it works, the first thing you have on your hands is a non-working cat. Pavard and Dugdale explain:

> A principal obstacle to the functional decomposability of complex systems is the dynamic and fluctuating character of its constituent functions. The interaction with the environment, as well as the learning and self-organisation mechanisms makes it unrealistic to regard such systems as structurally stable (Kissane 2011).

The theorist assessing a complex international system must avoid analysing the goals and motivations, the inner workings and political objectives, the leadership and material capabilities of the actors within that system for, even if a total understanding of all of these is achieved, it will not aid in understanding the system as a whole or in developing a means to explain the interactions between the actors existing in it. Indeed, the attempt to decompose the system in search of systemic understanding leads only to error, as the history of failed predictions by realists and liberals alike has demonstrated with frequency across the discipline's history.

Turning to the property of the distributed nature of information and representation we find reinforcement of the two notions detailed above with the addition of implied issues for elements and actors within the system itself. Information in a complex system is necessarily broadly distributed and sufficient information to predict the future shape and shifts in the system are neither maintained by any single actor nor able to be accessed by any single actor. Decisions are based on limited information about the system and its actors and are, thus, always in danger of delivering alternative outcomes to those envisaged by the actor making the decision. In addition, for the theorist can never competently predict the future state of the system as they will never have access to all of the information about the system. In a complex system where global conflicts can be sparked by the actions of a single aggrieved individual, the theorist cannot realistically claim to have enough information to predict the shape of the system or the likely effects of any action by any actor. As this author has argued elsewhere, Actors seek to advance their own interests as they conceive of them, and actors interact with imperfect knowledge of each other's preferences and aspirations. Unlike a simple system consisting of only known quantities, predictable futures and limited choices for actors, the complex international political system so broadly distributes information about the system and its actors that few quantities can be accurately tracked, few futures are predictable with any confidence (Kissane 2011).

The final property of a complex system is that of emergence and self-organisation and, like the other properties of complex systems, it has significant ramifications for understanding the shape and shifts of international politics. Pavard and Dugdale describe emergence as:

> Emergence is the process of deriving some new and coherent structures, patterns and properties in a complex system. Emergent phenomena occur due to the pattern of interactions…between the elements of the system over time. One of the main points about emergent phenomena is that they are observable at a macro-level, even though they are generated by micro-level elements (Kissane 2011).

Though the previous properties of a complex system have made clear that prediction is functionally impossible in a complex system the notion of the emergence of coherent structures and behaviours is not necessarily contradictory. Some interactions in complex systems occur regularly and in similar ways, sometimes so regularly and so similarly that the emergent behaviours appear normal, even natural. Identifying these emergent behaviours and noting the regularity with which they occur does not imply that such behaviours take on the status of a theoretical law;

indeed, nothing more is implied other than that certain behaviours in a complex system tend to recur. In the context of the international political system, we can identify emergent behaviours as realists have done with their studies of balancing and deterrence or as liberals have argued exists in the link between democratic governance and the recourse to war with other democracies. That the international political system self-organises into a certain level of security and stability is no accident; the properties of this system, like any other complex system, are such that it is highly likely to occur.

Thus, when we propose a complex international system as an alternative to the anarchic international system of Waltz, the realists, the liberals and the constructivists, we are proposing a system with specific properties that fundamentally restrict what a theorist can hope to achieve while also expanding the number of actors that the theorist must consider. Instead of a system of nation-states under anarchy we have a system of billions of individuals, states, corporations, NGOs, institutions and groups of all of these that interact in billions of dyadic, finitary and (potentially) infintary interrelations daily. The system is non-deterministic, non-tractable and cannot be decomposed to find meaning in its parts nor reduced in an atomic manner to provide a means to describe the qualities of the system as a whole. Information in a complex system is distributed and no single actor can have complete information about any interaction in which it engages while, in a similar way, the theorist cannot ever be sure, even with the benefits of time, distance and hindsight, that they have all the relevant information on which to draw conclusions about behaviour past or behaviour future. Yet despite these difficulties for the theorist seeking to describe, explain and predict complex international politics, the fourth property of complex social systems offers some hope: in complex systems certain behaviours emerge and repeat over time as the system self-organises around certain of these emergent behaviours and systemic norms. Thus, there is hope for the theorist after all as these emergent behaviours can be identified and probability functions developed to aid in international decision making efforts on behalf of international actors and watchers of international actors.

But while the complex international system has been presented as an alternative assumption for theorists of international relations, is it any better at actually explaining what takes place in the international system? In the section that follows this chapter will consider three cases where existing, anarchy based theories of international politics failed to explain the reality that emerged. Turning first to the explanations for the outbreak of World War One, then turning to the emergence of European cooperation in the shape of the European Union, and finally considering the post-Cold War security landscape in Europe, this chapter will demonstrate the superior explanations offered by a complex approach to international affairs and the promise that the assumption of complexity has for theorising international politics.

5.3 'A Damn Fool Thing in the Balkans'

The events leading up to the outbreak of World War One are one of the more studied series of events in international politics. The entangling alliances, the massing of forces, the first truly global struggle in the modern world and the crumbling of empires that followed in its devastating wake all serve to hold the interest of scholars and students of history and politics even nearly a century after that late June day in 1914. The assassination of Austro-Hungarian heir Franz Ferdinand and his wife in Sarajevo is held to be the catalyst that set in motion the mobilisation of troops across Europe and late the world, setting the stage for what would become World War One. Indeed, in typical accounts of the outbreak of the war it is held that Austria-Hungary was drawn into conflict with Serbia by the assassination; Russia mobilized to assist Orthodox Serbia; Germany moved to support Austria; France, bound by treaty to Russia, moved to counter the German threat; and Britain moved to support neutral Belgium and, in some interpretations, France (Kissane 2006). For realists and liberals alike there seems to be a certain inevitability about this march to war. The balance of nation-states and empires in Europe and the Near East was so fine as to see any small event push them all into war, making prescient Otto von Bismarck's prophecy that 'some damn fool thing in the Balkans' would be enough to launch Europe into chaos.

Realist accounts of the outbreak of World War One are satisfying on a superficial level: entangling alliances, states committed by treaty and grand strategy to the fight, the rampant nationalism that fuelled the appetite for war and an unbalanced balance-of-power European system are all held to be satisfactory explanations for the outbreak of the war. Yet while the realists can describe the broad strokes of the system in the weeks, months and years before the war began, they have little explanation for exactly why the assassination of Ferdinand was the specific catalyst or why, for example, cooler heads in Russia did not prevail. Indeed, as Stephen van Evera (MIT 2003) has maintained, the French and British could have and even should have said to the Russians "Hey you guys! Put a collar on the Serbs! They're out there shooting Archdukes!" Instead, Europe quickly found itself at war, the severity and extent of which they were sorely underprepared for. Realists, then, can explain the broad strokes but not the catalyst; the big picture but not the fine points that give the painting its shape. As has been held elsewhere, the reason for this inability to explain or predict the actions of a small group of assassins in Sarajevo may have a lot to do with the realist assumption of anarchy and the assumptions about the international system that assuming anarchy imposes on realist theorists of international relations.

In an anarchic system where states are the primary actor significance and causal explanation is attached to the large swathes that cut their way through the system. Great Power Politics becomes the basis for explanations, imperial overreach becomes a causal factor and sub-state events and actors are marginalised. The distribution and strength of the German army, for example, is identified as a key strategic factor while the motivations and personal animosity of Ferdinand's

assassin, Gavrilo Princip, is relegated to little more than proximate cause, if that, in realist accounts of the war's outbreak. Russet (1962), for example, details many 'causes' of World War One while concluding that the assassination of the Archduke was nothing more than a 'surprise'. But what a surprise, one without which it could be reasonably argued that the entire war might not have been launched at all (Kissane 2006). Anarchy prevents the realist from engaging in any real way with the proximate cause of the war and the sub-state level issues that combined to provoke the conflict. This is something that is not found when a theorist or analysts assumes complexity.

Indeed, as described above, the assumption of a complex system demands an assessment of what Russet termed the 'surprise' of the assassination of Ferdinand and his wife. When the international system is assumed to contain billions of individuals and groups all interacting in political space it is clear that analysis must reach below the state level and examine the specific circumstances that led to the assassinations in Sarajevo. One might enquire as to the significance, for example, of the date of Ferdinand's visit to the city being, as it was, the feast of St Vitus, an important saint in the Serbian Orthodox Church. One might wonder, too, how the proximate events surrounding the assassination appear incredibly important: the failed assassination attempts earlier in the day and the injuries that resulted leading to Ferdinand's visit to a hospital and revised route through the city; the wrong turn made by the couple's driver which left their car stationary on a street; and the serendipitous melange of events that saw that stationary car come to rest right in front of an otherwise dejected would-be assassin named Gavrilo Princip who needed to do little more than extend his arm through the car's open window to achieve what his co-conspirators had failed to do earlier in the day. Where realists label such facts 'surprises' or ignore them altogether, content with grand strategic explanations for the outbreak of the war, in a complex system such incidents, in specific combination, serve to provide the real explanation for the war. Indeed, without this largely unpredictable, sub-state sequence of events, it remains impossible to determine with any certainty that the war would have begun that summer or even at all. In Pascalian terms, the wrong turn made by Ferdinand's driver is analogical to the length of Cleopatra's nose: we know not what the world may have looked like had it been a little different but we know it would have changed.

5.4 Rectifying History's Greatest Mistake

On the night before his state joined the European Union, Lithuanian President Arturas Paulauskas remarked:

> History will rectify its greatest mistake tonight: Lithuania, the geographical centre of Europe, is returning to Europe. Today, we are saying to the old continent: Hello Europe, we are coming. We are coming to live together, to work together, to create together, yet to remain ourselves (BBC 2004).

The mistake he refers to was the post-World War Two division of the European continent into socialist, Soviet-dominated east and a capitalist, US-backed west. The Cold War that had seen Lithuania, its Baltic neighbours and most other states in Eastern Europe fall under the control of the USSR had concluded and little more than a decade later the east and west of the continent were again one. The rhetoric of the Lithuanian leader is far from overstatement: the magnitude and speed of the change in European political relations and the wilful trading off of sovereignty that joining the EU demands of any new Member State were the latest in a series of steps that had produced a zone of peace and prosperity in a region that—earlier in the century—has been the site of the two largest conflicts in the history of mankind. This transformation and integration was welcomed by many and surprised most realists who sought to explain the series of decisions made by EU states which saw them yield progressively more of their sovereign powers to regional institutions of their own creation.

For the uninitiated, a little background on the speed and breadth of this transformation in Europe is useful. From the European Coal and Steel Community (ECSC) which brought about the political reconciliation of France and Germany and laid the basis for the economic integration of Western Europe, through the Treaty of Rome which established the European Economic Community (EEC) to the Maastricht Treaty which established the European Union (EU), the recent history of Europe has been one of continued and extensive economic and political integration (Gillingham 2002). Former rival states, including states that had made war on each for centuries in the past, built not only regional economic institutions but also an international parliament and a supra-state decision making body in the form of the European Commission. While in practical terms the integration of the continent has long been an aim of prominent Europeans including Charlemagne, Napoleon and Hitler, the post-World War Two integration of the continent from Britain and Ireland in the west all the way to the Russian border in the east is the first time that this integration has been achieved peacefully and with the consent of the people. Europe now sits as the most striking example of regional political integration on the planet and its success serves as an example to other regional integration efforts worldwide (Mistry 2000).

Realists have faced significant difficulties explaining the extent of European integration from its first steps through to the sprawling alliance of nearly thirty states of today. John Mearsheimer (1990) lampooned analysts who imagined "a new age of peace in Europe" and argued that "the prospects for major crises and war in Europe are likely to increase markedly". Realist Stephen Walt (1999) argued that he:

> …has used structural theory to peer into the future, to ask what seem to be the strong likelihoods among the unknowns that abound. One of them is that, over time, unbalanced power will be checked by the responses of the weaker who will, rightly or not, feel put upon.

Walt and his fellow realists rejected the idea that any alliance between states can be permanent as interstate alliances are issue specific. As a general rule realists

remained generally pessimistic about the likelihood of peaceful integration and democratic transitions of the post-Socialist states of Central and Eastern Europe. Yet these realists seem, with the passing of time, to be proved more and more misguided. When even the pressures of the 2008 financial crisis failed to see significant cracks appear in the EU's institutional structures the impression an objective observer receives is one of continued integration, closer relations and the trading of significant national sovereignty for peace and economic advantage—something that the anarchy focussed realists reject as a strategy for states in a self-help environment.

Yet in a complex system such integration is not particularly surprising nor are the long term alliances that such integration engenders something that is problematic for theorists who assume complexity. It is only under realist anarchy that alliances are assumed to be short and issue specific; the assumption of complexity demands neither short term nor long term alliances of states and non-state actors. It is only under anarchy that security concerns are placed ahead of economic or cultural issues; complexity recognises that issues can be multifaceted and that no single issue rises above all others in every situation. It is only when one assumes realist anarchy that national sovereignty becomes the be-all and end-all of discussions of integration, allowing Mearsheimer and Walt, among others, to conclude that Europe and its institutions would soon revert to the balance of power politics of old. Indeed, under realist anarchy there is no evolution, no learning, no feedback and no way for states and their leaders to rise above past behaviour to new, more effective behaviours; the logic of anarchy that drives realists seems uncomfortable and ill-fitting in the face of European integration and it is of little surprise, then, to find that realists encounter significant difficulties in explaining the ever expanding zone of peace on that continent or the integration efforts it has sparked elsewhere. A theorist assuming complexity, on the other hand, would not share that surprise, confident that the sub-state causes and interactions among individual Europeans ignored by the state-centric realists will have some effect on the integration efforts and, at least in this case, a positive one.

5.5 Back to 'Back to the Future'

In 1990 John Mearsheimer penned a widely-cited article as the Cold War edged towards a conclusion, the tile of which he borrowed from the hit 1985 film, *Back to the Future*. The article, which like the film provoked a sequel of its own, argued that the end of the Cold War and the withdrawal of the superpowers from Europe would see the continent driven into security competition. Mearsheimer offered four potential futures for Europe as well as specific policy prescriptions for the US government which, with the benefit of hindsight some two decades later, seem incredibly aggressive:

> First, the United States should encourage a process of limited nuclear proliferation in Europe. Specifically, Europe will be more stable if Germany acquires a secure nuclear deterrent, but proliferation does not go beyond that point. Second, the United States should not withdraw fully from Europe, even if the Soviet Union pulls its forces out of Eastern Europe. Third, the US should take steps to fore-stall the re-emergence of hyper-nationalism in Europe (Mearsheimer 1990).

What caused Mearsheimer to suggest that the historic Central European geopolitical power which, for good reason, continued to be considered an existential threat by its neighbours to the east and west, should be encouraged to gain an offensive nuclear weapons capability? What made Mearsheimer push for the continued presence of US military forces in post-Cold War Europe in the face of a non-existent threat from the USSR? And why would Mearsheimer worry that hyper-nationalism would derail the peace that was predicted by others to be on the verge of breaking out? The answer, quite simply, is that Mearsheimer's reliance on a theory of international politics that assumes the international system is anarchic.

Like other realists, Mearsheimer relies on anarchy as a foundational assumption in his world view. He assumes that the normal condition of international relations is insecurity, that states are security seekers and that the self-help system that is anarchy does not encourage long term alliances or engender trust among states. Indeed, for offensive realists like Mearsheimer, every state is an existential threat to all others, for by virtue of their existence they constitute a threat to the survival of others. In such a system, then, Mearsheimer can envisage only four future conditions for post-Cold War Europe: a Europe free of nuclear weapons and where France, Britain and the USSR give up their existing stockpiles of nuclear arms; the nuclear weapons status-quo continuing but leading to increased instability and insecurity, particularly in Eastern Europe; a mismanaged and dangerously unstable and insecure process of nuclear proliferation in Europe; or, a process of well-managed nuclear proliferation across the continent (Mearsheimer 1990). All are considered less stable than Europe's Cold War balance between the US and the USSR and—after rejecting the idea that Europe could remain peaceful—Mearsheimer argues that the 'well-managed proliferation' scenario is the preferred future for a safe, secure and stable Europe. The reality, though, is that the rejected 'peaceful Europe' scenario is almost exactly what occurred.

Mearsheimer (1990) offers, and then rejects, what he terms an "optimistic scenario" that includes the following elements: a European community that grows stronger with time; common economic interests that encourage the Western European states to continue cooperating with each other despite the retreat of the USSR in the east; the German "threat" removed by integrating the German state more deeply into a common European architecture; an expansion of the European Community (EC) to include states in Eastern Europe; and a bolstered peace across the continent. Far from optimistic, this describes rather neatly what did happen in Europe after the Cold War. Mearsheimer's rejection of the possibility of an eastwards expansion by the EC and sustained peace in Europe rests on his assumption of an anarchic system, as he explains when he addresses what he calls flaws in the economic liberalism underpinning the optimism:

> The reason is straightforward: the international political system is anarchic, which means that each state must always be concerned top ensure its own survival. Since a state can have no higher goal than survival, when push comes to shove, international political considerations will be paramount in the minds of decision-makers (Mearsheimer 1990, italics added).

One might wonder, though, if the optimistic scenario would have been foreseeable if Mearsheimer had considered the international system as *something other than anarchic*. Indeed, if Mearsheimer had assumed a complex international system then his conclusions would have been very different, indeed.

As previously described, the assumption of complexity encourages theorists to consider sub-state actors in their calculations. Assuming complexity would have seen Mearsheimer recognise the strong opposition to nuclear weapons (and even nuclear power) in Germany at the end of the Cold War, as well as in other states (Kissane 2007). Constructivists, perhaps, might have been more open to acknowledging the significance of sub-state NGO and citizen opposition as a factor to consider when predicting patterns of proliferation in Europe but Mearsheimer, with his focus on an anarchic system of security seeking states, fails to comprehend the significance of such opposition, even in democratic Western Europe. Mearsheimer's anarchic vision of world politics forced him to consider the withdrawal of the Soviet Union from Europe as a shift in the European balance of power. He failed to neither consider the significance and influence of sub-state actors and groups in this withdrawal nor consider the 'pull-factor' that free-market capitalism remained for states of Eastern Europe newly freed from Soviet control. The broadening and deepening of European integration and the voluntary sharing of financial and political sovereignty with regional institutions was not foreseeable to realists like Mearsheimer as such decisions by states are seen as irrational in an anarchic realm where alliances are short-term and trust is scarce. By assuming complexity, however, the theorist is explicitly aware of the influence of sub-state groups on international political events and is open to futures like Mearsheimer's 'optimistic scenario' that would otherwise be closed to them. Predicting and explaining the Europe that emerged from the Cold War, then, is only possible for realists if one assumes something other than anarchy, and complexity may well be the systemic structure that can serve as this alternative for the discipline's predominant theoretical perspective.

5.6 Conclusion

Realism has consistently failed to describe, explain and predict the real currents of international politics and, while criticisms from liberal institutionalists and constructivists alike have pointed to many failings in the realist approach, the key failing remains axiomatic: the realist assumption of anarchy. Alternatives to the assumption of anarchy exist, however, and chief among them is the assumption of systemic complexity. Indeed, by considering examples like the origins of World

War One, the integration of Europe or the post-Cold War security landscape in Europe, it is easy to see why the assumption of a complex system can be useful to the theorist of international politics. Assuming complexity demands the theorist consider sub-state actors including NGOS, nations, corporations and even individuals, and that the theorist imagine what effects these actors might have on the wider politics regionally or even globally. Whether it is the motivation of an assassin in Sarajevo, the political integration of a continent more often at war than at peace, or the peaceful political landscape in Europe where realists could only imagine instability, insecurity and the proliferation of nuclear arms, complexity helps the theorist to better understand and explain the patterns and practices of international political life. Indeed, it is only by assuming a systemic state that one can fully realise what Pascal appealed to in his musings on Cleopatra for, under anarchy, the length of a single nose on a single face makes no difference to the evolution of the international politic while, for those who assume complexity, it might just make all the difference in the world.

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Chapter 6
Complexity Theory in Public Administration and Metagovernance

Ege Erkoçak and Şuay Nilhan Açıkalın

Abstract The notion of complexity has been used as unique phenomenon that attempts to define social systems in last 20 years. Societies can be considered natural complex system that featured by multi-actors and nonlinearity, ability to adapt local conditions, self-organizing and coevolution. Through this chapter, three features of complexity theory are going to be used to analyze its application in public administration. In other words, today societies are determined with multi actors, nonlinear relationship of actors, self-organizing and co-evolution. The next part is going to give a brief discussion about relations between civil society and state because civil society as a both actor and independent system that cover huge number of individual actors from complexity theory perspective. The last but not least, how governance perception is changed and then answer of can metagovernance considered as a new way to govern complex societies is seeking. So, through this chapter there is an attempt to understand dynamics of complex societies and its implementation on public administration and civil society and state relationship from eyes of complexity theory and last part would discuss metagovernance as a response to effects of complex societies on public administration.

Keywords Complexity theory · Governance · Self-organizing · Metagovernance · Civil society

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6.1 Introduction

We are all unique. Although carrying similar codes of DNA, these codes are not the same featuring an individual design. Every one of us is part of a greater system, but also represent an independent system. As an agent, everyone is completely independent, yet they are definitely interdependent from and interconnected to each other. Therefore, every agent has a complex notion of self-being and existence through varying roles whereas interdependence is the norm of communal life. In a world where our affiliated communities increase in numbers as our roles vary within every different community, we belong to given circumstances.

How governance model can be sustainable in such complex societies? Throughout the history, public administration has faced dramatic changes. Until 1950s, public administration approach mostly based on hierarchical models of governance. Then the world started to experience market-based models of governance in 1970s. In 1990s and onwards the network governance model became more and more illuminator. In 2000s three models of governance led to two main problems in public administration. First, these three governance models became contradictory with each other. As a second problem, none of them could meet the needs of complex social systems and its implementation on public administration. Patterns of shifting public administration models are actually embedded in the rapid intensifying complex structure of society.

Complexity theory definitely brings a new insight to both society and public administration. Society as natural complex system appeared with interconnected multi actors in each level of action. That's why throughout this chapter, there will be a brief summary of complexity theory and its application in public administration. During the last part we shall be delivering upon how complex the relations between civil society and the state could be through the lens of complexity theory and where metagovernance fits in understanding the modern challenges to the public administration.

6.2 Complexity Theory

The early second half of the twentieth century has been period of the new achievements for development of post-positivist approaches in social sciences. Starting with 90s, not only trends of natural science changed but also its implementation on social science became controversial. End of the Cold war and new dynamics in international economy fostered emergence of new paradigms on public administration because the new world would be determined by multi actors and multi-level governing which characterized by non-linearity, unpredictability and flux. "The new "nonlinear paradigm" has important implications for public policy (Kiel qtd in Morçöl 2005, 297). Among developments, the notion of "complex dynamic systems" is taken from biology that is one of the main pillars in the formation of complexity theory (Klinj 2008; Teisman and Klinj 2008).

Although complexity theory has been widely used in biology rather than social sciences, since society has been considered as complex phenomenon after 20th century, complexity theory has gained importance in public administration too. There are both internal and external resources of intensification of complexities in society such as increasing of multi identities, redefinition of political entities, fuzzy boundaries between agents and erosion of national sovereignty.

> "Societal complexity that flows from growing functional differentiation of institutional orders within an increasingly global society with all that this implies for the widening and deepening of systemic interdependencies across various social, spatial, and temporal horizons of action" (Jessop 1997)

These new patterns of societies have challenged limitations of rationality based classic approaches to public administration, so complexity theory and its implementation on public administration offer a new way to understand complex nature of societies and public administration. To understand complexity theory and its application on public administration, general framework and characteristics of complexity theory can be summarized as follows;

The main characteristics of complexity theory can be summarized as follows; (a) a large number of similar, independent and interdependent agents; (b) constant responses from these agents to other agents; (c) adaptiveness to new situations in order to survive; (d) self-organization, in which order in the system forms spontaneously; (e) local rules that apply to each agent; and (f) Coevolution (Valle 2000).

So, complex systems are 'composed from numerous interacting identities (actors), each of actors behave in its local context according to some rules, laws or dynamics (Maguire and McKelvey 1999). When each actor responds its local conditions, it also changes the whole system so in which millions of agents can easily shape the whole system. It makes the system self-organized and new patterns of the system cannot be understood by influence of each agent. It leads to not only self-organizing but also unpredictability. Equilibrium of systems—or well-known stability can be changed by unexpected events. In that point, both positive and negative feedback mechanism systems start to work. Positive feedback drives changing while negative feedback (balancing and moderating) maintains the stability of the system. "…the idea that complex social systems can work both with positive and negative feedback" (Erçetin et al. 2013). For example, a central heating system is where the thermostat registers a drop of temperature and activates an adjustment mechanism, which restores the temperature again. However, in social systems there are fewer mechanical relations because a social system has more complex social relations and interactions. That's why within such diversity the system can result in a locked position.

Sure, it is not easy to introduce all features of complexity theory into public administration but this chapter is going to focus on three of them which are multi-actors and non-linear dynamics, self-organizing, and co-evolution. Besides, there will be short discussion on civil society and state relationship from complexity theory perspective.

6.2.1 Multi-Actors and Non-linearity

Not only natural systems but also social systems are naturally complex and non-linear. Cilliers suggests that the number of humans involved in social relations is extremely large in a setting in which human interaction is realized through dynamic exchange of information with different patterns of interactions (1998). These social relations are composed of huge number of individuals that make social systems dynamic and unpredictable. In other words, human as an agent is both part of this system and determinant of it, so it is impossible to understand such a complex society and its interactions with rational based decision making approaches. Lindblom's first workings diagnosed the limitations of rational based decision-making process which does not include comprehensive approaches. "Assuming that organizations were unified, rational actors" (Braybrooke and Lindblom 1963). However, scholars suggest that public administration is more than state centric that includes unified and rational actors. Today, with the effect of globalization and reemergence of international systems brought undeniable diversity of actors. Public policy implementation started to be a complex notion and multi-actor approach was introduced (Pressman and Wildavsky 1973). All actors have their own network and there are interrelations of networks within public administration. This feature makes decision-making process more difficult. Any incremental changes in actors would result in changes in the whole system. Also, these incremental changes of actors would cause instability where negative feedback would not work and the system could always be in a deadlock situation. "… The cumulative effects of various small steps could, at some point, reach the moment where the system would just about to lose its stability (or its seemingly stable position)" (Klinj 305) It is also well known as the edge of chaos. It directly emphasizes dynamic structure of public policy making and pushes to focus on a new way of governance.

Secondly, a linear relationship means expected results paralleling to how much time and energy is put as an effort. However, in a nonlinear relationship, the rewards are unexpected to put an effort. Actually, it is hard to find a linear relationship in real life because almost all interactions can be described as nonlinear relationship. The feature of nonlinearity is directly interconnected with multi-actors characteristic of complex systems. In the definition of complex system; it is emphasized that "The interactions themselves have a number of important characteristics. First, the interactions are nonlinear" (Richardson 2006) As well as multi-actors characteristic of complex system, nonlinearity result in unpredictability. It means that the decision making process cannot be managed by simple way of governance. "…dynamical, and nonlinear forces existing in the relationships among social actors that are not easily explained by simple motivations (for gain or the avoidance of loss), and that cannot be mapped in the long run as more than probabilities" (Lewin 1997). In other words, governance of complex system tends to be more risky and complicated and can not be analyzed by state centric approach anymore.

6.2.2 Self-organization

Self-organization means complex system can evolve itself to a higher level of complexity. According to Kauffman, biological systems are typically in non-equilibrium states, and they have a tendency to evolve to the "edge of chaos" (1993). It is completely internally driven process that does not need any external forces to transform themselves. It also means that each actor has its own dynamics and these dynamics have capacity to transform themselves and the system as a whole. The new structure of system arises from actors' dynamism. This process (self-organizing) can occur many times by responses of actors to given conditions, repeated in the system. The most well-known example of self-organizing is "homeostasis" which is the self-maintaining nature system from the cell to the whole organism. Self-organizing has been one of the reasons why systems succeed in adapting to new landscapes. Self-organization and its application on public administration is one of the most interesting ones because it depends on rational decision making theory. Actors are expected to be in public administration always behave within limit of laws. However, as Teisman and Klinj mention actors in public administration not always behave according to laws or principles but have self-organizing capacity (2008). It refers that decisions of actors should be analyzed in course of their dynamism and self-organization capacity.

6.2.3 Co-evolutionary

Co-evolutionary means 'the evolution of one domain or entity (that) is partially dependent on the evolution of other related domains or entities, or one domain or entity changes in the context of the other(s)' (Mitleton-Kelly 2003). In this definition, entities reflect individuals and organization as an actor; it is much related to the level where actors operate. Morçöl defines (2012) the term "an emergent and self-organizational complex system. The relations among the elements (actors) of this complex system are nonlinear and its relations with its elements and with other systems are co evolutionary". In detail, we can interpret notion of "co-evolutionary" in public administration in two ways. First, subsystems-networks can evolve with other subsystems. Second, while a decision making occurs within one agents' network, it can also be another decision in another network, so, decision making can co evolve with decision making in another network. Kaufmann exemplifies the term of co-evolutionary with prisoner dilemma where lives of two participants are both independent but interdependent. The next part will be about analysis of civil society as an agent and state relationship in public administration under the light of complexity theory.

6.3 Civil Society and State Relations with Complexity Theory

As we mentioned today, public administration cannot be perceived as rational decision making boundaries which based on top-down, hierarchical decision making process. New century brought its new concepts to public administration too. Complexity theory is not a new phenomenon but completely challenging and new in public administration literature. Complexity theory reshapes public administration with multi-actors & nonlinearity relationship, self-organization and co-evolution features. From this perspective, we will analyze civil society and state relations as an actor.

Civil society and state relationship has always been questionable and suspicious. There is no doubt, definition of civil society and its relationship has been changed. Then we will give an analysis of civil society and state relations with complexity theory. In the early 20th century, Gramsci who had intensive work on civil society and state relationship, defined civil society as a part of political society of hegemony, and it had been used to strengthen hegemony. He suggests that state is the sum of political society and civil society where both parts are providers of hegemony (Gramsci 1971). Furthermore, Gramsci suggests that through civil society, hegemony can get consensus of people by mass media, churches and associations that called "manufactured consensus". Despite his position on civil society and state relationship, he also claims that civil society is also an opposing power to hegemony but it is embedded in cultural discourses (Heywood 1997).

On the other hand, Habermas suggests a completely different definition in the late 20th century. "Civil society is made up of more or less spontaneously created associations, organizations and movements, which find, take up, condense and amplify the resonance of social problems in private life, and pass it on to the political realm or public sphere" (Habermas qtd in Nuscheller 2003). Public sphere is in civil society and it is a kind of platform for individuals to discuss mutual issues and concerns so there is a kind of communication process among individuals. We can consider understanding of civil society by Habermas is more positive than Gramscis'. In contrast to Gramsci, Habermas claims that civil society is source of criticism towards state in terms of civil society and state relations; he suggests that civil society is frequently seen as a focal for limiting the power of the state.

Differences between Gramsci and Habermas reveal that almost within a hundred years, the perception of civil society and its relationship with state have completely changed and lastly we are going to analyze the relationship with complexity theory. During this analyze, we will reconsider civil society from 'associational' view common today, which defines civil society as a 'third sector' compose from voluntary organizations and NGOs. "…as it develops, civil society will consist of a range of local groups, specialized organizations and links between them to amplify the corrective voices of civil society as a partner in governance and the market" (Connor qtd in Ghaus-Pasha 2005).

90s brought an important space of number of actors in civil societies that were increasing in many countries especially focusing on democratization. Not only

political atmosphere but also international economy fostered increasing number and role of actors in civil society. It also facilitates effectiveness of civil society as an actor in public administration. From complexity perspective, civil society is both an actor in complex public administration and represents independent system itself. In other words, civil society and its structure also represent a complex system itself. Civil society has self organization capacity, and consists of small units of actors-individuals in local societies which have its own dynamics. Therefore, existence of civil society depends upon a complex equilibrium among diverse groups and associations. Furthermore, civil society organizations are co-evolutionary with their international and transnational network. Also, different actors from socio-economic groups can co-evolve in civil society that makes it unique among other agents in public administration. Also, today civil societies have transnational networks that provide its effectiveness in public administration. In case of civil society and state relationship, complexity theory gives a new insight. Because of civil society as both one of actors in public administration and complex system itself, it has a different relationship with state. So, civil society would have role as neither Gramsci's nor Habermas suggested. This has more broad and complex relations as naturally emerged. For example, democratization efforts of any country, especially the quest for a new Constitution should therefore continue, giving the ability to discuss and debate all public policy matters and empathize with each other (and with the State) for all citizens. The end-result, a brand new constitution, is of course a very important target to achieve. Yet, the process itself creates new space for all kinds of participatory democratic discussion models within civil society.

Last but not least, we are going to discuss how governance approaches transformed shortly and then metagovernance as a form of governing of complexity public administration in next parts.

6.4 From Government to Governance—A New Age

In the two parts, we mentioned that due to economic and political patterns since 20th century resulted in intensive complex societies that encourage scholars to revisit public administration. Complexity theory directs attention from government to governance. As beginning, government is body of structure of public institutions. The state is run by a government that has a consensus from citizens to run the affairs of the state. On the other hand, term of governance refers activities of government. In the last 20 years, the notion of governance has got into literature of public administration. There are numerous definitions of governance by scholars. Frederickson and Smith to suggest that governance has become "a virtual synonym for public management and public administration" (2003). On the other hand, Kooiman defines governance as "the emerging pattern arising from governing" (1993), and Lowndes and Skelcher add an actor's perspective to their governance definition. In addition, Rhodes suggests six different approaches of governance from governance as corporate governance to self-organizing networks (1997). Even Farazmand

furthered the idea of governance with international dimension. So, all these different approaches to governance show that meaning of governance is both multidimensional and open to be evolved.

"…governance is more than 'what governments do to get their jobs done': the term governance refers to the relations between public-sector actors and societal actors when addressing public issues" (Meuleman 2008). That's why governance modes and approaches should be revisited. It is hard to say only one mode of governance can be compatible with new complex public administration. Although it is obvious that different modes of governance have their own unique failure by unpredicted complexity and their implementations, there are three main time periods of how theories of governance failed. The first wave was in 70s; there were series of governing of welfare states and it led to development of idea of pluralism. Throughout 80s and 90s, public sector couldn't be the main stakeholder anymore. They started to describe state as complex body composed of institutions that exercise its power through network. In other words, state as a main agent argument lost its importance. In 2000s, the main arguments became eminent which are new models of fragmented state exercise power within formal and informal networks and civil society and state relationship has fuzzy and blurred boundaries. While the transformation of government to governance emerged naturally, new patterns of "governance" require both theoretical and practical approaches. New governance should focus on networking and comprehensive mode of all actors with fragmented and differentiated political system. Then, how we can achieve sustainable governance? or How ideal governance should be? became the main question of new researches about governance.

6.5 Metagovernance-"Governance of Governance"

Metagovernance can be considered an answer to those questions. Therefore the utilization of all kinds of governance models at all levels/orders including the metagovernance is overarching. Literally, "meta" comes from Greek word means after or beyond. In Jessop's definition, "metagovernance involves the organization of the conditions for governance in its broadest sense", and its "umbrella mode" is "managing the complexity, plurality, and tangled hierarchies found in prevailing modes of co-ordination", so metagovernance puts itself beyond all modes of governance. Indeed, it concerns "the judicious mixing of market, hierarchy, and networks to achieve the best possible outcomes from the viewpoint of those engaged in meta-governance". Not only Jessop but also some other scholars define metagovernance. Kooiman defines metagovernance as a third-order governance invoking normative ideals in the governing of institutional systems of governance (2003). On the other hand, Meulaman suggests that metagovernance is a means by which some degree of coordinated governance is produced, by designing and managing sound combinations of hierarchical, market and network governance (2009).

Not only definitions of metagovernance, but also practical dimension of metagovernance questionable. As mentioned, complexity theory gives a new insight to public administration and governance. As Jessop defines metagovernace as governance of governance should be beyond classical practice of governance modes. Characteristics of complexity theory and metagovernance are compatible and complimentary to each other. Jessop claims that metagovernance is a 'containing process' shoulder by the state but tends to failure. On the other hand, Bell and Hindmoor suggests effectiveness in metagovernance practice by emphasising the extent of resources and capacities still at the disposal of states (2009). In short, metagovernance should compass both analytical networking with all actors and have social and political identity. That's why; metagovernance can be achieved through three ways;

(1) be inclusive of multi-actor structure
(2) to provide but non intervene to self-organizing and coevolution
(3) to construct social and political identity.

Firstly, multi-actors and nonlinearity are two of the characteristics of complex system. As mentioned in the beginning, from individuals to civil society organizations, small units of network compose multi-actor structure of society. Multi-actors would lead to social and institutional interrelations and bigger systems. Despite classical modes of governance that give weight to state and market actors, metagovernance should be inclusive and broad. In other words, metagovernance should consider dynamics of multi-actor in governance process.

Secondly, metagovernance would provide but not intervene in the self-organization capacity of actors. As discussed, each actor has potential of self-organization. During self-organization process, the system would evolve to new one. In other words, self-organization capacity of each actor implements opportunities for system. Furthermore, related with providing self-organizing also would have positive effects on coevolution because consequences of self-organization of any actor would affect other actors and system. Due to this process, the system would experience action learning of coevolution. In such a complex system, intervention to self organization and co evolution of actors can lock the whole system and it would result in failure. Although metagovernance mechanisms should facilitate self organization capacity and coevolution of actors, it is impossible to underestimate this process completely because of this metagovernance should also include construction of social and political identity.

Thirdly, metagovernance cannot be only related with governing of networks or multi actors, it should cover social dimension of this process too. Within such a complex system, common social and political identity can be considered a "constructive element". This dimension of metagovernance depends on social constructivism approach which suggests that identities form interest and it forms behavior actors. Identity construction would have an impact indirectly on dynamics of actors and self-organization capacity in long term and then it will also determine the destiny of the system. So, construction of social and political identity would have

long term effects on actors and system itself. “Thus, they stress that governance can be exercised efficiently through the construction of social and political meaning and identity” (Sørensen 2006).

6.6 Conclusion

State centric, rational based theories have been the center of theoretical discussions in public administration. What is modern governance? or Is sustainable governance possible? Answers of these questions can be found in society. Dynamics of society have been evolved in the 21st century. There are many external and internal dynamits that triggered new and unique features of society such as globalization, technological developments and liberalization of ideas. It is hard to confine and draw boundaries to new features of society but we can say that society is nested with network compose from relations of multi-actors.

Complexity theory is an alternative way to understand and analyze new society. It is generally used in biology however it has been transferred to social sciences to define and naturally complex social systems. Main features of complexity theory are multi-actors, nonlinear relationship, adaptiveness to conditions, self-organizing and coevolution. This chapter would limit analyzing of public administration with complexity theory with three of these features, which are multi-actors and non-linearity, self-organizing and co-evolution. Civil society is not only one of the actors in the greater system but also it also represent independent complex system that’s why civil society and state relationship is revisited from complexity theory perspective. Civil society and its meanings changed in 21st century. It became more inclusive and strengthened its power in decision making process even it started to be called as third sector in public administration. It is remarkable development of effectiveness of individual actors who has capacity of self-organizing and coevolution with other actors. In other words, complexity theory implements more effective and multidimensional influence of civil society in this relationship.

As expected, all new patterns pushed us to revisit government and modes of governance. Governance theories are generally focus on three main modes of governance hierarchical, market and network. Nevertheless, all modes of governance experienced its failure. It debunks a demand for combination of these three modes of governance and also broader way of governance to meet challenge of complex societies. That’s why Jessop and other scholars define metagovernance as “governance of governance” which governing complexities, plurality and hierearchies within networks. Basically, metagovernance and its scope seem highly compatible with characteristics of complexity theory, so, how metagovernance can be exercised in real life became important question. Metagovernance can be realized in three ways; (a) be inclusive to multi actors structure (b) to provide but non-intervene to self-organizing and coevolution c)to construct social and political identity. The approach to metagovernance as “umbrella mode”, which emphasize covering all actors in all level, is directly fit into inclusiveness of metagovernance.

Secondly, self-organizing and coevolution ability of actors should be provided but there should be no direct intervention to internal dynamics of each actor however it is impossible to ignore all implementations of self-organizing and coevolution of actors. That's why lastly, construction of social and political identity is a requirement for social dimension of metagovernance. It provides to manage multi actors and nonlinearity characteristics of system.

To sum up, throughout this chapter, we attempt to give an approach that combines complexity theory and metagovernance. It is not completely end-result chapter but it can be considered as a skeleton of two new phenomenons how they coevolve with each other in public administration. While our complex societies transform themselves, seeking of sustainable governance model would be continued.

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Chapter 7
Limits and Criticalities of Predictions and Forecasting in Complex Social and Economic Scenarios: A Cybernetics Key

Gandolfo Dominici and Federica Palumbo

Abstract Predictions play a key role in assuring the status of "rationality" in decisions. Nevertheless, in the field of social sciences and economics, predictions fail to correctly depict the oncoming scenarios. Why is it so difficult to achieve quantitative prediction of social and economic systems? Can science provide reliable predictions of social and economic paths that can be used to implement effective interventions? As in the notorious "El Farol bar problem" depicted by Brian Arthur (Am Econ Rev 84:406–411, 1994), the validity of predictive models is more a social issue than a matter of good mathematics. Predictability in social systems is due to limited knowledge of society and human behavior. We do not yet have worldwide, quantitative knowledge of human social behavior; for instance, the perception of certain issues or the predisposition to adopt certain behaviors. Though tremendous progress has been made in recent years in data gathering thanks to the development of new technologies and the consequent increase in computational power, social and economic models still rely on assumptions of rationality that undermine their predictive effectiveness. Through some theoretical and epistemological reflections, we propose a way in which the cybernetic paradigm of complexity management can be used for better decision-making in complex scenarios with a comprising, dynamic, and evolving approach. We will show how a cybernetic approach can help to overcome the fear of uncertainty and serve as an effective tool for improving decisions and actions.

Keywords Cybernetics · Bathometer · Complex social scenarios · Complex economic scenarios

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7.1 Introduction

For the public, and for the vast majority of scientists themselves, science is typically considered to be able to predict, with theoretically unlimited precision, the future course of natural events on the basis of universal rules.

Many social, economic and managerial decisions are concerned with predictions. Friedman (1953, p. 15) argued that

> Economic assumptions must be judged not in terms of their "realism", but by seeing whether the theory works, which means whether it yields sufficiently accurate predictions.

But are predictions reliable?

There is no doubt that making predictions and forecasting in complex social and economic scenarios are not easy tasks, and are notoriously unreliable. While it is absolutely possible to predict an eclipse thousands of years in advance, predictions about the weather, the stock exchange or other complex phenomena are not reliable. This problem is due mainly to two kinds of problems: the difficulties in forecasting human behaviour (which are the basis of the research field of behavioural economics started with the pivotal work of Simon 1959) and the impossibility of predicting the results of the interactions of a huge number of diverse actors coming across each other in an extensive variety of ways (Sen et al. 1986).

Some may argue that predictions have a key role in assuring that decisions have a "rational" base.

But do we need rationality?

We believe that the rationality of economic agents and consumers is a myth; or, to put it another way, a 'metaphysical' assertion of economic theory. In management, this brings the possibility of making the mistake of believing that there is 'one best way' based on rational choices that can fit all situations, which makes rationality 'irrational'.

Humans are not rational; hence, the intangible and irrational aspects are prominent in human choices, including economic choices. The same existence of marketing implies that the consumer doesn't choose as '*homo oeconomicus*' by considering tangible costs and benefits, but thinks and chooses according to the emotional and symbolic value of the goods (Dominici 2011a). This has an implication for all value creation processes, and consequently, for managerial practices. In a famous experiment, Jensen and Call (2007) applied game theory (ultimatum game) to chimpanzees and pointed out how these primates act in a perfectly rational way according to the postulates of *homo oeconomicus*. Chimpanzees are rational; human beings are not! Chimpanzees would not pay a premium price for something they can get for a few cents, while men do. This is because during evolution, homosapiens acquired an aptitude for empathy and abstraction, which differentiates his behaviour from that of monkeys; policy-makers, consumers and managers are homosapiens and not chimpanzees.

Policymakers and managers still base their actions on these methods of forecasting; are they dumb? Are they trustworthy charlatans?

We believe that while forecasts and predictions are somehow necessary, they need to be handled with care. The foundation of the scientific model is the reproducibility of an experiment; therefore, the result of the experiment must be universally valid and repeatable. While this 'may be' the case for natural sciences (at least in the Newtonian framework), it is not the case for complex social systems. Uncertainty, unpredictability, insufficient knowledge and 'liquid' contexts in continuous change moved by changing actors (Bauman 2000) are the characteristics of today's complex social environment (Dominici 2011b; Dominici 2008).

There are several reasons as to why economic predictions are so hard to get right. First, we cannot fully understand the continuously changing processes that generate social and economic variables; and second, we cannot correctly measure them because, in many cases, they are immeasurable. Asserting that social systems are complex means that it is impossible to understand them considering the single elements separately, and that there is no possibility to predict the future, but only to grasp and influence the future scenarios proactively (Dominici 2011b).

But what do we mean by 'complex system'? A definition of complexity is given by the Santa Fe Institute (cited by Ramalingam 2013, p. 18):

> Complexity refers to the condition of the universe, which is integrated and yet too rich and varied for us to understand in simple common mechanistic or linear ways. We can understand many parts of the universe in these ways, but the larger and more intricately related phenomena can only be understood by principles and patterns—not in detail. Complexity deals with the nature of emergence, innovation, learning and adaptation.

In other words, complexity arises when the interactions among the components of the system do not respond to identifiable schemes that can be described by an algorithm, thus resulting in outcomes that are different from the original forecasting (Dominici 2011b; Dominici 2009; Dominici and Palumbo 2013).

A theoretical attempt to assert the reliability of predictions is the still-existing belief that the irregularity of the vast majority of natural phenomena are not real; they are to be regarded as temporary drawbacks caused by imperfect information regarding a large number of variables and parameters that the observer is not able to fully conceive, and that mask some fundamental underlying irregularities. This assertion has been proved to be incorrect by numerous experiments in laboratories under strictly controlled conditions, where ordinary systems, obeying laws understood to the smallest detail, produced unpredicted behaviours similar to the phenomenology of complexity (Nicolis and Nicolis 2007, p. 2).

Another attempt is to distinguish two different kinds of phenomena: those that have deterministic evolutionary rules, and those that do not have probabilistic evolutionary rules or those whose evolutionary rules are unknown (Vulpiani 2004). The latter are due to complex social systems, which are by definition unpredictable; but is it possible to predict the former? In theory, the deterministic evolutionary systems should be predictable, but they in fact are unpredictable because of the effect of chaos (measured by the Lyapunov exponent λ), with the rare exception of a

few cases in nature in which the effect of chaos (exponent λ) is negligible, like in planetary movement. Therefore, we can assert that Newton's 'universal laws' are exceptions to the complexity of nature. In the 1960s, Lorenz demonstrated mathematically the impact of 'chaos' in weather forecasting. Even if the atmosphere was to be described with only three variables (due to drastic simplifications), with chaos, every forecast would be unreliable after a certain period. Therefore, complexity is not a mere allegory of something that we do not understand; nevertheless, it is a ubiquitous natural phenomenon.

This is nothing new if we consider that, as early as the nineteenth century, Clerk Maxwell understood that deterministic evolutionary systems did not exist. According to Maxwell (Campbell and Garnett 1982, p. 440):

> It is a metaphysical doctrine that from the same antecedents follows the same consequents. No one can gainsay this. But it is not of much use in a world like this, in which the same antecedents never again concur, and nothing ever happens twice. Indeed, for aught we know, one of the antecedents might be the precise date and place of the event, in which case experience would go for nothing.

So if even the 'deterministic' scenario is not precisely predictable, how can we make decisions in a complex business environment?

This question is hard to be answered with a general model, but we can find a model to redefine and co-evolve the management of future situations. In this article, we will illustrate a possible way to deal with the future 'as it emerges' (Scharmer 2009; Dominici 2013).

7.2 The Cybernetic Prototype: The Bathometer

Applying the approach of cybernetics to manage future events is consistent with the notion of adapting to a given context. Cybernetics can be a learning tool to aid in trying out solutions to local and specific problems by thinking in order to implement a prototype action as a feed-forward tool for reading the feedback coming from it.

Cybernetics gives us two powerful tools for overcoming the uncertainty about the future deriving from complexity: 'feedback' and 'feed-forward'. As Lee (1997, p. 23) pointed out:

> Interactive component relationships create hierarchical levels of complexity. Protracted over time, component interactions 'feed forward' to produce the macroscopic configuration of components that is discernible at any given point; 'feedbacks' describe the continual accretion of effects from previous interactions, which may in turn alter lower-level interactions and higher-level configurations at the next point in time.

Feedback can be used as a method either of learning by doing, or of learning through mistakes. But before learning from our mistakes, we need to think in order to simplify the complexity of mental schemes, and to have a 'feed-forward' of possible scenarios (Dominici 2013).

Our brains have limited capabilities (e.g. Beer 1974, p. 58); hence, simplification is necessary for every human decision and action. When the decision-maker observes the other agents in context, he watches them from 'outside', considering them to be black boxes, of which he does not and cannot know all of the inner dynamics. When the observer is situated 'outside', he treats the observed system as an uncomplicated entity, ascribing a number of attributes and studying its interactions with its context (Espejo and Reyes 2011, pp. 9–10). This kind of simplified description is sometimes necessary to make it possible to deal with complexity (Dominici 2013).

The necessity of simplifying complexity in order to make decisions and take actions has been deeply analysed by the neurophysiologist Berthoz (2012), who introduced the neologism 'simplexity'. Simplexity explains how living organisms (and hence, complex social systems) necessitate finding conceptual maps that allow them to deal with information and circumstances, while considering past experiences and anticipating future ones. Using feed-forward, the decision-maker can eventually change his or her map and elaborate new solutions that are suitable to different situations (Dominici 2013).

Therefore, provisions are necessary to build a set of maps that can be used to make decisions and act in the midst of the uncertainty (Pitasi and Dominici 2012). In other words, the feed-forward is the intuitive prediction that allows the kybernetes to find new maps that allow him or her to grasp the variations that a certain input could present in a possible and desired final state. At the same time, the feedback works both as a regulatory mechanism inside the chosen conceptual map and, at a higher recursive level of decision, supplies inputs as a starting point from which to adjust the feed-forward planning and change the map (Dominici 2013).

To put this cybernetic framework into practice, we need to think and develop prototypes that explore the future, by doing something small and rapid that generates feedback from all the key stakeholders (Scharmer 2009). Prototypes reduce the risk of failure in uncertainty, hence increasing the resilience of the system.

In other words, the prototype should work as a 'bathometer' (Dominici 2013). A bathometer is an instrument used to measure the depth of the sea beneath a sailing vessel. After deciding the route (through feed-forward), the captain (decision-maker) can use the bathometer to continuously check whether or not the sailing waters are safe. The bathometer monitors the depth of the sea by plunging into the water, thus helping to avoid the catastrophe that might occur if a route were followed blindly without checking what is happening beyond the range of the captain's perception.

The bathometer has several functions: probing the depth of the sea; discovering what is not visible to the captain; taking the risk out of what is under the sea and cannot be seen from the ship; giving feedback about the bottom of the sea; and supplying inputs for feed-forward to modify the route of the ship.

The feedbacks obtained with the prototype can give clues about the true merits of changes of the outcome of decisions. It enables the decision-maker to obtain feedbacks that help better develop the prototype, and that can be used for feed-forward thinking, changing the root.

Moreover, using a bathometer or prototype, the risk is limited only to the bathometer or prototype, thus avoiding more serious damage to the ship. To be useful, a bathometer or prototype must also: be clear and possess a single focus, while being easy to read and interpret, so that it can supply unambiguous feedback; and be resistant to whatever threatens to impede its functioning within its context in order to be able to provide the required feedback.

7.3 Conclusions

Uncertainty, unpredictability, lack of information and continuously changing contexts are the characteristics of complex social and economic contexts. Predictions seem to be somehow necessary to overcome the fear of acting that arises in such circumstances. The decision-maker is required to deal with different models of depicting and manipulating new scenarios in the 'mare magnum' of complexity.

This portfolio of models and conceptual maps is crucial to the establishment of plans and procedures that can help the decision-maker reveal something impossible to grasp by the application of a single model.

The conceptual maps must be tested to prove their validity through action in the real world, and by learning from mistakes using prototypes. Building prototypes is crucial in helping the decision-maker to choose the direction properly and continuously learn from his or her mistakes. The key to success is organizational resilience, which is the ability of the system to return to the previous (or desired) state after an unexpected perturbation occurs.

In summary, the main criteria for a good manager or kybernetes in the twenty-first century should be knowledge, an aptitude to action, the ability to learn from mistakes and psychological resilience, which allows eventual failures to be damped and absorbed, the ability to learn from these failures and the ability to start up again and decide and act better than before.

We can call this ability to 'navigate through' complexity 'intelligence of complex phenomena' and describe it as a form of strategic intelligence, which is not limited to the mere knowledge of strategies, but is a more general way to manage knowledge and the future.

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Chapter 8
Leadership in the Formation and Change of School Culture

Mehmet Şişman

Abstract Educational reform is essentially a cultural transformation process that requires organizational learning to occur: changing teachers is necessary, but not sufficient. Changing the organizational culture of the school is more imperative and indeed an urgent necessity. The culture of the education system as reflected in various schools must undergo radical change, with the main catalyst being the principals managing the process of formation, sustainability and change of the school culture. This paper has examined the internal and external factors influencing school culture especially the school founders, administrators and school history. Meanwhile key symbolic and cultural leadership roles of school principals were explored calling for the school principals to be role models as well as transformational leaders. Key mechanisms in management and change of school culture especially communication and decision making were equally examined. Lastly the paper engaged the nature of chaos and complexity that obtains in the process of school culture formation and change.

Keywords Leadership · School culture · Culture formation · Culture change · Chaos and complexity

8.1 Introduction

Culture is not something that occurs suddenly since its formation occurs within a certain time frame. For a strong school culture to occur at the expected level within a school, it depends on various conditions and factors. Among the main factors and conditions in the formation of a strong school culture include long-term togetherness of teachers as school community members, absence or relative lack of sub-cultures

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in the school, cultural attributes among members such as strong communication and interaction as well as the managers' cultural leadership.

The formation of a corporate culture in institutions and schools is quite a complicated process. Some researchers who have explored the issue, have approached the subject focusing more on managers in terms of creation of this culture, and its survival in strengthening it as well as necessary attention to the role of managers in changing the culture. In this process much of the research focuses on the role of school leaders in the management of school culture change.

A common culture is produced and is therefore a product of people who share common cultural assumptions and values. The culture in question therefore is produced, shared and reproduced by people. Thus people don't just form mechanically or as adaptive transfer mechanisms per se but are also conceived as a builder and converter of such cultures. In this process, however, some factors may be more decisive and effective than others. The main determinants in the development of school culture may be discussed in two sections as internal and external factors. Among the external factors; the social, cultural, political and economic environment of the family within the school setting may be mentioned.

The occurrence of a corporate culture is subject to the presence of an interacting group of people and is a long term association above everything else. We cannot speak of groups of people interacting with each other without talking of a common culture among them. In the absence of a continuous and stable teaching staff and a leader in a school, a strong corporate culture cannot occur. Each school member carries the external environment and the cultural properties of the same environment which are added to the cultural aspects in the school's history. The culture of the external environment can also be developed through similar or different cultural properties. In the formation of a school culture, internal effects related with the environment, the founders, owners, leaders, employees, including the organization's history can be handled under certain titles.

8.2 School Founders

In the creation and sustenance of a powerful and corporate culture change, the founders, leaders and heroes are considered to hold an important place. The founders and managers in particular, are a key determinant of the dominant values expected in an organization. Those who establish a school are expected to have dominant values as well as some views, opinions and above all a vision. In this respect, some values that prevail during the first opening of the school are a foundation of the school culture. Vision which is about what you want to accomplish and achieve by providing a consensus on common goals, is an important factor in the formation of organizational culture. This situation can be seen as more significant in private schools. If the technical or social characteristics and values of the founders are highlighted, the resulting culture can be different. Naturally, every founder does not have the same effect in the formation of organizational culture.

Researchers, who have examined the basic field of organizational cultural formation and this culture's historical formation process at the same time, look at culture change as a complex phenomenon. However, research shows that organizational culture changes over time. In this process managers and leaders are seen as key determinants of cultural change.

8.3 School Principals

Besides the founders of the school, school principals can also be effective and decisive in the formation of culture in a school. There is a striking emphasis on the role of top management in impacting the process of cultural formation and change. Institutional practices and decisions as well as a number of issues adopted by the managers are based on core values and beliefs. However, school culture is not an ideology of school principals.

Administrators may consider some cultural criteria in the selection of personnel in schools, but for principals in state schools in Turkey there is no such authority. In order to realize organizational socialization there is need to highlight and strengthen values that can be adopted in the in-service educational activities held. Whether the innovation and risk of managers is there or not, whether new ideas and suggestions are supported or not, reward and punishment practices as well as attitudes in the crisis affect the formation of school culture.

According to the research conducted on this issue, the manager is seen as the most important actor in the development of school culture. Administrators can create a shared vision for an institution inside and outside the school and should be able to integrate them within shared values. However, two major problems in the manager's cultural leadership are emerging. It is difficult to find a clear answer to these questions in modern society: Which norms and values should managers strengthen? How should they form them? In multicultural societies it is not so easy to answer these questions.

In a school, administrators must first recognize and evaluate the dominant culture, and they must then develop strategies for strengthening or transforming the culture. Leaders need to know the cultural resources, the school's history and the region's characteristics. In this process, the administrator can see the positive or negative effects of the factors mentioned on the existing culture. Thus, evaluating the existing condition of the culture helps to determine a culture that supports positive values, norms and traditions. Accordingly, attempts towards strengthening and transformation of culture can dully start.

8.4 School History

Each school has a historical and cultural past. The cultural history of the school provides a deep social and symbolic meaning; the future of the school is also built on this culture. This creates an archive of the school's values and cultural memory and builds a bridge between past and future of the school. Besides some photos of the written history of the school's past, articles and videos also form the cultural collections of the school. In addition to these, there is an oral archive belonging to the school's history.

A school's history is important for the school's versatility. School culture is a resource that is born, developed and continuously fed within the history of the school. The written as well as the unwritten myths about the school create an institutional memory lane for the school archive. Successful schools pride themselves in having a long history and past. The institutionalization process which is briefly referred to as the organization's traditions and values is in short the process of formation of institutional culture. The described legends related to the founding of the school like problems and crises encountered overtime and how they were dealt with, requires reinforcement of institutional values within the school community members such as; founders, managers, employees and leaders as well as creating some successful memories like stories and legends which can be used especially as a means of socialization and integration.

In order to form a strong school culture at the expected level in a school, various conditions must be appropriate in terms of the internal school environment. Organizational actors are subjects of the organizational culture.

8.5 Leadership in the Formation of School Culture

The relationship between organizational culture and leadership is a hotly debated topic in the literature on whether these relations would supply a complex situation. This may be viewed from the various roles of the school principal abound. However, the basic roles expected from the school principal are; to determine meaningful school aims and values; to prepare a working and learning environment regularly; to create a strong school culture and a positive school climate for learning; to ensure the effectiveness of the school; to take actions that will improve the performance of teachers and students. The school principal therefore has the power to influence many cases related with the school.

There is emphasis on the new conceptualization of leadership and the subjective aspects in the image of leadership. Typically, when attempting to describe an administrator with more rational and objective concepts, leadership is defined with an emphasis on more subjective concepts. Understanding cultural leadership behaviors of school principals, school culture formation, influence, change and transformation may be listed as management functions. In this context, conceptualization of cultural

and symbolic leadership comes to the fore. In school culture studies, school administrators are conceptualized in the context of school culture associated with the main leadership styles such as, wide cultural leadership, ethical leadership, transformational leadership and instructional leadership.

Just like in social life, symbols constitute an important dimension of school management and leadership life. One of the principle symbols of the administrator as a leader is that he is expected to focus on the symbolic aspects of the school more than daily routine work. Some of the metaphors about the school and the administrator explain how a school administrator interprets their roles and those of the school, how they conceptualize the school and how their values and beliefs are reflected in their practices. Accordingly, a school administrator himself can be seen as a gate keeper, a bureaucrat or instructional leader.

Language and discourse analysis provide clues about the dominant values that should be held in schools. From this perspective, some school administrators may prefer discourse in general written rules, routines and implementation of procedures, i.e. schools may be a source of inspiration and excitement for stakeholders to concentrate more on future results by condensing the prevalent challenges in the process.

8.6 Symbolic and Cultural Leadership Roles of School Principals

Leadership is a process of influence and the most important tool in this concerned influence is language. Studies in school leadership indicate that the most important role of leadership is determining the school's vision, mission and values as well as strengthening the communication process to other members in the transfer and adoption of the created school culture.

Traditional management science's language in general is based on rational and logical concepts. In this view, subjectivity, sensuality and individuality are not included. Whereas leadership is irrational, it is an overriding concept with subjective and emotional aspects. In recent years, research on leadership focuses on the relationship between language and leadership and emphasis has been put on conceptualizing the subjective leadership with mental, moral and spiritual leadership.

School principals are a symbol generator and symbol manager. Symbols are powerful tools in the process of building school culture as well as school-related organizational change, innovation, restructuring and transformation. School administrators can have a significant impact on the words and actions with messages that are distributed, interactions, beliefs, values, attitudes and behaviors. If leadership is briefly seen as a process of influence, managers can communicate key messages via symbols; symbols can bring common sense, strengthen school culture and add new items to the culture.

The principal as a symbol builder: A school administrator uses a group of symbols that may also lead to the formation of new symbols. The place where the

administrator's room is located in the school, objects forming a room's decoration and their arrangement reflect the values considered important by the manager. Some administrators may prefer the immediate entrance of the school; while some may prefer a quiet, secluded location as a management room. In the rooms of administrators, objects such as a variety of student activities, trophies won in various competitions, awards received, artistic posters, photos, etc. can be found. These send a number of messages to the audience as to what aspects are important in terms of the school as an organization. Staff and students pay attention to the awards and values highlighted by the administrator especially during organizational or social crises.

The principal as a role model: Administrators themselves can be the symbol itself, the symbol leader, cultural hero and role model. The administrator's age, gender, philosophy of life, reputation, attitude, temperament, office furnishings give an important message to the members forming the school community. The administrator's coming to school in the morning, walking around the school, visiting classes, greetings to people encountered and talking to them are important symbolically. The administrator's performed actions, while meaningful to members containing a number of messages on the school's values and permits, at the same time have symbolic content. The forms of behavior the administrator used previously at the school, the issues focused on and paid attention to, books read, magazines, newspapers and daily routine will give clues on the values he emphasizes to others.

The principal as a communicator and orator: The principal defines the objectives of the school in a meaningful way and emphasizes them with appropriate messages to the members of the school community. He adds power and an emotional content to the messages. In the communication process he uses a strong symbolic language. The principal creates significant value in the messages to ensure effective communication and thus adds different forms of language to the symbolic content such as the use of; stories, analogies and metaphors. Metaphors, analogies and stories describe the emotions and facts of certain comments.

Written communication used in the management language, the language contained in the words, the text format and appearance, declared success in the school, determination of certain school-related written rules and regulations send a powerful message to others. Written materials give hints about the values of the administrator. In order for the administrator to influence the members of the school community in school life he can use some words, metaphors, slogans, myths, stories, jokes, epigrams, posters, newsletters, clothes, gestures and facial expressions. These can strengthen attitudes, behavior, values and emotions related to the image of a certain school.

That way, the symbols in question provide integration among members constituting the school community and may also provide joint effort to the members towards realizing shared objectives and actions.

The principal as a social actor: Leading executives stress the importance of the values during rites and ceremonies or important occasions organized at the school. Activities such as ceremonies provide common experiences to people in the school,

when the shared values are stressed they become a sacred rite and the shared beliefs and values in the school are consequently reinforced. Meeting days, tea parties, dinner meetings, opening and closing ceremonies, retirement ceremonies, are important opportunities to emphasize a set of values in a school. These actions help to meet sharing, socialization and integration purposes. Meanwhile in these activities, achievements are celebrated, approved behavior and situations are highlighted, and heroism and success stories about the school are told. Stories about the administrator or described by the administrator develop the audience's view about what they should expect from members of the school community and how and what should be the values and beliefs of the school system. Behaviors related to symbolic leadership vary according to the school, type of school and student characteristics. Besides, several studies on leadership behaviors in schools have also revealed some differences and similarities between managers in terms of behavior.

The principal as a transformational leader: Research on transformational leadership shows that a significant share of the leaders in question creates a vision that inspires them and their success. In contemporary discussions leaders are seen as an inspiration for the group members, being a source of enthusiasm and motivation for the group, following the group's belief, sensitive to the beliefs and values of the group as defined by the integration features towards the establishment of a different world and good moral values that can create new community around these values. In the background of such discussions, the language of the leaders holds an important position. In this respect the leader's language and concepts depicted in this language world are extremely important in terms of followers. Formal, official rhetoric which is far away from passion is not expected to have an impact on the audience. In trying to adapt to change in a changing society, a leader has to undertake an important role, being a role model for others, and is required to establish ethical and moral standards. The basic function of managers and leaders in the school is specifically the management of meaning and feelings.

Symbolic leadership applies in all contexts, literal, words, actions and cannot be discussed in terms of awards only. Behaviors related with symbolic leadership vary according to the characteristics of the school, school staff and students. Besides, several studies on leadership behaviors in schools have also revealed some differences and similarities between managers in terms of behavior.

8.7 Managing Cultural Change in Schools

Cultural change is a subject much discussed between anthropologists, psychologists and sociologists. Culture shows a special interest in cultural issues of change which are closely related to issues of theory and research about change. Cultural change includes changes that occur in the cultural beliefs, values, spiritual elements as well as the abstract or concrete and tangible items.

Culture, may differ from society to society and from organization to organization and has the ability to change over time. However, this change may sometimes occur

naturally based on internal and external impacts. Some cultural elements of change can be relatively easy. Rapid change in elements of material culture is accepted more than the elements of spiritual culture. However, some cultural characteristics in particular beliefs and values can take a long time to change.

Organizational change and process of change are cultural and symbolic aspects. An organizational change program is a process which substantially comprises cultural characteristics. In a school; strategy, purpose, structure, process and procedure changes are made in relation to the changing patterns in the minds of existing models and symbolic meanings within the school system. Institutional change also means substitution of an organization's sedentary habits, traditions, legends, images, etc. However, they are not easy to change. These cultural elements are emotion and value-laden.

According to some of the conclusions that can be drawn from the discussions of research related to school culture and change management, not all aspects of school culture change the same way, some are short term while others are long term changes. The most important task in this regard falls on the administrator. Management has the power to influence the formation of a strong school culture especially in the newly established school. This is because some traditions and subcultures have not yet occurred in the school. In such an environment management has an important opportunity of creating a strong corporate culture for realizing the school aims. However, if a school in the past didn't have a successful leader and/or employees were not satisfied with the existing cultural values and norms, the subsequent leader is expected to engage initiatives to change the existing culture. A principal is not one who follows only the values and norms he found at a school, but should be someone who adds new ones as well as changing the input where necessary.

In the process of cultural change, constituents of cultural change should be considered together. Although it may be easier to change items appearing in culture change, changing beliefs and values may be more difficult. Organizational beliefs and values can be highlighted according to the beliefs and values of the culture forming part of the more superficial organizational symbols and practices to deal with some changes. Various studies done on the subject show that some of the symbols of organizational and managerial practices can be used to redirect the energies of members of the organization in order to influence school culture and change. In this regard the duty of the manager is to find and use cultural items corresponding with their situation and institutions.

Schools are complex social systems formed from such components as purposes, rules, and regulations and surrounded by more networks and symbolic meaning than the formal system. Amendments to the formal structure of the school cannot bring about much change in the lives of the teaching staff and students. In the process of restructuring the school, there is need to concentrate on the symbolic domain and to create new symbols and mental models which are built primarily to change some habits in the school system. Policy makers concerned with education and school reform are more focused on the structural elements related to the school. Due to this, the results expected from the change efforts are not that much.

In many countries, schools and educational objectives, educational programs, roles and responsibilities in the school have been reformed during the past decades. In this framework studies conducted on various topics such as; standards, qualifications, performance improvement, accountability; standardized tests to measure student achievement oriented with an emphasis on the development of cultural and symbolic aspects of school life are ignored. However, the process of change in a school covers many aspects of the school such as changes in working forms, habits, values and norms, teaching methods and techniques.

The most important task in the process of changing school culture falls on the managers. Research shows that a school principal as an instructional leader has a key role in the creation of an effective school. For this, the principal as a cultural hero and role model should first and foremost create a unified and integrated culture within the school. School principals, on the one hand cherish existing cultural values, norms and symbols in schools to ensure continuity of the culture of the school and the school itself, if necessary however, they make changes to the state of affairs in the school. Different sub-cultures can co-exist in a school and the school's achievement of its goals can be realized through benefitting from cultural differences and diversity. In this process, the principal who allows one of the sub-cultures to prevail within the school and the exclusion of other cultures opens up to various conflicts and results in terms of the school. For this, the school principal must create an enveloping common culture in order to mobilize the various sub-cultures in the same direction.

8.8 Strategies for Management of School Culture

Literary, it is not possible to map out a standard way for school administrators in the management of culture. However, it may be said that administrators can take advantage of a number of mechanisms in this regard. The duty of managers is to select the most appropriate mechanisms for use according to them or develop some new ways and methods outside of these. By scanning the relevant literature to the topic, some of the mechanisms that may contribute to the formation, effectiveness and change of school culture are listed below:

Role Modeling and Leadership: The school principal as an instructional leader of the school should have basic mission and goals and must provide leadership to other members about the expected dominant values and norms of the school. The principal must be a role model for other members of the school community about new values, behaviors, thoughts and actions. In this context, the school administrators must be forward-thinking, innovative, motivating, engaging, risk takers, those who can cope with uncertainty, problem solvers, those who have high expectations, flexible and tolerant.

People's behaviors may be more effective than words. Administrators can be role models and can influence culture if they use some other forms of behavioral aspects or cultural symbols such as physical appearance, dress code, clothing, gestures, facial expressions, gait, posture and sitting styles.

Information and Communication Process: The school administrator uses various tools in influencing culture particularly oral, written and verbal communication methods. One of the means of communication is language. Language as a system of symbols is a tool of basic management, control and influence. The verbal communication manager will choose words, terms, concepts and metaphors that can affect certain values and can create a new school image. Metaphors are one of the most referenced forms of expression in verbal communication. In everyday life, individuals often refer to the metaphors in oral and written expression. For example; schools, factories, family, prison, free markets, hospitals, clinics. These metaphors affect the image of the school and the relationships in the school. Similar metaphors are used by school members to describe themselves and in qualifying students.

One of the requirements for building a strong culture is to have a common language and a series of concepts. In order for the administrator to influence the school culture, he has to create a new discourse and image of the school with a new language and series of concepts.

Changes in Institutional Structure: Organizational structure and distribution and use of power in this structure may vary according to culture. Organizational structure influences culture. The form of organizational structure created, some organizational processes and practices adopt a management philosophy that reflects the basic assumptions about human nature adopted by the manager. In an organization, topics such as the manager—subordinate relations, decision making, communication and audit management create the basic assumptions, time and form of organizational structure, organizational processes and applications and hence affect the culture of the organization. If people see dominant assumptions about human nature in a school as a good asset, then the creation of organizational structure and hierarchy are expected to be less centralized. In contrast, if there is more involvement, more autonomy and devolution, less power and distance in the relations between leader—subordinate as well as giving greater importance to multidirectional communication, then distant supervision can be expected to be preferred.

Management and Use of Symbols: Just as schools shape people's lives, people shape the life of the school. They give direction to the culture as an important element and its symbols. School administrators should strive to understand and analyze the world meaning of the school. In this context, in order for a leader to improve the quality of school life he has to create new meanings and symbols; he should also use symbols as a control tool, as a means of motivation and influence as well as organizational change management and leadership. According to some researchers organizational change process is not something else but a transformation process which carries symbolic and ritualistic features.

Use of Stories and Legends: Symbols are tools that can be frequently used both in the creation and transfer of a culture as well as its transformation. In this context, corporate ceremonies, heroes, stories are used as a tool of cultural transformation. School-related stories, memories, legends; are some of the tools managers can use to influence organizational culture. Leaders encourage positive stories and legends that are told about the school inside and outside school. School culture is strengthened

when the core values of the school are well described and followed to the letter. The heroes of these stories and legends create role models for members of the culture, represent the core values, and encourage integration, success and competition. Each school would be expected to have some potential hero. Most importantly, this hero is kept alive in a vivid manner. In order for managers to create an effective and an excellent school as well as a strong school culture, they have to take into account the role of the heroes, train the heroes and cherish them.

Ceremonies and Meetings: The ceremonies and meetings are basic elements of organizational life and organizational culture just as in everyday life. Many daily behaviors in school organization carry a ceremonial and ritualistic character. The school's daily, weekly, yearly, opening and closing ceremonies, graduation ceremonies, school participation, separation and retirement ceremonies, balls, fairs, various festivals, days and weeks regarding the commemoration and celebration ceremonies, speeches made, sung anthems and songs etc. constitute important parts of the school culture.

Ceremonies and meetings as monitoring and control tools are the basic means that can be used by the school administration to influence, change, integrate and make placement for new values in culture. Organizations and schools with strong organizational culture at the same time have well-organized and effective meetings and ceremonies.

Regulation of the Physical Environment: One of the tools that managers need in order to have a major influence on culture is their office as well as some arrangements to be made in the physical environment of the school. A change laden school administrator can affect school culture by making some changes in the physical environment of the school. Accordingly, a number of materials used in regulating the school environment image possess cultural meanings. For example, the location of the executive room, the arrangement of the room, forms of decoration materials, a physical symbol and each one of these reflects a number of meanings, messages and contains a sense of the administrator's management philosophy. In a school, offices, classrooms, workshops, hallways, playgrounds, materials used in the decoration and furnishings that make up the physical environment of the school set up by the administrator; reflect and influence the culture. In this context, school-related exhibitions, newspapers, paintings, slogans, logos, posters, uniforms, colors, badges, emblems, pennants, etc. constitute a part of the school culture.

Education and Socialization Programs: It is important that training and development of employees to improve their work be held in the school. In-service training carried out under names such as adaptation to work, internships, and staff development forms part of the educational activities, organizational learning and the process of organizational socialization. Organizational learning or socialization process is in a sense, the process by which organizational culture is learned. In a school, there is participation in educational activities such as the new accession ceremony for teachers; stories are told at these events, there would be heroes, and all these are important tools for learning school culture. Providing those working in the school with confidence and motivation for change can be achieved through training and acclimatization means.

Personnel Selection Process: The school administrator's power in personnel selection is extremely limited. However, it can be said in this regard that managers in private educational institutions have more authority. In the selection of staff, schools are expected to search for other qualities other than professional qualifications of the personnel concerned. One of these relates to the corporate culture of the staff who should be well equipped to adapt to the dominant values of this culture. In the selection of staff knowledge, skills and abilities are taken into consideration. The qualities possessed are assessed in view of the school and those with the appropriate values are selected.

Decision Making Process and Criteria: Decision making process, is a process of making a choice between alternatives in problem-solving. There are many variables that influence the decision making process. Prevailing or dominant values are an important determinant of school management's decision making on various issues of corporate culture. Decision making process is influenced by the values of the decision-makers. Also in the decision making process cultural characteristics affected by the decision should be taken into consideration. Organizations may encounter various crises and conflicts. In such cases, decisions of administrators are extremely important. The criteria adopted in this decision affect culture. In crisis periods the administrator's attitudes are seen among the factors that influence and strengthen culture.

Administrative Practices: Organizational strategies, policies, routines and procedures, assessment criteria, promotion processes, award—promoting changes made in systems and control systems provide for a cultural change. Culture should also be considered in the managerial practices carried out by school management in schools. The selected methods should be empowering and developers of culture.

Culturally appropriate reward and incentive systems, representing an ideal culture support, and performance evaluation systems take place in this context. In application of issues such as incentives, performance evaluation and reward-punishment, the importance and extent of assumptions and values adopted by managers may be different. The implementation of the recently adopted different criteria can give rise to different matters relating to organizational cultures. Apart from these, time management can be utilized more in other ways such as job rotation, assignment and relocation.

Create a Learning School: Organizational learning generally refers to the continuous improvement of organizational processes and products as well as transfer of knowledge into action. A learning school is a result of having the competence of the people in the school well developed. Organizational learning is an ongoing process. For people the moment you stop learning, living also ceases to exist. This also applies to a school. Because schools are defined as living social organisms, they have to meet the changing expectations of being sensitive to environmental changes in order to survive and adapt to change. This kind of school learns quickly and adapts as quickly as possible. Building a learning school is a responsibility issue of the managers.

People learn from individual life and experiences, observations and other ways. Just as it is about learning in general, is also not possible to identify the best method

for organizational learning. One of the ways of organizational learning is learning from mistakes. But what is most important is to be aware of organizational errors. Otherwise, if organizations are not aware of the errors, these errors will constantly repeated and consequently extend the habit. Another way of developing a model of learning is through imitation. This is premised on the view that one of the most important tools associated with organizational learning is organizational symbols.

A leader in organizational learning is supposed to be a good learner, teacher and role model. To be able to talk about organizational learning in an organization leaders should learn first. As a result of this learning leaders must be able to modify the necessary understanding and application of their management. For this to happen, an effective learning environment and climate needed for organizational learning must be created. Leaders should facilitate organizational learning, they should keep the roads accessing information open, and they should support efforts at development of new strategies, methods and techniques.

8.9 Chaos and Complexity in Building a Positive School Culture

Education in one form or another has been an essential ingredient contributing to the cultural and physical survival of communities for millennia in an oftentimes harsh and inscrutable arctic environment. The accumulated knowledge systems, worldviews, and ways of knowing derived from first-hand engagement with the community are integrated into the fabric of the societies and passed on seamlessly from one generation to the next in the course of everyday life. Education is thus an integral part of a self-sustaining cultural system (Barnhardt and Kawagley 2003). School culture therefore, does not only stand out as challenging but may actually turn out to be chaotic and complex if systems are not well planned and managed by all those in charge.

There is always a claim that schools are home to a "culture of chaos and disregard for authority." In such schools it becomes hard to manage school affairs from learners to the staff itself and every school system may fall out of hand. It would thus be imperative to think of building a school culture that is quite appealing to all systems in the school.

Nanavati and McCulloch (2003) identify a number of aspects attached to complexity of building a positive school culture. The principals and other stakeholders in the school system ought to be abreast with the same lest they fail to put across a tangible influence on school culture:

Workload and Resources: Many challenges are faced by schools and administrators as they try to build and maintain a positive culture. Time, priority of other issues in the school, mandated government initiatives like standardized testing and the skills of the team members all factor into the success of a school. Developing a positive school culture is not a process that happens quickly. It takes time to create a

foundation of shared beliefs. Specific and strategic planning is therefore needed by administration; this can be provided by a proper cultural leadership strategy.

Isolation and Need for Training: Isolation in the job is another concern and principals emphasize the need for training and mentorship in the role. Principals who are new to the role need the opportunity to network with those more experienced. Otherwise there are high chances the principals will be lost in the technicalities of school culture.

Staff Turnover: Principals also worry about turnover among team members and note the need for stability. An effective administrative team takes time to develop and rapid turnover hurts the desire to make positive inroads in school culture.

Maintaining Optimism: Maintaining optimism and dealing with staff negativity is indeed a challenging aspect for all administrators in varying school settings. Bringing a staff on side through a change process is difficult but very rewarding.

Alexander (2011) thus contends that dealing with the complexities of integration in cultural diverse school settings requires a holistic approach. The development of educational programs and curricula that enhance awareness, knowledge, and skills for learners is vital if schools are to provide culturally relevant, respectful, and affirming quality teaching-learning environments.

To that end, the development of culturally sensitive teaching, learning and intervention strategies, as well as professional training needs to take place. It is important that the latter actions should be structured along the lines of awareness, knowledge, skills development and an awareness of cultural diversity. This can only be realized through an effective leadership strategy in the schools in order to form, sustain and change the school culture where needed.

8.10 Conclusions

Within the school system, the roles of the administrator, teacher, and student should be redefined. Administrators should see themselves as a consultant according to teachers and teachers too according to the students; the manager himself/herself should have power, the teacher himself/herself should endeavor to find correct answers to students' questions and they should not be seen as a validator. As teachers use various methods they should engage efforts that help to develop the students' own abilities, setting their own goals, identifying as well as reaching these goals either alone or jointly to produce creative ideas of the highest quality. Diagnosis, recognition, comprehension should be used as purposive measuring instruments by the teachers; if not the ultimate control of student learning should not be considered. Some of the educational goals should also be redefined. As noted by leading scholars in the field of education, it seems to me that modern schools are in crises around the world. In order to overcome these crises, we need to redefine the roles of schools in the context of larger societal arrangements.

Many of the social problems experienced in modern society are concerned with understanding the meaning of values. Above all, the world meaning of the school

has to be rebuilt whereof the main goal should be the central area of values education from student-centered education to "human-centered education". Schools stack with which knowledge is transferred to the learners and places that prepare students for exams should be removed. The school where people are formatted should be reformed; they should not be places where mind formatting takes place. Schools, have to be transformed or converted into environments where people develop themselves, their interests and discover their talents. The sole aim of education should not be to prepare students for specific exams; exams which simply aim at enabling students to access higher vocational schools which provide a training element. The success of the school should not be considered basing on or limited to academic scores taken at the examination level. Exams should be seen as tools that enable people to recognize and explore themselves. In other words, schools need to redefine their traditional roles in light of the present societal and cultural changes that shape people's life.

A school is a significant place for students; an attempt should therefore be made so that learning becomes enjoyable for students. Schools are annoying places for students, the period spent in lessons is perceived as a waste of time, this means that there are serious problems related to school and education that need to be thought about. The crisis in schools essentially the crisis of meaning, is a cultural crisis. The origins of this crisis are based on very old tendencies. Therefore school leaders should be able to challenge existing school culture for the betterment of next generations.

The current crisis in contemporary society and education is one brought about by modernization and the values it produces. The perceptions of policy makers, practitioners, parents and adults about education and the school should be reconsidered. Politicians must stop viewing schools as places where individuals who have internalized the official ideology of the school are trained. Parents should stop viewing children's preparation for exams as a horse race. Schools should primarily be places where basic human and moral values must be internalized and the creation of a student's personality is experienced. School should be the place where values are learned and practiced.

Schools are physically similar. However, the culture, climate, people, traditions are unique to each school. Schools must abandon matching and standardizing according to each other. Each school is unique, distinct and has its own generic culture. School based relationships and the power of discourse relations based on dialogue and discourse format should be started. This relationship and the discourses should be understood basing on the main objectives of the school. Supportive and acceptance forms of discourse rather than exclusionary and defensive forms of discourse should be brought to the forefront.

Relations based on subject-object relationship between teachers and students should be abandoned in schools. A new relationship where students are actively involved in the whole process of school activities should be implemented. This kind of relationship is expected to bring about self-worth among the students. Schools themselves should be able to build their own authentic social facts. Rather than externally imposed policies, each school can develop their own policy which must

be transformed into relatively autonomous structure. Schools which aim at creating a self-taught, self-learning, self-controlled and socially responsible individual instead of externally controlled training of individuals and formation of schools should be considered. In sum, building a strong school culture in this era plays more important role than teaching and learning. Schools principals' role is to create and sustain a positive school culture.

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Chapter 9
Differential Entropy Dynamics: A Possible Cause of Coherence Resonance

Juhi Rajhans and A.N. Sekar Iyengar

Abstract Coherence resonance can be explained using differential entropy and mutual information. This theory explores the role of external noise in stabilising chaotic circuits such as the uni-junction transistor relaxation oscillator. The phenomenon of coherence resonance maximizes differential entropy and mutual information. Thus most natural chaotic oscillators show coherence resonance in the presence of an external driving noise.

Keywords Coherence resonance · Differential entropy · Mutual information

9.1 Introduction

Electronic circuits form the most elegant and simplest models to study synchronisation in chaotic oscillator systems. One of the most primitive models is the uni-junction transistor in the threshold voltage limit. A uni-junction transistor (UJT) is a bar of n-type semiconductor with a pinch of p-type semiconductor in the middle. It is a two base one emitter transistor with current flowing in the base2-emitter-base1 direction. Thus the CRO shows the voltage peaks in the emitter-base1 and emitter-base2 junctions of opposite polarity. Time dependent external stochastic perturbation leads to large amplitude limit-cycle oscillations in the emitter of the uni-junction transistor. According to Nurrujaman et al. (2009), thermal noise and negative resistance across the emitter and one of the bases makes it a non-linear relaxation oscillator. The phenomenon of conductivity modulation in the emitter-base1 region is responsible for the negative resistance of the emitter-base1 junction.

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The central theme of this paper is to explain coherence resonance in period-one limit cycle oscillator like the UJT. The study shows that synchronisation of noisy semiconductor circuits in the presence of external white Gaussian noise is inevitable.

9.2 Theory and Calculations

9.2.1 UJT Characteristics Without External Noise

The crucial point is the onset of negative resistance characteristics. Negative resistance occurs at zero frequency when $\frac{dV}{dI} < 0$. The conductivity of a semiconductor can be altered by the injection or extraction of carriers. Nishi (1962) shows in his work that negative resistance under D.C voltage can be obtained under two conditions—

1. In one model the electrons and holes in the emitter-base1 junction show Brownian motion with drift and no recombination (of electrons and holes) and in the other
2. where the lifetime of the drifting electrons and holes increases with increasing carrier density (Fig. 9.1).

Calculating the values of peak and valley voltages in terms of the power supply voltages, and then calculating the time required to discharge to these voltages, we obtain a set of equations.

$$\frac{dV}{dt} = \frac{V_0}{(RC)}(1 - \exp\frac{-t}{RC}) \quad \text{if } t \leq RC(1 + 3i)$$

$$\frac{dV}{dt} = -\frac{V_0}{RC}\exp(-\frac{t^x}{RC}) \quad \text{if } 2iRC < t \leq 3iRC$$

$$i = 0, 1, 2, 3, 4, \ldots, 1 < x < 2.$$

The biasing voltage determines the dynamics at the emitter- base1 junction. The dynamics in this region is null till the threshold voltage is crossed following which limit-cycle relaxation oscillations set in. This suggests the formation of a saddle-node bifurcation which leads to the formation of a stable and an unstable fixed point. In order to study the dynamics, one has to consider a 1-D graph with similar characteristics. The simplest such graph is the map governed by the following relation.

$$x_{n+1} = ax_n \quad \text{for } 0 \leq x_n \leq \frac{1}{2}$$

$$x_{n+1} = a(1 - x_n) \quad \text{for } \frac{1}{2} \leq x_n \leq 1$$

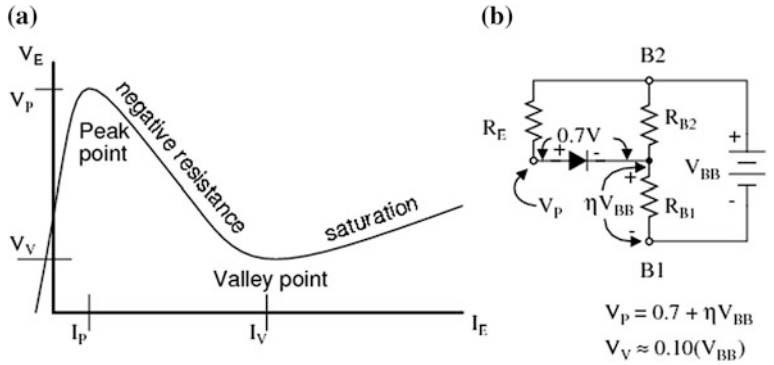

Fig. 9.1 The I-V characteristics of the UJT and the circuit (UJT relaxation oscillator)

Thus, according to the graph the limit cycle occurs for a certain value of the parameter and then the attractor goes through rapid period doubling into chaos. The brief window of parameter values which sustains the limit cycle is when the stable fixed point exists. The limit cycle collapses when the unstable fixed point meets the stable manifold leading to internal crisis.

9.2.2 UJT Characteristics with External Noise

9.2.2.1 Stable Oscillations Due to AWGN Resonance

It has been proposed that conductivity modulation generates a Johnson-Nyquist noise in the semiconductor base. This implies that the thermal noise generated due to mobile electrons is additive white Gaussian (AWGN) in nature, (Wong 2011).

The internal Johnson-Nyquist noise and external stochastic AWGN fed into the emitter through a capacitor, interfere and generate another white Gaussian noise. $X_i = N(0, n1)$ is a Gaussian with zero mean and variance n1. $Y_i = N(0, n)$ is another Gaussian noise. Thus, from the theorem of addition of two probability distribution functions, $Z_i = X_i + Y_i$ is also a white Gaussian noise. The addition of external Gaussian noise acts as a perturbation and throws the system into the stable limit cycle, and the amplitude increases due to differential entropy and mutual information maximisation. Following is a proof of the above statement (Reza 1961, 1994).

The differential entropy of a Gaussian is given by

$$\begin{aligned} h(X) &= -\int_{-\infty}^{+\infty} f_X(x)\log(f_X(x)) \\ &= -E[\log(f_X(x)] \end{aligned}$$

Now, we choose to maximize the differential entropy.

$$\int p(x)dx = 1$$
$$\int xp(x)dx = \mu$$
$$\int (x-\mu)^2 p(x)dx = \sigma^2$$

Using the Lagrangian multiplier one finds the following functional—

$$F = -\int p(x)\ln p(x)dx + \lambda_1(\int p(x)dx - 1) + \lambda_2(\int xp(x)dx - \mu) + \lambda_3 \int (x-\mu)^2 p(x)dx - \sigma^2)$$

From the calculus of variations,

$$p(x) = \exp(-1 + \lambda_1 + \lambda_2 x + \lambda_3 (x-\mu)^2)$$
$$p(x) = \frac{1}{2\pi\sigma^2}^{\frac{1}{2}} \exp\left(-\frac{(x-\mu)^{2^2}}{\sigma}\right).$$

The value of the maximum entropy-

$$\mathrm{H(x)} = \frac{1}{2}(1 + \ln(2\pi\sigma^2))$$

Similarly, the mutual information can be written down in the following form-

$$I[x,y] = \int\int p(x,y)\ln(\frac{p(x)p(y)}{p(x,y)})dxdy$$

One could also show that the mutual information is maximised when p(x), p(y) is a Gaussian.

$$I[x,y] = H[x] - H[x|y] = H[y] - H[y|x]$$

Thus maximizing the mutual information is equivalent to maximizing H[y]. The previous calculations show that this is possible only when y is circularly symmetric complex Gaussian or white Gaussian (Telatar 1999) and this happens when x is circularly symmetric complex Gaussian. The maximal mutual information is given by the following-

$$I[x:y] = \log\det(I + HQH^{\dagger}) = \log\det(I + QHH^{\dagger})$$

where the equality follows from the determinant identity $\log\det(I + AB) = \log\det(I + AB)$. H is a matrix relating the signals x and y. Q is the covariance of x and y.

Mutual information is the reduction in uncertainty about x given a value of y or vice versa. One can interpret the reduction in uncertainty in the second signal as onset of periodicity of the signal after superposition with the external noise. (Sigman 2007)

However, the question still remains as to why limit cycle oscillations should begin at a particular amplitude of the external noise and not at lower amplitudes. Silvia de Monte (Silvia de Monte, Francesco d'Ovidio, Erik Mosekilde, Noise-induced macroscopic bifurcations in populations of globally coupled maps, arXiv: cond-mat/030 1056) shows in her work that low amplitude of noise to a system at a stable fixed point or very close to it leads to bifurcation. The system traverses the entire phase space before returning back to the fixed point when the noise amplitude is equal to the emitter voltage at no noise-relaxation-oscillations.

9.3 Coupled UJTs in the Presence of External Noise-Coherence Resonance

The differential entropy analysis can be extended similarly with two or more UJTs coupled to each other in the presence of an external white Gaussian noise. The differential entropy of each such oscillator is maximum in the resonance regime.

$$I[x;y;z] = H[x] + H[y] + H[z] - H[x|y] - H[y|z] - H[z|x]$$

where one of the signals is the external noise and the other two are the oscillator signals. It is obvious that I[x;y;z] is maximum when H[x], H[y], H[z] is maximum, i.e., each of them generates a circularly symmetric complex signal. This would generate a shifted Arnold tongue diagram which can be tested through experiments.

9.4 Conclusions

Thus, the algebra of differential entropy and mutual information can be extended to coupled oscillator systems in the presence of an external noise. Numerous studies show that noise-induced resonance is observed in various biological oscillators. The explanation through differential entropy can be directly extended for more number of oscillators and the Arnold tongue diagram would suggest different mode-locked orbits in presence of the noise. We conclude by saying that the evolution of

differential entropy and mutual information in chaotic oscillators are clearly suggestive of emerging patterns in complex systems. We also extend our heartfelt thanks to Dr. S.K. Dana whose valuable insights and discussions at Indian Institute of Chemical Biology gave us a crucial paradigm to understand synchronisation in a chaotic system like the UJT.

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Chapter 10
Reliability Properties of Systems with Three Dependent Components

Mehmet Yılmaz, Nihan Potas and Birol Topçu

Abstract This study aims to investigate the reliability properties of the systems constituted of three identical components that are dependent of each other. Besides this, it is studied to compare between the lifetimes of such systems in the sense of hazard rate ordering. Illustrative examples are given by considering some trivariate exponential distributions that are commonly used in reliability literature for the joint distribution of the component lifetimes.

Keywords Hazard rate ordering · Systems with dependent components · Hazard rate function · Exponential lifetimes · Three-component systems

10.1 Introduction

In a reliability theory, when constructing a system model, a common assumption is to consider a system consisting of the independent components. But in many practical systems, the component's functioning affects the others. Therefore, it is necessary to consider the lifetimes of the components to be dependent on each other. For example, a student must take a three-step test to prove his/her competency. His effort in the first stage may have been influenced by environmental conditions and stress, which will probably effect his success in the other stages. Though the independence assumption is appropriate in certain systems, many common reliability modeling practices are

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inappropriate. If the component lifetime is influenced by environmental exposure, then the components within a system may be dependent on each other, or this dependence may be a result of functional dependence. The study of the system reliability without independent component lifetimes is one of the more difficult problems in the reliability engineering. Though the assumption of independence can often be used to obtain joint distribution of the component lifetimes, sometimes such an assumption is questionable. So, the joint attitude of such component lifetimes needs to be modelled by convenient multivariate distribution to include this dependence structure. Multivariate exponential distributions with exponential margins are useful in reliability modeling. Because these derivations are based on shock models, and the residual lifetime of the each component is independent of its age.

In this paper, we compare the hazard rate functions of systems. Each of them consists of three dependent components whose lifetimes have trivariate exponential distributions. Furthermore, the paper gives a reliability relationship among five systems when the component lifetimes are exchangeable. An ordering relation such as hazard rate ordering between the system lifetimes assuming exponential marginals has been studied by many authors. One may refer to those works in literature such as Navarro and Shaked (2006), Navarro et al. (2006a, b), Navarro and Lai (2007), Joo and Mi (2010).

This paper is organized as follows. In Sect. 10.2, basic definitions and the reliability properties of the system with three dependent components are given. We discuss an ordering relation for possible five coherent systems. In Sect. 10.3, we illustrate the discussion by considering four trivariate exponential distributions. For the joint distribution of the component lifetimes, we assume Farlie-Gumbel-Morgenstern, Marshall-Olkin, Gumbel Type I, Gumbel-Hougaard and Sarhan-Balakrishnan type trivariate exponential distributions which are widely used in reliability literature.

10.2 Basic Tools and Main Result

We provide a concise introduction to some basic tools and notions that will be relevant for achieving the main result. Let X and Y be both random variables with survival functions $\overline{F}_X$ and $\overline{F}_Y$, and density functions f_X and f_Y. The hazard rate function of X is defined by $h_X(t) = f_X(t)/\overline{F}_X(t)$ for all t such that $\overline{F}_X(t) > 0$. The hazard rate order is defined as $X \leq_{hr} Y \Leftrightarrow h_Y(t) \leq h_X(t)$ for all $t \geq 0$, or $\overline{F}_X(t)/\overline{F}_Y(t)$ is increasing in t. For more on the definition of the hazard rate order, readers may refer to Shaked and Shanthikumar (1994), and Lai and Xie (2006).

Let T_i be the lifetime of the ith system $(i = 1, 2, \ldots, 5)$ and X_i, $(i = 1, 2, 3)$ stand for the lifetimes of the components. Then five systems are demonstrated respectively as $\min\{X_1, X_2, X_3\} \equiv T_1$, $\min\{X_1, \max\{X_2, X_3\}\} \equiv T_2$, $\max\{X_1, \min\{X_2, X_3\}\} \equiv T_3$, $\max\{\min\{X_1, X_2\}, \min\{X_1, X_3\}, \min\{X_2, X_3\}\} \equiv T_4$, and $\max\{X_1, X_2, X_3\} \equiv T_5$. Detailed discussions can be found in Barlow and Proschan (1975). Throughout the paper, $S_{(\cdot)}$ denotes the reliability function of the system, and $\overline{F}(x_1, x_2, x_3)$ denotes

the joint survival function of the component lifetimes. Then the survival functions of the five systems respectively are:

$$\begin{aligned}
S_1(t) &= \overline{F}(t,t,t) = \Pr(X_1 > t, X_2 > t, X_3 > t)\\
S_2(t) &= 2\overline{F}(t,t,0) - \overline{F}(t,t,t)\\
S_3(t) &= \overline{F}(t,0,0) + \overline{F}(t,t,0) - \overline{F}(t,t,t)\\
S_4(t) &= 3\overline{F}(t,t,0) - 2\overline{F}(t,t,t)\\
S_5(t) &= 3\overline{F}(t,0,0) - 3\overline{F}(t,t,0) + \overline{F}(t,t,t).
\end{aligned}$$

We assume that component lifetimes are identical then we reveal the following two new equations as follows:

$$S_2(t) = \frac{S_1(t) + 2S_4(t)}{3} \tag{10.1}$$

and

$$S_3(t) = \frac{S_5(t) + 2S_4(t)}{3}. \tag{10.2}$$

Furthermore, following relation can be written for both identical and non-identical cases

$$S_1(t) + S_4(t) + S_5(t) = \overline{F}(t,0,0) + \overline{F}(0,t,0) + \overline{F}(0,0,t). \tag{10.3}$$

From (10.1) and (10.2), we respectively write below equalities for the hazard rates of T_2 and T_3

$$h_2(t) = \alpha_{14}(t)h_1(t) + (1 - \alpha_{14}(t))h_4(t) \tag{10.4}$$

and

$$h_3(t) = \alpha_{45}(t)h_4(t) + (1 - \alpha_{45}(t))h_5(t) \tag{10.5}$$

where, $\alpha_{14}(t) = \frac{S_1(t)}{S_1(t)+2S_4(t)}$ and $\alpha_{45}(t) = \frac{2S_4(t)}{S_5(t)+2S_4(t)}$.

Furthermore, let us consider the systems with two components which are series and parallel systems. Their hazard rates can be represented by a convex combination of the hazard rates of three-component system. Accordingly, T_{ss} and T_{ps} denote respective lifetimes of series and parallel systems. Then corresponding hazard rates is denoted by $h_{ss}(t)$ and $h_{ps}(t)$. From now on, we can write mentioned convex combinations as follows

$$h_{ss}(t) = \alpha_{12}(t)h_1(t) + (1 - \alpha_{12}(t))h_2(t) \tag{10.6}$$

and

$$h_{ps}(t) = \alpha_{35}(t)h_3(t) + (1 - \alpha_{35}(t))h_5(t) \tag{10.7}$$

where $\alpha_{12}(t) = \frac{S_1(t)}{S_1(t)+S_2(t)}$ and $\alpha_{35}(t) = \frac{S_3(t)}{S_3(t)+S_5(t)}$.

It can be seen from the Eq. (10.4) that $h_2(t)$ is represented as a convex combination of $h_1(t)$ and $h_4(t)$. Here, it is expected and reasonable that $h_1(t)$ is greater than $h_4(t)$ for all t. However, a counter-example was given for the coherent system by Navarro and Shaked (2006) (see Example 2.2). Now, suppose that $h_1(t) > h_4(t)$ for some t. In this case, $h_2(t)$ lies between $h_1(t)$ and $h_4(t)$. Conversely for some t, $h_1(t) < h_4(t)$ then $h_2(t)$ still lies between them. That is, if there exist an ordering amongst T_1, T_2 and T_3 then these lifetimes must be ordered as $T_1 \leq_{hr} T_2 \leq_{hr} T_4$ or $T_4 \leq_{hr} T_2 \leq_{hr} T_1$. Similar interpretation can be made for T_3 from the Eq. (10.5). On the other hand, according to the Eqs. (10.6) and (10.7), if one can reveal two usual orderings between $h_{ss}(t)$ and $h_1(t)$ and between $h_{ps}(t)$ and $h_5(t)$ then five lifetimes can be ordered respectively. It is easily seen that

$$T_1 \leq_{hr} T_2 \leq_{hr} T_4 \leq_{hr} T_3 \leq_{hr} T_5 \tag{10.8}$$

when each five system consist of independent components. We find out the conditions when the components are dependent the five systems reveal the same ordering above. Navarro and Shaked (2006) investigated some conditions of the hazard rate order of the order statistics. Their ideas give us to consider ordering amongst for all systems with three components. To show the ordering relation amongst the five lifetimes we propose the following Lemma.

Lemma 1 *$T_1 \leq_{hr} T_2 \leq_{hr} T_4 \leq_{hr} T_3 \leq_{hr} T_5$ holds if one of the conditions below is satisfied*:

(i) *both ratios $\frac{S_1(t)}{S_4(t)}$ and $\frac{S_4(t)}{S_5(t)}$ are decreasing function of t,*
or
(ii) *for all $t > 0$, $h_{ss}(t) \leq h_1(t)$ and $h_{ps}(t) \geq h_5(t)$.*

Proof

(i) Suppose that the ratio $\frac{S_1(t)}{S_4(t)}$ decreases in t. Then from (ii), two facts $\frac{S_2(t)}{S_4(t)} \downarrow t$ and $\frac{S_2(t)}{S_1(t)} \uparrow t$ are obtained. According to the definition of the hazard rate ordering, we have $T_2 \leq_{hr} T_4$ and $T_1 \leq_{hr} T_2$. According to the transitivity property of the hazard rate ordering, then we get

$$T_1 \leq_{hr} T_2 \leq_{hr} T_4. \tag{10.9}$$

Secondly, assume that the ratio $\frac{S_4(t)}{S_5(t)}$ decreases in t. Then from (10.3), two facts $\frac{S_3(t)}{S_5(t)} \downarrow t$ and $\frac{S_3(t)}{S_4(t)} \uparrow t$ are obtained. Hence, we write $T_3 \leq_{hr} T_5$ and $T_4 \leq_{hr} T_3$ and both relations imply

$$T_4 \leq_{hr} T_3 \leq_{hr} T_5. \tag{10.10}$$

By combining (10.9) with latter relation, we get the desired result.

(ii) From the Eq. (10.6), we have

$$h_{ss}(t) - h_1(t) = (1 - \alpha_{12}(t))(h_2(t) - h_1(t)) \tag{10.11}$$

This result is combined with Eq. (10.4), above equality is enhanced as

$$h_{ss}(t) - h_1(t) = (1 - \alpha_{12}(t))(1 - \alpha_{14}(t))(h_4(t) - h_1(t)). \tag{10.12}$$

By the assumption $h_{ss}(t) \leq h_1(t)$, according to Eqs. (10.11) and (10.12) we obtain two relations such as $h_2(t) \leq h_1(t)$, and $h_4(t) \leq h_1(t)$. From the Eq. 10.4, by considering $h_4(t) \leq h_1(t)$ then $h_4(t) \leq h_2(t) \leq h_1(t)$. Analogously we have two other relations from the Eqs. 10.7 and 10.5 that is, we have $h_5(t) \leq h_3(t)$, and $h_5(t) \leq h_4(t)$. Finally we write $h_5(t) \leq h_4(t) \leq h_1(t)$. By considering 5 again, we have

$$h_5(t) \leq h_3(t) \leq h_4(t) \leq h_1(t) \tag{10.13}$$

then we get the desired result. □

We investigate the results of (i) and (ii) of the Lemma 1 by considering some trivariate exponential distributions for the joint distribution of the component lifetimes.

10.3 Illustrations

We consider FGM type trivariate exponential distribution to illustrate Lemma 1, (ii). Marshall-Olkin, Gumbel Type I, Gumbel-Hougaard and Sarhan-Balakrishnan type trivariate exponential distributions which are widely used in reliability literature are considered to illustrate Lemma 1, (i).

10.3.1 Farlie Gumbel Morgenstern Distribution with Identical Marginals

Suppose component lifetimes are identically distributed as exponential with λ parameter. The survival distribution is given by at time t

$$S(t,t,t) = \exp(-3\lambda t)\left[1 + 3\theta(1-\exp(-\lambda t))^2 - \theta(1-\exp(-\lambda t))^3\right]$$

where $\theta \in \left(0, \frac{1}{2}\right)$. For more detailed discussion on this distribution can be found in Regina and Johnson (1976), Johnson and Kotz (1977) and Kotz et al. (2000).

First we compare $h_1(t)$ with $h_{ss}(t)$. To do this, we will check the monotonicity of the ratio $S_1(t)/S_{ss}(t)$. Accordingly, by letting $1-\exp(-\lambda t) = u$ then the monotonicity of this ratio is equivalent to monotonicity of $\rho_\theta(u)$ which is given by

$$\rho_\theta(u) = \frac{(1-u)^3[1+3\theta u^2 - \theta u^3]}{(1-u)^2[1+\theta u^2]}.$$

We interest the sign of the first derivative of $\rho_\theta(u)$ to determine monotonic property of $\rho_\theta(u)$. Consequently, after some rearrangement the first derivative can be written as follows

$$\frac{d\rho_\theta(u)}{du} = -2(1-u)\left[1 - \frac{1}{(1+\theta u^2)^2}\right] - \left(1 - \frac{1}{(1+\theta u^2)}\right) + \left[\frac{4\theta u(1-u)}{(1+\theta u^2)^2} - 1\right].$$

It is seen that first two summands are negative signed. Besides, for the last summand by using the fact that $4\theta u(1-u) \leq 1$, we have an upper bound for $d\rho_\theta(u)/du$ which is given by

$$\frac{d\rho_\theta(u)}{du} \leq -\left(1 - \frac{1}{(1+\theta u^2)^2}\right).$$

Hence it can be seen that $\rho_\theta(u)$ decreases in u. Therefore equivalently the ratio $S_1(t)/S_{ss}(t)$ decreases in t. As a result, $h_1(t) \geq h_{ss}(t)$. Now we will compare $h_5(t)$ and $h_{ps}(t)$ in a similar way. Monotonicity of $S_5(t)/S_{ps}(t)$ is equivalent to monotonicity of the $\varphi_\theta(u)$ which is given by

$$\varphi_\theta(u) = \frac{1 - u^3\left[1 + 3\theta(1-u)^2 + \theta(1-u)^3\right]}{1 - u^2\left[1 + \theta(1-u)^2\right]}.$$

The first derivative of this ratio can be arranged as

$$\frac{d\varphi_\theta(u)}{du} = u\frac{2\theta^2 u A(u)^2(2-u) + 2\theta[1-4A(u)] + 2[1-3\theta A(u)]}{\left(1 - u^2\left[1+\theta(1-u)^2\right]\right)^2} + \frac{u[1-4\theta A(u)(1-u)] + \theta u^3}{\left(1 - u^2\left[1+\theta(1-u)^2\right]\right)^2}$$

where $A(u) = u(1-u)$. Since each sums in the numerator is nonnegative the sign of $d\varphi_\theta(u)/du$ is nonnegative. Therefore $S_5(t)/S_{ps}(t)$ is nondecreasing function of t that is $h_{ps}(t) \leq h_5(t)$. Hence assumptions of Lemma 1 (ii) are fulfilled we say that when the lifetimes have a joint distribution as a special case of FGM the possible five coherent system lifetimes preserve the ordering as well as in the independence case.

10.3.2 Marshall-Olkin Trivariate Exponential Distribution

The survival function of this family is given by

$$\overline{F}(x_1, x_2, x_3) = \exp\left(-\sum_{i=1}^{3} \lambda_i x_i - \sum_{i<j} \lambda_{ij} \max\{x_i, x_j\} - \lambda_{123} \max\{x_1, x_2, x_3\} \right)$$

where λ's are corresponding shock parameters which are positive valued. For more details we refer to Marshall and Olkin (1967) and Basu (1997). According to Lemma 1, (i) we will compare T_4 and T_5. To do this, we check the monotonic property of the ratio $S_4(t)/S_5(t)$ denoted by $r_{45}(t)$. Then,

$$r_{45}(t) = \frac{3\exp(\lambda t) - 2}{1 + 3\exp((2\lambda + \theta)t) - 3\exp(\lambda t)}$$

where $\theta = \lambda_{ij}$ and $\delta = \lambda_{123}$. Hence, we consider the numerator of the first derivative of this ratio; denoting this statement by $g(t)$, then we obtain

$$g(t) = -\lambda - 3(\lambda + \theta)\exp((2\lambda + \theta)t) + 2(2\lambda + \theta)\exp((\lambda + \theta)t)$$

with $g(0) = -\theta$. If $g(t)$ remains negative along the line $(0, \infty)$ then its derivative may be negative signed or its maximum value has a negative sign. Therefore, we check the sign of the derivative of $g(t)$;

$$g'(t) = (\lambda + \theta)(2\lambda + \theta)\exp((\lambda + \theta)t)[2 - 3\exp(\lambda t)] \leq 0.$$

As it can be seen that $g(t)$ decreases in t. Since $g(0) = -\theta$, $g(t)$ can not be positive valued. This implies $r_{45}(t)$ decreases in t. According to Lemma 1, (i) second condition is satisfied. Now, we consider the ratio $S_4(t)/S_1(t)$ denoted by $r_{41}(t)$

$$r_{41}(t) = 3\exp(\lambda t) - 2.$$

We can easily say that $r_{41}(t)$ increases in t. This implies $r_{14}(t)$ decreases in t. The first condition of Lemma 1, (i) is also satisfied. As a result of Lemma 1, we have the ordering relation for this family.

10.3.3 Gumbel Type I Trivariate Exponential Distribution

The survival function of this family is given by

$$\overline{F}(x_1, x_2, x_3) = \exp\left(-\sum_{i=1}^{3}\lambda_i x_i - \sum_{i<j}\lambda_{ij}x_i x_j - \lambda_{123}x_1x_2x_3\right)$$

where λ's are corresponding shock parameters which are positive valued. Some characterizations and properties of this family can be found in Galambos and Kotz (1978) and Marshall and Olkin (1967). Then we get the ratio $r_{45}(t)$ which is given by

$$r_{45}(t) = \frac{3\exp(\lambda t + 2\theta t^2 + \delta t^3) - 2}{1 + 3\exp(2\lambda t + 3\theta t^2 + \delta t^3) - 3\exp(\lambda t + 2\theta t^2 + \delta t^3)}$$

where $\theta = \lambda_{ij}$ and $\delta = \lambda_{123}$. For the simplicity,

$$A(t) = \lambda t + 2\theta t^2 + \delta t^3$$

and

$$B(t) = \lambda t + \theta t^2$$

are taken. Then the ratio is rewritten as

$$r_{45}(t) = \frac{1 + 3(\exp(A(t) - 1))}{1 + 3e^{A(t)}(\exp(B(t) - 1))}.$$

To show the monotonicity of this ratio we check the sign of the first derivative. We consider the numerator of this derivative. Denoting this statement by $g(t)$, then we have

$$g(t) = 9\exp(A(t))[(\exp(B(t)) - 1)A'(t) - (\exp(A(t)) - 1)\exp(B(t))B'(t)].$$

By using two facts that are $A'(t) \leq \exp(A(t)) - 1$ and $\exp(-B(t)) \geq 1 - B'(t)$ then we can write an upper bound for $g(t)$ which is given by

$$\begin{aligned} g(t) &\leq 9e^{A(t)}\left(e^{A(t)} - 1\right)\left[\left(e^{B(t)} - 1\right) - e^{B(t)}B'(t)\right] \\ &\leq 9e^{A(t)}\left(e^{A(t)} - 1\right)\left[\left(e^{B(t)} - 1\right) + e^{B(t)}\left(e^{-B(t)} - 1\right)\right] \\ &= 0. \end{aligned}$$

This implies $r_{45}(t)$ decreases in t. Now, we consider the ratio $r_{41}(t)$

$$r_{41}(t) = 3\exp(\lambda t + 2\theta t^2 + \delta t^3) - 2$$

which increases in t. Hence, $r_{14}(t) \downarrow t$. We showed that ordering relation given in Lemma 1 is valid for this family.

10.3.4 Gumbel-Hougaard Trivariate Distribution

Distribution function of this family is given by

$$F(x_1, x_2, x_3) = \exp(-([-\ln F(x_1)]^m + [-\ln F(x_2)]^m + [-\ln F(x_1)]^m))^{\frac{1}{m}}$$

and the survival function is

$$\overline{F}(x_1, x_2, x_3) = \exp(-\left(\left[-\ln \overline{F}(x_1)\right]^m + \left[-\ln \overline{F}(x_2)\right]^m + \left[-\ln \overline{F}(x_1)\right]^m\right))^{\frac{1}{m}}$$

where $m > 1$. We refer the reader to Georges et al. (2001) for more details. Then we write the ratio

$$r_{45}(t) = \frac{1 + 2F(t)^b - 3F(t)^a}{1 - F(t)^b}$$

where $b = 3^{\frac{1}{m}}$ and $a = 2^{\frac{1}{m}}$. To show monotonic property of this ratio, we consider the following transformation: Let $1 - F(t)^b = v$ then

$$\varphi(v) = S_4(S_5)^{-1}(v) = 1 + 2(1 - v) - 3(1 - v)^{\frac{a}{b}}$$

Now, taking second derivative of $\varphi(v)$ we have the following result:

$$\varphi''(v) = -3\frac{a}{b}\left(\frac{a}{b} - 1\right)(1 - v)^{\frac{a}{b}} \geq 0$$

Hence, $\varphi(v)$ is a convex function on $(0, 1)$. This implies

$$\frac{S_4(S_5)^{-1}(v)}{v} \uparrow v \equiv \frac{S_4(t)}{S_5(t)} \downarrow t.$$

Now, we consider the ratio $r_{41}(t)$ which is given by

$$r_{41}(t) = 3\overline{F}(t)^{a-b} - 2.$$

Since $a \leq b$ we say that $r_{14}(t) \downarrow t$. For this family, we have the similar ordering relation as discussed for above two families.

10.3.5 Sarhan-Balakrishnan Type Trivariate Distribution

This family was introduced by Sarhan and Balakrishnan (2007). Franco and Vivo (2009) have determined the joint survival function of the n-dimensional extension. The survival function of this family is given by

$$\overline{F}(x_1, x_2, x_3) = \exp(-\lambda \max\{x_1, x_2, x_3\}) \prod_{i=1}^{3} \left(1 - (1 - \exp(x_i))^{\theta_i}\right)$$

where λ and θ's are positive real numbers. In order to show that the monotonic property of the ratio $r_{45}(t)$ we take the equivalence $u = 1 - \exp(-t)$ which simplify the notation. Thus we get the transformation $r_{45}(u)$ as below

$$r_{45}(u) = -2 + 3\frac{1}{\frac{u^{2\theta}}{1+u^{\theta}} + 1}.$$

Since $u^{2\theta}/1 + u^{\theta}$ increases in u this ratio decreases in u. Equivalently $S_4(t)/S_5(t)$ decreases in t. By similar notation, we consider the ratio $r_{41}(u)$;

$$r_{41}(u) = \frac{3}{(1 - u^{\theta})} - 2$$

where $u = 1 - \exp(-t)$. This implies $r_{14}(t)$ decreases in t. We have similar ordering relation for this family.

10.4 Conclusion

The ordering relation given as the result of Lemma 1 is also valid in case of the independent component lifetimes. Because of this, in the case of dependent component lifetimes, by considering five trivariate exponential distributions for the joint distribution of component lifetimes, we emphasized that the system consisting of the dependent components satisfies the same ordering relation. In a reliability

theory, for the five distribution families which have important role for the system modeling, this ordering properties obtained in this work can be seen as a useful result.

Acknowledgments This paper is dedicated to the memory of our advisor emeritus Professor Yalcin Tuncer who passed away suddenly on August 18, 2011.

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Chapter 11
Cryptosystems Based on Chaos Theory

Mohammad Ahmad Alia

Abstract This paper reviews some developments in cryptographic primitives based on chaotic systems; such as Mandelbrot set, Julia set, and logistic map. However we classified the reviewed chaotic cryptosystems into two categorizes; public-key and nonpublic key cryptosystems. Chaos system has attracted much attention in the field of cryptography due to its properties such as being deterministic and sensitive to the initial values. As it will be indicated in the following sections, researchers are urgently looking for new public-key primitives (encryption, key sharing and digital signature) and nonpublic key system (Hash function) which might be able to replace standard cryptographic algorithms. In the surveyed nonpublic key system, we are showing the latest hash function (chaos Hash Algorithm 1 (CHA-1)) which is based on chaos theory. CHA-1 accepts messages with length less than 2^{80} bits and produces a unique message digest of length 160-bit. As well as in the public-key systems, the creation of the Fractal based public-key primitives is possible because of the intrinsic connection between the Mandelbrot and Julia Fractal sets. The surveyed chaotic cryptosystems are attractive alternative to the traditional number theory based cryptosystems.

Keywords Cryptography · Chaos · Fractal · Logistic map · Encryption · Digital signature · Key exchange · Hash function

11.1 Introduction

Cryptography algorithms can be classified into two board categories, non public-key algorithms and public-key (asymmetric) algorithms (refer to Fig. 11.1). In general, Cryptography protocol employs public-key cryptosystem to exchange the secret key and then uses faster secret key algorithms to ensure confidentiality of the

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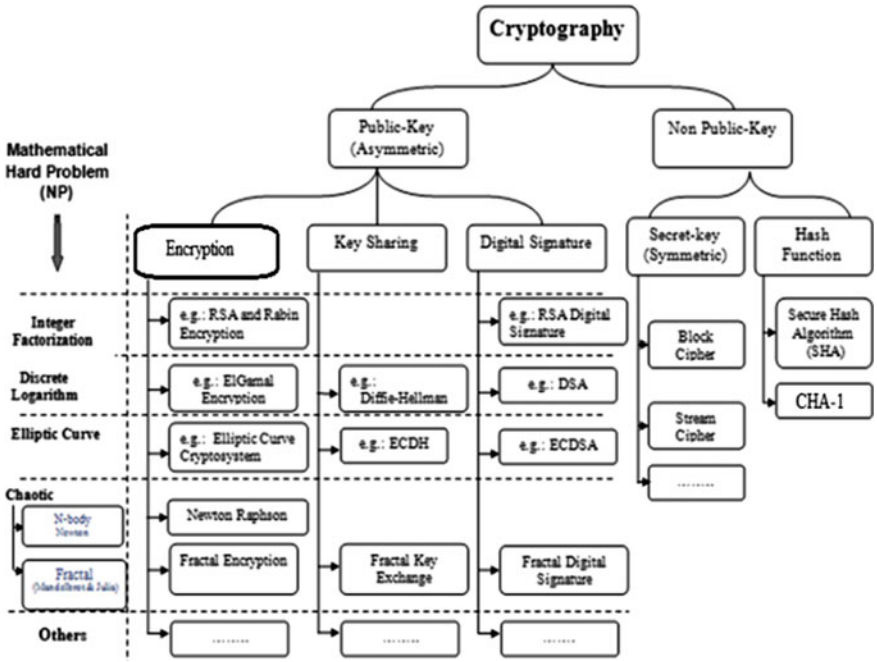

Fig. 11.1 Main branches of public-key scheme

data stream (Branovic and Martinelli 2003; Menezes et al. 1996). Non public-key (Secret key algorithm) is used to encrypt and decrypt messages by using the same secret key. While hash functions are a non public-key cryptography and work without key. Hash functions are normally used as data integrity primitive in more complicated cryptographic protocols as well. However, the secure hash algorithm (SHA) was issued by the National Institute of Standards and Technology in 1995 as a FIPS (NIST 1995). Public key algorithm on the other hand, works in a very different way. In public key algorithm, there are two keys, both belonging to one party, either the recipient or the sender. One key is used to accomplish half of the task (e.g. encryption) while the other key will be used to complete the rest of the task (e.g. decryption).

This paper summarized the various developments in chaotic public-key and non public-key cryptosystems. The paper discusses the latest developments in public-key schemes and non public-key which include Fractal key exchange, Fractal encryption, Fractal digital signature and CHA-1.

11.2 Public-Key Cryptography

Figure 11.1 shows the most critical categories of public-key cryptosystem (asymmetric) which can be classified into three main titles: key sharing, encryption, and digital signature. Each type is fragmented into many subcategories based on its mathematical hard problems (integer factorization, discrete logarithm, Elliptic Curve, etc.).

11.2.1 Key Exchange

The key exchange is an important method in public-key Cryptography. It was the first public-key cryptographic scenario as developed by Whitfield Diffie and Martin Hellman (Diffie and Hellman 1976), this key exchange algorithm is called DH. In DH, keys are exchanged between the users according to Cryptography protocols which are based on the key exchange problem. They highlighted the most important method of exchanging the keys by using the discrete logarithm hard problem (refer to Fig. 11.2).

11.2.2 Public Key Encryption

The first encryption protocol based on the public-key concept is the RSA (Rivest et al. 1978) algorithm which was created by Revist, Shamir and Adleman in 1978. In RSA, one key is known to the public (receiver's public key), and is used to encrypt the information by the sender. The other key is known as a private key, and it is used to decrypt the encrypted data received by the receiver (receiver's private key). There are many other public-key encryption algorithms published since the RSA was made public. Among them are ElGamal (1985), Elliptic Curve (Koblitz 1987), Rabin (1979), etc. (Figure 11.3).

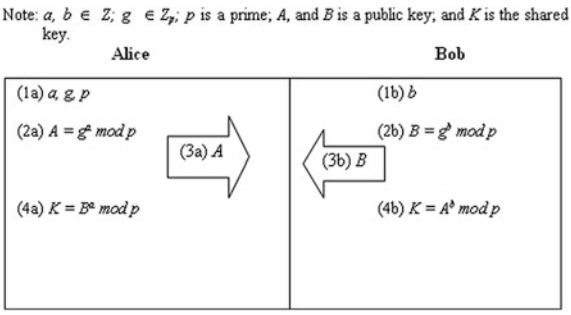

Fig. 11.2 Diffie-Hellman key exchange protocol

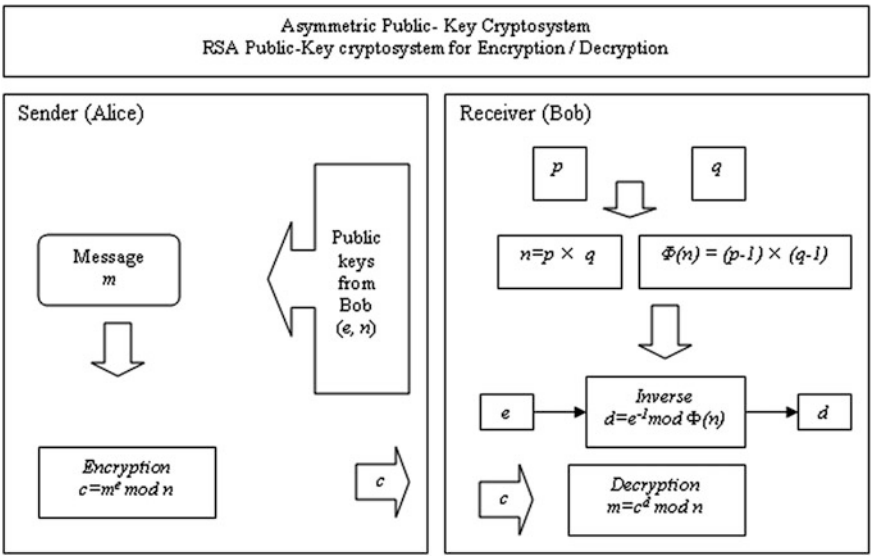

Fig. 11.3 RSA public-key encryption scheme

11.2.3 Digital Signature

Digital signature is a verification mechanism based on the public-key scheme (refer to Fig. 11.1) that is focused on message authenticity (Burnett and Paine 2001; Law 2001). In digital signature public-key algorithms, the private key is used to sign a message, while the public key is used to verify the authenticity of the message.

In 1976, the first idea of a digital signature scheme was given by Whitfield Diffie and Martin Hellman, although at that time they only conjectured the existence of such scheme (Diffie and Hellman 1976; Kaoru and Ogata 1999). In 1978, Rivest, Shamir, and Adleman invented the first digital signature scheme which is called RSA digital signature algorithm (Rivest et al. 1978). Subsequently, there were more proposed digital signature algorithms such as ElGamal signature scheme (ElGamal 1985), Undeniable signature (David and Antwerpen 1990) and others.

11.3 Non Public-Key Cryptosystem—Hash Function

A Hash function is a method of turning the given input message into small digests which are normally used for data integrity service which is also known as the message digests. The Hash function is used to serve algorithms such as the digital signature algorithm to produce the secure signature. However, there are many hash function algorithms such as MD5 (Rivest 1992), SHA family (National Security Agency Announcing 2002), HAVAL (Zheng et al. 1993), etc. As mentioned earlier,

Secure Hash Algorithm (SHA-1, SHA-224, SHA-512, etc.) was issued by the National Institute of Standards and Technology in 1995 as a FIPS (NIST 1995).

SHA-1 is one of the most popular hash functions, which accepts message with length less than 2^{64} bits and generates 160-bit message digest. SHA-1 has been adopted by many institutions, deployed as an important component in various cryptographic schemes, as well as being implemented in most commercial security systems and products.

Lately there has been significant advancement in the analysis of hash function. In February 2005 SHA-1, has been compromised when a new way of finding collisions in SHA-1 was discovered (Wang et al. 2005). From the report, collisions in SHA-1 can be found with less than 2^{69} hash operations. Later, in August 2005, another group of cryptanalysis scientists discovered an improved attack on SHA-1; this time the complexity of the new attack is claimed to be 2^{63} (Wang 2006).

11.4 Fractal System

The word "Fractal" itself was coined by Benoit Mandelbrot in 1960. The word "Fractal" comes from a Latin word "fractus" meaning "broken" or "fractured". As defined by Benoit, "Fractal" is a fragment of geometric shape, created interactively from almost similar but smaller components (some changes in scale) (Peitgen et al. 1992). From another perspective, a Fractal is an example of a Chaos system, whereby changing the initial parameters of the system, even slightly, can generate a totally new Fractal image altogether (Spencer 1997). There are many applications of Fractal. One major example is the use of Fractal to create a realistic image of nature such as the image of clouds, snowflakes, and others (Patrzalek 2006).

11.4.1 Julia and Mandelbrot Sets

The Julia Fractal set (refer to Fig. 11.4), developed by Gaston Julia (Mandelbrot 1982), is the set of points on a complex plane. Julia Fractal image can be created by iterating the recursive Julia function (refer to Eq. 11.1). However, there are infinitely many points of Julia sets which depend on a given small value of c, ($|c| < 2$) (Michael 2000).

In 1982, Benoit Mandelbrot began his refinement on Julia Fractal set. He was looking for the connection between Mandelbrot set and Julia set regarding the value c from the Julia Fractal equation (Lazareck et al. 2001). As the result, Mandelbrot Fractal was defined as the set of points on a complex plane by applying Eq. 11.2 iteratively (refer to Fig. 11.4).

Mandelbrot Fractal set iterates $z^2 + c$ with z starting at 0, and Julia set iterates $z^2 + c$ starting with varying non-zero z which is a slight difference from the Mandelbrot equation.

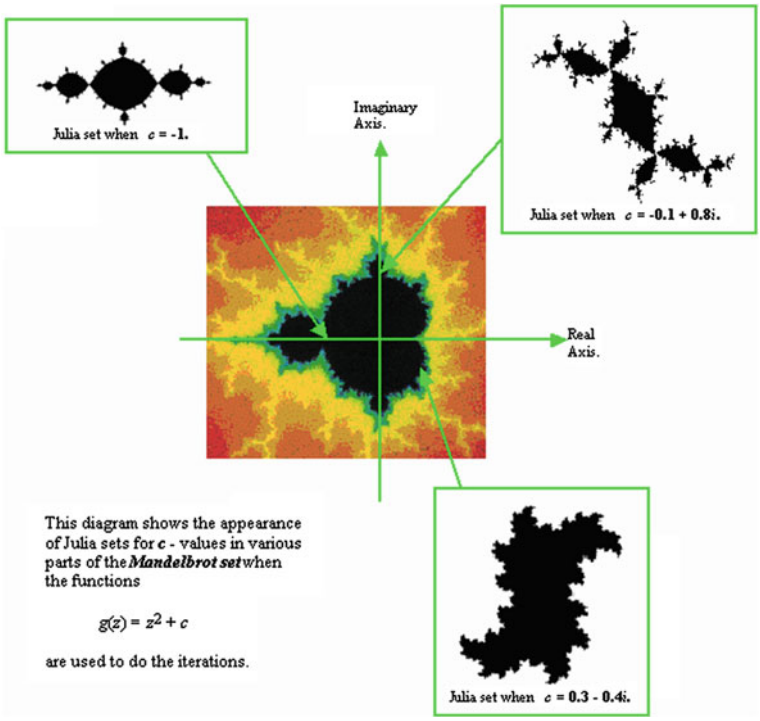

Fig. 11.4 The connection between Julia and Mandelbrot sets (Winter 2007)

Actually they use the same basic Fractal equation which can be seen in Eqs. 11.1 and 11.2. The connection between Mandelbrot Fractal set and Julia Fractal set is that each point c in the Mandelbrot actually specifies the geometric structure of a corresponding Julia set (refer to Fig. 11.4) (Pete 2007; Winter 2007).

$$z_n = z_{n-1}^2 + c; c,\ z_i \in \mathbf{C}; n \in \mathbf{Z} \tag{11.1}$$

$$z_n = z_{n-1}^2 + c;\ z_0 = 0; c, z_i \in \mathbf{C};\ n \in \mathbf{Z} \tag{11.2}$$

11.4.2 Mandelfn and Juliafn Function of the Mandelbrot and Julia Fractal Sets

The Fractal public-key surveyed by this paper uses a specific Mandelbrot function, *Mandelfn* and a specific Julia function, *Juliafn*. In *Mandelfn* and *Juliafn* functions, one can substitute the function f() (refer to Eqs. 11.3 and 11.4) with well-known functions such as sin(), cos(), exp(), etc. However, the value which is generated by

Mandelfn must belong to the Mandelbrot set, and likewise, the value generated by *Juliafn* must belong to the Julia set (Giffin 2006). In the surveyed scheme the function *f*() was set as shown by Eq. 11.5 for *Mandelfn* function and Eq. 11.6 for *Juliafn* function.

$$z_n = c \times f(z_{n-1}) \tag{11.3}$$

$$f(z_{n-1}) = z_{n-1} \times c \times e; z_i, c, e \in \mathbf{C};\ n \in \mathbf{Z} \tag{11.4}$$

$$z_n = c \times f(z_{n-1}); z_0 = c; c, z_i \in \mathbf{C};\ n \in \mathbf{Z} \tag{11.5}$$

$$\begin{aligned} z_n &= c \times f(z_{n-1}); \\ z_0 &= y; y, c, z_i \in \mathbf{C};\ n \in \mathbf{Z} \end{aligned} \tag{11.6}$$

11.5 Fractal Public-Key Cryptosystem

11.5.1 Fractal Key Exchange Protocol

In the Fractal key exchange protocol (Alia and Samsudin 2007) (refer to Fig. 11.5), *c* is the global value known to the public. *d* and *n* are the private values for Alice while *k* and *e* are the private values for Bob. The private values and the global

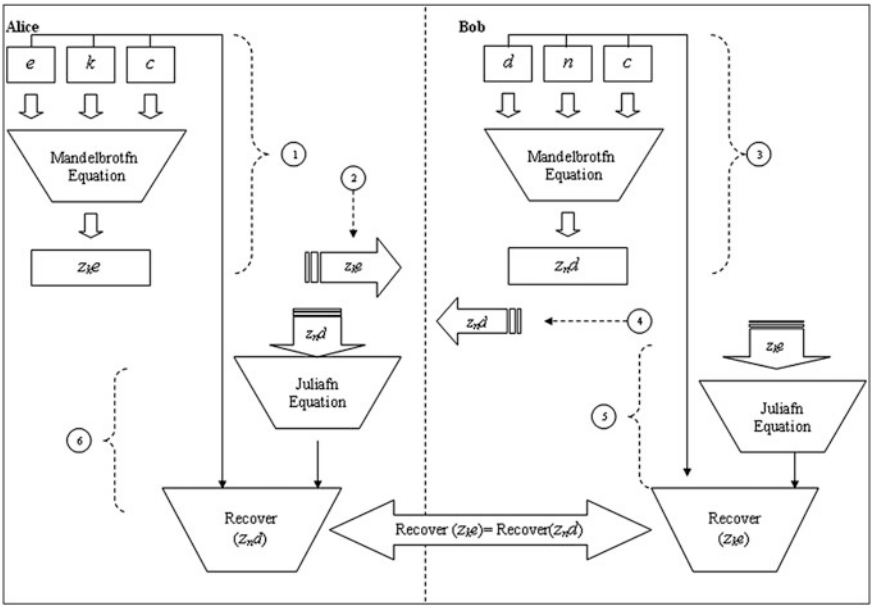

Fig. 11.5 Fractal key exchanging protocol (Alia and Samsudin 2007)

information c are then used as the inputs to the Mandelbrot function, which will in turn produce the public keys, $z_k e$ and $z_n d$ (refer to Eqs. 11.7 and 11.8), for Alice and Bob, respectively. The public values will be used in the exchange process between Alice and Bob. With the private information and the other party's public key as the inputs to the Julia function, both parties will be able to generate the same secret key, $(z_k e)_n d = (z_n d)_k e$ (refer to Eq. 11.9).

$$z_k e = z_{k-1} \times c^2 \times e; z_i, c, e \in \mathbf{C};\ k \in \mathbf{Z} \tag{11.7}$$

$$z_n d = z_{n-1} \times c^2 \times d; z_i, c, d \in \mathbf{C};\ k \in \mathbf{Z} \tag{11.8}$$

$$\begin{aligned} &c^{k-x} \times (z_n d) k^e = c^{n-x} \times (z_k d) n^d; \\ &z, c, e, d \in \mathbf{C};\ n, x, k \in \mathbf{Z} \end{aligned} \tag{11.9}$$

11.5.2 Fractal Public-Key Encryption Protocol

In the Fractal public-key encryption protocol (Alia and Samsudin 2007) (refer to Fig. 11.6), sender and receiver must agree and use a public domain value, c.

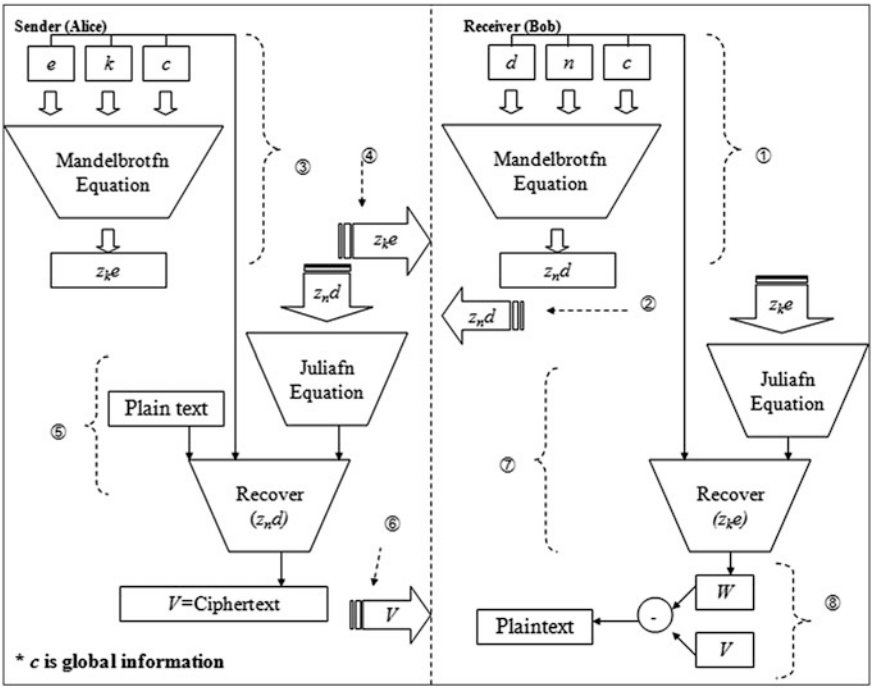

Fig. 11.6 Fractal public-key encryption protocol (Alia and Samsudin 2007)

The receiver, Bob, will generate e and n as the private keys, while the sender, Alice, generates k and d as her private keys. Sender and receiver use their private values as well as the value c as inputs to the Mandelbrot function to produce the public-keys $z_k e$ and $z_n d$ (refer to Eqs. 11.7 and 11.8). Then Bob and Alice must exchange the public keys. Alice will obtain Bob's public key, $z_n d$ and use this value together with her private key and the plaintext, as inputs to the Julia function to produce the ciphertext V (refer to Eq. 11.10), which will then be sent to Bob. Bob must obtain Alice's public-key, $z_k e$, and her ciphertext V which will be used as input values together with his own private key to Julia function, to decipher the ciphertext V (refer to Eq. 11.11).

$$\begin{aligned} &V = c^{k-x} \times (z_n d)_k e + M; \\ &V, c, e, d \in \mathbf{C};\ n, x, k \in \mathbf{Z};\ M \in \mathbf{R} \end{aligned} \tag{11.10}$$

$$\begin{aligned} &W = c^{n-x} \times (z_k e)_n d; \\ &W, c, e, d \in \mathbf{C}; n, x, k \in \mathbf{Z} \end{aligned} \tag{11.11}$$

11.5.3 Fractal Digital Signature Scheme

This Subsection describes a Fractal public-key digital signature (GFDS) scheme (Alia and Samsudin 2007) to sign and verify the corresponding message (refer to Fig. 11.7). The functionality of the proposed scheme depends on the strong connection between the Mandelbrot and Julia sets. Special functions, *Mandelfn* and *Juliafn* functions are used to generate the corresponding private and the public keys. With GFDS protocol, the general public is able to verify signature by using the sender's public key.

In Fig. 11.7, sender Alice, must choose her private keys k and e and generate c, d and n as the public keys. Alice uses her keys as inputs to the Mandelbrot function to produce the private keys $z_n d$ (refer to Eq. 11.8) and the public key $z_k e$ (refer to Eq. 11.7). In addition, Alice, generates k and d as her private keys, and then generates her public key for the public. Also, Alice uses her keys together with the message, as inputs to the Julia function to produce the signature s which is also illustrated by Eq. 11.12, which will then be sent with the message to Bob. Bob must obtain Alice's public key, $z_k e$, c, d, n, the signature s and the message m from Alice which will be used as input to Julia function, to verify the message v which is further illustrated by Eq. 11.13.

$$\begin{aligned} &s = c^{k-x} \times (z_n d)_k e \times m; \\ &z_i, s, c, e, d \in \mathbf{C};\ n, x, k \in \mathbf{Z};\ m \in \mathbf{R} \end{aligned} \tag{11.12}$$

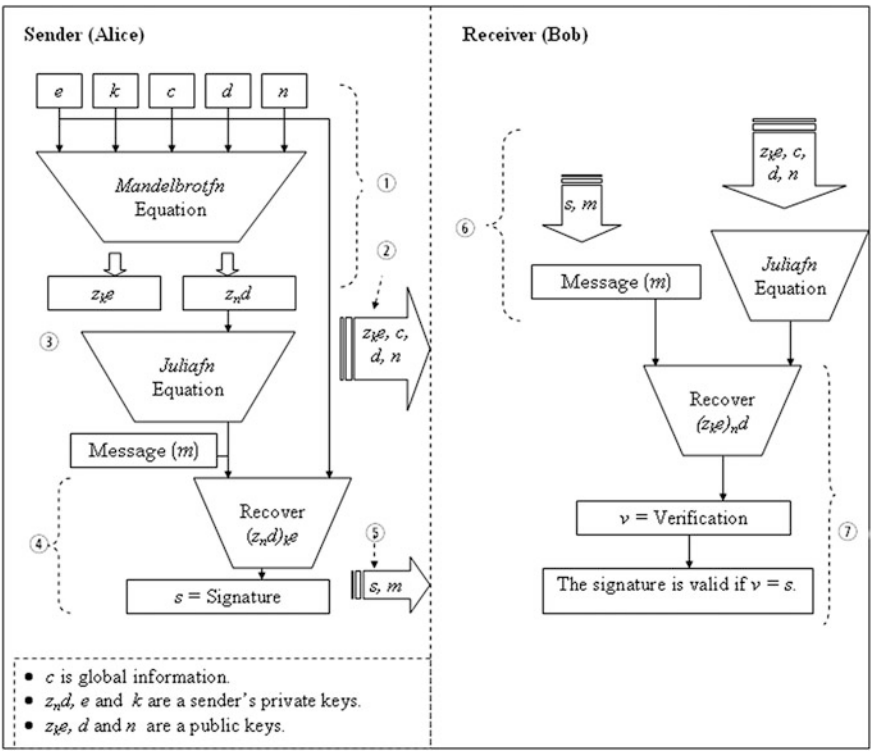

Fig. 11.7 Fractal digital signature protocol (Alia and Samsudin 2007)

$$\begin{aligned} v &= c^{n-x} \times (z_k e)_n d \times m; \\ z_i, v, c, e, d &\in \mathbf{C};\ n, x, k \in \mathbf{Z}; m \in \mathbf{R} \end{aligned} \tag{11.13}$$

11.6 Logistic Map Based Non Public-Key Cryptosystem

In general, hash function is similar to a pseudo random number generator in terms of the randomized output required. Therefore, a dynamic system like chaos is a suitable candidate to be used as engine for a hash function. However, not all chaotic maps are suitable for cryptographic purposes. Among the promising chaotic maps that can be used for cryptographic purposes is the logistic Map. Logistic Map is simple, fast, sensitive to the initial conditions, unpredictable and it is a one-way-function. Logistic Map is a recursive function which takes a real number (X_n), $0 \leq X_n \leq 1$ as an input, and produce a real number, X_{n+1}, between 0 and 1 (inclusive) as indicated by Eq. 11.14. Various sequences of the Logistic Map can be

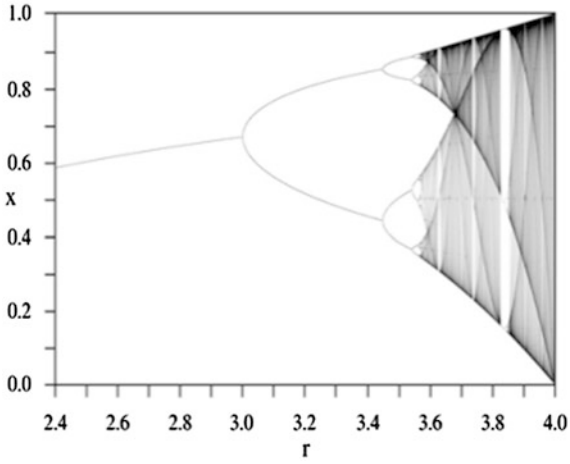

Fig. 11.8 Bifurcation diagram for the logistic map (NIST 1995)

generated from different initial values of X_0 and r. Figure 11.8 shows the graph of the Logistic Map plotted from Eq. 11.14.

$$X_{n+1} = X_n \times r \times (1 - X_n); \quad \text{Where } r \in [0, 4], X_n \in (0, 1), \text{ and } n \in \mathrm{N} \tag{11.14}$$

Figure 11.9 briefly illustrates the general outline of CHA-1. Chaos Logistic Map is used as the core of the CHA-1 at two phases, in Phase 3 and Phase 4. As in other chaos systems, apart from being sensitive to the initial conditions, the logistic Map is also influenced by the recursive parameters (X_n and r). This property has been

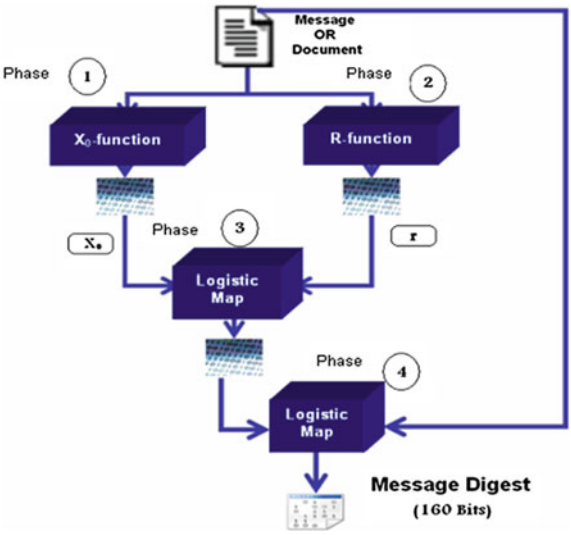

Fig. 11.9 CHA-1 (NIST 1995)

exploited in the design of CHA-1. As shown in Fig. 11.9, the message digest produced by the Logistic Map in Phase 4 will be heavily influenced by the original message (X_n, in terms of Logistic Map) and the initial conditions (X_0 and r, in terms of Logistic Map) which were derived from another Logistic Map in Phase 3.

11.7 Chaos Hash Algorithm-1 (CHA-1)

As shown in Fig. 11.9, CHA-1 (NIST 1995) has four main parts: *R*-function, X_0-function, Logistic Map equation that takes the parameters from both the *R*-function and X_0-function, and another Logistic Map equation which takes the message as the input parameter to produce the final message digest. CHA-1 accepts messages with length less than 2^{80} bits and processes each 160-bit block each time from the original document as inputs to the X_0-function and *R*-function. The first function of CHA-1 is X_0-function, which is designed to produce 160-bit output to be used as an input to the Logistic Map in Phase 3 as the initial value X_0. The second function of CHA-1 is the *R*-function, which is designed to produce the incremental value r, where r is the second parameter for the Phase three Logistic Map. The third Phase of CHA-1 is the process of finding a real value between 0.33 and 0.59 which is the chaos region of the Logistic Map. In Phase 3 the initial value, X_0, and the initial value r will be used as the input parameters to the Logistic Map. CHA-1 takes the first 64-bit from the result of *R*-function to be incremented with the value of r to calculate the next value of X (X_{n+1}) according to Eq. 11.14. In Phase 4, CHA-1 uses the result from Phase 3 as the initial value, and recursively producing X_n by using 64-bit value at a time from the original message.

11.8 Security Analysis

11.8.1 Security of Fractal Cryptosystems

It is computationally impossible to attack the proposed Fractal public-key protocols. Since the system is based on the Chaos NP hard problem (Ruhl and Hartenstein 1997). Furthermore the result of running both Mandelbrot and Julia function is random as shown by correlation coefficient test. The correlation coefficient analysis is used to find the correlation between two distributed adjacent points, which have been used to perform the statistical analysis on the surveyed Fractal public-key cryptosystem algorithms (refer to Table 11.1). Since the correlations averages are very small and close to zero, hence it has been concluded that there is no correlation between the distributed points for the surveyed Fractal public-key cryptosystem algorithms (refer to Table 11.2) and therefore the cryptosystem can be defined as uncorrelated to highlight the difficulty of attacking the Fractal public-key cryptosystem algorithms.

Table 11.1 The averages of the correlation coefficient tests

Protocol	Correlation coefficient average
Fractal key exchange	0.123898
Fractal public-key encryption	0.169263
Fractal digital signature	0.117727
Fractal zero-knowledge proof of identity	0.123898

Table 11.2 Typical interpretation of the correlation coefficient (Franzblau 1958)

Correlation range	Interpretation of correlation coefficient
±(0–0.20)	No correlation
±(0.20–0.40)	Low degree of correlation
±(0.40–0.60)	Moderate degree of correlation
±(0.60–0.80)	Marked degree of correlation
±(0.80–1.0)	High correlation

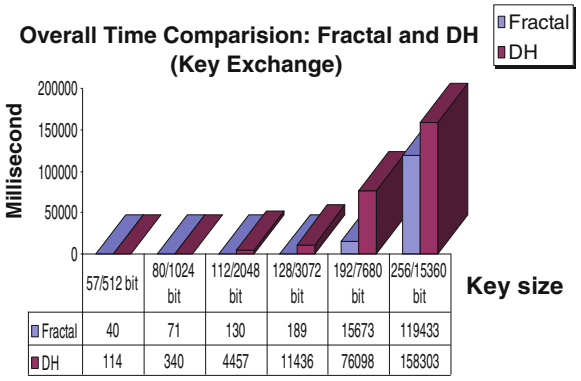

Fig. 11.10 Overall time comparison between Fractal and DH key exchange time (Alia and Samsudin 2007)

The performance of the Fractal public-key cryptosystem algorithms had also been compared against the well-known public-key protocols. Fractal key exchange was compared with DH key exchange protocol (refer to Fig. 11.10) (Alia and Samsudin 2007), Fractal encryption with RSA encryption protocol and Fractal digital signature with DSA (refer to Fig. 11.11) (Alia and Samsudin 2007) and RSA digital signature protocol (refer to Fig. 11.12) (Alia and Samsudin 2007). The comparisons show that the Fractal based public-key protocols provide higher level of security at a much lower cost, both in terms of key size and execution time.

11.8.2 Security of CHA-1

This section shows some of the experimental results based on different input messages (NIST 1995). In addition, article (NIST 1995) shows some comparisons between SHA-1 and CHA-1 according to their execution time. The comparisons

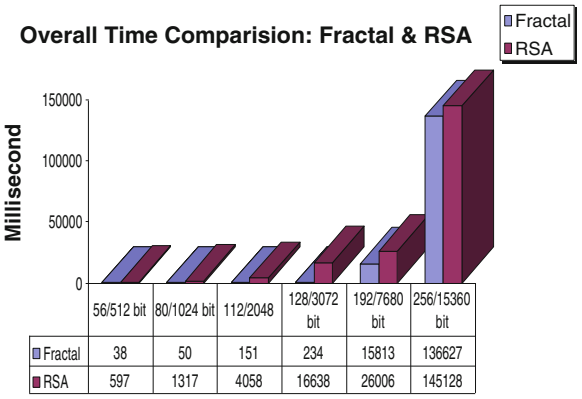

Fig. 11.11 Overall time comparison between Fractal and RSA public-key encryption algorithm time (Alia and Samsudin 2007)

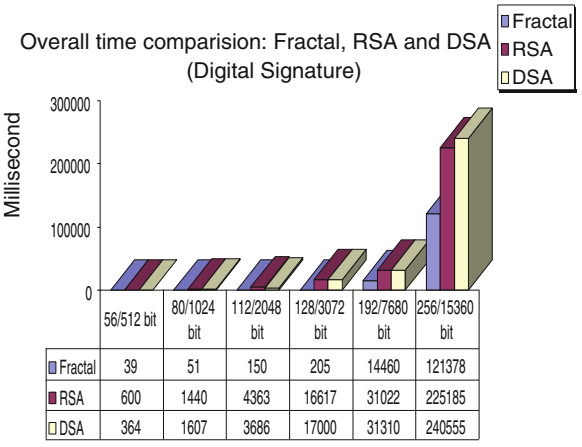

Fig. 11.12 Overall time comparison between Fractal, RSA and DSA digital signature algorithm time (Alia and Samsudin 2007)

use the same set of data as the input message, and calculate the time taken by both hash functions.

Figure 11.13 shows the comparison between SHA-1 and CHA-1 in terms of the execution time. The test was started with 10 KB of data as the input to both algorithms. For large data set (larger than 90 KB), the performance of SHA-1 is always better than the performance of CHA-1 as shown in Fig. 11.13. When size of the input message is about 1,000 KB, we can see SHA-1 is about three times faster than CHA-1.

Even though CHA-1 is slower, CHA-1 is better than SHA-1 in terms of security (refer to Fig. 11.14). As mentioned earlier, with the advance in cryptanalysis the security factor for SHA-1 has gone down to only 2^{63} (hash operation-brute-force) while the security factor for CHA-1 is 2^{80} (hash operations brute-force). CHA-1 can

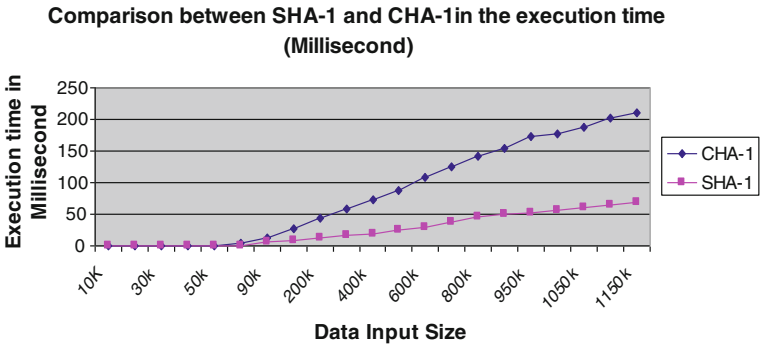

Fig. 11.13 Comparison between SHA-1 and CHA-1 in the execution time (millisecond) (NIST 1995)

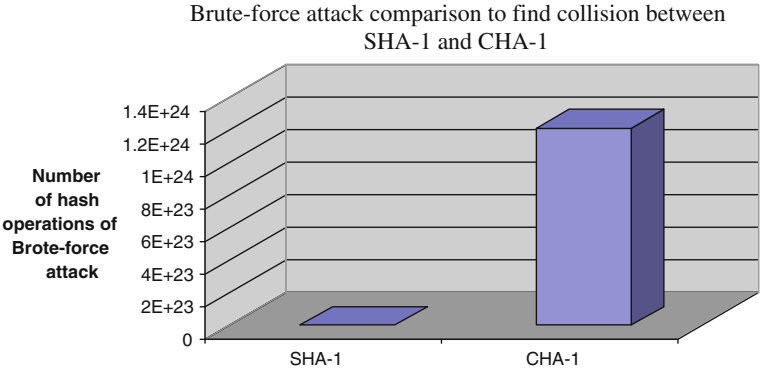

Fig. 11.14 Brute-force attack comparison between SHA-1 and CHA-1 (NIST 1995)

also accept any message less than 2^{80} bits, compared to SHA-1 which can only accept message size less than 2^{64} bit. The qualitative analysis between SHA-1 and CHA-1 is further described by Table 11.3.

Table 11.3 Comparison between SHA-1 and CHA-1 properties (NIST 1995)

Properties	SHA-1 (bits)	CHA-1 (bits)
Message size	2^{64}	2^{80}
Block size	512	160
Word size	32	32
Message digest size	160	160
Security	2^{63}	2^{80}

11.9 Conclusion

This paper summarizes the work that shows the possibility of using chaos to establish chaos based cryptosystem. The surveyed algorithms are key exchange algorithm, public key encryption algorithm, digital signature algorithm and hash algorithm. The security protection of the chaotic cryptosystem depends on the chaos NP-hard problem and the randomness of the output generated. However, this is highlighted by the number of iterations needed to convert the initial value c in the Mandelbrot Fractal equation to the starting value of z in Julia Fractal equation. Much as Logistic Map function generates random output but at the same time it is completely deterministic and sensitive to initial values which highly suitable for cryptographic hash function. Therefore, the surveyed chaotic cryptosystems are good alternatives to the traditional number theory based cryptosystems.

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Chapter 12
Understanding Chaos and Complexity in Education Systems Through Conceptualization of Fractal Properties

Şefika Şule Erçetin, Ssali Muhammadi Bisaso and Fathimath Saeed

Abstract Education is a trans-phenomenal, trans-disciplinary, and inter-discursive enterprise. Research into education necessarily reflects this. Educational theorists are making increasing use of the metaphors and concepts of complexity thinking in their discourses. This is normally done in company of exploration of chaotic tendencies in education systems. In this paper we discuss the elements of complexity that engulf educational systems today and highlight some cases of chaos in the education system as well. In doing so we also dissect the properties of fractals which obtain in chaos and complexity theory and how they relate with the features of education systems. We conclude by arguing that if the managers and stakeholders in education are fully abreast with properties of fractals, they would find education systems quite manageable since the properties would inform their operations through understanding the nature, steps and implications of various scenarios in the education system. Thus knowledge of fractal properties becomes a sine-qua-non for educational management and understanding of education systems.

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We hope the study is a ground breaking one and there is no gain saying that it will contribute massively to the growing body of elusive knowledge that is fractals and how they can help educationists transform the education systems.

Keywords Education · Chaos · Complexity · System · Fractals · Fractal properties

12.1 Introduction

The dawn of the 21st century has brought with it an unprecedented wave of change. The days of mass production or standardized products appear to be over. Accordingly, the key words for the future are variety, flexibility, and customization. These have ushered in a new order indeed. The new sciences of chaos and complexity and the study of non-linear, dynamic systems have helped Western scientists recognize this order in phenomena that were previously considered chaotic and random (Alexander 2011). The theory of complexity emphasizes that the relationships in the complex systems such as organizations are not linear, and have a structure revealing unexpected results and arising choices in which the events cannot be predicted (Erçetin et al. 2013). These patterns reveal new sets of relationships that point to the essential balances and diversity that help nature to thrive. Western scientists have constructed the holographic image, which lends itself to the Native concept of everything being connected. The relationship of each part to everything else must be understood to produce the whole image (Alexander 2011).

Moreover with fractal geometry, holographic images and the sciences of chaos and complexity, the Western thought-world has begun to focus more attention on relationships among elements rather than on elements in isolation. Thus there is a growing appreciation of the complementarity that exists between what were previously considered two disparate and irreconcilable systems of thought. There is a new way of thinking ad conceptualization of things around us as a result.

Among the qualities that are often identified as inherent strengths of indigenous knowledge systems are those that have also been identified as focal constructs in the study of the dynamics of complex adaptive systems. In addition to unpredictable behavior of complex adaptive systems systems in chaos, they have fractal patterns that symbolize strange attractors (Erçetin, 2001) According to Nanavati and McCulloch (2003), Michael McMaster, a management consultant who has applied the science of complex systems to management practices in organizations in Great Britain, indicates that “Complexity theory is about identity, relationships, communication, mutual interactions.” These qualities focus on the processes of interaction between the parts of a system, rather than the parts in isolation, and it is to those interactive processes that the AKRSI educational reform strategy has been directed (Barnhardt and Kawagley 2003). In so doing, however, attention must extend beyond the relationships of the parts within an indigenous knowledge

system and take into account the relationships between the indigenous system as a whole and the external systems with which it interacts, the most critical and pervasive being the western formal education systems that now impact the lives of every native child, family, and community in the world (Nanavati and McCulloch 2003).

12.2 Chaos and Complexity in Education Systems

The dictionary Meaning of *Chaos* is "a state of things in which chance is supreme; especially: the confused unorganized state of primordial matter before the creation of distinct forms" (Webster).

Chaos Theory represents a big jump from the way we have thought in the past—a paradigm shift. The traditional notion of chaos is simply; unorganized, disorderly, random etc. But *Chaos theory* has nothing do with the traditional notion per se. On the contrary, it actually tells you that not all that 'chaos' you see is due to chance, or random or caused by unknown factors. Chaos theory is thus about the deterministic factors (non-linear relationships) that cause things to look random.

Rosenstein and Collins (1998) contend that since the early 1980s, the field of chaos has enjoyed a remarkable growth in popularity. With origins primarily in physics and mathematics, chaos has gained the attention of researchers from largely disparate disciplines (e.g., physiology, communications, and economics). Unfortunately, this popularity has not been free of undesired side effects. Some experimentalists, for instance, use the tools (i.e., numerical algorithms) of chaos without familiarity of their theoretical limitations.

Chaos has been a big part of education systems in various forms (Cahill 2010; Cunningham 2000). The three principal conditions for a chaotic system are: (1) that it operates in a non-linear way; (2) that it is iterative (the output of one cycle becomes the input of the next); and (3) that small variations in initial conditions lead to large differences in outcomes. Many systems within educational organizations appear to meet these conditions (Cunningham 2000 cited by Kara 2008). Accordingly, education is an essential component in responding to emergencies after conflicts or national disasters (Cahill 2010).

Suffice to say, when a complex adaptive system is portrayed as a learning system (whose components are humans) the move to educational contexts seems quite natural (Newell 2008). This application of complexity science and new concept of learning creates new ways of imagining and talking about educational processes. Mennin (2010) opines that education appears to be in a state of perpetual unrest. Indeed education currently exists in a state of tension between the tendency to fall back into traditional teacher-centered pedagogies and the urge to reach to newer, more interactive, authentic, integrative and transformative approaches to teaching and learning.

Along the same line, complexity in education systems is on the rise due to a number of intersecting trends (Hopper et al. 2013; Peurach 2011). Parents in OECD countries have become more diverse, individualistic and highly educated

(OECD 2013) and this pushes schools to cater for the individual needs of their children. How to transform under performing schools to higher performing ones (Peurach 2011) thus becomes a central theme of education. For this to happen though there is need to understand a number of complexities in the education system. These may include complexity of thinking, intervention and learning (Hopper et al. 2013).

Related to the above there are also uncertainties in education systems that make it complex. Indeed such uncertainties include; uncertainty in Teaching (Jackson 1986), uncertainties about instructional content (Schoön 1983), uncertainties about authority and influence (Lortie 1975), uncertainty about personal development and uncertainty about changes within learners (Clark and Floden 1988). Meanwhile large numbers of students in classes and schools, increasing diversity in student populations, student mobility, scarce resources, pressure on accountability, competition for good students (Bourgeois 2002) are other forms of complexities that obtain in the education systems today and which the educational managers as well as other stakeholders have to contend with on a regular basis. Mennin (2010) postulates that the school as a whole and the expression of its curriculum through the interactions, exchanges and learning that take place within and outside of the school is a complex system.

At the same time, ministries of education remain responsible for ensuring high quality, efficient, equitable and innovative education. Therefore, one of the crucial questions for OECD countries is how their increasingly complex education systems can achieve national objectives (OECD 2013). Education systems revolve around teamwork, participation, and learning. They also revolve around improved communication, integration, collaboration, and closer interaction and partnering with customers, suppliers and a wider range of stakeholders. Value creation, quality, responsiveness, agility, innovation, integration and teaming are increasingly regarded as useful guiding principles in the evolving new environment.

Credaro (2006) states that internal to the school are the pressures brought to bear by curricular reform. Further, alterations in staff-student relationships from teacher-centred to student-centred create the need for modification of teaching practices, and policies and procedures to support more meaningful educational experiences (Dean 2000). In keeping with Credaro (2006) educational institutions themselves, must restructure the framework of their organization to form learning communities rather than institutions whose core function is the dispensing of information. The innovations and changes are at system, whole school and classroom level.

Iancu et al. (2012) identify two key aspects: the paradigm of learning environments and learning activities and the paradigm of instructional resources which are not only institutional, but also affecting the time and energy of students. Equally Neave (1998) cited by Georgeta and Castro (2012:337) argues that the general acceptance of this paradigm shift has been accompanied by the introduction of new assessment procedures and models of accountability in school systems. Newell (2008) tries to make a connection between complexity science and education by bringing in the classroom picture. He draws on a number of conditions that

underpin this similarity. The conditions are (a) internal diversity, (b) redundancy, (c) decentralized control, (d) organized randomness, and (e) neighbour interactions.

Internal diversity is closely linked with a system's creativity or intelligence. The insight that a group's potential for varied response increases with the sum total of the individual capabilities within the group is not unique to complexity science. But complexity science accentuates that such diversity is a blessing in disguise for a collective intelligence (Newell 2008). In a complex system, however, it is not the existence of diverse talents among its agents, but the appropriate interaction of such talents that gives rise to adaptive behaviors that transcend those of the system's individuals. Meanwhile, diversity in a class determines how well it will respond to the external environment (such as, for example, the curriculum). Redundancy in a class is key to establishing coherence. External flexibility is kept in balance with internal robustness.

Generally therefore, a number of aspects render the education system rather complex and a summary of some is drawn from a multiplicity of researchers to the following effect (McManus 1993; Dean 2000; Pintrich 2000; Lemke and Sabelli 2002):

- Integrating the commonly polarized goals of education, that is the goals that focus on transmitting knowledge with the goals that emphasize the development of an individual in the system.
- Catering for individual student needs. Running a classroom which recognizes and respects difference is first in the hands of a teacher who acknowledges that there are differences in the classroom.
- Assessment feedback and learning approach. We might consider the role of high-stakes standardized testing and assessment schemes in the present educational system as imposing an artificial fitness landscape that pulls the system toward behaviors that maximize test results rather than deep conceptual understanding.
- The dynamic nature of education system, the teaching and learning system that exists within the education system is subject to change with the changing world. Innovations and inventions must be incorporated into the system with the aim of maximizing student performance.
- The existing educational system of schooling isolates students and teachers from the wider community.
- Integrating the curriculum by developing interdisciplinary curriculum units that enable students to acquire knowledge from disciplines through unifying them while having the opportunity to contribute in different and special ways to the objectives of the integrated units.
- Dealing with misbehavior is a complex undertaking. Student misbehavior in the classroom is a tough and unavoidable task to the teachers and it takes up teachers' considerable time to deal with, which in turn affects the quality of the student's learning experiences.

Education systems are now characterized by multi-level governance where the links between multiple actors operating at different levels are to a certain extent

fluid and open to negotiation (Burns and Wilkoszewski 2011), also they propose pondering over the following questions:

1. What models of governance are effective in complex education systems?
2. What knowledge system is necessary to support the effective governance of complex education systems?

Answers to such complex questions bordering on education can only be found in more complex systems and theories indeed. A closer look at *fractal properties* would reveal that they would go a long way in helping educationists understand and conceptualize the chaotic and complex terrain of education in the contemporary times. As always claimed in chaos theory and fractals, within the seemingly chaotic, disorganized and complex systems is a certain level of organization and orderliness that can serve as a basis of turning educational complexity into opportunity.

12.3 Description of Fractals

> 'The rationality of our universe is best suggested by the fact that we can discover more about it from any starting point, as if it were a fabric that will unravel from any thread. George Zebrowski (1994 cited by Pickover 1998).

The earliest works on fractals can be traced from Mandelbrot and Edward Lorenz (Gleick 1987). In general Benoit Mandelbrot is credited with advancing Fractals and Edward Lorenz with formalizing Chaos theory in Modern times. However, Fractals have of recent attracted the attention of many researchers and scholars alike (Snyder 1995; Glickman 2001 cited by Kara 2008). All these have endeavored to explore the nature of fractals in both the natural and scientific systems (Glickman 2001 cited in Kara 2008). The claim therefore is that Fractals are not just complex shapes and pretty pictures generated by computers. Anything that appears random and irregular can be a fractal (Fryer and Ruis 2004). Fractals permeate our lives, appearing in places as tiny as the membrane of a cell and as majestic as the solar system (Kara 2008). Fractals are the unique, irregular patterns left behind by the unpredictable movements of the chaotic world at work.

Kluge (2000), writes that in theory, one can argue that everything existent on this world is a fractal: the branching of tracheal tubes, the leaves in trees, the veins in a hand, water swirling and twisting out of a tap, a puffy cumulus cloud, tiny oxygen molecule, or the DNA molecule and the stock market.

The definition of Fractals has always challenged many, a researcher and scholar. Fryer and Ruis (2004) contend that the word "fractal" often has different connotations for laypeople than mathematicians, where the layperson is more likely to be familiar with fractal art than a mathematical conception. It is imperative to note that Fractals have always been associated with the term chaos (Gleick 1987). One author elegantly describes fractals as "the patterns of chaos". Fractals depict chaotic behaviour, yet if one looks closely enough, it is always possible to spot glimpses of self-similarity within a fractal.

To many chaologists, the study of chaos and fractals is more than just a new field in science that unifies mathematics, theoretical physics, art, and computer science—it is a revolution. It is the discovery of a new geometry, one that describes the boundless universe we live in; one that is in constant motion, not as static images in textbooks. Today, many scientists are trying to find applications for fractal geometry, from predicting stock market prices to making new discoveries in theoretical physics.

The application of fractals has also not gone unnoticed. From people of ancient civilizations to the makers of Star Trek II: The Wrath of Khan, scientists, mathematicians and artists alike have been captivated by fractals and have utilized them in their work. It is thus argued that Fractals have more and more applications in science (Glickman 2001 cited by Kara 2008). The main reason is that they very often describe the real world better than traditional mathematics and physics.

Astronomy, medicine, surface physics, telecommunications, fluid mechanics, computer science and nature are perhaps the most critical areas where fractals are dully represented. According to Sprott (1998), all of these fields benefit because fractal geometry provides a language and conceptual framework for ill-defined geometries, and the power law inherent in fractals condenses their description. For example, fractals will be increasingly used to estimate the strength of rocks under shearing forces, in the analysis of breast mammograms, and in analyzing the randomness of transcendental numbers.

Meanwhile Klein and Rossler (1998) argue that "Chaos" and "fractals" seem to bridge the gap between physics and philosophy, mathematics and nature, and computer and art. The *Fractal Geometry of Nature* [B.B. Mandelbrot, 1982], *Fractals Everywhere* [M.F. Bamsley 1988], *The Beauty of Fractals* [H.O. Peitgen and P.H. Richter 1986], or *Does God Play Dice?* [I. Stewart, 1989] are only some of the very promising book titles exploring fractals at their intricate best. One reason for the success of *Chaos: Making a New science* (Gleick 1987) is the fact that it deals with a classical theory.

Nevertheless, the view is that fractals have also found their way into social sciences, arts and humanities (Kara 2008). Accordingly scholars and researchers have examined fractals in areas like management (Credaro 2006; Carnall 2003; Greenwald 2001 cited by Jamali 2004), administration (Garmston and Wellman 1995; Herghiligiu et al. 2013), organizations (Sandkuhl and Kirikova 2011; Mrówka and Mikołaj 2011), leadership (Raye 2012; Nonakaa et al. 2013; Topper and Lagadec 2013), business systems (Yan-zhong 2005).

Imperative to note is that there has been limited attention paid to Fractals in the field of education (Kara 2008; Barnhardt and Kawagley 2003; Nanavati and McCulloch 2003; Alexander 2011). The few studies that can be traced mainly deal with chaos and complexity in education systems thereby rendering a view on fractals (Lortie 1975; Cunningham 2000). The most specific attachment to fractals in education features teaching and learning processes (Claypole 2011) as well as chaos and complexity in the classroom (Trygestad 1997; Newell 2008).

However all these studies do not capture the relationship between fractals (especially fractal properties) and the seemingly chaotic and complex education

systems. The study in question therefore comes in handy to describe how knowledge of fractal properties aids educational managers, educationists as well as other key stakeholders to understand the nature of education systems whilst helping to turn the seemingly educational chaos and complexity into opportunity.

12.4 Reflection of Educational Chaos and Complexity in Fractal Properties

School managers and all stakeholders ought to know that contemporary education systems are premised on nonlinearity. In a linear system there is a simple cause and effect relationship; A causes B which causes C, and so on. However, a chaotic system is nonlinear. A may not necessarily cause B at all times. Lots of variables come into play and interact with each other. School systems look like nonlinear chaotic systems, too. In school district A, the purchase of new computers might have a positive impact on student achievement, while in school district B, this might bring little or no gain in student achievement.

Kara (2008) indeed postulates that it is widely believed that experienced teachers have better classroom control. If you have a veteran teacher in a classroom, you will have an orderly environment and the administrators, thinking in a linear way, might believe that the more veteran teachers in a building, the more orderly the environment will be. That might not be the case in every school district, especially in urban schools; there are instances where young and inexperienced teachers contribute positively to the school environment much more than veteran teachers.

It is imperative to note that the whole idea of educational systems reflected within learning processes, teaching strategies, administration, relationships between stakeholders, resources etc. and the complexity there in can easily be understood once *fractal properties* are conceptualized. Fractals are home to a number of characteristics, herein coined as properties that distinguish them from other features. Yan-zhong (2005) while reflecting on the major characteristics of fractal organization pointed out the following:

Self-similarity: The self-similarity of fractal administrative organization includes self-similarity of administrative organization structure and that of function, i.e. the function of a small fractal unit can be in harmony with that of the large one.

Like fractals in nature, schools reveal self-similarity in different scales. For example, a school-wide staff development day, a department meeting, a classroom lesson, and a halfway interaction between a teacher and student might all reveal the same cultural characteristic. Thus, reflective inquiry at the school, team, classroom and individual level can help educators better understand their school culture, change needed, and pathways to improvement (Glickman 2001 cited by Kara 2008). Even basic learning themes and aspects of discussion in meetings found on different agendas in schools are quite generative. They actually are the same but taught differently or discussed differently at various levels (Teichler 2002).

Iteration: Large amounts of fractal geometry examples are the figures produced by mathematical methods, especially by iteration and recursion arithmetic. The symmetry of different scale of fractal self-similarity means the iteration and recursion of pattern: pattern nesting in patterns, subdivision created on more and more detailed scaling, forming infinite delicate structure.

In education systems teachers help students to learn by designing curricula and learning experiences that are contextually rich, recursive and relational (Teichler 2002). The implication thereto is that even without the teacher learners can survive by learning on their own.

Self-organization: This is the remarkable character of system internal structure with fractal feature, in different scale, whose structure has the feature of self-similarity and self-copy, appear to be a new structure on macro-scale under open system through systemic cooperation, i.e. external environment only provides some conditions but does not carry out any specific intervention and it is formed by the system itself.

In terms of education systems, teachers, learners, planners all promote conditions for self-organization (integration) through dialogue, stories, problems, unresolved situations, questions and incomplete undertakings; all of which serve to disturb the status-quo and stimulate curiosity, interaction and exchange (Mennin 2010). This interaction and exchange is always the basis of transformation of the system at different levels and varying places.

Dynamic process: Fractal means a series of dynamic processes which reflect the growth and evolution of structure. It portrays not only the still form but also the important evolutional mechanism of dynamics.

It is largely known that from general to specific learning and teaching structures, education is home to dynamic processes and structures at all levels (Fischer and Immordino-Yang 2002). These may include Quantitative versus qualitative structures, centralized versus decentralized structures, mono-disciplinary versus multi-disciplinary structures, levels of education: bachelors, masters, and doctorate, gender structures etc. and understanding this *fractal property* helps educationists conceptualize dynamism in education systems effectively.

Simple regularization in complexity: Along with economic development, social progress and societal rising hierarchy, people's needs and requirement become more and more complex, this follows that administrative management becomes more and more complex.

New research in education suggests that children who learn to mind their Ps and Qs may also have an easier time learning their ABC's and 123's. There is also a lot of focus on good self-regulation skills in schools so that learners have better relationships with teachers, classmates and other school personnel (Hoffman 2010). The implication here is that when learners are self-regulated they help the system perform effectively, yet to understand this, educationists ought to be abreast with the knowledge of *fractal properties*.

Emergence: Rather than being planned or controlled the agents in the system interact in apparently random ways. From all these interactions patterns emerge which informs the behavior of the agents within the system and the behavior of the

system itself. For example a termite hill is a wondrous piece of architecture with a maze of interconnecting passages, large caverns, ventilation tunnels and much more. Yet there is no grand plan, the hill just emerges as a result of the termites following a few simple local rules.

When subjected to education we realize that a proposal for a new curriculum in the school is an emergent pattern. It depends on what came just before and at the same time influences what will come next (Dean 2000). Once educationists grasp the concept of *fractal properties*, they easily get to understand how various patterns in the education system emerge and thus look at them from a realistic, anticipative and positive perspective.

Co-evolution: All systems exist within their own environment and they are also part of that environment. Therefore, as their environment changes they need to change to ensure best fit. But because they are part of their environment, when they change, they change their environment, and as it has changed they need to change again, and so it goes on as a constant process (Perhaps it should have been Darwin's "Theory of Co-evolution").

Some people draw a distinction between complex adaptive systems and complex evolving systems. Where the former continuously adapt to the changes around them but do not learn from the process. And where the latter learn and evolve from each change enabling them to influence their environment, better predict likely changes in the future, and prepare for them accordingly (Fryer and Ruis 2004). Fractal systems therefore, are as well adaptive as evolving.

Even in education systems teaching, learning and assessment become co-evolutionary events. This is because learning is understood as trans-active and transformative. Without one aspect in the school system, the others might not perform to the expected levels (Mennin 2010). To know this however, educationists may require the basic knowledge of *fractal properties*.

Sub-optimal: A fractal system does not have to be perfect in order for it to thrive within its environment. It only has to be slightly better than its competitors and any energy used on being better than that is wasted energy. A fractal system once it has reached the state of being good enough will trade off increased efficiency every time in favor of greater effectiveness.

Realistically, stakeholders in a school create discrepancies between what is and what could or will be. These lead to gradients and gaps in information and understanding among stakeholders which result in a need to know and act (Hoffman 2010). This leads to reflections and feedback which make the system more effective. Educationists who command knowledge of *fractal properties* would easily know that certain discrepancies in the education system may serve for the best when it comes to transforming the system yet on the other hand they learn that perfection is just but part of success.

Requisite Variety: The greater the variety within the system the stronger it is. In fact ambiguity and paradox abound in fractal systems which use contradictions to create new possibilities to co-evolve with their environment. Democracy is a good example in that its strength is derived from its tolerance and even insistence in a variety of political perspectives.

We note that in the education system a school committee like other complex adaptive systems will learn from its experience and adapt to changing circumstances as it pursues its task over time (Mennin 2010). The knowledge from *fractal properties* would help realize that variety is a positive and desirable thing in a school system since it widens the spectrum of learning and experiences.

Connectivity: The ways in which the agents in a system connect and interact to one another is critical to the survival of the system, because it is from these connections that the patterns are formed and the feedback disseminated. The relationships between the agents are generally more important than the agents themselves.

In education systems, the learning process is all about relationships between things. Creative play, interaction and exploration all bring about connectivity in the school system. Even as a group of teachers start working together they experience multiple interactions (Mennin 2010). Whereas the educationists may be scared of teachers' groups that may not be the case if they were abreast with knowledge of *fractal properties*.

Simple Rules: Fractal systems are not complicated. The emerging patterns may have a rich variety, but like a kaleidoscope the rules governing the function of the system are quite simple. A classic example is that all the water systems in the world, all the streams, rivers, lakes, oceans, waterfalls, etc. with their infinite beauty, power and variety are governed by the simple principle that water finds its own level.

Everyone in the school knows the aims, goals, objectives, mission, vision, strategies etc. these are reflected in well outlined documents in the school and always communicated via school functions, assemblies, parades, meetings, convocations to all stakeholders by those charged with administration or management of school affairs (Dean 2000; Hoffman 2010). In that case *fractal properties* inform us that the education system ought not to be complicated but simple for everyone to grasp.

Edge of Chaos: The edge of chaos is somewhere between order and disorder or between a chaotic and complex situation. According to chaos-complexity theory, this is the best scenario for an organisation or policy system because there is a higher degree of "creativity and innovativeness" hence the term "thriving on the edge of chaos" (Praught 2004).

Fractal theory is not the same as chaos theory, which is derived from mathematics. But chaos does have a place in fractal theory in that systems exist on a spectrum ranging from equilibrium to chaos. A system in equilibrium does not have the internal dynamics to enable it to respond to its environment and will slowly (or quickly) die. A system in chaos ceases to function as a system (Cloete 2004). The most productive state to be in is at the edge of chaos where there is maximum variety and creativity, leading to new possibilities.

In the education system, interactions among school employees initially serve to destabilize the group and move it through a variety of possible patterns or states until its members re-organize themselves and a shared understanding emerges in the form of a group decision about learning objectives or an agreed upon action or explanation (Mennin 2010). Knowledge of *fractal properties* implies that when the

education system seems to be embroiled in chaos, it develops mechanisms of engaging the chaos which ultimately helps in getting out of the complexity thereby transforming for the better.

Nested Systems: Most systems are nested within other systems and many systems are systems of smaller systems. If we take the example in self-organizing above and consider a food shop. The shop is itself a system with its staff, customers, suppliers, and neighbours. It also belongs the food system of that town and the larger food system of that country. It belongs to the retail system locally and nationally and the economy system locally and nationally, and probably many more. Therefore it is part of many different systems most of which are themselves part of other systems.

In the education system, each person on a school committee is also a member of other complex systems that are nested within the other at different levels of interaction such as departments nested within the school, school with the community and individuals with social groups outside the school e.g. families (Teichler 2002). Knowledge of *fractal properties* would thus help educationists realize that the survival of the system is premised on the various interactions between members belonging to varying systems in the same bigger and larger system (Table 12.1).

Table 12.1 Reflection of fractal properties within education systems

Fractal property	Reflection within education systems
Self-similarity	Administration, departments, student bodies, classroom leaders, peer groups etc
Self-organization	Problem solving sessions, decision making processes etc
Dynamic process	Inequalities among schools, changing standards, centralized and decentralized systems, day and boarding systems etc
Simple regularization in complexity	Decisions taken at various levels in the school are always different
Emergence	Peer groups, pressure groups, student associations, teachers' bodies, disgruntled staff etc
Co-evolution	Stakeholders, local people, local institutions like mosques and churches, other schools etc
Sub-optimal	Less resources, moderate buildings, moderate learners, moderate teachers, moderate principals etc
Requisite variety	Power variety, character of people, opinions and views, variety of programs, various activities etc
Connectivity	Relationships, associations etc
Simple rules	Everyone in the school knows the aims, goals, objectives, mission, vision, strategies etc
Edge of chaos	Learners who are about to fail, teachers about to quit the school, principals pending firing, resources about to be finished, committees breaking up etc
Nested systems	A learner, peer group, classroom, department, school, region, ministry, government, country etc

Owing to the reflections in Table 4.1, whereas a simple look at the educational system may bring about a feeling of daunting chaos and complexity thereof, conceptualization of *fractal properties* would help educationists and other stakeholders know that such elements of chaos and complex are actually positive ones that can help in transformation of the education system. This would be a turn of educational chaos and complexity into opportunity indeed.

12.5 Conclusions

The deterministic view of education that schools are simplistic, cause-effect systems which can be easily manipulated, quantized and controlled is not addressing the problems of today's schools. From an alternative perspective, chaos theory gives us an understanding that the things we consider unimportant or trivial in our daily lives might have an equal weight in terms of affecting the results as the things we consider important. The complex education system is coming to look less familiar to us as the details unfold. We are conditioned to think of control, power, and authorship of knowledge as situated in individuals or groups of individuals. Final authority for what constitutes suitable truths for a class might be a curriculum, a text, or a teacher.

As discussed above therefore, education is a dynamic and complex system that evolves to meet the demands of society, the market and the educational institutions including schools themselves. Thus to be effective at education and learning the system must be designed to be agile and support changes. However, there is nothing that would come closer to improving our understanding and transformation of this complexity in education than a conceptualization of *fractal properties*. What this study has brought to the fore is that fact that chaos and complexity in education systems can easily be understood and turned into opportunity with command of knowledge of *fractal properties* by all educationists and stakeholders. This makes *fractal properties* a sine-qua-non for education.

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Chapter 13
Chaotic Pseudorandom Sequences and the Security of Cryptosystems

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Abstract The generation of pseudo-random numbers (bits) plays a critical role in a large number of applications such as statistical mechanics, numerical simulations, gaming industry, communication or cryptography. The choice of secret keys for cryptographic primitives largely depends on the quality of random numbers used. These random numbers are fundamental tools in the generation of secret keys and initialization variables of encryption for cryptographic application, masking protocols, or for internet gambling. Chaotic Pseudorandom numbers were found to be very efficient in this aspect. The relevance of chaotic pseudorandom sequences in ensuring security in cryptosystems is considered, at the same time reviewing statistical tests required to make such sequences cryptographically secure. This paper intends to review the development of chaotic pseudorandom number generators through the years and the statistical tests they are required to pass as a measure of their randomness.

Keywords Chaos · Deterministic algorithm · Non-linear map · Pseudorandom · Statistical test

13.1 Introduction

Probably one of the earliest applications of chaos came from the observation of its natural pseudo randomness, either as a sampled form of continuous chaos, or straight from the appropriate nonlinear map (Silva and Young 2000).

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A pseudorandom sequence generator is a device or a deterministic algorithm that generates a long sequence of bits that are statistically independent and unbiased, upon the receipt of a fairly short sequence of input called the seed. The sequence generated must be of sufficient size and be "random". The probability of any particular value being selected must be sufficiently small, this id to preclude an adversary from gaining advantage through optimizing a search strategy based on such probability.

Deterministic in the sense that the sequence appears random even though a careful observation of a reasonable number of the outputs reveals its pattern, hence the name "pseudorandom". The output of such an algorithm is referred to as a pseudorandom sequence. The output of a pseudorandom numbers generator could be made to be numbers or digits, referred to as pseudorandom numbers or bits.

We take "randomness" in this sense to mean that a sequence of pseudorandom numbers should have the same probability of passing a "statistical test" as truly random numbers would have, (Not better!). A statistical test may be based on the value of any function of the sequence of pseudorandom numbers. It is sufficient that the expected distribution of that value be known (or calculable numerically) for a truly random distribution, then by considering the value of the function for the given pseudorandom sequence, compared with the known expected distribution of that value for truly random numbers, one obtains a confidence level for the test. If many tests are applied and the confidence levels are calculated correctly, and if the tests are independent, the confidence levels should be uniformly distributed between zero and one if the pseudorandom generator is "good". The formal difficulty arises mostly from the fact that the number of possible tests is uncountably infinite, and in addition they are of course not all independent. The pseudorandom Number generator is cryptographically secure if, given the mapping that defines the generator and an arbitrary sequence of numbers generated by the generator, but not knowing the seed of the generator, it is hard to compute the next and the previous numbers in the sequence (Kocarev 2001).

Suitable metrics are needed to investigate the degree of randomness for number (binary) sequences produced by random number generators (RNGs) for cryptographic purposes. Today, researchers are developing new hardware and software based RNGs. However, few standards address statistical analysis techniques that should be employed in practice. (Knuth 1973) describes several empirical tests which include the: frequency, serial, gap, poker, coupon collector's, permutation, run, maximum-of-t, collision, birthday spacing, and serial correlation.

Researchers at the Information Security Research Centre of Queensland University of Technology in Australia, developed a suit called the Crypt-XS suite of statistical tests. Crypt-XS tests include the frequency, binary derivative, change point, runs, sequence complexity and linear complexity tests.

The National Institute of Standards and Technology (NIST) came up with a Statistical tests package which includes tests like the: frequency, block frequency, cumulative sums, runs, long runs, Marsaglia's rank, spectral (based on the Discrete Fourier Transform), nonoverlapping template matches, overlapping template matches, Maurer's universal statistical, approximate entropy (based on the work of

Pincus, Singer and Kalman), random excursions (due to Baron and Rukhin), Lempel-Ziv complexity, linear complexity, and serial.

A more detailed description for those tests can be found in (Juan 1999). Where as a brief introduction of the most frequently used tests contained in the NIST suit is give viz.

Frequency (Monobit) Test is to determine whether the number of ones and zeros in a sequence are approximately the same as would be expected for a truly random sequence. Frequency Test within a Block is to determine whether the frequency of ones in an M-bits block is approximately M/2, as would be expected under an assumption of randomness (M is the length of each block).

Runs Test is to determine whether the number of runs of ones and zeros of various lengths is as expected for a random sequence. In particular, this test determines whether the oscillation between such zeros and ones is too fast or too slow. Test for the Longest Run of Ones in a Block is to determine whether the length of the longest run of ones within the tested sequence is consistent with the length of the longest run of ones that would be expected in a random sequence.

Binary Matrix Rank Test is to check for linear dependence among fixed length substrings of the original sequence.

Discrete Fourier Transform (Spectral) Test is to detect periodic features (i.e., repetitive patterns that are near each other) in the tested sequence that would indicate a deviation from the assumption of randomness.

Non-overlapping Template Matching Test is to detect generators that produce too many occurrences of a given non- periodic (aperiodic) pattern. Overlapping Template Matching Test is the number of occurrences of pre-specified target strings.

Maurer's "Universal Statistical" Test is to detect whether or not the sequence can be significantly compressed without loss of information.

Linear Complexity Test is to determine whether or not the sequence is complex enough to be considered random. Serial Test is to determine whether the number of occurrences of the 2m m-bit (m is the length in bits of each block) overlapping patterns is approximately the same as would be expected for a random sequence. Approximate Entropy Test is to compare the frequency of overlapping blocks of two consecutive/adjacent lengths (m and m + 1) against the expected result for a random sequence (m is the length of each block).

Cumulative Sums (Cusum) Test is to determine whether the cumulative sum of the partial sequences occurring in the tested sequence is too large or too small relative to the expected behavior of that cumulative sum for random sequences.

Random Excursions Test is to determine if the number of visits to a particular state within a cycle deviates from what one would expect for a random sequence. Random Excursions Variant Test is to detect deviations from the expected number of visits to various states in the random walk.

Over the years, (James 1990) considerable experience has indicated what kinds of tests are likely to find the weaknesses of typical generators, and modern tests are much more stringent than most of the older ones. Modem generators are expected to pass all the old tests as well as those tests which traditional generators are known to

fail. Probably the most extensive presentation of pseudorandom number testing is given by Knuth (1973), but should be updated by the more severe tests, who suggests that any pseudorandom generator likely to have a "lattice structure" should be subjected to the "spectral test" among other tests.

Chaotic systems are widely reported in the literature for use as pseudorandom number generators have proposed a pseudorandom number generator based on the Chen chaotic system. The advantage of the proposed algorithm compared to others is that the generated pseudorandom sequence shows a uniform distribution. Security analysis of the proposed generator was carried out using a variety of statistical tests (Özkaynak and Yavuz 2013).

For a cryptographic system, having satisfactory statistical properties is one of the necessary conditions in order to achieve security of the system, but it is not sufficient by itself. In this study, the security of the proposed generator is discussed from a different perspective.

A minimum security requirement for a pseudorandom bit generator is that the length k of the random seed should be sufficiently large so that a search over 2^k elements (the total number of possible seeds) is infeasible for the adversary.

A pseudorandom number generator is said to pass all polynomial-time statistical tests if no polynomial-time algorithm can correctly distinguish between an output sequence of the generator and a truly random sequence of the same length with probability significantly greater than the probability of flipping a coin (Menezes et al. 1996).

While it is impossible to give a mathematical proof that a generator is indeed a random bit generator, a test to detect certain kinds of weaknesses of the generator must be conducted. This is accomplished by taking a sample output sequence of the generator and subjecting it to various statistical tests. Each statistical test determines whether the sequence possesses a certain attribute that a truly random sequence would be likely to exhibit; the conclusion of each test is not definite, but rather probabilistic (Menezes et al. 1996).

13.2 Pseudorandom Number (Bits) Generators (PRNGs)

The need for random and pseudorandom numbers arises in many cryptographic applications. For example, common cryptosystems employ keys that must be generated in a random fashion.

The nature of randomness has attracted an increasing amount of interest in recent years. Many (Akhshani et al. 2014) applications require random input. Sources of random numbers can be broadly divided into two classes.

Pseudorandom number generators (PRNGs) and the true random number generators (TRNGs). The primary difference between random and pseudorandom numbers is that pseudorandom numbers are necessarily periodic derived from deterministic algorithms, whereas truly random numbers are not periodic and are derived from truly random sources.

A pseudo-random number generator is a deterministic method, usually described with a mapping, to produce from a small set of "random" number(s), called the seed, a larger set of random-looking numbers called pseudorandom numbers. Such mappings are preferred to be one-way. Several researches have been conducted using various kinds of chaotic mappings ranging from one dimensional two and three dimensional mappings. A number of authors considered combining to kinds of mappings so as to remedy the shortcoming of stability points of some mappings, such regions where the function is not chaotic.

In 1986, (Blum 1986) two pseudorandom number generators, the 1/p generator and the x^2(mod N) generators were considered. The later was found to be unpredictable even though it was earlier thought to be weak and inefficient by researchers, a surprising development! the security of these generators were based on the assumed intractability of some number theoretic problems by probabilistic polynomial time procedures. However, the current standard in cryptographically secure random bits is the Blum Blum Shub (BBS) algorithm (Akhshani et al. 2014). The security of the BBS algorithm is based on the difficulty of factoring prime numbers. (Merah et al. 2013) proposed in their paper an appropriate way to generate a cryptographically secured pseudo random sequence from a chaotic system. With this new scheme the Chua's system shows better chaotic performance by inheriting the high sensitivity to the initial conditions and expanding the range of parameters. In addition, the generated sequence passes all the NIST statistical tests which confirm its effectiveness for cryptographic issues.

Shannon in his classic 1949 first mathematical paper on Cryptography, proposed chaotic maps as models mechanisms for symmetric key encryption, before the development of Chaos Theory. Chaotic maps are simple unstable dynamical systems with high sensitivity to initial conditions. Small deviations in the initial conditions (due to approximations or numerical calculations) lead to large deviations of the corresponding orbits, rendering the long-term forecast for the chaotic systems intractable (Makris and Antoniou 2012).

13.3 Chaotic PRNGs

For about two decades now, a lot of research has been ongoing in the area of chaotic cryptography particularly chaotic pseudorandom number generators (Maqableh 2001; Wolfram 1985; Matthews 1989; Alvarez et al. 1999; Shujun et al. 2001; Joseph NSPKB 2000). Simultaneously, many cryptanalytic researchers have analyzed the proposed chaos-based cryptographic algorithms and found that some of them are not secure enough and/or are slow algorithms (Maqableh 2001). Therefore, the main challenge in this research is to look at the relevance/importance of pseudorandom numbers in the design of secure and fast chaos-based cryptographic algorithms.

Since the advent of research in the chaotic systems, a lot of researchers have become interested into the use of chaotic maps to generate pseudorandom numbers

using the unpredictable nature of chaotic systems. Chaotic systems like piecewise non-linear chaotic maps, Logistic map, Tent map, the Henon attractor and many more were used. Some proposals were based on multiple chaotic maps to enhance the PRNG security by some researchers (Wolfram 1985). We intend to review chaotic pseudorandom number generators that are cryptographically secure.

The first paper on pseudorandom number generators is due to Wolfram in 1985, where he used cellular automata to design a stream cipher algorithm (Wolfram 1985). The ciphertext is produced by XORing the plaintext with the random bits generated from the cellular automata.

Matthews in 1989 substituted the used of pads with random sequence generated from chaotic functions as system keys in the design of a chaos based stream cipher algorithm (Matthews 1989). Chaotic credentials of a tent map were utilized by Alvarez et al. (1999) in a symmetric block cipher to generate a pseudorandom number from its orbits using a certain threshold. A cipher text is produced as the information on the position of the plaintext in the generated sequence. G. Alvarez cryptanalyze E. Alvarez's scheme with four methods among other weaknesses.

The use of coupled chaotic systems to generate pseudorandom sequences was proposed by Shujuna et al. in 2001. The coupled two chaotic systems to generate pseudorandom binary sequences which was claimed to have higher security than the individual maps (Shujun et al. 2001). Shortly afterwards, (Joseph NSPKB 2000) used the trajectories of two logistic maps that are close to each other to generate pseudorandom sequences of high complexity. The cipher XORs the plaintext with the generated sequence to generate the ciphertext (Fig. 13.1).

In 2003 Lee et al. (2003) considered the composition of multiple chaotic maps to design a chaotic stream cipher. The scheme generates pseudorandom byte sequences and a two dimensional chaotic map is used to permute the generated byte sequence. Thus far, there have been no successful attacks on this algorithm. In 2005, another research group proposed a pseudorandom number generator derived from a discrete chaotic map that is defined over a long interval (Addabbo et al. 2005).

Wang et al. used an n-dimensional non-linear digital filter (n-NDF) (to improve randomness and security) and a chaotic system to design a proposed pseudorandom binary generator (Xiamin Wang et al. 2010). The authors used n-NDF_1 and n-NDF_2 as transition functions defined by:

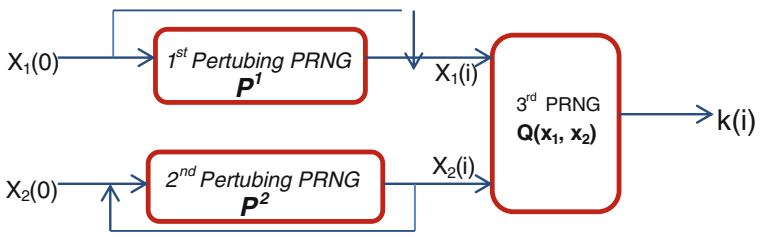

Fig. 13.1 An illustration of coupling Chaotic maps to generate pseudorandom numbers

$$y_1(k+1) = z_{11}(k+1) = F_1(z_1(k), \varphi_1, c_1)$$
$$y_2(k+1) = z_{21}(k+1) = F_2(z_2(k), \varphi_2, c_2)$$

with $y_1(k)$ *and* $y_2(k)$ as the output of the two n-NDFs at step k (Details in Li and Poh-Han (2003)).

A cipher encryption algorithm based on the combination of the XOR operation and the logistic map was proposed by Xiang. This scheme is considered as an improvements to the Baptista's algorithm, a combination of XOR and circular bit shift was used in the encryption and the decryption processes (Xiang et al. 2006). Yu and Cao (2006) modified Xiangs scheme by replacing the Logistic map with a chaotic neural network time varying delay.

Yu and Cao's scheme was cryptanalyse by Li et al. in 2007 by showing that the pseudorandom number generator upon which the security of the system is based, does not have sufficient randomness and is not uniformly distributed. In the same year, high dimensional cat and tent maps were used to generate a pseudorandom key stream with stream cipher architecture for a chaotic image encryption. This scheme is not known to have successfully been broken till now.

The dynamics of chaotic system-based synchronization to generate a pseudorandom sequence as a keystream based on the value of the secret key is utilized. The plaintext is encrypted using the symbolic dynamics of the logistic map or tent map with certain values of its parameters and initial conditions (Kurian and Puthusserypady 2008). A research group analyzed the proposed stream cipher encryption scheme in 2011 (Arroyo et al. 2011). They were able to deduce and estimate chaotic systems' parameters with low error rate, and pointed out that a tent map is not a good source for a pseudorandom number generator and that the logistic map key stream has to be generated from a positive Lyapunov exponent.

Intermediate chaotic key streams are generated based on a logistic map and chaotic standard map to provide high confusion and diffusion properties. This novel scheme was proposed by Patidar et al. (2009) with a mixing operation. they modified the scheme after it was cryptanalyze by Rhouma et al. in 2010 with only a pair of plaintext and ciphertext (Rhouma et al. 2010). In 2011 the modified version was analyzed by Lie et al. and found it not to be secure against known plaintext and known ciphertext attacks. The weakness is based on the generated Logistic map sequence which is weak and non-random.

Since the Tent map is one of the equations that produce pseudorandom numbers that have no stability island (Martínez-Ñonthe et al. 2012). The noise function used in the proposed cryptosystem is an approximation to the chaotic tent map, and it is called pseudo chaotic tent map (PCT map) it was used as a chaotic map to generate pseudorandom sequence of bits to be used in an encryption algorithm. PCT with sub-block size of 16-bits (PCT-16) has better statistical distribution than that of 8-bits sub-block size (PCT-8) (Fig. 13.2).

The encryption process consists of r rounds of PCT-16 map using encryption key. The result of the proposed chaotic pseudorandom number generator was tested

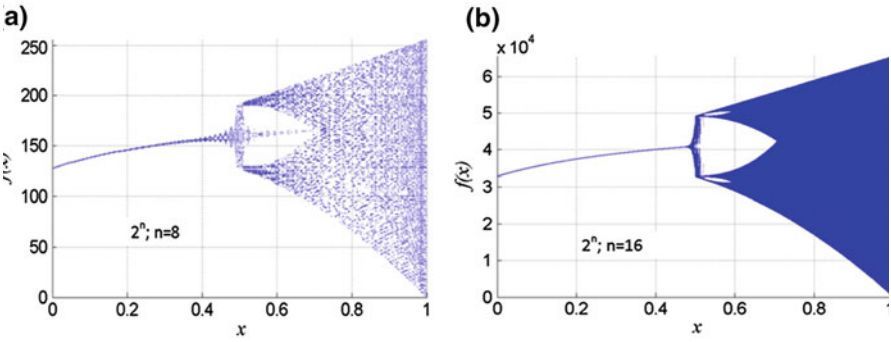

Fig. 13.2 A typical bifurcation diagram for a tent map with varying n

using NIST statistical test suite, and it confirmed its randomness by passing all the tests.

A pseudorandom bit generator was proposed using the combination of three standard chaotic maps which generates a 32 random bits at each iteration. The authors noted that the proposed generator has the advantage of high sensitivity to initial seeds, high randomness and resistance to several attacks in addition to speed of the algorithm (Franc 2013). They used the map with an initial seed belonging to [0,1]

$$X_{n+1} = 3.9999X_n(1 - X_n)$$

with $\lambda = 3.9999$ and all X_n belonging to]0,1[.

The three combined equations are given by the following in the same algorithm.

$$X_{n+1} = 3.9999X_n(1 - X_n)$$
$$Y_{n+1} = 3.9999Y_n(1 - Y_n)$$
$$Z_{n+1} = 3.9999Z_n(1 - Z_n)$$

For each computed value of X_n, Y_n, Z_n binary64 floating point format is used.

The generation of pseudo-random numbers (bits) plays a critical role in a large number of applications such as statistical mechanics, numerical simulations, gaming industry, communication or cryptography.

Chaotic trajectories even look random, and, they pass many classic "tests" of randomness. This in fact generates the principle of equivalence between chaotic and random systems. In there paper, (Francois et al. 2013), observed that:- chaotic and random systems are observationally indistinguishable, thus, one can replace a random system by an equivalent chaotic system, and vice versa, as has been argued in (Werndl and Philosophy 2009).

Pseudorandom number generators' (PRNGs) results are mainly used on stream cipher algorithms as key streams that simply XOR with plaintext to generate the correspondence ciphertexts using any mode of operation.

A PRNG using a standard chaotic function is proposed by (François et al. 2014). The algorithm uses a degressive modulo to index progressively the positions of an initial vector, before permuting their associated elements through the use of a XOR operator. The chaotic permutations are achieved iteratively on the initial vector in order to produce three chaotic maps. These maps are xored and the resulting sequence is the output of the algorithm. This PRNG has shown its ability to produce a very large number of pseudo-random sequences which can be useful in several cryptographic applications.

Chaotic functions (Tent and Logistic maps) (Khanzadi et al. 2014) were used to generate pseudorandom numbers which are then converted to binary numbers to be used as random bits stream. These random bits are therefore used for image encryption by forming a random bits matrix.

Quantum chaos theory seems to be a tool that can be used to improve the quality of pseudorandom number generators. It helps in producing sequence at a speed that cannot be obtained with a true number generator (Akhshani et al. 2014). They proposed a novel pseudo-random number generator based on the quantum chaotic map. A quantum map is the logistic map with additive noise that arises from the very lowest-order quantum corrections. The proposed scheme exploits the interesting properties of three-dimensional quantum logistic map such as statistical complexity. The three different statistical tests, NIST, DIEHARD and ENT test suites are employed to evaluate the randomness and uniformity of the sequence generated.

13.4 Conclusion

Chaos based Pseudo-Random number (Bit) Generators (PRBGs) is an algorithm that generates pseudorandom numbers through the use of chaotic maps. The dimension of the map to be used depends on application requirements of the schemes. So many generators were cryptanalysed almost as immediately as they were proposed. The quality of a pseudorandom number generator largely depends on the choice of seed(s) and the control parameter(s) of the chaotic map(s) to be used. A good number of Pseudorandom Numbers Generators that were considered to be good for some purposes did not find a place with cryptographic applications, thus all random numbers generated must be subjected to a rigourous statistical tests using any of the industry standard statistical suits like NIST, NFIS Diehard Tests, TestU01 etc.

Though chaotic cryptography may be considered at present peripheral in circles of conventional cryptography, chaotic number generation may have attractive applications as simulation engines in computational science (Pellicer-Lostao and Lopez-Ruiz, 2011c, 2011d). Chaos based number generators are easy to use and

highly configurable. This makes them a valuable tool for the realization of effective and efficient cryptosystems.

With the increasing demand for various services such as encrypted digital TV, credit cards, etc., it became necessary to manufacture encryption systems (RNGs, algorithms) on chips. Thus the need to intensify research on the development of robust chaos-based RNG integrated circuits (ICs) that are cryptographically secure (Merah et al. 2013).

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Chapter 14
Object Oriented Modelling of Corporate Complexity Performance Balance Card: CBBC

Fatma Çınar and C. Coşkun Küçüközmen

Abstract Recent advances in computing and communications technology indicate that this progress and use of state of the art techniques will continue at a very rapid pace. This situation will inevitably increase companies' informational data input and output as a consequence. It is also obvious that companies need to process and convert both input and output in such a manner that valuable entities are created in return. We value data as a company asset to be visualised in the form of new generation graphics providing decision-makers with significant corporate information. By these ways executives who can realize and evaluate the overall picture more effectively will be able to take new steps forward in improving business efficiency. We hereby suggest an alternative object-oriented business modelling approach which is able to more comprehensively analyse problems with respect to relations and correlations in current company structure. Through our model we propose a new reporting system by restructuring available data to enable decision makers to have reports via a user friendly reporting system. We combine the data available in the system with data source Objects via the Java SQL-based database, then the Cortex is formed and an infrastructure is developed for making statistical inquiries. Thus, all data in a single pool of resources can be managed and integrated with the reports consolidated while summary reports which provide spontaneous pictures and graphics are provided to be displayed instantly.

Keywords Multi-dimensional performance evaluation model · Corporate finance · Complexity management · Complexity business balance card (CBBC)

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14.1 Introduction

The last 3 decades have witnessed an unprecedented revolution in computing and communications technology and it seems that this progress and use of state of the art techniques will continue at a very rapid pace. This situation inevitably increases companies' informational data input and output as a consequence. Thus, companies need to process and convert both input and output in such a manner that valuable entities are created in return. We live in a data rich world, although not all of the information is valuable. Few (2009) states that software tools on the market vary in how effectively they can assist us in navigating the data analysis process, and no matter how well designed these tools are, the results they produce will depend on how skilled we are in employing them.

The data itself as a company asset to be visualised in the form of new generation graphics provides decision-makers with significant corporate information. Thus, executives who can realize and evaluate the overall picture more effectively are able to take a new step forward in improving business efficiency. As a result, the next step to be taken will improve the company's performance without the excessive expenditure of effort and resources. To the best of the authors' knowledge, this pioneering study argues that current techniques and models used to clarify and simplify complex data have been either insufficient or misleading. Thus, it is impossible to illustrate properly all multi-dimensional company variables with a two-dimensional diagram. The suggested alternative object-oriented business modelling approach is able to more comprehensively analyse problems with respect to relations and correlations in current company structure.

14.2 Business Modelling of Problem Areas

Current models in use are generally graphics based on mathematical and statistical models. Today as a result of the widespread use of databases, current models have also been studied within the framework of informatics. Despite improvements made based on scientific models, current techniques fail to reflect the dynamics of the contemporary business environment. Unfortunately, these techniques are stationary and in a structure that produces lagged outputs. Object-based features of computer software allow us to use this feature for the modelling of business processes. This approach is also suitable for users who are accustomed to utilizing object-based office programs. To explain this more clearly, once created, a *business problem domain model* can be used as a management tool, which helps to ensure the appropriate reaction given to the continuous improvement of operating performance or to changes in the business environment. In other words, such business models have served as basic intellectual tools to transform the companies from their *current situation* to the *status desired*. In this context, we can say that these models have the advantage of providing cost and operational gains of various alternative policies that can be tested without forcing the active processes of the company. In this way,

the user-friendly business model considerably simplifies processes and also creates its own market.

Therefore, the success of modelling is embedded in the properties of modelling techniques. Costly real life experiences can be reduced significantly. *As time metric of performance increases the level of performance also rises.* Today, concerning each level of organisation, systems that illustrate how to design information in various strategic layers and how to achieve significant analysis of data along with hidden patterns, are required. Performance optimization for companies has now become more important than ever. Therefore, companies need to measure their performance in more realistic terms to make the best decisions. It has also become more important for companies to optimize their financial performance and to make the necessary decisions via measurements in order to maximize benefits to the business.

To serve this purpose, companies need to utilize *Integrated Theoretical Application* to transform their approach to *Object-Based Integrated Enterprise Performance Management Model* with *real-time risk analysis*. This makes measuring the real value of the company possible within the framework of integrated theoretical applications and integrated reporting systems. These models created for performance monitoring should also be compatible with the current dynamic environment in which the company operates. They should also be compatible with factors which are important for competition, such as innovation and flexibility.

14.3 Modelling with Object-Based Techniques of Management Structure

Development of new techniques and changing insights based on data management (informatics) has become a necessity for organizational success rather than simply an option. Our proposal is *Complexity Approach* that evaluates companies as *Object Oriented* organic and complex structures with informatics backbone, and not simply as mechanical and bureaucratic structures (see for example Hruby (1997) and Pedroni and Meyer (2009)). This approach is based on *General Systems Theory*, *Informatics* and *Chaos Theory*. Business concepts and techniques, and company processes are re-interpreted using a dynamic-cybernetics cognizance. This topic has been studied in detail by Kauffman Santa Fe Institute and many respective scholars (Holland 1992). In this study, we propose an *Object-Based Modelling* premised on information and Informatics as the most suitable model to realize subject approach.

14.4 Company as a Complex of Objects

The main feature that distinguishes *Object-Based Modelling,* the basic component of complexity approach based on *Object Oriented System,* from other management theories (*kaizen*) is that it defines the constituent parts of the components as

functional objects and their inter-relationships and their interaction in combination (see for example Holland (1992)). This situation is actually similar to the traditional *General Systems Theory* (GST) but cannot avoid being labelled as the *hierarchical composition mechanical parts*. Detection of complex organic compounds as functional Object (Object Oriented) hinges on the foundations of complexity approach (see for example Hruby (1997) and Pedroni and Meyer (2009)). This approach is capable of describing and explaining the behaviour of systems that cannot be explained by analytical approaches. Our basic model of interest will be the *Company Complex*. This is the intelligent modelling of complex and dynamic presence of main problem areas within the so-called company universe. These problem areas, which make up the organic structure of the company, will be modelled as Objects. This can be conceptualized as follows: *a business entity is a complex*, *consisting of Complex Objects.* In other words, entity and complexity have become synonymously identical in our model space.

14.5 Object-Based Business Modelling

Business Objects constitute the foundation of *Object-Based Complexity Management.* Every organization is a *complex* consisting of people. Even an organization which is run by a single person is considered as a *complex structured organization*. This is because complexity is *not* related with the number of the people, but the number of the necessary business processes (see for example Hollande (2006)). The complex structure of the organization is composed of vertically and horizontally linked relationships of *Business Objects.* A modern enterprise can be considered as a *Mega Object* composed of *Objects*, which are themselves composed of *Objects*. A sector that compromises several entities and the whole economy within the global system are also Mega Objects composed of units. An *organizationobject* can neither be detected nor interpreted irrespective of the *objects* independently (*Habitat Effect*). In other words, each *object* in the space of *objects* is the *object* of, or composed of their extension. Complexity Management perceives each individual of the organization as a self-governing administrator who governs, functions, time and relationships, as well as itself. In other words, a CEO and a warehouse keeper are similar objects, but whose roles and functions are different.

14.6 Architecture of Object: Properties and Methods

Object-oriented complex business universe objects are not dead mechanical entities. Each *object* is a dynamic and living organic-informatics structure, capable of receiving and recognizing impulses, and giving appropriate reactions. In conformity with the principles of *Object-Based* software; there must be *parametric structure properties* that define each object and a *set of methods* to determine their behaviour.

Thus, all business units of the organization and the people as well as their identity and roles in each position are clearly identified in advance. Their level of success will be the *Performance of Objects* of the organization. Accordingly, a *business object* should be considered as an active organizational unit whose job/duty definitions are well-defined and equipped with *impulse and response capacity* against specific reactions. Accordingly, *software objects* both host data and command against external stimuli (such as mouse clicks or using touch sensitive screens) and are interactive modules that can react. These units, as in software, may be observed in organizations or in natural habitat. Especially, the nature exhibits the perfect examples of *object originstructuring*. All living things exhibit a structure originated from the Object. Naturally, the most complex structured basic *object* is the human himself.

14.7 Complex Structure in the Active /Professional Object: Agent

The active *object of objects* of an organization is *Agents*. *Basic objects* are the first to be determined by the sector the company operates and their business lines. Following this process, new objects are created and hence active/professional *agent objects* are formed upon this expansion. In conventional management science these are sections and departments.

14.8 Control and Coordination Balance Object of Business Objects: CORTEX

It is *Cortex Object* that employs all *objects* of the organization and information systems as a backbone. The function and dynamics of organizations are executed by *Cortex* which indeed is an *Object of Control Coordination and Balance.* Conventional management science refers to this as *management*. In *complexity management*, *Cortex* executes the functions beyond management. *Cortex is the basic Object of all organizations*. We can observe an organization formed solely of a *Cortex,* but we cannot observe an organization without its *Cortex*. *Cortex is the most basic Object of Object based modelling. Modelling in our study will take place around the Cortex.*

We need some certain criteria to refer to corporate balance. Criteria should be parallel with the strategies determined by the strategic management. To ensure that the strategy is well received, perception of change, studies conducted under the leadership of management, the definition of concepts, harmonizing the organization with the strategy, motivating people and all sub-factors related should be harmonized as a whole with the *Complexity of Business Balance Card* model and the

Financial Performance Assessment Methods. Since the assessment criteria differ according to the sector's structure, sector-based sensitivities should be taken into account when formulating models. Inputs of a company may be machinery, personnel, financial resources, or informatics. Outputs can be staff, financial and informatics performance. Transformation process is the implementation of organizational process to transform these inputs into goods and services.

Outputs are the goods and services produced by the organization. Feedback is the rearrangement of inputs with the support of information provided by outputs. Environment is the social, economic and political values where the organization takes place.

14.9 CORTEX Coordinated Relations Management Model: Sycamore Tree

The strategic business unit of the model is composed of *Agents*. Two types of nested structure of business units are *Agent-Objects.* Object relations with other agents, functional and strategic integration of operational responsibilities, delegating integral business responsibilities (performance-project groups) have a weighted impact on management processes of network units. Agent-Objects integrated with informatics backbone of autonomous work groups constitute the backbone of the system by jointly operating their own leadership to work in cooperation with other operating business units from various levels. All *Agent-Objects* are associated with *Cortex* and under its control. *Cortex* is the system that uses information systems as a backbone of all *objects* of the organization. For example, one cannot think of a hotel without beds, a hospital without an operating room and an advertising company without a design-workshop. Other similar examples are banking and transportation, and these sectors cannot be imagined without a computer system. Therefore, the backbone performs the strategic functions in a system that is composed of *object of objects* which ensures continuity of the integrity of the system. The performance *objects* on the right hand side of the *fishbone diagram* refer to *tangible agents,* while the left hand side refers to *intangible agents*. On both sides of the *performance object* resembles ecosystems and living organisms, just reflecting each other, and many are likened to the fractal structure. Nearly all fractals are self-similar, if not completely all, at least most of them have this feature. The parts of the body in self-similar objects or components resemble the whole body. Three-dimensional *Sierpinsky pyramids* are typical of this structure. Each fishbone on *Sycamore Tree* diagram is the *object of the objects*. In other words, the organic structure of the *objects* is displayed as a fractal hierarchy among *objects* both vertically and horizontally within the matrix.

The fishbone illustrates the unlimited coordination of objects before and after and the control and their internal balance. Accurate perception and interpretation of *Object-Based Business Modelling*—and *Sycamore Tree* (*Complexity of Business Balance Card* (*CBBC*)—in a complex business universe will constitute the base for

Table 14.1 CBBC diagram model

CORTEX		
Stakeholder Relations	LAN	Competitions Relations
State Relations		Customer Relations
Information & Communications Technologies	WAN	Product Relations
Innovation Relations		Marketing Relations
Global Environment Relations		Financial Environment Relations

successful management. Our proposed *Sycamore Tree* diagram augmented with communication technologies, will give in-depth perspectives to the management through our *operating business units approach* (Merih and Çınar 2013) (Table 14.1).

14.10 Information as a Fundamental Business Object: Numerical and Graphical Data Mining

Data and information are active objects, and have gained much importance, as much as capital in today's organizations. Informatics object contains information about data, software, charts, tables and various reporting tools. All active data sources and reporting tools send and receive information to and from the related objects. *Object-based* software also supports the exchange of information together with the *agent object* carrying information of any kind is associated with *Cortex*. For example, any transaction to be transmitted to *Cortex* in *CBBC diagram*, such as a balance sheet which is an *agent of an object*, consists of the reports based on general accounting principles. Agents have a number of behavioural methods. All categorical and numerical variables that take place in performance analysis of *business objects* are *objects* that vary depending on the company business line. These variables reveal the *processobjects* that affect information and having a direct impact on the performance of *objects*.

Conventional techniques and methods fail to respond to the needs of today's businesses. Thus, using existing methods is a waste of time, effort, energy and money. Therefore, instead of conventional command and control method, the proposed *Cortex* should be adopted.

14.11 Conclusion

In this study, we design and propose a reporting system. By restructuring available data the system enables decision makers to have reports via a user friendly reporting system. The data available in the system is combined with data source *Objects* via

the *Java SQL-based database*, the *Cortex* is formed and an infrastructure is developed for making statistical inquiries. Thus, all data in a single pool of resources can be managed and integrated with the reports consolidated while summary reports which provide spontaneous pictures and graphics are provided to be displayed instantly. *Business Intelligence Interactive Dashboards* combined with pop-up menus and slideshows will provide commercial data/enterprise applications/graphics/tables/photos clearly exposes and enable decision makers only with a few clicks to access data in an interactive format to work and plan and test future business processes. Through this model, complex organizational structures operating in an increasingly competitive environment can be systematically reported. These reports will include management functions of the company. Since analytical approach to events in perspective is no longer sufficient, complex methods of thinking in organizations is a requirement rather than a necessity.

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Chapter 15
Chaotic Awareness in Gezipark

K. Gediz Akdeniz

Abstract The power of cosmos (order) has been ended by the chaos theory. Thus, the deconstruction of modernity dualities (modern reality of principles) derived by cosmos-chaos (order-disorder) duality has started. According to Chaotic Awareness Simulation theory, the simulation of such deconstructions could lead to the emergence of non-predictable changes and transformations (zuhur) in sensitive societies. Recently we also proposed a new anarchy definition in the sense of such spontaneous activist behaviors in the simulation world. In this study, following the Chaotic Awareness Simulation theory, we would like to examine the Istanbul Gezipark event of June 2013 which could be considered as a proper example of zuhur and we would like to investigate the sensitive differences of the Gezipark event from other remarkable mass protests in the world these days. This search could lead us to critique the status of Gezipark event in the simulation world as a new stage of open democracy.

Keywords Simulation theories in social science · Occupy protests · Arab spring · Gezipark protest

15.1 Introduction

Recently many critical theorists in social science and in political studies are interested in the different perspectives of the "Occupy Protest" movements. Particularly, through the "Occupy Wall Street" protests in US, street movements in the West European capitals, the Athens street protests in Greece, the World Cup protests in Brazil, the Arab Spring protests around Arab countries, and very recently the Istanbul Gezipark protests in June 2013 in Turkey.

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In this presentation we would like to find out the diversity of the Gezipark protest movements through the guidance of the "Baudrillard's simulation (BS)" theory in the context of simulakra (Baudrillard 1995) and the "Chaotic Awareness Simulation (CAS)" theory in the context of zuhur (emergence in Turco-Arabic) (Akdeniz 2007, 2010 and 2012). In this perspective these critiques could also lead us to realize the possibility of the global solidarity of these protests in the simulation world (social media, internet, TV, etc.).

15.2 The Occupy Protest Movements

The Wall Street, European Occupy Movements and the World Cup protests in Brazil are fully suitable simulation cases with the BS theory. First of all, in those movements the principle of reality is a reality of modern society. Because all the elements in the thousands of the protesters were pushing against a new tax rule (In the case of Greece, EU and IMF economic pressure) which is supported by the global economic powers who have ruined the economy to the detriment of the poor and middle class. By this banking reality, the emergence of the simulation should be only simulacra as more welfare to the middle class (hyper-reality) in the simulation world. On the other hand such simulacra will never cause any hyper-reality in the sense of transformation in non-modern society to western human behaviors. The only sensitive change that happened is that communitarianism in Greece was raised in an alternative context (Anastasopoulos 2012). They can be responsible for improving the modern life concepts for humanity in the simulation world as the "New Anarchy" example (Akdeniz 2014). The World Cup protests have been the right choice for activist movements in Brazil because the Brazilian people are strongly sensitive to football. But football is not sensitive itself. Its working structure and its correlations in society are formed in modernity forms. Its simulation will never cause change in the Brazilian society. Of course the governments in Brazil will be more careful with the people from an economic point of view.

But the character and the common dynamic behaviors of the Arab Spring protests have different properties from the above occupy protest movements. Because, it was a chaotic protest (Açıkalın and Bölücek 2014) and it was about the dissolution of an authoritarian regime (Göle 2013). And it could be an example of the complex utopia events in the simulation world (Akdeniz 2014). Furthermore, according to BS theory (Baudrillard 1995), since the Arab countries have Muslim majority and their societies are non-modern, the reality principle of simulation of such occupy movements in Arab countries is not modern reality. Thus one can predict by BS theory that they would never cause a hyper-reality (simulacra) to change authoritarian regime tradition in Arab countries. On the other hand what is seen in today's Arab world (particularly in Syria, Egypt and Tunisia) is also not a surprise for the CAS theory. Because; the "Muslim Brothers" as an Islamic movement, for example in Tahrir Square, strongly dominated the other protest groups by their Islamic political aims in long correlations.

It means that the complex correlations of the activist groups in the Arab Spring meetings were not enough to be applicable to the chaotic awareness reality principle. In additional to that, most of the other activist groups were also globally simulated in modern context by non-Arab social media and digital civil society operations. These conclude that the chaotic awareness as a reality principle in the Arab Spring has remained so weak for the emergence of zuhur. So it is not causing any change to the Arab World in revolutionary new forms.

15.3 Istanbul-Gezipark Protests (May–June 2013)

In some non-governmental organization forms and protest behaviors, Gezipark looks similar to occupy street movements (Göle 2013). But in both BS and CAS theories the reality principle is essentially an initiation of social movements. If we follow these simulation theories, first of all, the reality principle of Gezipark is not dominated by modern reality like in occupy street movements. On the contrary, by focusing on its nature of spontaneous behaviors, according to CAS theory its reality principle is the chaotic awareness. Because it was a public square demonstration of the disordered micro-activist groups and individual minority voices which are in different identities and they are not affiliated to any political party or ideology with no centralized macro-group leaderships. And the short correlations (social media) through micro-activist groups and civil society organizations were also complex with the sensitively collective aim (in their own independent self-autonomy boundary conditions to resist for the demand of participatory democracy against the authoritarian style of the democratically elected government by defending the environment and by criticism of the capitalism irony).

Thus, Zuhur emerged when the Gezipark as chaotic awareness reality is disorderly simulated by the social media and TV (included international and state-operated media channels) via black hole pictures (like woman in red dress under the tear gas) and black hole videos (like girls beaten by police in Kordon-İzmir) as well as the aggressive intervention of police. First of all, like a butterfly effect, it (as Zuhur in CAS theory) caused transformation of all social elements of Turkish Society to a non-measurable and non-reversible state with undefined and non-scale invariant representations (non-conformal). It can be considered the first New Anarchy experiment in the Simulation world for the evaluation of the Turkish Society and Turkish Politics. Furthermore the long range sensitive international affairs have been in seduction. For example: “Gezipark accelerated dialogue and negotiations between Turkey and EU” said Italian Foreign Minister Emma Bonino. Of course, “Why the world politics changed in Egypt and Syria recently?” is another example.

15.4 Conclusions

First of all, using a critique of the BS theory we understand that the Occupy Protests, the Athens Demonstrations and the World Cup Protests have similarities in having globally economic character of the principle of reality. Therefore the emergences of these protest movements in the simulation world will be same simulacra in the context of modern world. Hyper realities would be new life styles and new life aims to cover the economical regularity claims. Examples to this are the rise of communitarianism in Greece (Anastasopoulos 2012) and the new type protest organizations like in Brazil. But such common simulacra in modern societies could cause solidarity to lead the way to the new western type of humanist homogenization and direct democracy in the simulation world. But they will never cause any provocation impacts in the non-modern societies. Specially, considering the Islamic structure of the societies, they would not have any link and any correlation with Arab Spring to demand for democracy in Arab countries.

On the other hand, according to both BS and CAS theories, the initial structure of the Arab Spring was not a right reality principle for the emergence of simulakra or zuhur in the Arab World because it lost its ability to overcome the operations of non-Arab international organizations and the strong Islamic dynamics in simulation world. Thus, it still remains difficult to find new roles to improve modernizations using their own realities of the Arab World.

But by the reason of emergence definition in CAS theory the Gezipark distinguishes itself as a zuhur contrary to the occupy protest movements league including the Arab Spring. Both BS and CAS theories remark that Protest movements cannot be considered as a right dynamic for solidarity in the world against global economic powers. It means that the simulation of these protests do not have additive properties in the human homogenization and global direct democracy. To force such solidarity through protest movement could obstruct unpredictable worldwide revolutions in non-modern societies.

Today, the Gezipark protest has confirmed itself as zuhur and already caused all organs of Turkish society to have non-measurable changes. It has also caused unpredictable social evolutions in world politics. It means that all structures in Turkish organizations and in the Turkish public area are deconstructed in non-common scale and in fractal ratio. In world politics Turkey has become a new key player for the European Union. World politics has already started to revise their reality principle of Islamic understanding. Last but not least, according to CAS theory the orientalist bothering of the Europeans (West Civilization) for the Turks has been ended by the Gezipark (Zuhur) as black-hole in social media. By this postmodern change the Turks are not like in western history books, in their novels and in their cinema and arts anymore.

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Chapter 16
Unraveling the Complexity of Tourist Experience with NFC Technology and Mobile Wallets

Federica Palumbo and Gandolfo Dominici

Abstract By considering the tourist experience as a complex dynamic system, in this paper we depict the traveler as a kybernetes (κυβερνήτης is the ancient Greek word for 'sea captain', 'steersman', or 'governor') in search of powerful tools to help him or her to obtain directions in the *mare magnum* of complexity, overcoming the fear of action and taking decisions. We focus our attention on the key role of Near Field Communication technology and mobile wallet as 'attenuators of complexity' in the travel and tourism industry.

Keywords Smart · Complexity · Simplexity · Mobile technology · NFC technology · Mobile wallet · Tourist satisfaction

> *Everything is simpler than you think, and at the same time, more complex than you imagine.*
>
> Johann Wolfgang von Goethe

16.1 The Smart Revolution in Tourist Experience: From Complexity to Simplexity

The European Union (EU), in its *Europe* 2020 strategy, has emphasized the need to sustain a '*smart, sustainable and inclusive growth*' that might emerge stronger from the economic and financial crisis of the coming years (COM 2010). With the aim of simplifying complexity in the life of citizens, the scientific community is dealing

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with the development of new models of '*Smart Cities*', based on ICT, sustainable growth, social inclusion, and the quality of life in urban areas.

What does the term 'smart' exactly mean?

The concept of 'smart' can be summarized with the phrase '*the complexity of simplicity'*. Indeed, the main new challenge of the smart era is to provide complex products or services that can be perceived as simple, useful, and time-saving by users.

Creating new technologies to simplify complexity is, in itself, rather complex, but is necessary for action. Berthoz (2012) proposed the neologism 'simplexity' to describe the simplifying principles that make it possible to process complex situations very rapidly, elegantly, and efficiently, taking past experience into account and anticipating the future.

This '*smart revolution*' should not overlook the tourism industry. Tourists need to deal with a high level of complexity in their travel decisions, and so turning complexity into simplicity is particularly valuable in this industry.

The tourism sector has been described as highly information-intensive (Poon 1993), and involves a wide variety of different processes (Egger 2013). The onset of mass travel and tourism has seen the pain of delays, lost luggage, and seemingly ever-increasing queues confront many travelers. In addition, we can see how the industry is often fragmented and lacking a *kybernetes* able to manage it (Dominici 2013). For the consumers of tourist services, the effect of this fragmentation is that they are swamped with information from different sources; they need to spend a great deal of time and energy to make decisions and act.

We argue with that stream of tourism literature that suggests that travel is a 'linear process', consisting of three different temporal phases (anticipatory, experiential, and reflective) (Craig-Smith and French 1994; Graburn 1989; Jennings 1997, 2006), and we embrace the view of the tourism industry as a dynamic complex system, presenting emergent variables and nonlinear evolutionary paths (Baggio 2013; Faulkner 2001; Faulkner and Russell 1997, 2001; Faulkner and Vikulov 2001; Russell and Faulkner 1999, 2004; Zahra and Ryan 2007). In such circumstances, there is the need for a criterion to select those factors that are relevant to managing the complexity of tourist experience. Espejo and Rayes (2011: 54) called this criterion the '*attenuator of complexity*', defining it as "*any device, mechanism or procedure reducing the number of states in a [complex] situation*".

Thus, new technologies, designed to simplify complexity, can bring tremendous advantages to the tourism industry. A new model of '*Smart Tourism*' should emerge as an innovative view of tourism supported by the new digital (and in particular, mobile) technologies, and oriented towards improving and simplifying the tourist experience.

Considering mobile phones as powerful mediators of the tourist experience, we describe in this paper two attenuators of complexity that can be incorporated into mobile devices: NFC technology and mobile wallet.

16.2 Mobile Tourism

Today, we carry our smartphones everywhere we go, using them for communication, mapping, and many other applications that make our lives easier. Mobile and wireless technology incorporated into smartphones and other mobile devices has an increasing impact on everyday life. Smart phones and mobile devices can play a key role in mediating the tourist experience (Wang et al. 2012a), because tourists use mobile technology before, during, and after the travel.

Smart phones and mobile devices can help travelers' decision-making process by providing easy access to information anywhere and at any time, and by enabling travelers to learn about new travel opportunities and to become more familiar with a destination (Brown and Chalmers 2003; O'Brien and Burmeister 2003; Rasinger et al. 2007).

> Imagine a traveler driving on an Interstate highway in America. With the assistance of a GPS-enabled iPhone, he/she accesses Google Map for driving directions. Rock music is played through the car's stereo system with the streaming music coming from the Spotify app on the phone. With a little help from the embedded search engine, he/she locates a restaurant of one of his favorite brands 20 miles away along the highway; and, fifteen minutes later arrives at the restaurant and instantly checks in through the Four-square app equipped with the location-awareness capabilities. His/her status is immediately updated so that he/she can now interact with friends through various social networks, such as Facebook and Twitter. Wang et al. 2012b: 309)

According to several authors (Ricci 2011; Buhalis and Law 2008; Wang et al. 2012a; Palumbo et al. 2013), smart phones and other mobile devices are becoming the most promising area for promoting technological innovation in the tourism sector.

16.3 Near Field Communication Technology

Near Field Communication (NFC) has been defined as a proximity technology (up to 5 cm at a speed of 400 kB/sec) for data transfer without physical touch, which has evolved from Radio Frequency Identification (RFID) (Ok et al. 2010; Pesonen and Horster 2012). NFC allows people to interact with objects through the help of a smart phone or other mobile device, revolutionizing daily habits.

According to the International Air Transport Association (IATA 2009), NFC is the third wave in the mobile telephony revolution, after mobile voice and text and mobile internet communication (Egger 2013).

NFC technology traces its roots to a joint venture between Sony and Philips (Sony 2002). Its development was then promoted by the NFC Forum, a collaboration established between these two firms and Nokia.

NFC technology can operate in three modalities (Ok et al. 2010):

- *Peer-to-peer*: data is transferred between two NFC-compatible devices.
- *Reader/Writer*: data is transferred between NFC tag and mobile devices.
- *Card emulation*: data is transferred from mobile devices to NFC reader.

The main advantage of NFC technology is its *dematerialization*', meaning that all the information normally included in physical devices (badges, credit cards, access keys, etc.) is stored inside the smart phone.

Other advantages of this technology include the speed of exchange of information (useful, for example, for cash spending or transport) and the convergence of the offline and the online world (by making available more information about the products in a physical store).

Tourism is a promising area for developing this technology. Pesonen and Horster (2012: 11) have stated that "*NFC has been predicted to be one of the next big things in technological progress and it can potentially have a huge effect on both the tourism business and tourism research*". Some applications of NFC technology in the tourism industry already exist. Nevertheless, this technology is relatively recent, and its potential is still underexploited.

16.4 The Mobile Wallet

The mobile wallet, or multi-wallet, is a type of application for smart phones that integrates a physical wallet, money, payment cards, keys, and other cards, enabling users to simultaneously use all these cards using only a smart phones equipped with Near Field Communication technology.

A mobile wallet can be used for different purposes: mobile payment, mobile ticketing, vouchers and couponing, digital identity, loyalty cards, and customized and geolocalized offers.

According to Fischer (2009), an electronic wallet could replace credit, debit, transportation, access, and loyalty cards, and it could also be used for vending machines.

NFC technology, enabling smart phones and other mobile devices to become mobile wallets, will simplify and considerably improve customer experience.

Payment companies are investing heavily to determine the best ways to implement mobile payment, which would allow their users to pay for everyday goods by phone. They expect that this payment system will eventually be available in every store, and that this technology will be on every phone across the world, making credit cards extinct.

16.5 NFC Technology and Mobile Wallet in Tourist Experience

According to Madlmayr and Scharinger (2010) NFC technology and mobile wallets may be useful for a number of tourist purposes: access authorization, loyalty programs, mobile payment, Bluetooth and Wi-Fi configuration, VCard transfer, Smart Poster, data exchange, OTA (over-the-air) provisioning, ticket upload, and money top-up (i.e. preloading money).

Kneißl et al. (2009) affirm that NFC technology may be useful, not only for payments and ticketing, but also for social purposes in the tourism industry. For example, allowing users to share places they have visited on social networks by simply bringing the NFC device near to in-location tags. Ok et al. (2010) have imagined NFC-based services in hotels, for example, as automated check-in systems.

Ho and Chen (2011) studied the impact of NFC technology on user satisfaction. They hypothesized that restaurants could customize menus and offer special discounts to guests equipped with NFC enabled devices, improving their experience and enhancing their satisfaction.

> Fischer stated that "The customer sees an advertisement, likes what he/she sees, waves the phone, and orders the product right there. Imagine arriving at an airport, going to a hotel advertisement board, choosing a hotel that looks good, and waving the phone reader over the tag; the phone either offers the URL to go to the reservations Webpage or just dials the number, and stores the address in your phone. You confirm with the hotel. You then go to your rental car and wave the phone over the navigation system for a peer-to-peer connection; the address you got from the board is transferred into the navigation system, and you are on your way." (2009: 24).

16.6 Conclusions

The next decade and beyond will see a qualitative shift in the travel and tourism experience. Our research suggests that an era of 'smart tourism' will soon emerge and transform how people experience travel.

NFC technology and mobile wallets hold great promise for tourism marketing and advertisement. Through mobile-based promotion, they can become increasingly popular tools (Okazaki and Hirose 2009) and might contribute to the diffusion of mobile coupons and customized discounts (Pesonen and Horster 2012).

In this work, we have presented a first conceptual effort which, far from being exhaustive, may serve to stimulate further reflection on the benefits of NFC technology and mobile wallet in unraveling the complexity of the tourist experience.

This research is the first step in a wider research program that aims to design new tourist services based on NFC technology and mobile wallets, in line with the drivers of tourist satisfaction. In the further steps of this research, we intend to apply

the model proposed by Kano et al. (1984), in which customer needs are identified and transformed into design requirements, engineering specifications, and production details (Dominici and Palumbo 2013a, b).

We are fully aware that this work is not without limitations. In particular:

- NFC technology and mobile technology are still not widely known to users.
- The tourism sector is highly fragmented and is characterized by the existence of many small companies that often lack sufficient resources to invest in new technologies and infrastructure.
- Local authorities have few financial resources to invest in improving tourist offerings.

In the future, we aim to interview tourists so as to evaluate their familiarity with and acceptance of NFC technology and mobile wallets. We aim also to interview local authorities and travel, leisure, and hospitality companies, in order to test their interest (or lack thereof) in developing a range of new services based on NFC and mobile wallets.

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Chapter 17
Protection of Fundamental Rights and Freedoms as a Universal Problem and Chaos Theory

Sami Sezai Ural and Şuay Nilhan Açıkalın

Abstract Protection of fundamental rights and freedoms and the removal of all forms of barriers has always been the focus of political, social and cultural struggles conducted throughout human history. In this struggle of freedom and protection of human rights and preventing violations, the necessary assurance mechanisms have been established depending on the success achieved and they vary from region to region calling for provision to eligible individuals. In today's world order, government, culture and geographical frontiers, human rights are an acceptable set of values considered indispensable within all domains and in recent years have become a matter of serious debate and research at both national and international level. This is because if fundamental rights and freedoms of a person are attacked his personality and dignity in everyone's view are violated too. In this respect, the person who violates the right of the one attacked ends as more than a personal reckoning and this is an issue that should be addressed in a universal dimension. This study is intended to bring out the impact of chaos theory on the implementation of human rights as a mechanism of protecting fundamental rights and freedoms.

Keywords Fundamental rights · Freedoms · Chaos theory · Complexity

17.1 Introduction

Protection of fundamental rights and freedoms and the removal of all forms of barriers has always been the focus of political, social and cultural struggles conducted throughout human history. In this struggle of freedom and protection of

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human rights and preventing violations, the necessary assurance mechanisms have been established depending on the success achieved and they vary from region to region calling for provision to eligible individuals. This is because if fundamental rights and freedoms of a person are attacked his personality and dignity in everyone's view are violated too. In this respect, the person who violates the right of the one attacked ends as more than a personal reckoning and this is an issue that should be addressed in a universal dimension. Otherwise, it remains up to the audience's persecution, and if we don't react to that attitude we would become a partnership to that persecution (Öztürk 2013).

17.2 Fundamental Rights and Freedoms as a Concept

In the academic and philosophical understanding, the emergence and development of the phenomenon of human rights is almost as old as civilization. In this sense, the theme of human rights and the social life that reveals the concept of "legitimacy of the state" is discussed in the academic world in close association with natural rights especially in the realm of theory. This debate today, is very meaningful especially against the deep violations in the field of human rights.

In the historical development process, the concept of what is covered in human rights has been and is always a subject of heated debate and struggle in the philosophical and political fields but tragic statements have been seen in the violation of human rights especially in war and economic crisis eras. Despite this gloomy atmosphere all cases of human rights from this struggle could be strengthened on the conceptual, institutional and practical plane. As a result of the major economic crisis in the world, the point of compromise has always been to "promote and safeguard human rights" (Ural 2013).

Beyond being "a moral ideal" (Erdoğan 2007), Human rights, is an important element of the strategy developed for the establishment of peace in the world that has a modern security concept dubbed "confidence-building measures". In this context, the most precious element of peace which will be used in the establishment of stability, peace and security in national and international order is "human rights".

When we talk of human rights two factors come to mind. The first of these is "human", the other is the "right phenomenon". Besides human existence in material form, spiritual aspects of the person as a whole are of supreme value. If the concept of rights in general is "true, correct and receivable", it offers a meaning "next to the protection and benefits that must be observed with other material and spiritual values". In this context, in a country where human rights are one of the most important indicators of existence, respect and value are given to people. In addition, the main purpose of the law is; to determine what right belongs to whom, to protect the rights and to eliminate all kinds of violations of human rights. The rule of law meanwhile determines and balances the rights and responsibilities of individuals and society. What is important in a modern legal system is to provide unrestricted

and unconditional rights for people to have the confidence to live together in dignity and honor as much as possible.

The concept of human rights also refers to the freedoms that people have. In this context, "rights and freedoms" are facts which actually complement each other. This is because a right can be realized through freedom, but also freedom is a right in a way. In other words, a right at the same time implies a demand for freedom. Because the request is not authorized or empowered by law, enforcing the protection of a right is not likely to happen.

The field of human rights has always extended in the historical process. Civil and political rights consist of first-generation rights, while we view economic, social and cultural rights which developed in the middle of the 20th century as representing the second generation rights, in this period we refer to globalization and the information age rights such as the right of individual-state relations as those which define the third generation rights, beyond this though there are scientific rights against the possibility of the misuse of technological developments and essential features of human dignity which have been raised calling for the human being to be concerned about situations (such as the right to the fetus). Here some arrangements should be made in areas pointing to the fourth generation of rights. All of these processes have been reviewed as testimony to the emergence of new rights, along with the redefinition of existing rights (Tezcan et al. 2011).

Today, "the content of human rights" is equally important as the subject of fundamental rights, especially the methods and mechanisms which can be used to protect human rights. Because lived social and political experiences sometimes show that traditional security mechanisms are inadequate, the advances in human rights theory could not be reflected into practice quickly and accurately. Thus, the universal quest for a standard of achievement in the field of human rights has always been an application reflected in how better to establish new mechanisms or looking to strengthen the existing ones and how to be protected against possible dangers. In the historical process we live in, despite the grave situation faced in many regions of the world, inadequacy of existing mechanisms that disturb the human conscience and efforts in this direction will continue to increase the intensity today.

On such an important subject of human rights, the academic, philosophical and practical work can be grouped under two main headings. The first is determination of the extent of human rights, the other is related to how effectively the study of human rights considerations can be protected and improved.

This article will examine how to draw on the scope of human rights. Accordingly international mechanisms for the protection of human rights will be discussed and the functioning of these mechanisms in terms of managing chaos will be examined too. The functioning of processes towards the protection of human rights in chaotic situations holds an important place in literature of the present international system and this article will add a key difference to the discourse in this respect.

17.3 Chaos and Management as a Concept

> Chaos is inevitable. In the sense that perturbation is evolutionary, it's also desirable. But managing it is essential. It's no use for any of us to hope that someone else will do it. Do you have your own personal strategies in place?
>
> C.P. Brinkworth 2006

Chaos means that strategies go wildly astray. It is often associated with missed deadlines, understaffing, runaway costs, and similar situations generally considered negative (Hubler et al. 2007). Under these circumstances "Chaos" describes a situation where the goals of a strategy are unachievable and therefore the outcomes become random, unpredictable and often undesirable.

In organizational development, chaos theory is a subset of more general chaos theory that incorporates principles of quantum mechanics and presents them in a complex systems environment (Wikipedia, the free encyclopedia 2014). To the observer the systems seem to be in chaos. The claim therefore is that organizational development of a business system is the management of that apparent chaos.

Any of the administrative sciences wishing to guide firms, agencies and governments through the cycles of uncertainties in an increasingly complex and changing environment might well consider the findings of the new science of Chaos (Young and Kiel 1994). Chaos theory deals with the changing relationship between order and disorder in the behavior of natural or social systems. Chaos theory is so fundamentally different from previous understandings of social and natural dynamics that an entirely new paradigm for the knowledge process is required.

Young and Kiel (1994) also opine that the chief elements of the new paradigm include (1), the nonlinearity but self-similarity of systems dynamics, (2), qualitative transformations to new dynamical states, (3), progressively more complex outcomes as well as (4), the appearance of new forms of order out of even the most chaotic regimes.

The expected enables stability and helps us live comfortably. The unexpected changes our lives and the lives of organizations. As strategic leaders, we can build a positive future out of chaos. But without management, chaos can produce arbitrary outcomes, some may be very positive some may be very negative. If the management does a good job in prioritizing ideas for implementation the overall outcome is positive. Traditional, control-oriented, resource and bottom-lined focused Management approaches have been consistently shown to be ineffective in handling change, chaos/complexity, or globalization.

Chaos Management is a catalyst for change in organizations. It can provide tools and solutions for collaborative, equitable, and participatory work through consultation, facilitation and education. Macnamara (2013) postulates that the concept of managing change comes from the erroneous belief that we can control it, direct it, contain it, slow it down or even speed it up. (The "it" being the many external forces of customer expectations, market value shifts, changing regulations/standards, and more, plus the internal processes, efficiencies, employee attitudes, etc.) Managing after all, is mainly about the organization and control of resources in order to achieve specific goals or results.

Managing change requires facilitating continuous innovation, while managing Chaos & complexity calls for connecting systems & networks to lever novelty and improved value. Indeed Billie (2010) laments that from this decade, forward; management practice will take a completely new direction. For those in health care management this will mean greater focus on strategy as well as the recognition of management's new realities. For starters, management in this decade will be directed and informed by the dictates of chaos management principles. These principles include: steady state chaos; chaotic direction; and managed focus implementation.

Taneja et al. (2013) contend that managing chaos is a strategic and tactical leadership imperative which can positively or negatively impact an organization's competitive capability and potential for long-term success and survival. Strategic thinkers should use a strategic management process which is capable of being consistent and improving organizational processes as well. Particular emphasis is given to strategic management in eras of paradigmatic chaos, i.e., in eras that are defined by chaotic, disruptive change.

Dolan et al. (2000) in their article entitled Organizational Values as "Attractors of Chaos": An Emerging Cultural Change to Manage Organizational Complexity, write that traditional management approaches fail to achieve is a confident reliance on human adaptation to turbulent environments. Both giving orders (Management by Instructions or MBI), and defining objectives (Management by Objectives) do not incorporate dealing with changes into their principal philosophy, and consequently fail to help organizations operating in turbulent environments. To deal successfully with complexity, chaos, and turbulence means to be embroiled in constant processes of change. A common view of managing change in organizations implies managing a cultural change, which affects the members of the organization directly. It for this reason that we should humanize the concepts and tools that are used in the change processes.

Dolan et al. identify the following conditions for adaptation to turbulent environments

- Reach shared ends and principles
- Generate trust to deal with uncertainty
- Work with flexibility
- Explore chaotic situation to develop creativity and innovation
- Simplify structures and rules
- Self-organize
- Stimulate participation and collaboration
- Create social responsibility
- Create high quality relationships between oneself and others
- Accomplish well-being in both ethical and emotional aspects

The bottom line therefore is that chaos is prevalent in organizations and all other systems. In the contemporary setting, chaos is looked at as something positive if well-handled and thus negative if neglected or poorly handled. The most important function in this case therefore is management with which every element of chaos

would be effectively dealt with. Managing chaos not only becomes a calling but actually inevitable. In this study chaos management is examined as expendable and indispensable or rather a sine qua-non for organizational and institutional success.

17.4 Human Rights Protection Within the United Nations

When we consider it in chronological order, the first efforts relating to the protection of fundamental rights and freedoms at the international level were the 1899 and 1907 Hague Peace Conferences. In 1899, the First Conference of Hague was organized upon the request of the Russian Tsar Nicholas II. By an edict dated Wed, 24 August 1898, making such a meeting brought an agenda for discussion of the development of interstate relations, the preservation of peace and disarmament issues which was welcomed by the countries which were being crushed under the weight of the other states during the arms race, so, on May 18th 1899, the First Peace Conference was held at The Hague with the participation of 26 government representatives (Gönlübol 1975).

At the end of the conference, the Hague Conventions for the International Pacific Settlement of Disputes agreement was signed. The 1899 conference resulted in the aforementioned Convention of 1907 and with the subsequent addition to the new Hague agreement of a charter, a set of rules that must be followed during the war, was established (Tezcan et al., 2009).

As a result of negotiations in the Conference a consensus was reached; everyone regardless of nationality, but issuing from the nature of being human, is subject to the rights and obligations of international law, both as a subject and object (Ball 1999). Accordingly, the 1899 Convention and the 1907 Convention are regarded as an extension of the process adopted in the annex of regulations through which some acts were prohibited in times of war. Among these acts are: attacking unprotected towns and cities, destroying enemy towns and cities arbitrarily, ill-treatment of prisoners of war, violating the independent status of a state and etc.

However, given cases of violation of the prohibitions referred to, the control function established as a mechanism can be seen to have failed. The Peace conference attended by 26 governments established a Permanent Court of Arbitration, however, this Court, having jurisdiction in the true sense was not an organ with power and authority, in case of disagreement between states judges could be selected from a list containing the names of the judges constituting the said states (Gönlübol 1975).

The first court to be established in the international arena was the International prize Court. On 07/18/1907 during the second Peace Conference at The Hague, the convention for the International Court of confiscation was adopted. But due to the fact that this agreement did not elicit the approval of the parties, its operations did not become operational at any time (Özbey 2010).

By articles 4 and 5 of this contract people were given the real right to apply directly to the court.

On 12/20/1907 a group of states located in the Americas by special agreement created the Central American Court of Justice which has been serving as the first actual international court. This Court, as agreed by the parties served for a period of 10 years and in 1918 the activities of the court ended.

After World War I, one of the courts that provided people with the opportunity/right to apply is known by the name "Mixed Arbitration Tribunal Court", the UMS court was used just to win over the citizens of the German state against their own claim to compensation. The courts in question consisted of two members of the concerned State; the results were determined by the head and also the two government representatives in total consisting of 3 members. In these years another court working in an organized manner which became operational on 09/02/1921 and established by the League of Nations was the Permanent Court of International Justice. The Court started work on 15/02/1922 and the activities of the court ended on 18.04.1924.

After the Second World War the "International Court of Justice" was established under the United Nations with similar duties and powers in place of the Permanent International Court of Justice. Here again, the people did not have authority to apply directly to the Court.

Even the International Court of Justice just like the International Court of arbitration with the Permanent Court of Justice before, could not try individuals. However, as highlighted in the Nuremberg trial, which constitutes a serious violation of international law, those who commit crimes are not abstract institutions but real people all the time. The rule of law shall provide for such a person to be punished (Tezcan et al. 2009). The most important activity of a criminal trial is conducted by the recently established "International Criminal Court". The Rome Statute outcome document dated 17.07.1998 adopted by 120 states, seven states (U. S., India, Israel, Bahrain, Qatar, China, and Vietnam) against, and 21 absentees adopted the Statute of the Court. As before this is established in the international criminal court 4 times. This court was established to prosecute offenders of Genocide and crimes against humanity respectively: Nuremberg International Military Tribunal (was established to prosecute German Nazi war offenders and managers); Tokyo International Military Tribunal for the Far East (the court having jurisdiction over the Pacific to prosecute crimes committed by the 28 Japanese citizens in the area who served in the war; these cases included crimes against peace, conventional war crimes, and crimes against humanity); International Criminal Tribunal for the former Yugoslavia (the tribunal was set up to try those in former Yugoslavia with crimes against humanity, and grave breaches committed within the territory); Rwanda International Criminal Court (1990 and 1994 in Rwanda, the resulting civil war, along with the Hutu tribe, the Tutsi tribe genocide against the opposition moderate Hutus with about 800 thousand people killed as a result of the 11/08/1994 date and by the 955 decree of the United Nations Security Council the establishment of an international criminal tribunal for Rwanda and the status determination was adopted. The court began its work in 1995).

Besides the international courts, particularly within the United Nations after the Second World War, many contracts were signed. On 01/01/1941 at the United

Nations Declaration a contract was discussed and was to be signed subsequently on 26.06.1945 as the United Nations Charter. However on 10/24/1945, the approval process was completed. This was to turn out to be a cornerstone in the history of mankind in terms of a very important document dubbed the "Universal Human Rights Declaration" of the United Nations General Board which was adopted and attained effective operation on 10 December 1948.

After World War II the United Nations Charter was signed, but in the charter, human rights and fundamental freedoms are considered as only one, the charter does not specify them one by one and did not explain them as well. These deficiencies within the United Nations Human Rights Commission were corrected the "Universal Declaration of Human Rights" prepared by the United Nations was adopted and proclaimed by the General Assembly on 10 December 1948.

Declaration of the United Nations General Assembly resolution technically does not offer authority and obligation to signatory states. However, the platonic nature of a list of rights within the "the United Nations Universal Human Rights Declaration", makes it one of the present documents that are legally binding in terms of rights and thus symbolizing a landmark in the processes of human development and the history of mankind (Kapani 1981). The lack of a binding dimension within the Declaration of the United Nations establishment was reviewed under the contracts prepared by the commission. During the preparatory phase of human personality a lot depends on "fundamental" rights. There is need to ensure that social and cultural rights profit from socio-economic development fully and urgently according to levels and interests of the different groups of people. In order to realize the idea, different control mechanisms were envisaged which resulted in two contract preparations: in 1966 the International Covenant on Civil and Political Rights was opened for signature and in January 1976 became operational whilst the International Covenant on Economic, Cultural and Social Rights came into effect in March 1976. This Agreement encompasses such a wide range of personal, legal, civil, political, livelihood, economic, social and cultural rights (Donelly 2000).

Human rights at the international level in terms of preserving contracts are extremely loose (Kapani 1981). However an assurance system that creates a general consensus that more flexible and gradual mechanisms bringing out the idea that the present settings contain rights that are interrelated and interact has been reached (Donelly 2000).

Civil and Political Rights Convention hold important and classic rights and freedoms of persons. Under this agreement "Human Rights Committee" organ was formed to spy on the implementation of the rights and freedoms of other State Parties and to assess whether appropriate action is being implemented thereof. Accordingly, the Committee on the other side of the state has the right to complain about the alleged breach of contract related to one of the State parties. For this, both parties must accept the Committee's examination authority. This is a valid way for "government applications". Also the optional Protocol to the Convention "personal application" was adopted and accordingly member states can complain about their rights being violated by an individual. In this case, the committee provides a review of the scenario and decision-making is swiftly undertaken. For this, the state must be party to the protocol.

However, as in the Court there is no serious mechanism to supervise and to follow the decisions of the Committee. Even the "Tracking Method" formed by the committee is also unable to perform this task effectively (Özbey 2010).

Another International agreement adopted by the United Nations is the "Convention on the Elimination of All Forms of Racial Discrimination" dated 21.12.1965. A committee was established with the objective of tracking the rights and freedoms defined in the Convention for consideration under the responsibility of the member states. In case of violations against one of the state parties, another state party complains to the Committee. If the Committee does not remove the conflict between the parties within 6 months, a "Reconciliation Commission" shall be established. However, this commission is not binding on the parties under sanctions. In addition, real people, individuals and groups in the community, are entitled to "personal application" citing their grievances to the Committee. For this, the actual application against the state should be preceded by a declaration in advance accepting the jurisdiction of the Committee on this subject.

Another United Nations Convention that became operational on 26.06.1987 is the "the Convention against Torture and other Cruel, Inhuman or Degrading Treatment and Punishment". These mandatory reports stipulated in the contract that state control by way of reference and personal reference is provided as a task and responsibility of states. Following the establishment of the "Committee against Torture" many other organs have been named too. In this regard the State party accepts the jurisdiction of the committee with regard to whether there are rights of reservations.

Another United Nations Convention signed with full assertion to realize crimes against Women and became effective on 18.12.1979 is the "Convention on the Elimination of All Forms of Discrimination against Women". Under the contract, a "Committee" was established and an optional protocol called "personal remedy" was also adopted. However, the Committee had no authority to request for a report containing the measures taken regarding violations of women rights other than notifying concerned parties on this issue.

An important control mechanism within the United Nations is evaluation of the application by the member states relating to human rights violations that are conducted by a person. This is done by "United Nations Commission on Human Rights". Commission and Sub-Commission take a stand or decision by examining violations by subject and creating a series of reports and making recommendations to the State party. The said report is presented to the "Economic and Social Council". That way an indirect pressing is made on the states concerned. Applications are made to the "United Nations Human Rights Center" established by the "United Nations Secretary-General's" based in Geneva. The state does not have a binding decision as required by the Commission as well as the Economic and Social Council (Özbey 2010).

The major Conventions and Declarations formed by the United Nations are:

- United Nations Universal Declaration of Human Rights;
- United Nations Economic, Social and Cultural Rights;
- United Nations Convention on the Rights of the Child;

- World Conference on Human Rights;
- Declaration of Basic Principles on the Role of Lawyers;
- Principles for the Role of Prosecutors;
- Declaration on the Elimination of all Forms of Intolerance and Discrimination based on Religion or Belief;
- The United Nations Basic Principles on the Independence of the Judiciary;
- United Nations Conference on Human Settlements Habitat II Declaration—Istanbul;
- The United Nations Millennium Declaration

17.5 Protection of Human Rights at the Regional Level

Development of regional protection systems in terms protection of human rights is an effort supported by the United Nations. On a regional basis the "Central American Court of Justice" is one of the oldest international bodies with a contract made between Costa Rica, Guatemala, Nicaragua and El Salvador, to carry out audits of the Latin American states, it was established in 1907 and its duties ended in 1918 (Özbey 2010). The most important of all documents protecting human rights at the regional level is the European Convention on Human Rights signed on 4 November 1950 with the full name "European Convention for the Protection of Human Rights and Fundamental Freedoms". A legal obligation is imposed on the side of the states to provide and protect the rights and freedoms contained in the Convention. This aspect provides that the rights and freedoms of individuals based on the assurance of judicial sanctions are to be made subject to a control feature which is different from the Universal Declaration of Human Rights (Akad and Dinçkol 2002). Another important document at the regional level which was signed on November 22, 1969 and became operational on July 18, 1978 is the "American Convention on Human Rights" (Kapani 1981). The Organization of American States from across the continent which had gathered in Bogotá before, published the "American Declaration of Human Rights and Duties" in the 9th Pan-American Conference of 1948.

The "American Convention on Human Rights", signed in 22.11.1969 and became operational on 18.07.1978 inspired the creation of the Universal Declaration of Human Rights by the ECHR. The "American Commission on Human Rights" and "American Human Rights Court" was established as bodies guaranteed under the agreement to conduct audit activities relating to rights. The U.S. is not a party to the agreement in question (Özbey 2010).

Later in the year 28.06.1981 African Heads of State and Government agreed to the "African Human Rights Charter" with the Summit in Kenya's capital Nairobi. This charter became operational on 21 October 1981. In order to realize people's rights and to ensure proper protection of the same, the Organization of African Unity established the "African Commission on Human and Peoples' Rights" to present an

element of accountability in the eyes of Africa. The second organ to handle Control mechanisms however is the "African Heads of State and Government Conference".

The Commission which started work since 12 June 1989 examines member states, non-governmental organizations and the applications made by individuals. However, rights under the African Charter on rights suffered serious challenges and thus a meeting of the Organization of African Unity was convened in Cape Town in 1995 with an aim of establishing a court. At the meeting, a protocol floating the idea of establishing the "African Human and Peoples' Rights Court" was adopted by the Contingent. In September 1998, the Heads of State and Government accepted the "Additional Protocol to the African Charter" and dully signed it for recognition. It was agreed that in case 15 States ratify the Protocol, it becomes fully operational.

Another document in this field is the "Commonwealth of Independent States Human Rights and Fundamental Freedoms Agreement" passed in 1995 by the former USSR states, including a portion on the dissolution of the union may have on the Commonwealth of Independent States depending on the seven-states identified.

To ensure respect for human rights in the international arena the other document the "European Security and Cooperation Conference" was signed by the 35 countries who participated in the Helsinki Final Act in 1975. In principle the document intended to guarantee human rights but legally does not have the nature of a contract. However, the countries' "sovereign equality" and "the inviolability of borders" next to principles like "human rights and fundamental rights and freedoms" were based on a treaty that hinges on respect. Hence the importance of the Helsinki Final Act on the concept of human rights has been adopted as a common value lying between ideologies (Kapani 1981).

In the European Security and Cooperation Conference Summit of 19–21 November 1990 however, the "Charter of Paris" renewing views on the disarmament treaty known as the "European Conventional Forces Treaty" (CFE) and human rights, democracy and minority issues was adopted. In the Charter of Paris, human rights and fundamental freedoms of all people, inalienable rights that are acquired with birth were guaranteed by law. Their protection and promotion is the duty of the state. Respect for them creates real guarantees against an overbearing state. Adherence to and full implementation of freedom, and justice is the foundation of peace.

The last European document in this field is "European Charter of Fundamental Rights" signed on 7 December 2000 in Nice /France with a future bearing on the Constitution of the European Union as a part. The number of rights, freedoms and principles that constitute the European Charter of Fundamental Rights declaration and the quality extended to the rights cannot be considered legally binding. Therefore, it is appropriate to claim that the declaration itself and the rights enumerated in the declaration do not impose any obligations on states.

Attributes of the document are stated in the introduction of document itself as follows:

> "The peoples of Europe have resolved to share a peaceful future, in order to create an ever closer union among them based on common values. Awareness of spiritual and moral heritage, the indivisible union and universal values of human dignity, freedom, equality and solidarity are built on values. It is based on the principles of democracy and the rule of law.

> The union is the center of all activities for establishing freedom of citizenship, security and justice in the region…. This Declaration, takes into account the Community and the Union's powers and duties and the principle of subsidiarity, and in particular the Member States' common international obligations and constitutional traditions of the EU Treaty, the Community Treaties, the European Human Rights and Fundamental Rights and Freedoms Convention for the Protection of the Community and by the European Council Social Charters adopted and the European Court of Justice and the European Court of Human Rights case law confirms the rights arising from there …"

However, this is not a factor affecting the political weight of the document. It is an argument that all this would be a basic reference for the internal affairs of EU states whose leaders approved this document yet for the candidate countries, they are also bound by the criteria for determining human rights established at the Copenhagen Summit.

Among the major declarations occurring on a regional basis include the following:

- The American Convention on Human Rights;
- African Charter on Human Rights;
- European Convention on Human Rights; European Social Charter;
- European Convention for the Prevention of Torture;
- European Charter for Regional or Minority Languages;
- Convention for the Protection of National Minorities

In addition, in the framework of the Organization for Security and Cooperation in Europe (OSCE), documents, papers, and meetings such as Helsinki Outcome Document; The Charter of Paris; Monitoring of Madrid Meeting; Vienna Monitoring Meeting; Moscow Human Dimension Meeting; Helsinki Summit Declaration; Budapest Summit Declaration; Lisbon Summit Declaration; The Istanbul Summit Declaration; Copenhagen Meeting on the Human Dimension etc. were held.

If we examine the documents by the European Union, the following come to the fore: Declaration of Fundamental Rights and Freedoms; Declaration on Racism and Xenophobia; Declaration of Human Rights; Anti-Discrimination Directive; Decision on Human Rights, Democracy and Development; Agenda 2000 Report and the European Charter of Fundamental Rights.

17.6 Relationship Between Chaos and Complexity and Protection of Human Rights Mechanisms

The idea of human rights protection coming under the auspices of the UN was sown in the Preamble to the UN Charter. It was further reflected in the provisions of the UN Charter and the UDHR. Human rights were then spelled out in the two UN Covenants, the ICCPR and the ICESCR, which represented much refining of the rights and freedoms set forth in the UDHR. The relatively recent introduction of the

Second Optional Protocol on the abolition of capital punishment highlights that human rights are not static; they continue to evolve.

It is obviously important that UN human rights instruments be assessed as to their impact on promoting and protecting the human rights of individuals who are the nationals of contracting parties (Steinerte and Wallace 2009).

Accordingly a number of mechanisms have been introduced in an attempt to monitor compliance with each human rights treaty. The main international human rights treaties have established special committees which have been specifically entrusted with the task of supervising the way countries abide by their treaty obligations.

These treaty bodies, of which there are currently nine, have been created pursuant to the relevant UN human rights treaties, as follows (Steinerte and Wallace 2009):

- the Human Rights Committee (HRC), created under the ICCPR
- the Committee on Economic, Social and Cultural Rights (CESCR), created under the ICESCR
- the Committee on the Elimination of Racial Discrimination (CERD), created under the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD)
- the Committee on the Elimination of Discrimination against Women (CEDAW), created under the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW).
- the Committee Against Torture (CAT), created under the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT)
- the Subcommittee on Prevention of Torture and other Cruel, Inhuman or Degrading Treatment or Punishment (SPT), created under the Optional Protocol to the Convention against Torture (OPCAT)
- the Committee on the Rights of the Child (CRC), created under the Convention on the Rights of the Child (CRC)
- the Committee on Migrant Workers (CMW), created under the International Convention on the Protection of the Rights of All Migrant Workers and Their Families (ICRMW)
- the Committee on the Rights of Persons with Disabilities (CRPD), created under the Convention on the Rights of Persons with Disabilities (CRPD).

Similarly, a Committee on Enforced Disappearances is set to be created under the International Convention for the Protection of All Persons from Enforced Disappearance, which was opened for signature on 20 December 2006.

Human Rights are guaranteed under international law but working to ensure that they are realized and taking up the cases of those who have had their rights violated can be a dangerous activity in countries all around the world. The work dully falls in the hands of the human rights defenders. Human Rights Defenders are often the only force standing between ordinary people and the unbridled power of the state (Enrique and Marie 2009). They are vital to the development of democratic processes and institutions, ending impunity and the promotion and protection of human rights.

Human Rights defenders often face harassment, detention, torture, defamation, suspension from their employment, denial of freedom of movement and difficulty in obtaining legal recognition for their associations. In some countries they are killed, abducted or "disappeared."

Over the last few years, general awareness has increased of the enormous risk human rights defenders face in their work. The risk is easy to identify when defenders work in hostile situations, for instance, if a country's laws penalize people who do certain types of human rights work. Defenders are also at risk when the law fully sanctions human rights work on the one hand, but fails to punish those who threaten or attack defenders on the other. In armed conflict situations, the risk becomes even higher.

Apart from a few chaotic situations during which a defender's life may be in the hands of soldiers at a checkpoint, the violence committed against defenders can't be called indiscriminate. In most cases, violent attacks are a deliberate and well-planned response to defenders' work, and linked to a clear political or military agenda.

These challenges require human rights defenders to implement comprehensive and dynamic security strategies in their day-to-day work. Giving defenders well-meant advice or recommending that they "take care" is not enough. Better security management is key. This manual does not offer tailor-made solutions ready to be applied to any scenario. However, it does try to provide a set of strategies aimed at improving defenders' security management.

Meanwhile according to the ILC infonote (2012), human rights defenders usually work in complex environments, where there are many different actors, and which are influenced by deeply political decision-making processes. Many things will be happening almost simultaneously, with each event impacting on another. The dynamics of each actor, or stakeholder, in this scenario will play a significant role in that actor's relationships with others. Human rights defenders therefore need information not only about issues directly related to their work, but also about the positions of key actors and stakeholders.

17.7 Conclusions

Chaos theory reflected in its management is a contemporary issue that bothers all institutions alike. But it does not get more intriguing than when subjected to protection of human rights. Indeed the debate about the issue of human rights in the international conjuncture intensified especially after the Second World War and academic studies have focused on the next steps towards implementation.

With the onset of war, sometimes human, sometimes mythical, philosophical or ideological reasons are offered although the underlying facts are often conflicts of interest of the state. The Second World War saw the birth of a new race based on interests of the sovereign states, and as always there was a strong common interest among states resulting in a general consensus. However, the real victory in this

battle was the victory achieved against dictators and totalitarian regimes declared as a success that the world could easily detect. In such an atmosphere, the United Nations as a world peace project idea was proposed and accepted. The United Nations Organization, in the foundation stage, claims that global peace is directly related to human rights and declared its commitment to this idea. As a result of this understanding, the famous Universal Declaration of Human Rights was proclaimed in 1948. That way, human rights won a universal identity for the first time in history, provided a general consensus regarding validity and also became one of the main concepts or subjects of national law in addition to being the individual subject of international law (Öztürk et al. 2013).

In this context, human rights protection and development has taken new steps in furthering the long-standing existing judicial and administrative mechanisms, in addition to continued developments occurring as a result of the 2nd World War in particular. These developments have been considered by governments and international organizations alongside people of international law subjects and are reflected within teams that concern themselves with protection of human rights. According to the rules of human rights law, while editing obligations at the national level, the state of relations between the individual and the state are expanded to include references to supranational rights of individuals. This opens up to searching for other mechanisms to address the human rights challenge (Tezcan et al. 2009).

In the historical process, when human rights practices are examined, the great massacres in the world and humanity's blind conscience will continue to bother us just like grave conflicts. Meanwhile the international community's agenda to engage hunger and poverty will continue since these are given the protection and tag of human rights. Therefore in any kind of academic work that will be done in this area, humanity will continue to be significant and indispensable.

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Chapter 18
The Use of Systems Approach in Psychological Counseling and Guidance

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Abstract The field of Psychological Counseling and Guidance (PCG) places the individual in the center. At the same time, systems that have a crucial place in personal development such as the family, school and work place are also considered important. Efforts in this context make use of approaches that study the interaction between the individual and the systems to which he belongs to (such as the linear system, modern system, ecological system, and chaos theory). These approaches are all based on general systems theory but have different fields of practice. To substantiate this, the general systems approach which originated from natural sciences has emerged in the field of psychology as the ecological system approach. Much as the individual remains at the heart of Psychological Counseling and Guidance (PCG), it is equally important to study the relationship between the individual and the system. This article therefore includes information about systems theory which explains the relations between individuals and the system, the ecological approach and chaos theory. Following this, the place and importance of the systems approach in education and PCG is explained. A survey of the related literature reveals a very limited number of PCG studies conducted in Turkey. The article offers sample studies from different stages of education. Finally, an evaluation of the feasibility of these approaches and recommendations will follow.

Keywords Systems theory · Ecological system theory · Psychological counseling and guidance · School

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18.1 Introduction

The field of Psychological Counseling and Guidance (PCG) places the individual in the center. At the same time, systems that have a crucial place in personal development such as the family, school and work place are also considered important. Efforts in this context make use of approaches that study the interaction between the individual and the systems to which he belongs to (such as the linear system, modern system, ecological system, and chaos theory). These approaches are all based on general systems theory but have different fields of practice. To substantiate this, the general systems approach which originated from natural sciences has emerged in the field of psychology as the ecological system approach.

Studies on the systems approach emerged abroad in the 1950s with Ludwig von Bertalanffy and later expanded to other fields. In Turkey, the systems approach was first used in Biology (Alıç 1991), followed by fields such as Educational Sciences (Bozkaya 1993; Kayısılı 2008), Sociology (Ökten 2006; Yıldırım 1997), Administrative Sciences (Yavaş 1996), and drama (Solak 2000). A survey of the literature shows that studies in Psychology (Gökler 2008), Social Services (Acar and Acar 2002) and Psychological Counseling (Atik 2013; Gençtanırım Kuru 2010) are more often based on the ecological system approach. PCG studies based on the systems approach seem to be less popular in Turkey than abroad (Bratcher 1982; Kazak 1989; Malatino 2011; Neville and Mobley 2001; Stormshak and Dishion 2002).

In this study, the Systems approach is explored in relation to its place among other disciplines and PCG studies. In addition, the feasibility of the approach in the field is discussed and recommendations are made.

18.2 Systems: Definition and Classification

Bertalanffy (1951) defined a system as "a series of elements in a mutual relationship". The author proposed that the whole is bigger than its parts and that the mutual processes between the parts of a system need to be evaluated to see how an organism works. The mutual relationship between systems is valid for all living and non-living systems.

According to systemic thought, a concept can only be defined if the structure that the concept is situated in is known. Owing to this, no data means a thing outside its own context (Kılıç 2009).

Systems are divided into two: 'open systems' that interact with their environment and 'closed systems'. If a system has no input and output, it is a closed system; if, on the other hand, it changes with input and output, it is an open one (Cole 1993, cited in Yalçınkaya 2002). Bertalanffy (1951) states that as living organisms and psycho-biological entities, humans are an open system.

As discussed in the introduction, there are various approaches that explain human behaviors in relation to systemic thought. Of these, general system, ecological system and chaos theory are given below in chronological order.

General Systems Approach: A biologist by profession, Bertalanffy proposed the general systems theory as an effort to develop a consistent theoretical model related to all living systems (cited in Dallos and Draper 2012). According to the general systems approach, the world is an organization structured at different levels ranging from the individual (microsystemic) to the society (macrosystemic).

General systems approach is considered to be a linear and modern dynamic system. In the linear systems approach, events are explained with a cause-effect relationship inside a system (Spronck and Compernolle 1997). This reason-result relationship in the linear model may be illustrated with the example that the ambient temperature in a room may vary with a cold or warm air current. However, this approach may fail to explain the variation in social and psychological phenomena (e.g. bullying or violence).

In the modern dynamic systems approach, the principle of cyclical causality has been adopted. According to this, each system has interaction with an unlimited number of variables tied to each other with mutual causation (Spronck and Compernolle 1997). For instance, violent behavior by students should be explained by considering the regional and physical facilities of the school, discipline and punishment regulations, parent and teacher attitudes, the importance attached to social activities at school, and students' communicative competence, etc.

Ecological Systems Approach: The 1929 Depression and the ensuing World War II brought many social problems such as poverty, unemployment, guilt, and social stress (Toikko 1999, p. 355). These problems became the basis for the ecological systems approach which postulated that problems and human behavior arise within a certain environment and should be thus evaluated with a contextual mindset (Compton and Galaway 1979, pp. 111–114).

The ecological system approach emphasizes the mutual interaction of internal and external forces that affect human behavior. According to this, valid behaviors patterns that help individuals adapt to different situations are defined, and the mutual effects of people and other systems around are explained (Miley et al. 1998, pp. 31–32). According to Bronfenbrenner and Ceci (1993), humans are a common product of the environment and genetics. Even though genetic limitations may prevent optimal development, environmental support may increase capacity (cited in Kağıtçıbaşı 2010). The close links between development and family structure, and those between families and the socio-cultural environment show that the ecological approach is at the same time contextual (Kağıtçıbaşı 2010, p. 33).

Environmental factors can influence not only behaviors but also emotions, thoughts, motivation and communication (Markus and Kitayama 1991). For instance, Levy (1973) found that in Tahiti "angry" facial expression did not exist (cited in Markus and Kitayama 1991). This does not suggest that they do not feel angry, just that they have learned to value others and act politely in all situations (Markus and Kitayama 1991).

In the ecological model, there are four systems that affect human behavior. Bronfenbrenner (1979) named these systems as follows: microsystem, mesosystem, exosystem and macrosystem. Having the greatest effect on personal development, microsystem basically covers family, school and peers; while mesosystem includes the interaction between two or more microsystems that the child is involved in.

As an extension of mesosystem, exosystem is not made of individuals but the formal and nonformal social structures that affect their environment (Bronfenbrenner 1979). Examples of these structures include relations with school management and neighbors, local authority and transportation systems (Muuss 2006). Macrosystem, on the other hand, includes a society's cultural values, belief systems and laws, people's attitudes, lifestyles and socio-economic statuses (Bronfenbrenner 1979).

The ecological model treats human behavior as a result of the interactive factors comprising of the individual, situational, socio-structural, cultural and historical levels (Braun, 2012). Kağıtçıbaşı (2007, p. 47) states that psychological phenomena never emerge independently of their environment and, therefore, the environment is always a part of psychological reality. The self is known to develop within a relational pattern. Therefore, the individual cannot be separated from their society and the upper systems including the society. Systems proposed by the ecological approach interact with the individual directly or indirectly, and develop the "self" and biological entity.

The mutual effects of these systems and the individual on each other in the ecological model are shown in Fig. 18.1. Each system, starting with the individual, is alive and variable. In other words, a type of butterfly effect is present from the center to the periphery or vice versa. The individual in the center is continuously changing and developing. This change and development affect upper systems, and the non-static upper systems affect the individual. For instance, the educational policies of a state may change. These changing policies can affect families and, in turn, students. In Turkey, 2012–2013 school year witnessed the transition to 4 + 4 + 4 compulsory education system, upon which families registered their 60 month old children in Grade 1 of primary schools. However, the regulations also allowed families that wished their 60 month old children to receive preschool education to do so. Later, a new regulation was introduced in the 2013–2014 school year that clearly enabled families to decide whether their 60 month old children would start school or not. As can be seen, the systems around students are in a constant change, not a linear but cyclical one.

The ecological system approach includes the systems and structures that must be considered in relation to personal development. Chronosystem is based on time and refers to the time-bound change of the four systems. It may change the operations of all dimensions from the microsystem to the macrosystem (Hetherington et al. 2006). The indirect effects of the macrosystem on all other structures are reflected on the individual. As shown in the figure, the constitution, value system, media/internet, political structuring of the country feature in this system. The structures within it affect each other. For instance, the media reach the public by using the value system or governments connect with the public through the media. This communication can improve or change existing structures.

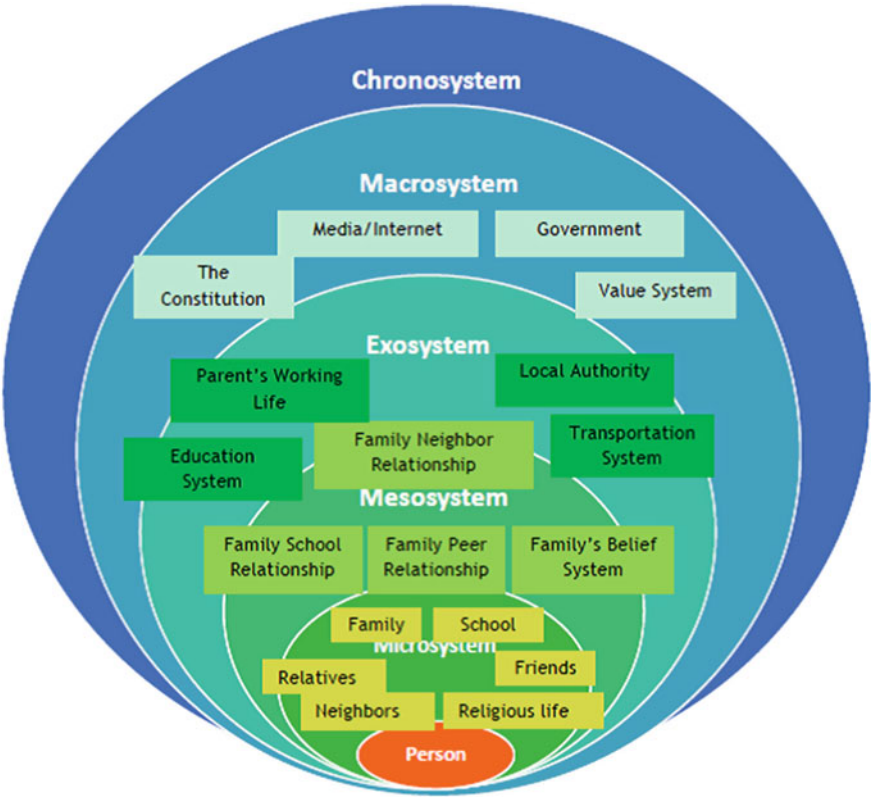

Fig. 18.1 Ecological Model

In the exosystem layer, there are structures such as the education system, workplaces, transportation system, and local authorities. Similar to the structures of the macro system, they interact both with each other and with the lower and upper systems. To elaborate on this, local authorities are responsible for the transport system in an area. The strengths and weaknesses of the transport system (duration, fares, etc.) may affect parents' work success and, in turn, their social and psychological well-being. This affects students indirectly, too. The next layer, the mesosystem includes structures such as family-neighbor, family-belief system, family-peer, and family-school relationship. These are structures that may both directly and indirectly affect students. A family with strong neighbor relationships may involve them in the social support system for the student. For instance, working parents may ask their neighbors to take care of their children when they come back from school. Family belief system, on the other hand, may affect the quality of children's education directly.

Microsystem is the layer that directly affects the student. It includes peers, the school, neighbors, religious sources, the family, and relatives. Kağıtçıbaşı (2007) states that the collectivist nature of Turkish people may mean that relations are important in the process of the emergence of the self. As a trait of such societes, the family, school, peers and relatives are all included in a student's direct interactions. Religious sources are also included here owing to their easy accessibility. Particularly in rural areas, religious leaders are seen as a "wise person" and have one-to-one contact with people.

As shown in the figure, the lines between systems are dotted, which denotes the ability of structures to replace one another depending on students' own systems or their social structure. For instance, the neighbors in an individualistic society may be in the mesosystem rather than the microsystem. The same may be true for religious sources and belief systems. The way people make use of religious sources may even vary among families in the same society. In this case, the ecological system is shaped accordingly. Despite these structural differences, the layers are constant and the structures may be placed according to their direct and indirect effects on students.

The definitive perspective in the linear system approach does not exist in the ecological system approach because a system entails many interrelated systems. Each system is alive within itself and expands by affecting others. In other words, the individual cannot be considered independently of his microsystem, just as his direct or indirect influence on the systems within the microsystem cannot be ignored.

Chaos Theory: This theory was born out of Rene Thom's (1970, 1972, 1973) mathematical studies (cited in Jones 1977). Seen as the basis for post-modern social sciences, the Chaos Theory contends that relationship patterns within complex systems (e.g. organizations) are not linear, but comprise a mechanism that yields unexpected results (Tetenbaum 1998). As can be understood, cyclical causality is at the root of both Chaos Theory and Modern Dynamic Approach. At the same time, chaos theory offers a more complicated structure. Spronck and Compernolle (1997) state that in this theory, all elements in a changing system affect each other simultaneously. Therefore, the relationship existing within the changing elements of a system should be examined.

Even though advanced mathematical techniques and many sets of data are needed in Chaos theory and other models based on it, they are important for the fresh perspective they have brought in many fields. For instance, chaos theory in education argues that events do not have definite borders, the relationship between them is not linear, causes and effects are not proportionate, and that simple-looking causes may lead to extreme effects (the butterfly effect) (Kesici 2006). Educational organizations, and specifically classrooms, have a complicated and non-linear nature. Therefore, an educational organization needs to consider education a chaotic concept to reach success. The disorderliness caused by chaos in educational settings means re-organizing for a new order and adapting to it. In other words, educators have the option to turn chaos into opportunity (Akmansoy 2012).

In the linear system approach explained above, events are explained with a linear cause-effect relationship in a system, while the modern, ecological system and chaos approaches have adopted the principle of cyclical causality. The linear system approach endorses the equivalence of effect and reaction (Bloch 2005, p. 179). When the individual is taken as a living organism, this explanation falls short. According to the modern, ecological and chaos approaches, countless variables that are tied to each other with mutual causality relations interact within systems (Spronck and Compernolle 1997). However, these authors claim that the chaos approach has the limitation of not being able to foresee behaviors in the long run.

According to Miley and Du-Bois (1998, pp. 31–32), the ecological system approach explains the mutual effects of the individual and other systems on each other by defining the behavior patterns that enable individuals to adapt to different situations. In this way, the change in social sciences may be revealed more meaningfully.

Accordingly therefore, as social relations and behaviors cannot be continuously controlled, it may be better to use non-linear approaches. At the same time, cultural differences should not be ignored when approaches are examined separately or comparatively. Below, this issue is discussed largely over the ecological model.

Culture emerges at the macro level in the ecological model and includes exo-meso-micro systems (Kağıtçıbaşı 2010, p. 65). Most psychological events are shaped in relation to the environment. Accordingly, easterners and westerners go through different processes. While Westerners perceive the world to be full of objects and organize them in categories, Easterners organize their world by considering relationships and take events to be connected to a large web in the environment (Nisbett 2003). Therefore, this model is said to be clearer, more static and stable for Westerners, but more flexible, dynamic and see-through for Easterners. Indeed, collectivistic cultures hold social relations and harmony important, while individualistic cultures embrace personal development, competitiveness and uniqueness (Markus and Kitayama 1991).

The industrial revolution, renewal movements and capitalism made important contributions to individualism and led to adequate, controlled and unique individuals in Western societies (Heiner et al. 1999). This may be an example that the macrosystem affects the system which includes the time aspect of the ecological system, known as the chronosystem (Bronfenbrenner 1979).

Cultural ideas are shaped by many institutions such as the constitution system which is an element of the macrosystem, and allows each individual to construct and protect their own rights. In North America, the will to be autonomous is reflected in social indicators such as images, proverbs, males who choose their own path, captains of their own ships, lone cowboys, and less travelled routes (Heine et al. 1999). On the other hand, in the human-oriented Confucian philosophy, the prevalent belief is that “humans do not exist alone; all actions are born out of human-to-human interaction” (Nisbett 2003, p. 52). In non-Western cultures, individuals organize their affective, cognitive and behavioral operations by taking

into account others and they see themselves as a part of social relations. The question "Who am I?" can be answered by taking significant relations (child, friend, colleague) or group membership as reference (Cross et al. 2011). These qualities are related to the systems that include not only the family, school and religious beliefs in an individual's microsystem, but also the values, politics, constitution system and other indirect relations of their culture.

The ecological model functions in Turkey uses both individualistic and collectivistic elements. For instance, individuals in a soda advertisement in the USA sit alone in a sofa and watch TV while eating crisps and drinking soda, while the same company advertises in Turkey by using big dinner tables around which extended families gather, eat and drink soda while chatting. This is a reflection of cultural differentiation in the media. At the same time, while men in the past used to be called by their fathers' names and not by their own, today's women can carry their father's last name even after they get married. In the West where personal boundaries are valued, individuals address people they have just met with their last names preceded by "Ms or Mr", while personal addresses in Turkey mostly include relationship ties such as "uncle, aunt, brother".

Traffic that runs on the right hand side of the road in Turkey has led to the rule that when pedestrians cross the road, they should "first look left, then right, then left again". However, using the same habits in the UK may lead to an accident. Exemplified here is the primary effect of an exosystemic element in explaining the differentiation between cultures.

İmamoğlu and Edwards (2007), state that while Turkish culture brings social responsibilities, it also emphasizes the value of free choice and behavior. Therefore, despite research results revealing the relational nature of Turkish individuals (Hofstede 2002), the recent prevalent view is that it allows individualism and collectivism to coexist (Kağıtçıbaşı and Ataca 2005; Kağıtçıbaşı et al. 2007; Karatekin 2013). Kağıtçıbaşı (2010) attributes this to the coexistence of modern regulations and traditional values in the country.

Considering the information above, knowing about individuals' ecological systems may raise our awareness of their sense of self and these may be used in education and PCG. For instance, along with the individual-oriented approach, systemic approaches may also be considered. Below is the role of system approaches in education and the field of PCG.

18.3 The Role of Systems Theories in Education and PCG

As education is a social construct that includes many inter-related elements, it needs to be considered in relation to the basic concepts and principles of the systems approach. According to Katz and Kahn (1968), an open system includes input, transformation (process) and output as a continuous trait. When the school is taken as a system, input includes humans, information, technology and finances; transformation includes humans, structure and administration; and output includes

educated students, products and services (cited in Yalçınkaya 2002). It should be remembered that, in this process, psychological counselors at schools are also a part of the system.

Seen from the perspective of PCG, systems and ecological approaches are used in all practical fields (such as psychological counseling, preventive guidance, vocational counseling). Family counseling is an area where the systems approach is used very commonly. Practitioners such as Bateson, Jay Haley, John Weakland, Carl Whitaker and Nathan Ackerman examined the mutual interaction between the members of families with schizophrenic individuals in the 1950s, and started to adopt the tenets of the systems approach in family counseling (Dallos and Draper 2012, p. 29). In addition, social scientist William Buckley argued that human relations resemble a system where family members may be seen as a network or group of components (persons) that interact more or less in a certain way over time (cited in Dallos and Draper 2012, p. 29). The skill at the heart of systemic thought is being able to distinguish linear interventions from systemic ones. The basic assumption is that each family member or both couples have some role in everything (Weeks and Freat 2001, p. 63). Family and marriage counselors have shown that creativity through systems may be used at schools, workplaces and administrations to increase the competence and potentials of individuals in personal, economic and professional fields (Dupree 2007).

In the literature, studies on the general systems approach or the ecological system approach have usually focused on schools. The units that become affected by the school system or that affect it (e.g. students, parents, and teachers) have been studied at all levels of education.

18.4 Research Studies

The literature includes many studies based on the ecological systems approach, particularly the individual-environment interaction. As these studies examined the individual, they did not separate the environment from the individual and focused on both personal and social factors. Below are examples of studies on different levels of education from pre-school to university.

Darling (2007) discussed the concepts of parental monitoring and acknowledgement, which include the elements of systems theory. The need to focus on both negative and positive child behaviors was emphasized by referring to the ecological model in early childhood. Technological developments bring change to the operations of parental monitoring and acknowledgement, thus showing that technological tools as a part of the system may be causing risky and problem behaviors.

Gökler (2008) proposed a model based on the systems approach and social-ecological approach to study the role of family adaptation in chronic childhood diseases. The study centered around the relationships between chronic childhood diseases—as a traumatic experience that scars the family life cycle—and depression and post-traumatic stress symptoms in both children and parents. The study group

in this study comprised 125 children/adolescents and their parents. The variables that predict traumatic stress are integrated within a conceptual model within the scope of the systems approach and the social ecological approach. This model includes demographic characteristics, disease characteristics (objective and perceived), socio-ecological variables and children's personal traits as indicators of psychological adaptation.

In another study, strong ties were found between children's cognitive levels and proximal zones as the process of transition to school was being evaluated (Xuewen 2005). The results showed a strong meaningful relationship between the first circle in the ecological approach, the individual (cognitive level) and its second circle, the microsystem (proximal zone).

In a study about the relationship of the student with the ecological environment and of the teachers with the other parts of the system, the tension between the factors that stop pre-school, elementary and secondary school teachers from making educational decisions and early childhood education areas was studied (Cole 2006). The results showed similarities and differences between teachers with respect to their literacy education decisions. It was stated that all teachers are affected by the microsystem that includes their knowledge, beliefs and experiences, and the microsystem that includes children in classrooms and their own children. Elementary school teachers seem to be more affected by macrosystem factors than pre-school teachers, whereas the latter seem to be more affected by exosystem factors such as the family and society.

Doğan's (2010) study took ecological systems theory as a basis for examining the definition of peer bullying, its types, negative effects, and the main features of victims and bullies. The study focused on the relationship between the family, school, peer groups, family environment, and child abuse, authoritarian parenthood, resolving problems with physical power in the microsystem and child or adolescent bullying. The physical environment of the school, peer relationships, teacher behaviors were studied within this system and linked to peer bullying. Family and peer, family and school administration, family and teacher interactions were seen as the most basic mesosystems. The relationship of family and peer relationship to bullying was mentioned. Within the scope of the exosystem, factors that did not directly affect the adolescent or child but indirectly affected their development (e.g. the effects of parent employment on children) were studied. In the macrosystem, the effects of the cultural values, beliefs, lifestyles and attitudes of the society on triggering children's and adolescents' violence tendencies were studied. In the chronosystem (the final system that covers all others), the changes that children undergo in their environment over time are treated normatively or non-normatively. For instance, events such as starting school or divorcing are included in this system.

Atik (2013) studied peer bullying, similar to the one mentioned above. Conducted with secondary school students, the study compared peer bullying victims with others to examine the role of factors at student and school level on the possibility of being a victim within the scope of the ecological system approach. The results showed that student characteristics were the most important factor explaining variations between schools regarding bullying. Findings show the

importance of focusing on students' emotional self-efficacy beliefs and school climate perceptions when school-specific bullying interventions are developed.

Mindinch (2007) based his study on Ogbu's cultural-ecological theory which was used to evaluate the school success of minorities. He found significant relationships between the success, unreasonable beliefs, school personnel relationships and academic studies of Latino students. The results showed that, particularly in studies that focus on the school success of minorities, it is important to adopt ecological approaches that consider the effects of the family, relations with the environment and cultural traits.

In another study, eighth-grade Latino students focused on academic attitudes when examining their academic success (Reigadas 2006). Based on the ecological system theory, the study evaluated the effects of the socioeconomic level of the family and school atmosphere on students' academic attitudes. The study also investigated how all these factors, coupled with students' academic attitudes, affected the school performance of Latino students. The results showed a positive relationship between the socioeconomic level of the family and expectations and students' academic attitude. At the same time, a positive and meaningful relationship exists between school atmosphere and student success.

Ribadeneira (2006) studied the relationship between high school students' perceived parental attitudes and career choice competence level by taking Bronfenbrenner's ecological model as his base. The results showed a relationship between students' cognitive skills, academic success, perceived parental attitudes, and peer support and career choice competence level.

In another study on adolescents' smoking behaviors, the familial and individual factors that encourage youth to smoke were examined within the ecological system approach (Wiium and Wold 2009). The strongest factors were individual ones such as attitudes towards smoking, perceived behavior control and time spent with peers. Environmental factors such as the school and family were found to mediate individual factors.

Adolescent suicidal behaviors were studied multi-dimensionally in the ecological approach. Layers within the ecological system and their relations to one another may increase the risk of suicide among adolescents. Gençtanırım Kuru (2010) found in her study that high school students with a suicide attempt in their families and relatives, those with psychological problems, those in the upper socioeconomic level and those that perceived their family functions as unhealthy in the area of "emotional reactions, showing interest, and problem solving, communication and behavior control" had higher suicide risk.

Kağıtçıbaşı's (2007) longitudinal study based on the ecological system approach (1982–1992) focused on early childhood support and mother training in areas from the lower socioeconomic level. Including a total of 255 mother-child pairs, the study offered a mother training support program during the 2nd and 3rd year of the study to randomly selected mothers of children who attended an education institution, a care institution and who grew up at home. Mother training was the main independent variable. The other one is the preschool environment (Childcare institution, education institution, home environment). The mother support program

was a bi-weekly cognitive training program. In the 4th year of the study, the Stanford-Binet IQ test was given to the children. It was found that the difference between children whose mothers had received training and the control group children whose mothers had not been trained was significant. Even though personality and social development results did not yield as significant findings as cognitive level, the personality and social development of children whose mothers were trained was different from others. Follow-up was held 6 years after the initial study was complete and 7 years after mother training. The results showed that experimental mothers were happier about school success and the teachers were also happy with them. Also, this group was better at socio-emotional and social adaptation than the other one.

These studies reveal that the system approach is functional in education and psychological counseling practices. Although psychological counseling and guidance it is an important component of education, there is a gap in the literature as far as Turkey is concerned.

18.5 Evaluation

In light of the studies based on the system approach, it is important to view and evaluate individuals in line with this approach. Even though there may be more studies in the literature on individual-oriented PCG, systems approach may also be used effectively in school, career, family, rehabilitation and mental health psychological counseling. Here, systems approach is evaluated with respect to school psychological counseling.

Individuals go through developmental crises during early childhood education, 12-year compulsory education, and university years. For instance, children at elementary school struggle as they learn literacy, arithmetic and peer interaction skills. Adolescence that comes during secondary school and even during high-school is critical with respect to physical, sexual, personal and moral development. Psychological counselors may study these eras based on the ecological systems approach and offer protective psychological health services.

At schools, students with different socioeconomic backgrounds and cultures gather. The underlying reasons for these differences may be many and may also be interacting with each other. To exemplify this view, when trying to explain why a secondary school student uses substances, it will not be enough to only consider a student's personal characteristics (social skills, competence perception, etc.). Family traits in the microsystem and belief patterns in the mesosystem may also be studied. In addition, how these systems affect each other must also be considered.

Having a collective culture, (Hofstede 2002; Kağıtçıbaşı 2007) Turkey places much importance on family ties, relations with relatives and other close relationships. However, the quality and quantity of these may vary based on the individual and the systems that surround them. Negative family factors include dysfunctional families, damaged family-child relations, and family adaptation problems; while

negative environmental factors are living in a socially disadvantaged environment and unhealthy peer relations. For instance, sexual abuse may suddenly be revealed during psychological counseling with an adolescent. This may have started during childhood and thus may be a pattern. Fergusson et al. (1997) study shows that this may be a result of sexual fragility due to one of the risk factors listed above. In the ecological model, repeated victimization should be seen with a view to ontogenic development, microsystem, exosystem and macrosystem. According to this, the history of the victim should be taken by considering many variables such as the relationship of victimization (reduced resistance power and skills), society (low family support) and cultural factors (blaming the victim) (Grauerholz 2000). As can be seen, systems approach may shed light on the preventive, protective and interventionist work of school psychological counselor as well as how to proceed, and thus increase the quality of the work.

As stated above, when the family and school are taken as a system, the student may be seen and evaluated as the person who affects this system and is affected by it. For instance, feedback from parents about time management may be affecting the students' performance, while educational activities (school, private tutoring, course, afterschool study hours, etc.) may be affecting the planning of the family's social or daily life. The family-child relationship may suffer because of this and, in turn, the family's relationships with the environment may be negatively affected. It is crucial for psychological counselors to become aware of how systems affect the services offered to students and families and they themselves are affected by the systems.

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Chapter 19
Using Balance Theory for the Sequential and Correlated Development of Vision, Strategies and Projects in Complex Environments

Ömer Livvarçin and Dilek Kurt

Abstract This study introduces the usability of Balance Theory for the effective and correlated management of vision, strategies and projects especially in complex environments. Balance Theory was initially developed by Livvarçin (J Turk Navy Navy 77–81, 2010) as a tool for the strategic management of business organizations as well as national organizations or even countries. The theory basically claims that there should be a balance between the interest area of the organization and its power. Any misbalance between those two parameters will cause various types of strategic level problems. When the level of complexity increases, the establishment of clear vision, derivation of strategies and finally development of oriented projects becomes more crucial and more difficult. This study proposes the usage of balance theory for designing vision as the first step. It basically aims to answer the questions; "Where are we now?", "Where do we want to be?" and finally "How shall we go there?" for the determination of the vision. In the second step; strategies will be developed by assessing the gap between our current and aimed positions. Afterwards, the most appropriate and feasible projects can be initiated. This straightforward process is valid also in complex environments where pursuit of strategies becomes more difficult.

Keywords Strategic management · Vision · Strategy · Project selection

19.1 Introduction

Vision is one of the most crucial parameters that directly influence not only the improvement but also the survival of any organization and has always been an interesting topic for researchers (e.g. Conger and Kanungo 1987; Baum et al. 1998). Moreover, many studies introduced vision as one of the major functions of managers and leaders (e.g. Tichy and Devanna 1986; Bass 1990). But surprisingly, the

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foundations of effective vision have been less studied (Kantabutra and Avery 2002). Similarly limited effort has been applied in the assessment of vision implementation (e.g. Robbins and Duncan 1988).

Similar considerations are also valid for strategies. Strategy is commonly accepted as a complex phenomenon (Miles et al. 1978; Ansoff and McDonnell 1990; Mintzberg and Quinn 1991; Stacey 1996; Bakir 2001) and extremely difficult to formulate (MacCrimmon 1993). However this assumption doesn't provide a useful input for strategic management.

The manageability of strategy is a crucial issue but the lack between academic theories and real life applications is also important. Mintzberg (1972) emphasized the lack of empirical studies on strategy. He claimed that most of the strategy theories were not based on research. Some scholars (Gupta and Lonial 1998; Barney 1991) emphasized similar concerns which proves that most of Mintzberg's criticisms are still valid.

Finally, derivation of projects from clearly defined visions and strategies is another phenomenon which is usually failed even by the most prospering organizations and leaders. The projects are usually either not vision oriented or not cost effective from the perspective of strategies.

According to Porter (1996), strategy is the creation of a unique and valuable position, involving a different set of activities. This study introduces the usability of Balance Theory for the effective and correlated management of vision, strategies and projects especially in complex environments and aims to support managers while defining strategies and selecting projects.

When complexity level increases, the establishment of clear vision, derivation of strategies and finally development of oriented projects becomes more crucial and more difficult. This study proposes the usage of balance theory for the designation of vision as the first step. It basically aims to answer the questions; "Where are we now?", "Where do we want to be?" and finally "How shall we go there?" for the determination of the vision. In the second step; strategies will be developed by assessing the gap between our current and aimed positions. Afterwards, the most appropriate and feasible projects can be initiated. This straightforward process is valid also in complex environments where pursuit of strategies becomes more difficult.

19.2 Balance Theory

Strategy studies that predate the current literature have been criticized for not fulfilling the requirements of managers or for not fitting with the circumstances of real business world (Prahalad and Hamel 1994; Feurer and Chaharbaghi 1995; Hendry 1995; Schendel and Hofer 1979). One reason is that strategy used to be accepted as a non-rational process (Braybrooke and Lindblom 1963; Cyert and March 1963; Cohen et al. 1972).

Friga et al. (2003) introduce the development of a vision of the end result—or setting specific goals for a particular institution—as the first element of the strategy.

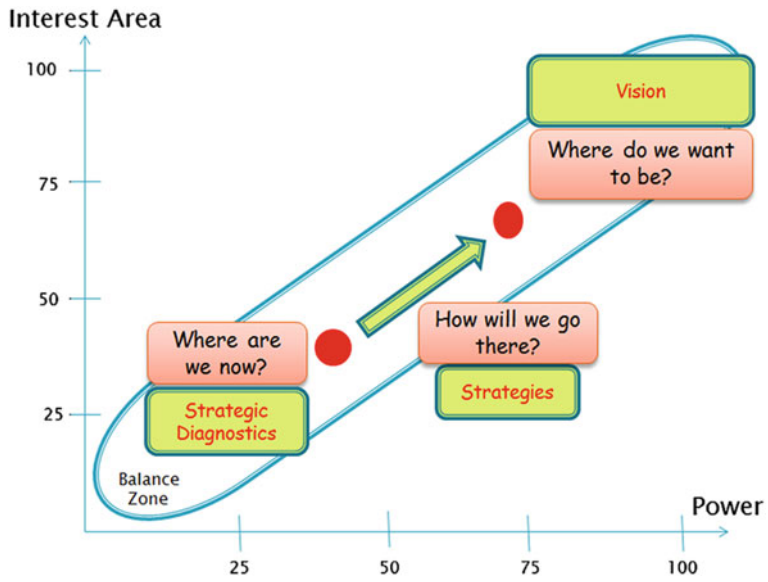

Fig. 19.1 Balance theory (Livvarçin 2010)

For that particular reason, Balance Theory was initially developed by Livvarcin (2010) as a tool for the strategic management of business organizations as well as national organizations or even countries. The theory, while determining the vision, basically claims that there should be a balance between the interest area of the organization and it's power. Any misbalance between those two parameters will cause various types of strategic level problems.

As illustrated in Fig. 19.1, the vision of an organization (particularly a nation) may be expressed as a point on a graph where "Power" and "Interest Area" are used as horizontal and vertical axes respectively. The graph does not only indicate the aimed vision but also the current position which enables decision makers to observe the gap between "where they are" and "where they want to be".

The gap between the current status and the vision, represents the strategies that need to be adopted. In other words by using the metrics of Balance Theory managers can easily derive organizational strategies out of the organizational vision.

19.3 GAFA-S Model

The last step should be selection of the projects which best fit with the organizational strategies and thus with the organizational vision. Although it sounds easy, in complex environments and with limited resources effective project selection is usually not the case.

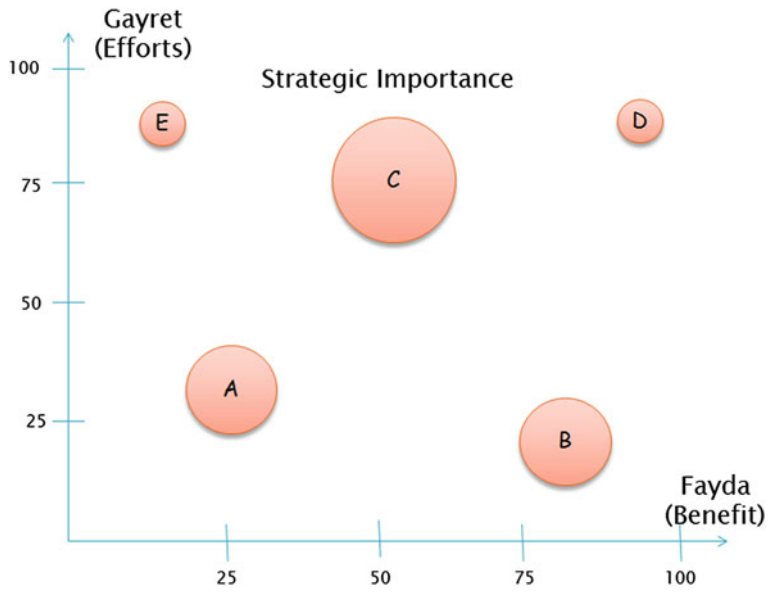

Fig. 19.2 GAFA-S model (Livvarçin 2012)

The introduced GAFA-S Model (Livvarçin 2012) might be used for appropriate selection of most cost effective and vision focused projects.

As illustrated in Fig. 19.2, GAFA-S model has two axes and three dimensions in total. The vertical axis represents the value of all kinds of efforts (including budget, human resources, risks, time etc.) which means "Gayret" in Turkish and the first two letters of the GAFA-S Model is derived from this word. Similarly the horizontal axis represents all kinds of benefits that are expected from a particular project. The third and forth letters of the introduced model, "FA" are taken from the Turkish translation which is "Fayda". Finally, the strategic importance of a particular project is represented with the dimension of the circle.

After plotting all project alternatives on the graph it becomes much easier for decision makers to select the best projects.

19.4 Results

It is generally believed that (corporate and competitive) strategy is formulated by top management (e.g. Bakir 2001; Zuboff 1988; Zaleznik 1989). However without an effective management tool that enables his/her staff to support him/her, managers can do little.

Balance Theory makes vision measurable thus clear and manageable. Appropriate and still clear and measurable strategies can be developed out of the vision. Finally by using GAFA-S Model organizations and managers in particular can choose and start the best projects for the goals of an organization.

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Chapter 20
Chaotic Interaction in Abnormal Leadership Processes from the Perspective of Leaders and Followers

Şefika Şule Erçetin, Halime Güngör and Şuay Nilhan Açıkalın

Abstract In this chapter, we will discuss a very different type of leadership called abnormal leadership, and the chaotic interaction between abnormal leaders and their followers. Abnormal leadership can be defined as a group's or organization's leader who encourages members to commit criminal or destructive activities. We can say such leaders are "abnormal leaders". The groups or organizations can be formal or informal in structure but the major aim of both is to benefit substantially from the continuing criminal activity. Abnormal leaders focus on criminal activities and encourage followers to commit crime. There are lots of such groups or organizations and can be formal or informal in structure but those groups are destructive to the followers, other people, countries and the earth. Abnormal leadership is a chaotic interaction field between leaders and followers. Chaotic interaction between abnormal leaders with their followers has been explained by five major assumptions in this chapter. Consequently, discussing this subject is of paramount importance especially given contemporary trends.

Keywords Abnormal leadership · Followers · Chaos · Criminal groups

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20.1 Introduction

Throughout history, lots of terrible events have happened on earth such as rape, sexual assault, violence, bullying, robbery, extortion, murder, car high-jacking and so on. Unfortunately, all these destructive experiences have extremely negative effects on individuals' psychological health and other aspects of human life. So these experiences create chaos and turmoil in human life of both followers and victims. Accordingly, people who live such destructive experiences and those who follow such organizations' leaders have started to perceive the earth with fear and more differently than usual. Those people's emotional, psychological and sometimes physical well being is alarming and life has become largely chaotic.

These criminal aspects sometimes have been carried out by individuals and sometimes by groups. There are organized criminal families, criminal cults, criminal gangs, street gangs, murder groups, drug mafias, organ mafias, sex trade, terror and so on. All these criminal groups have leaders and followers as well.

Leadership and chaos can be considered fundamentally interconnected, topics of chaos and leadership have been classified, unitized and graded in a variety of ways (Erçetin et al. 2013a). In this chapter, we will discuss a very different type of leadership called abnormal leadership, and the chaotic interaction between abnormal leaders and their followers. Abnormal leadership can be defined as a group's or organization's leader who encourages members to commit criminal or destructive activities. We can say such leaders are "abnormal leaders". The groups or organizations can be formal or informal in structure but the major aim of both is to benefit substantially from the continuing criminal activity.

Abnormal leaders are authoritarian figures on followers but use participative leadership style if necessary. They build totalitarian or narrowly dynastic regimes in the organization. They have destructive behaviors. Abnormal leaders can leave their followers worse off than they found them by seducing, imprisoning, terrorizing or killing them. So they violate human rights of others and the followers as well. They deliberately feed their followers illusions that enhance the leader's power and impair the followers' capacity to act independently, including depicting themselves as the only ones who can "save" the followers (Lipman-Blumen et al. 2005).

20.2 Why Do People Follow Abnormal Leaders?

According to Maslow's theory, there are four types of needs that must be satisfied before a person can act unselfishly, Maslow referred to the four lower needs as "deficiency needs" because their lack creates a tension within us. The needs are arranged in a hierarchical order, the most basic drives are physiological, after that comes the need for safety, then the desire for love, and then the quest for esteem and finally self actualization (Griffin 1994). There are lots of people who have lived in deficiency of needs. Some people follow abnormal leaders because of meeting their needs. Especially youth between the ages of 8 and 18 are vulnerable to joining

such groups because their lives are characterized by several risk factors, at-risk youth population that includes youth living predominantly in poor, urban areas without access to education, employment and other opportunities (USAID 2006). At the most primitive end, followers in such groups experience physiological needs for food, shelter and other basic necessities of life (Lipman-Blumen et al. 2005).

People also have existential needs. People face non-stop uncertainty, change, turbulence, crises and chaos in daily life routine. Because life is chaotic in nature, leaders who promise followers an orderly, predictable and controlled world can seem very attractive when everything around them appears to be disintegrating and also leaders mollify this desire by persuading them that followers belong to "The Chosen" (Lipman-Blumen et al. 2005).

Other reasons to join such groups and follow abnormal leaders are negative parent-peer relationships, abusive parents, week family connections, lack of interest and affection in families etc. So, sometimes parents encourage their children to join such groups both directly and indirectly. Some members' parents are aware of their children's membership to such groups. In addition some people follow abnormal leaders with their families and sometimes parents are also abnormal leaders in organized criminal families. According to Aquino et al. (2005) followers who conceal or have concealed their gang membership from their parents, report some 41.3 % bomb/arson gang activity, this rises to 56.9 % among those gang members whose parents are fully aware of their gang membership.

Another reason to follow abnormal leaders for people is obligation. Abnormal leaders persuade some followers to join or attend to such groups by using different methods. Usually they find any reason to threaten members related to their families, criminal events that have not been announced, some secrets or addictions. For example generally drug sellers are drug addicts at the same time, abnormal leaders use this information as a threatening fact to followers. Of course, it is possible to hear "if you leave me, you don't see your children again" kind of sentences from bully blackmailers if you decline to obey their rules (Forward 1998).

Furthermore, the other reason is authority addiction. Some people do not know how to protect themselves from harm and evils, they do not behave in a protesting manner as a something required to save themselves. They behave in daily life according to allegiance culture and they are scared of the authority figure.

Finally, we can say that negative family relationships, needs deficiency, bad life conditions, obligation and addiction to authority are trigger aspects to following abnormal leaders.

20.3 Chaotic Interaction Between Abnormal Leaders and Their Followers

According to Külebi (1986) a group is a community that consists of individuals who are connected with each other through a situation, benefit or feeling. Ozankaya (1999) defines a group as a community that consists of individuals in which there

are certain relationships between members, each member distinguishing the group's existence and symbols consciously and there is a relative continuity. Group is a community that consists of individuals who perceive themselves as the same group's members, share the same psychological meaning and significance with other group members and provide a social agreement about group membership's properties and values (Arkonaç 1988).

A group is a dynamic system. The energy that provides for communication and interaction within the group is that stimuli which is derived from perceiving two people as related to each other thus creating tension and anxiety within their spirits (Köknel 1997). In light of all these definitions of a group we can define groups which are managed by abnormal leaders as a community that consists of individuals with the aim of doing destructive activities to individuals and societies.

Abnormal leadership is a chaotic interaction field between leaders and followers. It is impossible to explain this complex phenomenon with only one assumption. So group or mass phenomenon is equally contradictory. There are lots of variables in the process of individuals' maturation in psychological and sociological dimensions. Followers' psychological maturation influences group dynamics and group interactions. We can explain pathologies about being "individual" and being "we" processes as reflections of group dynamics within sociological dimensions in five major ways:

1. "*We*" *consciousness in groups that consist of individuals who have been successful in being* "*individual*": In such groups, group norms, group activities are shaped in the context of individuals' own life choices. These individuals prefer deviancy as their way of life. In such groups, abnormal leaders do not need to force followers into any activities; creating "we" consciousness in group is not so difficult with followers who have been successful in being "individual". Because such individuals can know and define themselves and they are aware of their own capacity, doings, goals, positives and negatives.
2. *Individuals who have been successful in being* "*individual*" *but losing individuality by* "*We*" *consciousness in the group*: Individuals can behave different than usual in groups by mass psychology. Followers who have been successful in being "individual" can lose their individuality and can behave like one person as a group and can easily adapt destructive activities of abnormal leaders. This situation is pathologic also. Because with mass psychology, followers can do anything the abnormal leader wants them to do without questioning, followers lose their individuality as a result.
3. *Groups that consist of individuals who have not been successful in being* "*individual*": Followers who can not complete individualization process, self-actualization, choose anything consciously in life and can behave without questioning the group norms, rules and group activities. They can easily accept abnormal leaders' requests and attach leaders with high commitment.
4. "*I*" *formatted group after the* "*we*" *consciousness:* Mass psychology includes both passive and violent rising behaviors; because beliefs and excitement have contagion effects in mass—fear they can take the form of panic and anger can

turn to lynch—(Anzieu 2002). In such type of a group all followers behave like one person and focus on the groups' goals all together. It is called "butterfly effect". According to the results of some researches that compare groups' tendencies to solve different problems, groups tend to have solutions that contain more risks and also although followers know the possibility of being damaged, they prefer being with the group and they have a tendency of taking all risks with the group (Sığrı 2011). Groups tend to take more risky decisions because any tendency becomes strong in a group process rather than in new or individual member setting (Tosi et al. 1994), and they also enjoy sharing responsibility among followers in a group (Sığrı 2011).

5. *Individual-group-society interaction*: Groups that are managed by abnormal leaders are not free from individual-group-society interactions. If the current social context within a community structure is not available for such destructive groups, would they have been prevalent? Can abnormal leadership and abnormal groups be evaluated regardless of societies' culture, values and traditions?

Abnormal leaders maintain their authority and followers' loyalty by creating chaotic situations. We can define abnormal leaders and followers interaction pathologies in psychological dimension in two major ways:

1. *Interdependency*: There is interdependency between abnormal leaders and their followers. Interdependency is an emotional psychological and behavioral situation that emerges as a result of individuals' falling into a series of suppressive rules which have been banned from questioning personal and interpersonal problems of individuals and also have been banned from expressing individuals' feelings explicitly for a long time (Beattie 2006).
2. *Psychopathology in abnormal leaders and their followers*: Each group has an identity, group members internalize this identity and they see group identity like their own, so a group has an egocentric viewpoint. In this sense, we can clearly see in groups as well as group members the "us and them" phenomenon. The question is "Why does an individual prefer joining Group A to Group B? "Why does a follower prefer following Abnormal Leader X to the others? In groups that have been managed by abnormal leaders, in fact followers prefer to follow leaders like themselves. So, self-image of followers in the group has been proliferated, empowered, legitimized with the others image and this narcissistic image gives people confidence (Anzieu 2002).

Erçetin and Çayköylü (2007) and Erçetin et al. (2014) defined peace intelligence and suggested that narcissistic, paranoid, mazokis, sadistic, sociopathic, dependent, avoidant or histrionic personality patterns and/or personality disorders or paranoid featured psychotic disorders have been grounded in cases that decline or blunt peace intelligence at individual, communal, national or international level. In addition, they suggested that generating aggression projections of such cases can be at individual, communal, national or international level. Contemporary social scientists have recognized that some members of gangs evidently suffer from psychopathology (Short 1997).

The presence of chaos, change, poor management, and bullying in an organization may not therefore, be causally linked to each other but rather to the presence of Corporate Psychopaths who, as toxic leaders, cause each of these to exist simultaneously (Boddy 2011). Corporate psychopaths use humiliation to cause confusion, chaos and fear in order to hide their other activities (Hare 1999). All in all, we can say that if abnormal leaders have psychopathology, the followers also have the same.

We can define abnormal leaders and followers interaction pathologies in managerial dimension in five major ways.

1. *Commitment in abnormal groups*: The most important aspect of abnormal leader and follower interaction is commitment. Abnormal leaders' followers have to do whatever the leader expects of them. Leaders' "automaton" is basically a follower willing to do anything the leader asks them to do. According to Aquino et al. (2005) gang members describing themselves as "I do whatever I want regardless of what the gang expects me to do" report 48.9 % bomb/arson gang activities cases; however, this rises to 56.9 % among gang members who describe themselves as "whatever the gang expects of me, I do". Such leaders encourage followers' behaviours to their own benefit and while they reward followers that see the abnormal leader as an idol, they equally have a tendency to torment followers who are critical of them (Kernberg 2002).
2. *Abnormal leaders' power usage on followers*: Abnormal leaders usually use authoritarian power on followers. Abnormal leaders are like dictators. Sometimes participative leadership roles are necessary. Modelling in criminal groups is described in Fig. 20.1.
3. *Manegerial Structure of the Group*: Groups that consist of abnormal leaders and followers may be of a bureaucratic structure. All of the followers have deprivation experience on narcissistic challenge, oedipal competition, pre-oedipal period specific dependency and behavioral dependency all of which create aggression (Kernberg 2002). If inadequate managers of bureaucratic structure especially have significant amount of narcissistic and paranoid tendencies, they can convert an underdeveloped bureaucratic system into social nightmare. We can say this for abnormal leaders as well.
4. *Abnormal leaders' leadership strategy*: Abnormal leaders use both authoritarian and participative leadership strategy. This process is based on followers' needs. Abnormal leaders influence followers by their own behaviors. Contagion may imply willingness and shared goals but some may follow due to conformity

Leader Strategy	*Leader - Follower Interpersonal Style*	*Follower Reaction*	*Process*
Participative Action	Co-operative	Co-operative Imitation/ Contagion	Power with the group
Autocratic Orders	Dominant – Submissive	Submissive Obedience	Power over the group

Fig. 20.1 Modelling in criminal groups. *Source* Porter (2013)

pressures (Porter 2013). Abnormal leaders do activities with the group to influence followers. On the other hand, in fact abnormal leaders are authority figures and leaders' automaton is basic in the group while commitment of followers is a necessity of course.

5. *Group Norms*: Furthermore, there are some obligatory rules to obey for followers in such groups. These rules are usually of the leader's own making. Such groups have a special language, special rules, regular meetings, violence against its own members, killing its own members if necessary and so on. For example, *Crips* sets are among the most violent street gangs in the United States. All members are required to take an oath and go through an initiation process, so initiation is achieved in one of three ways-by committing an armed robbery, performing a drive-by shooting, or being beaten by members in a ceremony called a beat-in, kangaroo walk, or bull pen, initiation is intended to test the prospective member's courage and loyalty (NDIC 2002).

Leadership is an interaction field between leaders and followers (Erçetin et al. 2013b). Abnormal leaders and their followers have a chaotic relationship. Chaos theory purports that abnormal leaders revolve around a complex pattern of interaction, known as strange attractor, that serves to hold the system together. When events from outside or within the group occur that are intense enough to alter the stability of the current attractor, the interaction becomes less stable and begins to look for alternate means to regain its stability. For example when any follower does not obey the rules, abnormal leaders use violence against the follower or kill him/her to regain stability, because abnormal leader's authority and obeying his rules are crucial. The stability factor in such groups is commitment.

20.4 Conclusion

Chaotic interaction between abnormal leaders and their followers has been discussed in this chapter. Abnormal leaders focus on criminal activities and encourage followers to commit crime. There are lots of such groups or organizations and they can be formal or informal in structure but those groups are destructive to followers, other people, countries and the earth in general. Accordingly, this subject should be discussed in all its related aspects in order to find plausible solutions to the negative effects of abnormal leaders as well as abnormal leadership.

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Chapter 21
A Comparative Study on Three Different Types of Music Based on Same Indian Raga and Their Effects on Human Autonomic Nervous Systems

Sayan Mukherjee, Sanjay Kumar Palit, Santo Banerjee and D.K. Bhattacharya

Abstract Complex heart dynamics reflects activities of human non-autonomous system through Heart rate variability (HRV). Poincaré plot is one of the fascinating geometrical tools, which can properly describe the complex heart dynamics. In this chapter, the effect of music on HRV is studied by observing the geometric pattern of Poincaré plot. In this concern, Indian classical music based on Raga 'Malkaunsh' is selected in different forms, and HRV signals are collected from different persons. Then, we have identified the differences (if any) in the pattern of music in the three cases, where by pattern we understand dynamics, timber, rhythm and tonality. Next, by using Poincaré plot it is investigated whether the different types of music have different types of effects on HRV. The whole study has been carried out for both of Indian Raga music initiated and non-initiated (IRM and NIRM) persons.

Keywords Complex dynamics · Heart rate variability (HRV) · Psycho-acoustic music · Poincaré plot

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21.1 Introduction

Mind and body of the human being sometimes feel stressed due to lots of workload in the busy-world. Relaxation is a process by which human being can get relief from these stresses. Some organizations have already started designing many experiments by different tools for the purpose of getting feedback about physical and mental conditions of the subjects suffering from stress. One such useful tool is music. In this context, an essential question may arise—how does music affect human physiological condition and what are the important parameters needed to classify the pattern by which we can say that music has great importance to reduce stress. Various studies (Hong et al. 2004; Guétin et al. 2009; Wei et al. 2005; Yang et al. 1996; Orini et al. 2010) have been carried out to establish the role of music towards reduction of stress of mind. However, most of them are Phenomenology or statistical survey that is based only on human feedback, which comes from their intuition and feelings. Thus, different conclusions derived from such survey are prone to questions on accuracy. On the other hand, some scientific studies have also been carried out by different researchers. However, the results regarding the effect of music were found to be very much conflicting and confusing in relating to the exact circumstances and variables that affect the body's response to music, such as the type of music (Wei et al. 2005) and the subject's involvement in the music (Guétin et al. 2009). In some literature, it was found that music decreases the sympathetic nervous system (SNS) and increase parasympathetic nervous system (PNS) activity as measured by heart rate (HR), blood pressure (BP), and heart rate variability (HRV), indicating physiological relaxation (Guétin et al. 2009), while in some other literature it was found that music increases SNS activity and it also increases the HR in subjects who listened to some preferred music after exercise (Hong et al. 2004). In fact, two other factors—respiratory rhythm (Hong et al. 2004; Iwanaga et al. 2005) and gender (Hong et al. 2004) also affect the human physiological response to music.

Basically, music consists of some organized sounds and electrically it is like an impulse or signal. When it hits our brain, some information of impulses are selected, organized, and interpreted. This is called psycho-acoustic study. In this concern, some scientific parameters—dynamics, timber, rhythm and tonality play a vital role (Howard and Angus 2001). These measures are mainly based on time domain, frequency domain and time-frequency domain (Cook 1999). Dynamics measures degree of loudness, timber differentiates different sounds in music, rhythm defines how much calm a music may be and tonality classifies clarity of main key(s) of music. But whenever our mind organizes these sounds, our body is impressed due to some of them. In fact our hypothesis is that the effect of these sounds must reflect some of the physical signals of human body.

In this concern, HRV (Niskanen et al. 2004; Saul 1990) is such a non-invasive tool that can assess different heart conditions. Due to its non-invasive character HRV has become an attractive tool for using it in the study of human physiological response to different stimuli (Heitmann et al. 2011; Piskorski and Guzik 2011; Voss

et al. 2012; Karmakar et al. 2013; Dong et al. 2014). HRV is the variation of time between two consecutive heartbeats. It is a useful tool to know the overall cardiac health and the status of the autonomic nervous system (ANS). There are two branches of the ANS—the sympathetic and the parasympathetic. The sympathetic branch increases heart rate and the parasympathetic branch decreases it. Thus at any instant, the observed HRV is an indicator of the dynamic interaction and balance between these two nervous systems. In the resting condition, both the sympathetic and parasympathetic systems are active with parasympathetic dominance. The balance between them is constantly changing to optimize the effect of all internal and external stimuli (Iwanaga et al. 2005). Although the effects of music on mind are mostly realized in brain through Central Nervous system (CNS), music also affects the conditions of heart through the dominance of Para-sympathetic nerves of Autonomic Nervous system (ANS). So it is no less important to study the effect of music through analysis of HRV data extracted from the corresponding ECG signals of the heart in the time domain, when we listen to music.

HRV is a time series whose elements are differences of successive time intervals of R-peaks appearing in ECG signal (Clifford et al. 2006). The geometry of Poincaré plot (Brennan et al. 2001) consists of those successive intervals and it conveys the information of condition of heart indirectly. Moreover, the axes of fitted ellipse on the aforesaid plot are used to quantify the Poincaré plot.

In Indian classical music, raga is realized by selection of notes and the sequence (s) of distribution of notes. Raga 'Malkunsh' is known for its special appeal to human feeling. It has got well prescribed notes for use and proper distribution of notes to follow.

In the present study, we consider samples of raga 'Malkunsh' of three varieties, one from classical vocal music, one from instrumental music (sitar recital) and the last one from Rabindra Sangeet (songs by universal poet Rabindranath Tagore). Our primary query is to know whether there is any difference in the pattern of music in the three cases, where by pattern we understand dynamics, timber, rhythm and tonality. These are determined through scientific musical analysis, which is mainly physical in nature. The secondary query is to see whether these types of music have positive impact on human autonomic nervous system (ANS) in the sense of dominance of parasympathetic nerves through Heart rate variability (HRV) signal. If so, then it is further investigated, whether the different types of music have different types of effect on ANS. This is studied through pattern of the long-term discrete dynamics of HRV signal, which means time independent phase space analysis of the HRV signals. The HRV data was taken from 20 subjects, of two groups—one conversant with rules of music and the other not conversant with the same. The music was of maximum 30 min duration in .wav/.mp3 format.

The whole chapter is subdivided into two parts. In the first part, patterns of instrumental music signal, classical vocal music signal and Rabindra sangeet are analyzed by dynamics, timber, rhythm and tonality respectively. In the last part, we first choose HRV-signals of persons under normal conditions and also when they

were listening to the above types of music. Then we construct Poincaré plot for each of the HRV signals, quantify the Poincaré plots of those signals by using 'ellipsoid fit' and thereby establish the different effects of different music signals of same raga—'Malkunsh'.

21.2 Data

21.2.1 Music Signals

In Indian classical music, Malkunsh belongs to the "Bhairavi thaat" and its notes are Sa, komal Ga, shuddh Ma, komal Dha, and komal Ni. In Western classical notation, its notes can be denoted by: tonic, minor third, perfect fourth, minor sixth and minor seventh. Malkunsh is a serious, meditative raga, and is developed mostly in the lower octave (mandra saptak) and in a slow tempo (vilambit laya). Ornaments such as midh, gamak and andolan are used rather than 'lighter' ornaments such as murki and khatka.

For the purpose of the present study, the music signals of raga 'Malkunsh' are collected in three varieties, one from classical vocal music (music signal-1), one from instrument—sitar (music signal-2) and the last one from Rabindra Sangeet (music signal-3). The classical vocal music was performed by one of the legendary vocalists, the instrumental music was played by one of the legendary sitar player and Rabindra sangeet was also performed by an eminent Rabindra sangeet artist. Some portion of slow renditions (alap) has been taken in all the three cases. Sample size in all the three cases is taken as 100,000. All signals are converted into .wav format and .txt format by Adobe Audition for the purpose of analysis in MATLAB.

21.2.2 HRV Data

As we think that the impact on the Indian Raga Music (IRM) initiated persons might be biased in some ways, we included persons with no previous exposure to Indian Raga Music (NIRM). This helped us in procuring relatively unbiased data.

All the signals are recorded under normal room temperature and least noisy environment. All signals are taken in ten minutes duration. Finally, recorded signals are processed by *MATLABR2010a* software using moving window integration of a digital filter and converted into HRV signals (Fig. 21.1).

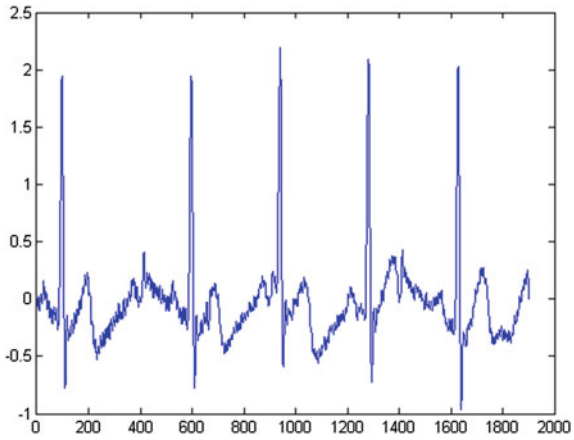

Fig. 21.1 ECG signal

21.3 Methods

21.3.1 Time/Frequency/Time–Frequency Domain Based Analysis

All measures related to this section are calculated in MATLAB software under an audio analysing toolbox. The followings are short preview of methodology of such measures.

a. **Dynamics**

The global energy of the signal can be computed simply by taking the average of the square of the amplitude, also called root-mean-square (RMS). With frame decomposition, we get energy curve. This energy curve can be used to get an assessment of the temporal distribution of energy, in order to see if it remains constant throughout the signal, or if some frames are more contrastive than others. One way to estimate this consists in computing the low energy rate, i.e. the percentage of frames showing less-than-average energy. This percentage is actually the degree of loudness or softness.

b. **Timbre**

In describing timbre, first, the audio sequence is loaded and then decomposed into successive frames, which are then converted into the spectral domain. In this process, we can recognize the key in a signal with respect to its corresponding time. Now by calculating slope of the corresponding curve how one key attack the next one, we can get attack slopes for every keys in a signal. In this way, timber can be defined by attack slope and this measure is able to differentiate two sounds from same instruments.

c. **Rhythm**

As pulsation is generally related to increase of energy only, the envelopes are differentiated, half-wave rectified, before being finally summed together again. This gives a precise description of the variation of energy produced by each note event from the different auditory channels. After this onset detection, the periodicity is estimated through autocorrelation. However, if the tempo varies throughout the piece, an autocorrelation of the whole sequence will not show clear periodicities. In such cases it is better to compute the autocorrelation for frame decomposition. This yields a periodogram that highlights the different periodicities. In order to focus on the periodicities that are more perceptible, the periodogram is filtered using a resonance curve (Toiviainen and Snyder 2003), after which the best tempos are estimated through peak picking, and the results are converted into beat per minutes. It is known as tempo of music.

d. **Tonality**

The spectrum is converted from the frequency domain to the pitch domain by applying a log-frequency transformation. The distribution of the energy along the pitches is called the chromagram. The chromagram is then wrapped, by fusing the pitches belonging to same pitch classes. The wrapped chromagram shows therefore a distribution of the energy with respect to the twelve possible pitch classes (Gomez 2006). Krumhansl and Schmuckler (Krumhansl 1990) proposed a method for estimating the tonality of a musical piece (or an extract thereof) by computing the cross-correlation of its pitch class distribution with the distribution associated to each possible tonality. The most prevalent tonality is considered to be the tonality candidate with highest correlation, or key strength. This method was originally designed for the analysis of symbolic representations of music but had been extended to audio analysis through an adaptation of the pitch class distribution to the chromagram representation (Gomez 2006). Key clarity is defined by key strength associated with the best key(s).

21.3.2 Poincaré Plot and Quantification

a. **Poincaré plot**

Poincaré plot (Brennan et al. 2001) is a standard concept in analyzing a discrete signal. It gives a geometrical way of identifying the presence of nonlinear structures in a discrete signal. It is simply a phase space plot (Brennan et al. 2001) with unit lag which generally corresponds to the linear relationship among the data itself.

Let us consider a signal $\{x(k)\}_{k=1}^{N}$. Then, Poincaré plot (Brennan et al. 2001) is thus constructed by only plotting the points $(x(t), x(t+1)), t = 1, 2, \ldots, N-1$ in two dimensional space.

b. **Quantification by 'ellipsoid fit'**

After the construction of Poincaré plot (Brennan et al. 2001) of a signal, sometimes it can be seen that most of the points among $\{(x(t), x(t+1))\}, t = 1, 2, \ldots, N-1$ are roughly concentrated within an elliptical region. In this connection, the major axis and the minor axis of that ellipse has major role to cluster two types of Poincaré plots (Brennan et al. 2001) (constructed from two different signals of different subjects).

21.4 Evaluations

21.4.1 Time/Frequency/Time-Frequency Domain Based Analysis

a. **Dynamics**

The percentage of window which contains lower energy of the signals is calculated from RMS energy. It is found that percentage of lower energy window is greatest for music signal-1and least for music signal-2. Thus, loudness of music signal-1 is greatest, the next one is music signal-3 and the minimum one is music signal-2 (Fig. 21.2).

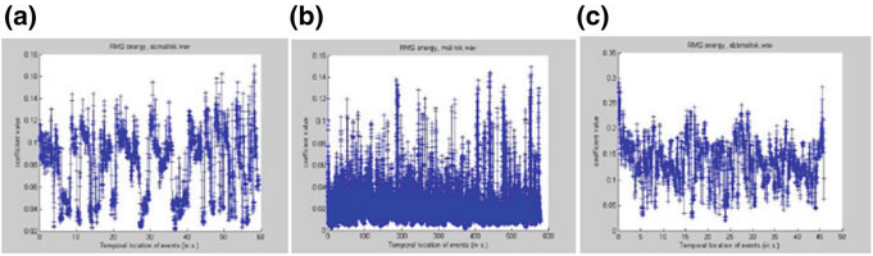

Fig. 21.2 RMS energy of **a** music signal-1, **b** music signal-2, **c** music signal-3

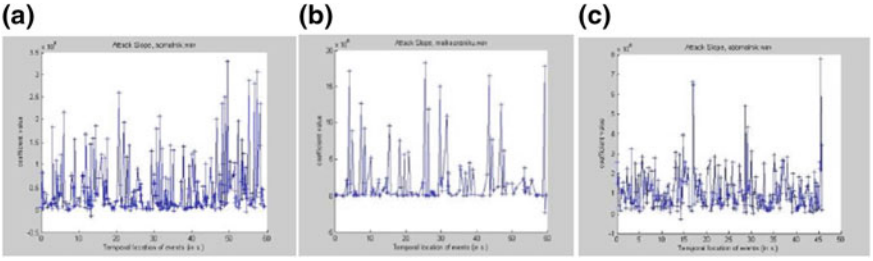

Fig. 21.3 Attack slope of **a** music signal-1, **b** music signal-2, **c** music signal-3

b. **Timbre**

Figure 21.3 show how attack slopes changes in music signal-1, music signal-2 and music signal-3:

c. **Tonality**

Key clarity of the music signal-1, 2 and 3 are shown in Fig. 21.4.

From the parameters attack slopes and key clarity, it is found that pattern of three music signals are different in their attacking style and clarity of key(s).

d. **Rhythm**

Tempo of music signal-1, music signal-2 and music signal-3 are given by Fig. 21.5.

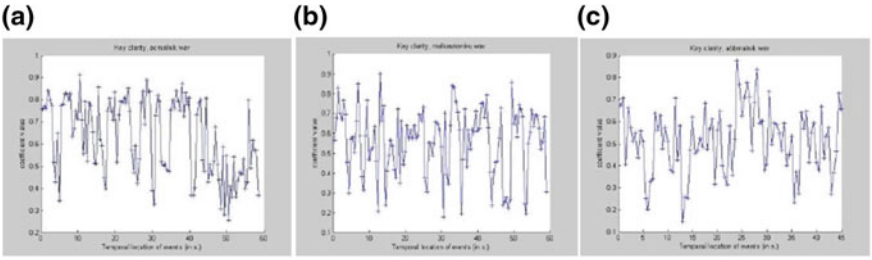

Fig. 21.4 Key clarity of **a** music signal-1, **b** music signal-2, **c** music signal-3

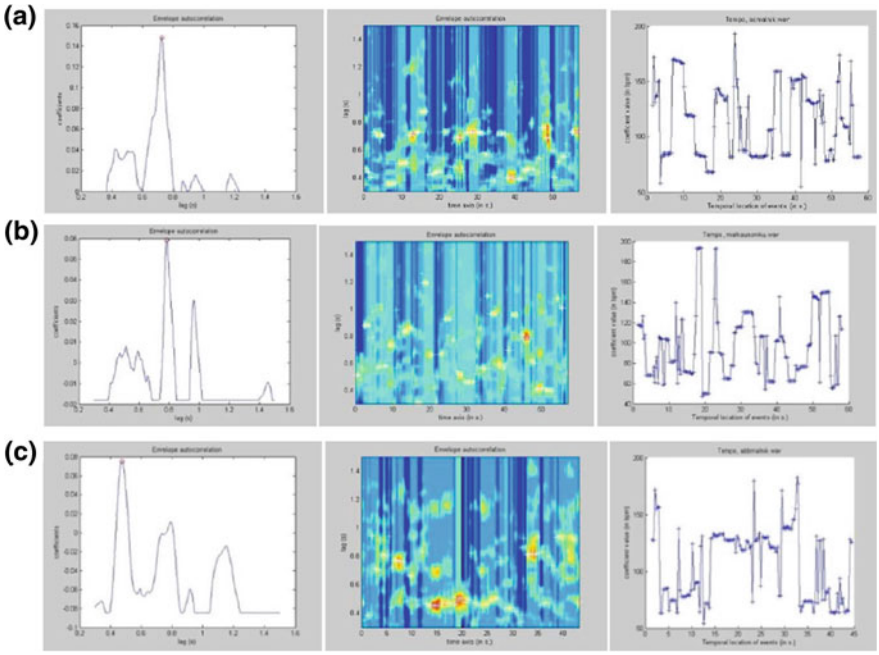

Fig. 21.5 Tempo of **a** music signal-1, **b** music signal-2, **c** music signal-3

In fact, the lag, where first time autocorrelation meets maximum value is first found, then with the corresponding lag we calculate the time, where envelope autocorrelation attains its maximum and at the end, the bpm for that time is calculated. This is actually the value of tempo of the corresponding signal. It is found that the tempo of the music signal-1 is the largest, next comes the tempo of the music signal-3 and tempo of the music signal-2 is the least among all.

Tempo is the speed of the beat. A fast tempo in music gives a feeling of excitement and energy, whereas slow tempo gives a feeling of calm mood. Hence, music signal-2 is more in calm mood than music signal-1 and music signal-3. In fact, feeling of excitement and energy is greatest for music signal-1.

21.4.2 Poincaré Plots and Their Quantifications

The Poincaré plots for each of the subjects (both IRM and NIRM subjects) for all the three types of music based on raga "Malkunsh" are constructed. Some of them are presented in Figs. 21.6 and 21.7.

Since the points in each of the Poincaré plots are concentrated about the line of identity, an ellipse with major axis as line of identity is fitted to the dense region of each of the plots. The area of the ellipse is taken as a quantification parameter. Interestingly, it is observed that the area of the fitted ellipse decreases in each cases (both IRM and NIRM initiated), when the subjects listen to Rabindra sangeet based

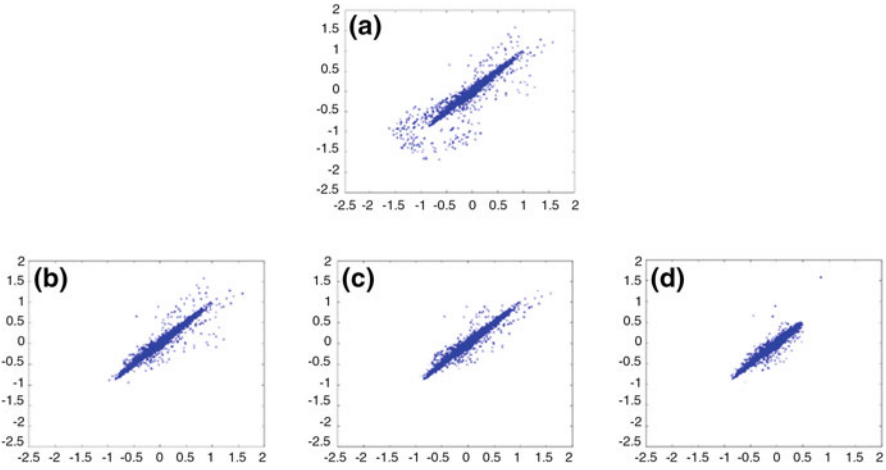

Fig. 21.6 Poincare plots of IRM initiated normal healthy subjects **a** before listening to any music, **b** listening to Indian classical music, **c** listening to instrumental music, **d** listening to Rabindra sangeet

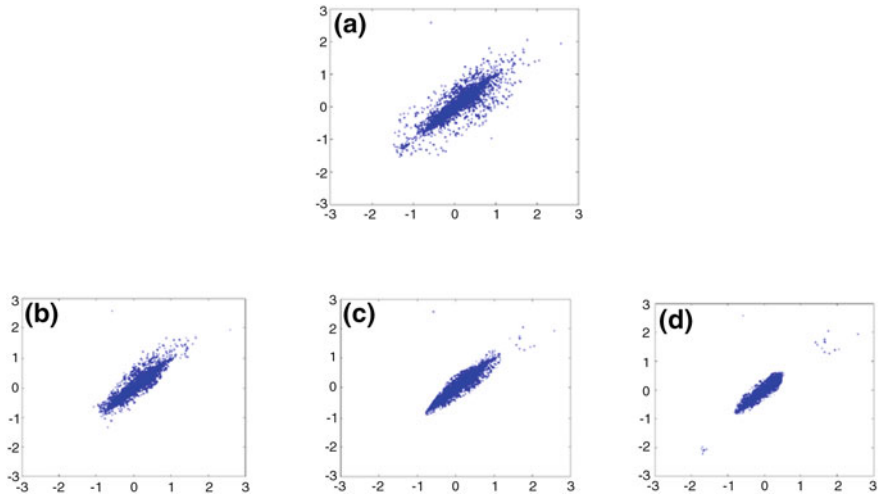

Fig. 21.7 Poincare plots of NIRM initiated normal healthy subjects **a** before listening to any music, **b** listening to Indian classical music, **c** listening to instrumental music, **d** listening to Rabindra sangeet

on raga "Malkunsh". However, a mixed trend is observed in the values of area for both IRM and NIRM initiated persons, when they listen to Indian Classical music based on the same raga. On the other hand, the value of the area decreases uniformly for IRM initiated persons but not uniformly form NIRM subjects, when they listen to Instrumental (Sitar) music based on raga "Malkunsh".

21.5 Conclusion and Future Scopes

The study introduced in this chapter is new of its kind. Three different types of music based on the same raga have been selected and analyzed through its dynamics, timber, tonality and rhythm. Finally their effects on normal healthy subjects have also been investigated through Poincaré plot construction. Most interestingly, it is found that out of the three types of music based on raga "Malkunsh", Rabindra sangeet has uniform effect on all of IRM and NIRM initiated persons. From the view point of time/frequency/time-frequency based analysis, all the three music are different in their attacking style and clarity of key(s), but loudness and calmness of Rabindra sangeet (music signal-3) is medium compared to the other two music of the same raga. Probably this is the reason for which the effect of Rabindra sangeet is uniform on normal healthy subjects, whether they are IRM initiated or not. Since the value of the quantifying parameter have decreased for all subjects, when they listen to Rabindra sangeet, it is expected that only Rabindra sangeet among the three different music based on raga "Malkunsh" has a

strong positive effect in relieving stress from human being irrespective of the fact that they are IRM initiated or not. The future scopes of this article includes but not limited to the verification of the positive effect of Rabindra sangeet on human being, finding of a correlation between the psycho-acoustic measures and the degree of its effect on human being and also searching of some Indian classical ragas such that any type of music based on those ragas produce positive effect in relieving stress of the human-being.

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Chapter 22
Injustice as a Judicial Product: A Problematic Tendency in Legal Thinking and Practice

Emir Kaya

Abstract This chapter questions a common postulate among lawyers that order is a positive aim of law, and disorder can only have negative connotations. Albeit true to a great extent, this assumption also brings about injustices when applied radically. Order is not a moral value, but a means to such values as fairness and justice. When law, order, and justice are linked together as elements of linear reasoning, order becomes an end. This, in turn, leads to a mindset that misses out on the real and potential value of chaos. The chapter analyses the concept of chaos in three ways, namely, negative, neutral, and positive, and concludes that lawyers ought to develop a more balanced attitude towards order, and pursue justice by acknowledging chaotic realities fairly. In other words, the modernist association of law with order should not be relied upon without reservations. It needs to be reminded constantly that law is a means to justice, which cannot be realised in an unbending order of any authority or convention, but through a balance of considerations for the elements of order as well as its lively counterpart, chaos.

Keywords Law and psychology · Order · Chaos · Legal realism · Judicial behaviour

22.1 Introduction

Law and order have been associated with each other throughout the age of modernity, whose effects persist to this day. In this association, chaos meant disorder and lawlessness–both with negative connotations. This perception stemmed from the predominant theories of natural sciences that depicted the universe as full of laws, hence ordered. Whether or not there is an intelligent being behind it, it was indisputable that the universe is in order, and chaos is just another word for

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deviation from it. In times of postmodernity, however, the concepts of order and chaos are not necessarily entirely altered but refined (Peat 2002). Order is still positive but chaos is not so negative anymore: it is neutral to the extent that it is natural.

Law as a social science has been really slow to adapt to the recent developments in natural sciences. Newton's physics is now out whereas quantum physics is in (Scheurer and Debrock 1988). Accordingly, even though the physical world presents a great amount of continuity and predictability, what is really available to human knowledge is probabilities. Physical laws are valid only within limited spheres of examination, and not unconditionally so. Law, the social science, lags far behind this confession, and is still largely obsessed with an archaic notion of order. To most lawyers, chaos continues to be a dirty word and an antonym for the *raison d'être* of law. This biased reaction to the concept of chaos is due to lack of awareness as to the several connotations of the term.

There are three basic ways to conceptualise chaos. Negative chaos is one that comes to mind most easily and commonly. It is a state in which there is little predictability but great arbitrariness and irregularity. This state allows for self-motivated and self-justified actions without any clear and shared logical pattern among them. This type of chaos is what law fundamentally fights against, thus, what most lawyers think is the only meaning of the word (Tamanaha 2001: 56).

Neutral chaos, the second type, refers to a state in which complexity and irregularity are natural. Let us imagine, for example, a tree that sheds its leaves every autumn. Within this regular occurrence, it is not known how many leaves the tree will have every year and when and where exactly each leaf will fall. Even though one natural scene, namely, the fall of leaves, occurs every year in order, the way it occurs in smaller scenes is in chaos. The latter, too, is natural, therefore as neutral as the former. It would be unnatural to regulate the smaller scenes of the fall of leaves. For another example, let us think of an office where working hours start at 9 a.m. This is a rule for order. However, the routes all officers take to arrive at the office by 9 a.m. cannot be ordered in a natural world. There is no rule about it; hence it is chaotic in a neutral sense. In this sense, the universe is in part ordered, and chaotic for the rest.

This type of chaos comes as a matter of perspective. The reality is that all events of life are neither wholly predictable and ordered nor wholly unpredictable and chaotic. There is a mixture of both. This simple wisdom is important for everybody, including social scientists. Here arise important questions especially for lawyers with respect to the correct conceptualisation of order versus chaos: Is order always a positive goal, or how much of it is good?

The answer lies in the third type of chaos, namely, positive chaos. This type, like the former two, is also a matter of perspective and an outcome of deepening one's view on the concept. First, the very existence of chaos (in the sense of lack of absolute certainty, regularity, predictability, inclusivity, knowledge and so on) is a law itself, though not necessarily overt. Although there is a rule that all laws are valid only in their limited scopes, there is no rule that all laws are or can be made accessible to human reason. Chaos is such a law, and should be received positively.

Secondly, chaos is positive because it is what makes life diverse, colourful, surprising, challenging and interesting. A radically ordered world in which every single detail of our destiny is predetermined and known to us would suggest no motivation for any action or inaction. The fact that we are ignorant of the details, or the very existence, of an absolute order behind the visible, that is, that we live in partial chaos is actually our fuel.

Thirdly, chaos is an area of equality whereas order is an area of hierarchy. In an ordered realm, the maker and manager of order is the authority, hence superior to others in one way or another. Order creation becomes an arena for struggles of a political sort for this simple reason. In chaos, each entity is more or less self-governed, free, and equal to others. Too much emphasis on order is a strategy to prevail over others, and is unfavourable in an open and egalitarian society.

Fourthly, chaos is more tolerant to novelties and advancements. Thinking and acting in linear ways rotten by authorities and authorizers is often the core reason for losing flexibility, capacity, and creativity. Without such qualities, any order would lose its self-renewing substance and turn into a mere fetish.

Here it should be noted, in light of the above, that order, too, has three basic types: Positive, neutral, and negative. Taking the specific example of law and politics, a negative order is unjust and authoritarian whose legitimacy and sustainability are always questionable. It is both incapable of and detrimental to the aims of law. Furthermore, in such a state, laws, too, are vulnerable to the polluting effects of authoritarianism, and soon become mechanisms for sustaining order and the position of its creators therein, at the expense of fairness and justice. This quality of law links to the core argument of this essay, that the importance of order should not be exaggerated by those involved in the field of law, and any attitude to this effect should be criticised.

Having reflected on the three types of chaos vis-à-vis order, it is now more accurate to note that neither is really positive or negative outside the human sphere: The world is as it is, and it is natural and neutral. Both order and chaos ought to be conceived as such. It is the human interpretation of the world that can be positive or negative, which depends upon experience. As a general principle, however, one can say that too little or too much order or chaos are both negative in different ways. Correct measure is the key, which is contingent upon having a correct attitude and starting point.

It needs to be highlighted as a problem that many a great lawyers lack positive chaos awareness andappreciation, hence they have a wrong and imbalanced attitude toward order to start with (Williams and Arrigo 2002). In social and ethical reality, order is a means, not an end. The end is justice whose criteria are less tangible and rigid than an apparent order would require. Justice requires more abstract skills, such as objectivity, inclusivity, and sincerity, and overall expanded, cultured and refined minds. Order, or a facade of order, can be created by any powerful yet crude person. When legal concepts, institutions, norms and procedures produce objectively unsatisfactory results, thus anything less than justice, this state of affairs is

simply an outcome of a legal/political crudity having power to concretise its order fetishes that go hand in hand with homogeneity, generalisation, and repetition.

One frequent manifestation of this phenomenon can be observed in the very judiciary. Judicial bodies are created through state power to deliver justice. They exist to repair misconduct; hence it is never surprising or particularly impressive if they do so. It is normally presumed that injustice is an accidental outcome of judicial processes, if not due to corruption. The latter possibility can be kept aside because it is not part of the standard behaviour of judges in most developed countries. The former, that is, injustice as being only accidental in judicial work, needs to be problematised. Here it is assumed that there must be either a factual or an interpretational mistake behind unjust results.

It is further assumed that laws are generally reasonable and applicable; judges generally possess superior capacity of evaluation and freedom of conscience; the legislature enacts laws that are of common sense by paying comprehensive attention to numerous factors. And so forth. On the whole, the legal realm is full of such suppositions. In reality, however, injustice is not always a deviation from an otherwise perfect legal world, but it is a very product of problematic tendencies in legal thinking and practice, among others. In other words, judiciary is one of the active sources of injustice. This aspect of judicial work has not been elaborated upon adequately as associating injustice directly with judiciary sounds awkward at first sight.

It would be unfair to single out the judiciary as doing something special to produce injustice. Rather, the argument made here is that judiciary is no different from any other type of public or private body in terms of having the tendency to make its tasks easier by first developing and then applying generalisations and other pseudo-order tools to that effect. To be clearer, whereas life is extremely complex and chaotic, the legal tendency is towards order by convention. Creating and restoring order is the goal of political authorities and judicial organs. In light of the foregoing discussion, this tendency is to be welcomed up to a certain degree, or the world could come into pieces. However, when inflated, it turns to be self-consumptive: the world is not, cannot be, and does not have to be as orderly as most people of law imagine (Wieland-Burston 1992). When legal habits go too far in ordering cases and scenarios of life, by mistakenly and narrowly linking or anticipating events, or by likening facts to one another due to reading into them through laws and not without bias, it does nothing else but produce injustice.

It should be noted that the root of this problem lies in the legislature and the contemporary notions about what counts as law (Menski 2006). Codification as a modern style of lawmaking has some advantages, such as predictability and uniformity. But again, adjudicating by codes comes to mean having prejudgments about cases. The limits of evaluation, perspective and methodology are set by codes. How so? As parties begin putting forward their claims and requests, public officers, primarily judges, transform their statements into legal language. They, in the meantime, search for apt legal articles that correspond to statements made. Sometimes it works. Yet quite often it does not. And when it does not work, the lawyer must go by the closest option which does not necessarily capture the core of

the case. So thinking by means of codes actually makes judges coded and biased towards legal requests. They, in a way, question "What of law, that is, the presumed order?", instead of "What of people and justice?".

Order, when taken as a moral value, has the portrayed potential of turning people and their lives into the mere objects of a profession. This is because values, by nature, are abided by. Admitting the balancing value of chaos, and such notions as diversity and individuality captured by it, is a cure to order-obsessed legal thinking and practice.

22.2 Conclusions

To sum up, the modernist association of law with order should not be relied upon without reservations. It needs to be reminded constantly that law is a means to justice, which cannot be realised in an unbending order of any authority or convention, but through a balance of considerations for the elements of order as well as its lively counterpart, chaos. Only then a productive equilibrium of stability and dynamism, of generality and specialty, and of unity and diversity can be achieved.

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Chapter 23
Selected Indicators and Methods for Evaluation of E-Participation

Jitka Komarkova and Devanjan Bhattacharya

Abstract All democratic governments try to involve the citizens into the public deals. So, they support development of information society in many ways including high investments into increasing utilization of information and communication technologies in public administration. But it is still very difficult to measure successfulness of this support and compare countries between themselves. A possible way how to assess development of E-Participation is proposed.

Keywords E-Participation · Indicators · Information society

23.1 Introduction

Participation of citizens in public life is the main idea of democracy. Nevertheless in prevailing systems of governments, citizens are allowed to participate only by voting once in several years. In periods between infrequent elections, citizens have only limited power to change things they do not like. Rare examples of direct democracy are described below:

- The right of citizens to propose laws in parliaments.
- Possibility to initiate and take part in referenda on local or national issues.
- Participation in community planning.

The idea that all members of a community should participate in reaching common decisions is unfeasible. It has been proved that in social groups which are

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larger than a village or small town it is impractical let each particular person to co-decide on issues of public concern, e.g. policy, laws, implementation of decisions. Before the emergence of ICT these arguments seemed more convincing, especially for very large units such as cities or states. However, with modern technology it is theoretically possible to allow all citizens to inform themselves about public issues and to participate on public affairs (1999).

Despite claims about revolution expected as a result of "information superhighways" some things do not change too quickly. For example, most citizens of the rich industrialized countries don't imagine that they personally could nor should do anything to promote direct democracy, neither to improve participation in public decision-making. Most people, and this applies to academics as well as other citizens, at least in Europe, do not know why they might need an Internet connection. And most, having connected, would not dream of using it to promote social change or for political purposes (Boehnke and Macpherson 1989).

Seeing that participation of citizens is inadequate, Committee of Ministers adopted Recommendation Rec (2001) 19 on the participation of citizens in local public life. Where are formulated, among others, steps and measures to encourage direct public participation in local decision-making and the management of local affairs. Recommendation covers introduction or improvement of the legislation/regulations which enable (Recommendation Rec 2001):

- Petitions/motions, proposals and complaints filed by citizens with the local council or local authorities.
- Popular initiatives, calling on elected bodies to deal with the matters raised in the initiative in order to provide citizens with a response or initiate the referendum procedure.
- Consultative or decision-making referendums on matters of local concern, called by local authorities on their own initiative or at the request of the local community.
- Devices for co-opting citizens to decision-making bodies, including representative bodies.
- Devices for involving citizens in management (user committees, partnership boards, direct management of services by citizens, etc.).

Giving citizens more influence over local planning and, in a general manner, over strategic and long-term decisions is another aim of recommendation. More specifically:

- Give citizens the opportunity to become involved in the various stages of the decision-making process concerning these decisions, notably by dividing this process into several stages (for example programming, drafting of projects and alternatives, implementation, budgetary and financial planning).
- Illustrate each phase of the planning process by means of a lucid, intelligible material that is readily accessible to the public, using, if possible, in addition to the traditional methods (maps, scale models, audiovisual material) the other media available through new technologies (CD-Rom, DVD, electronic documentary bases accessible to the public).

One of their recommendation also considered utilization of new information and communication technologies and take steps to ensure that local authorities and other public bodies use (in addition to the traditional and still valuable methods such as formal public notices or official leaflets) the full range of communications facilities available (interactive websites, multi-channel broadcast media, etc.).

Practical examples of encouragement of citizen's participation in public life can be found for example in document issued by State of Tennessee—Citizen Participation in Housing and Community Development: A Handbook for Planning, Decision Making, Implementation, and Evaluation (2005). The main thought of this publication is that effective citizen participation start when people have both the desire and ability to plan and carry out development programs to enrich their lives. The degree to which this is accomplished depends on people having opportunities to learn and apply knowledge, imagination, and experience toward solving mutual problems. The State intends to provide for and encourage citizens to participate in the development of the Consolidated Plan, and in substantial amendments to the Consolidated Plan, and all annual performance evaluations and reports in the interim. The State will take whatever actions are appropriate to encourage the participation of all its citizens, including minorities and non-English speaking persons, as well as persons with disabilities.

Activities will include traditional and nontraditional forms of community and citizen participation and will be designed to be appropriate for the type of citizen participation needed:

- Community outreach and education activities.
- General informational mailings and announcements.
- Public hearings.
- Marketing publications.
- Workshops.
- Technical assistance seminars.
- Solicitation of appropriate advocacy group participation.
- Encouragement of community-based citizen participation activities.
- Survey questionnaires.
- As available, the use of electronic media and telecommunication aids to facilitate citizen participation, including but not limited to electronic mail, and the State of Tennessee/THDA web page.

23.2 Citizens Involvement

An importance of information and communication technologies (ICT) for regional development has been studied and it is indisputable. In this case the whole country, region, micro region or municipality can be understood as a region. There have been four main phases of influence of ICT on regional development identified (Perez 1983; Storper 1995).

All the European countries want to involve citizens in public deals so they provide information and electronic services on Web sites to let people more easily participate on governmental decisions. They strongly support development of information and knowledge society on the governmental level too because knowledge is supposed to be an absolute need for the next sustainable development of all the countries. So, inclusive European Information Society and support of growth with respect to the ideas of sustainable development belong to strategic aims of EU stated in its policy "i2010—A European Information Society for growth and employment" (2005).

Besides the strong strategic governmental support, the situation in regions (including activities of various regional authorities and non-governmental organizations), real electronic services available for the citizens, and abilities (including digital literacy) and possibilities (including ownership of computer and availability and quality of Internet connection) of the citizens must be considered too.

Next significant problem is that the users of the same level of digital literacy still individually differ so usability of any application cannot be ensured by training or education. Users' diversity must be respected by design of the application (Dillon 2000). Danish project Public Participation GIS can be used as an example of project targeted to the all citizens but resulting in a participation of only limited group (middle-age well-educated males with income above average) (Hansen and Reinau 2006).

The informational environment of public administration shows certain specificity, by which it differs from the informational environment of the other types of organizations, primarily commercial organizations. Enterprise information systems (understood except public administration institutions) are aimed directly at its target groups of the users and their requirements. The target groups of the users and their needs can usually be in this case precisely specified. Information sources within public administration are used by various users who have different aims (requirements on the information system), education, professions, technical conditions (especially Internet connection speed, hardware, and software), and digital literacy—see Fig. 23.1.

In the public administration environment, however, it is a duty of the state, to take care of the citizens divide, even if there is just a potentiality of it. The state is responsible for preserving the social cohesion. But at present implementation of information and communication technologies into all spheres of the citizens' lives leads to so called digital divide, i.e. there are generations and groups of the citizens who cannot use these technologies and, besides, participate in the public life. So, this situation significantly handicaps them in their lives. Thus, it is advisable to create a suitable environment for such groups (e.g. user-friendly interface, easy access to information, support of digital literacy of all groups of the citizen), so that the social cohesion would be preserved at the highest possible level. Activities of various regional authorities and non-governmental organizations can be very helpful in this case because they can target their projects directly to the neediest groups of the citizens. Activities like 'Public places with access to the Internet in Facilities for Children and Youth and in Children's Homes established by the

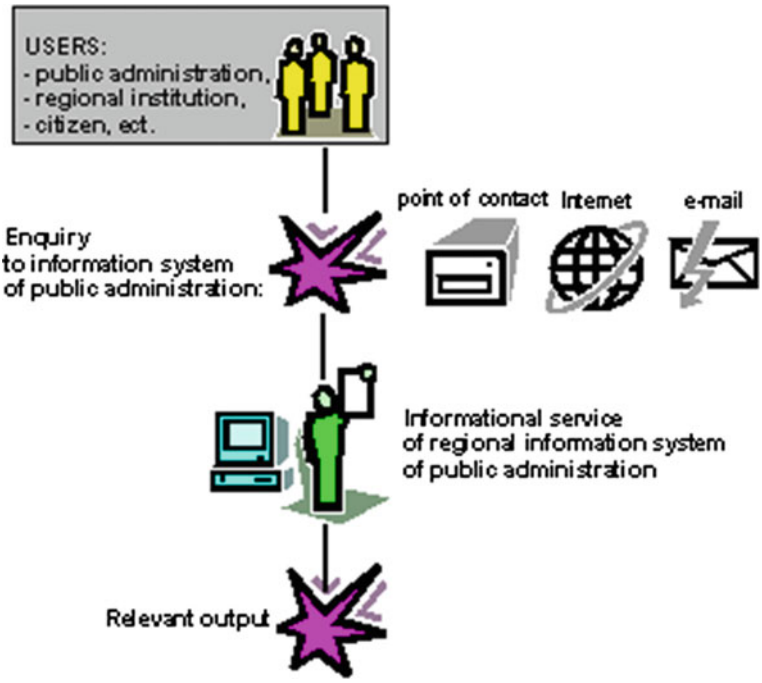

Fig. 23.1 Specific groups of the users of public administration information systems

Pardubice Region' and Public places with access to the Internet in social facilities established by the Pardubice Region can be given as an example of targeted projects supported by local government (Regional Authority of Pardubice Region in this case).

23.3 Selected Indicators and Methods for Assessment of Development of E-Participation and Information Society

To allow measuring development of information society and comparing situation in various regions (e.g. countries), many statistical indicators has been introduced, e.g. (CIRCA 2006; Comparable Statistical Indicators 2006; SIBIS 2006).

But there are still many problems connected with measurement of the development of information society and E-Participation. There are only short time data series available, data come from various sources and data are collected according to the different methodologies.

The following indicators should be followed:

- Number of the citizens of the region—statistical data
- Number of the households who owe computer (or any other suitable mobile device)—statistical data
- Number of the households connected to the Internet (broadband connection should be distinguished—statistical data
- Number of accesses to the Web pages of the selected public administration authorities—should be available from the relevant institutions
- Number of suggestion sent by the citizens in digital form by means of ICT—should be available from the relevant institutions
- Number of various topics discussed on the Web sites of the institutions and number of discussants—should be available from the relevant institutions
- Number of universal and public access points to the Internet and/or eGovernment services in the region—statistical data and should be available from the relevant institution

Many various methods can be used to analyze collected data. Classical statistical methods, and spatial analyses (including spatial statistics) belong to them. The spatial analyses (can by done by means of geographic information systems) provide at least following methods:

- Identification of the geographic center, or the center of concentration, for a set of features. Geographic centers can be used for example for identifying the change of the phenomena in the time by means of following how the center of phenomena moves—see Fig. 23.2.
- Detection of spatial autocorrelation: identification of clusters of features with similar attribute values (local clusters) and those clusters of features with very heterogeneous values (spatial outliers—areas which significantly distinct from their neighbors) in the given area by means of Anselin Local Moran's statistics.
- Examination of the spatial patterns: identification of spatial clusters of statistically significant high or low attribute values, i.e. identification of hot/cold spots by means of Getis-Ord Gi* statistics—see an example on the Fig. 23.3. This figure shows percentage share of the Czech households which use PC for each region of the Czech Republic. High values of the G-statistics indicate that values higher than the mean tend to be found together, low values mean that values lower than the mean tend to be found together.

23.4 Conclusions

Without any doubt there are information and communication technologies available which could allow the citizens to more easily participate in the public deals. Large political support and investments have been provided by the governments to support development of information society and involvement of the citizens. Although

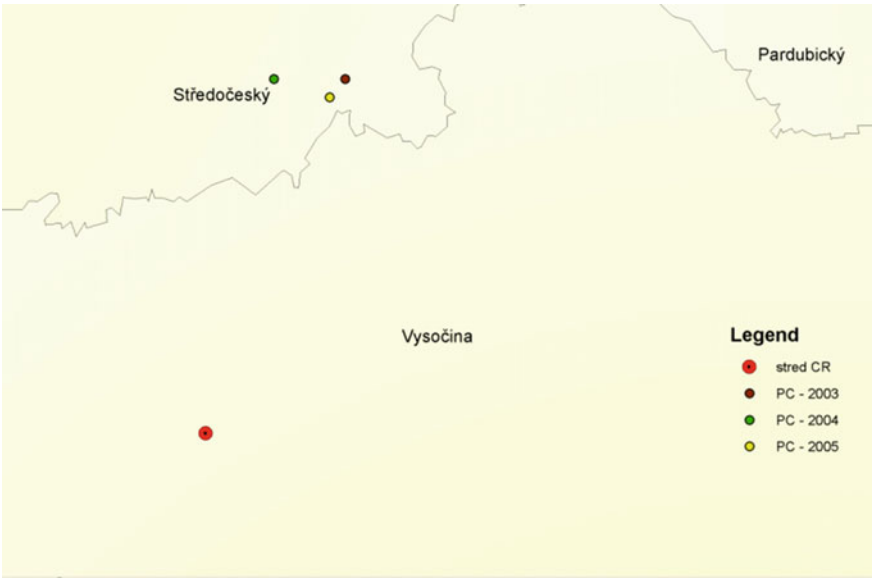

Fig. 23.2 Geographic centers of utilization of PC by the Czech households in years 2003–2005

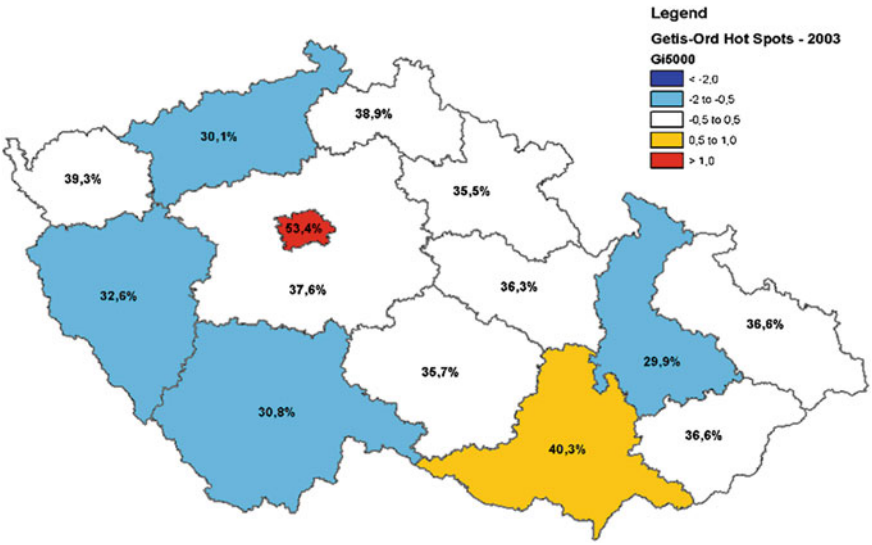

Fig. 23.3 Getis-Ord hot and cold spots analysis of utilization of PC by Czech households (given in percents)

some indicators for measurement of successfulness of these projects have been proposed, there are still not necessary information available.

Problem of digital divide must be considered.

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Chapter 24
Stock Market Development and Economic Growth: An Empirical Analysis Between Turkey and BRICS Countries

Abdu Seid Ali

Abstract There is an overwhelming consensus that vibrant stock markets exceedingly affect countries' economic progress. This paper tries to examine the complex linkages between stock market development and economic growth employing market capitalization ratio, turnover ratio and total value of shares traded as percent of GDP as proxies to stock market development while GDP per capita and FDI as a percentage of GDP to gauge economic development of BRICS (Brazil, Russia, India, China and South Africa) and Turkey. Significant positive links were revealed by VAR results, indicating that stock market development positively and significantly affects the economic growth of Russia, India and China. The Ganger causality test model uncovers that stock market development significantly and robustly influences economic growth for Russia, India, Turkey and South Africa whereas for Brazil and China, it is the economic growth which promotes stock market progress through enhancing liquidity. The complexities of stock markets and their relationship with economic growth prevented us from generalizing their positive link. Accordingly, the need of further research is apparent in order to obtain more evidence about their interaction.

Keywords Stock market development · Economic growth · Complexity · BRICS countries

24.1 Introduction

One of the essential requisite for the accelerated development of an economy is the existence of a dynamic financial market. A financial market helps the economy in saving mobilization, productive investment, national, entrepreneurship and

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industrial growth among others. Moreover, strong local markets can also provide a more stable source of financing for the public and the private sectors, insulating them to some extent against volatile global capital flows.

The growing importance of stock markets around the world has recently opened a new avenue of research into the relationship between financial development and economic growth, which focuses on the effects of stock market development. Stock prices determined in exchanges, and other publicly available information help investors make better investment decisions. Better investment decisions by investors mean better allocation of funds among corporations and, as a result, a higher rate of economic growth.

The positive impact of stock market development towards economic growth of countries is not fully acknowledged by some researchers. They argue that such nexus is highly affected by the choice of countries (developed and developing), the variables or indicators used, statistical models applied etc. others believe that the relationship between finance and growth is exceedingly embellished. Hence, this paper tries to check this complex relationship between stock market development and economic growth of selected countries in emerging economies.

24.2 The Complexity of Stock Markets and Their Relation with Economic Growth

As Mauboussin (2002) stated, a vital feature of a complex adaptive system is "critical points". Explicitly, huge changes arise due to the accumulation of small stimuli—just as the accumulated weight of many sand grains precipitates large avalanches. This entails that large fluctuations are endogenous to such a system. Critical points are a formal way to express the concept of "the straw that broke the camel's back." Seeking specific causes for even big-scale effects is often an exercise in futility.

A complex adaptive system reveals a number of indispensable characteristics and methods.

- Firstly, aggregation is the emergence of complex, large scale behaviors from the collective interactions of many less-complex agents. In capital markets caption, the behavior of the market "emerges" from the relations of investors. This is what Adam Smith, the famous economist, described as the "invisible hand."
- Secondly, agents within a complex adaptive system obtain information from the environment, mingle it with their own interaction with the environment, and develop decision rules. Individual trading rules, the disappearance of anomalies and investment rules of thumb can be regarded as decision rules in the capital markets.
- Thirdly, the nonlinear systems, the aggregate behavior is more complicated than would be predicted by totaling the parts, create an interaction effect. For the

capital markets, this means that cause and effect may not be merely interacted but may instead intermingle to produce embellished result.
- Fourthly, a feedback system is one in which the output of one iteration becomes the input of the next iteration. Feedback loops can intensify (positive feedback) or diminish (negative feedback) an effect.

A financial market generally consists of the so called agents (traders), equipped with varying amounts of capital, and the interaction rules (commercial laws) of the trading platform. The agents interact among themselves in an exceedingly nonlinear way. Each agent tries to acquire the maximum possible profit, by selling and buying financial assets of all types at different times. In contrast to such a simple microscopic structure, the macroscopic behavior of financial markets appears to be surprisingly rich: the seemingly uncorrelated swings of financial indices and the extreme event of a crash constitute typical phenomena of complex systems (Sarkar 2007).

The stock market is examined as a complex institution instilled with intrinsic mechanism through which long-term funds of the major sectors of the economy involving households, firms, and government are organized, tied together and made accessible to various sectors of the economy (Nyong 1997). The complexity arises due to various reasons ranging from social, technological, economic, political, asymmetric and incomplete information to idiosyncrasies of investors and other stakeholders. In addition, Alile (1997) documented that the complexities of stock market may occur from tendency in globalization and amplified assortment of new instruments being dealt with: equity options, derivatives of various forms, index futures etc. nevertheless, the fundamental motives of the stock exchanges world-wide remain the safeguarding of the efficient market with attendant advantage of economic growth.

24.3 Theoretical Background

Before we consider the precise channels through which the stock market may help or hinder economic development it will be practical to observe the broader issues of the role of finance in economic growth from alternative theoretical perspectives.

24.3.1 Growth Theory

Growth theory assumes that the interest rate plays the main role in equilibrating an economy's savings and investment. According to the neo-classical Golden Rule, the optimal growth path is equal to the real interest rate. For a long time, the design of the financial sector was thought to be of no major significance for economic decision making because in the presence of perfect markets, the financial sector produces nothing but a veil on the true determinants of economic developments.

While today's understanding of market imperfections has allowed this view to be put aside, the exact transmission channels from finance to economic activity and in particular any estimate of their quantitative impact are still subject to considerable uncertainty.

The finance and economic growth nexus may run through various transmission channels. Already a very simple growth model illustrates that there are three important connections between financial variables and economic activity. Financial development might (1) reduce the loss of resources required to allocate capital; (2) increase the savings ratio; and (3) raise capital productivity.

24.3.2 Financial Deepening, Repression and Liberalization

There is another branch of theoretical literature related to developing countries where the capital markets are generally underdeveloped. This body of notion is associated with McKinnon and Shaw who have tried to link stock market development to economic growth in developing countries (Singh 1993). They used "financial deepening" to describe the constructive impact of financial intermediation and modernization towards economic development. The measure of governments which hold interest rate artificially low and provide subsidized credits either to favored sectors or to them is detrimental to long term economic growth. This measure has illustrated as "financial repression". The third which is "liberalization" of these repressed credit markets will promote development, since raising interest rates to their equilibrium levels leads not only to higher savings but also to more efficient use of investment resources.

24.3.3 Financial Market Theory of Development

The use of private flows of capital and stock market creation began to shape into a new theory of development put forward by the World Bank's World Development Report for 2000. The "*financial market theory of development*" has found support in several academic studies. The theory implies that stock markets will boost economic growth to the extent that they are entrenched in an institutional matrix that ensures that their signals guide decision makers toward growth opportunities. But countries vary substantially in the extent to which they provide hospitable climates for financial markets. (World Bank WDR 2000)

The relationship between financial development in general and stock market development in particular and economic growth has been extensively debated and scrutinized over the last two centuries both theoretically and empirically. Theoretically, some argue that stock markets promote long-run growth. For example, Greenwood and Smith (1996) show that stock markets lower the cost of mobilizing savings, facilitating investments into the most productive technologies. Obstfeld

(1994) shows that international risk sharing through internationally integrated stock markets improves resource allocation and accelerates growth. Bencivenga et al. (1996) and Levine (1991) have argued that stock market liquidity—the ability to trade equity easily—plays a key role in economic growth. Besides, studies made by Bagehot (1873), Schumpeter (1912), Hicks (1969), Miller (1998) confirmed that the financial development is a significant contributor to growth.

Contrary to the above theoretical view, others cast doubts on the contribution of stock markets to long-run growth. For instance, the role of stock markets in improving informational asymmetries has been questioned by Stiglitz (1985) who argues that stock markets reveal information through price changes rapidly, creating a free-rider problem that reduces investor incentives to conduct costly search. The contribution of liquidity itself to long-term growth has been questioned. Demirgüç-Kunt and Levine (1996) point out that increased liquidity may deter growth via three channels. First, it may reduce saving rates through income and substitution effects. Second, by reducing the uncertainty associated with investments, greater stock market liquidity may reduce saving rates because of the ambiguous effects of uncertainty on savings; third, stock market liquidity encourages investor short-sightedness, unfavorably affecting corporate governance and thereby plummeting growth.

24.4 Review of Empirical Literature

Like the theoretical literature, the empirical evidences are also mixed and disputed concerning the impact of stock market development on economic growth. Several studies have shown a positive link between financial development and economic growth. Levine and Zervos (1998) measured stock markets development along with different magnitude and have suggested strong statistically significant relationship between initial stock market development and subsequent economic growth. An efficient stock market contributes to attract more investment by financing productive projects that lead to economic growth, mobilize domestic savings, allocate capital proficiency, reduce risk by diversifying, and facilitate exchange of goods and services. Empirical evaluation of Mohtadi and Agarwal (2001) on the relationship between stock market development and long-run growth using time series cross-section data for 21 countries from 1977 to 1997 suggests that stock market development is positively associated with economic growth.

It entails that the stock market development leads to higher growth because it reduces both liquidity and productivity shocks. Besides, Atje and Jovanovic (1993), using a data set of 39 countries over the period 1980–1988, supported the assertion that a strong, positive and statistically significant relationship existed between stock markets and economic growth. This confirms that the existence of stock market development highly affects the level and/or the growth rate of economic activity through the ratio of the value of stock market trading and gross domestic product (GDP).

Mercan and Göçer (2013) examined the effect of financial development on economic growth for the most rapidly developing countries (emerging markets) (Brazil, Russia, India, China and Turkey, BRIC-T) via panel data analysis using the annual data for the period from 1989 to 2010. Foreign direct investments and trade openness were included in the analysis. According to empirical evidence derived from the study made with panel data analysis it was found that the effect of financial development on economic growth was positive and statistically significant. This finding supports the idea that financial systems function for markets by meeting the funding needs of real sector.

Consequently, they provide a source by contributing to the effective allocation of savings and eventually they sustain the economic growth. Likewise, Gürsoy and Müslümov (2000) examine causality relationships between stock markets and economic growth based on the time series data compiled from 20 countries for the years 1981 through 1994. Analysis based on the panel data revealed a two-way causation between stock market development and economic growth. Apart from the above empirical evidences, quite a lot of studies propped up the constructive effect of stock market development on economic growth.

Some other studies show assorted results. Rioja and Valev (2011) find that stock markets have not contributed to capital accumulation or productivity growth in low income countries. Conversely, in high-income countries, stock markets are found to have sizable positive effects on both productivity and capital growth. Perhaps the size and activity of equity markets in developing countries has not yet reached levels where they are significant determinants of the sources of growth. Alajekwu and Achugbu (2012) investigated the role of stock market development on economic growth in Nigeria. Their results show that market capitalization and value traded ratios have a very weak negative correlation with economic growth while turnover ratio has a very strong positive correlation with economic growth. This shows that liquidity is significant for economic growth but does not establish same for stock market size. An empirical analysis for Turkey was made by İnce (2011) on financial liberalization, financial development and economic growth. Her result revealed that there is a strong relation between finance and growth in the short-run, while it depicts the absence of long run relationship. This implies that the existence of high inflation, instability and uncertain economic policies prevent the long term effect.

In contrast, others concluded that the effect of stock market on economic development is either negative or insignificant. Harris (1997) uncovered that the evidence suggesting that stock markets promote economic development was “at best very weak”. In some studies it is also stated that the relationship between financial development and economic growth variables is weak, even though financial growth may play a decreasing role in the economic growth process (Singh 1997) while others reject the existence of a finance-growth relationship (Lucas 1988). The author argues that economists tend to over-emphasize the role of financial factors in the process of growth. Besides, Ake and Ognaligui (2010) probed the Douala stock exchange and Cameroonian economic growth nexus employing Granger causality tests. The finding which was based on the stock exchange variables and Cameroonian GDP disclosed the absence of association

between stock exchange and economic growth for Cameroon. The result indicated that the Cameroonian economy couldn't be enhanced due to the occurrence of low value of market liquidity in Douala Stock Exchange.

This paper seeks to shed light on the impact that stock markets have had on economic development of Turkey and BRICS (Brazil, Russia, India, China and South Africa). It is going to employ market capitalization, turnover ratio and value added ratio to gauge stock market development while gross domestic product (GDP) per capita and foreign direct investment (FDI) as a percentage of GDP to determine economic growth.

24.5 Measurement of Variables

24.5.1 Stock Market Development

Stock market development is a multi-dimensional and complex concept. It is usually measured by stock market size, liquidity, volatility, concentration, integration with world capital markets, and the legal rules (regulation and supervision) in the market. Markets that are liquid should be able to handle heavy trading without large price swings (Levine 1996).

24.5.1.1 Market Size

We determine the *size* of the stock market using the ratio of market capitalization divided by GDP. Market capitalization (or market cap) is the total value of the issued shares of a publicly traded company; it is equal to the share price times the number of shares outstanding. As outstanding stock is bought and sold in public markets, capitalization could be used as a proxy for the public opinion of a company's net worth and is a determining factor in some forms of stock valuation. The assumption underlying the use of this variable as an indicator of stock market development is that the size of the stock market is positively correlated with the ability to mobilize capital and diversify risk.

24.5.1.2 Liquidity

Liquidity is used to refer to the ability of investors to buy and sell securities easily. It is an important indicator of stock market development because it denotes how the market lends a hand in improving the allocation of capital and thus boosting the prospects of long-term economic growth. This is possible through the ability of the investors to quickly and cheaply alter their portfolio thereby reducing the riskiness of their investment and facilitating investments in projects

that are more profitable though with a long gestation period. Two main indices are used to monitor the performance of the stock market liquidity:

- **Turnover Ratio** gauges the value of the traded shares in the domestic stock market divided by the total value of shares in the market. It measures how active or liquid the stock market is relative to its size. Though it is not a direct measure of theoretical definitions of liquidity, high turnover is often used as an indicator of low transaction costs.
- **Value Traded Ratio** is the value of all shares traded in the stock market as percent of GDP. It appraises how active the stock market is as a share of the economy. The total value traded ratio measures the organized trading of firm equity as a share of national output and therefore should positively reflect liquidity on an economy-wide basis.

24.5.2 Economic Growth

Like stock market development, Economic growth is a broader and multifaceted notion too. It is the increase in the market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. Of more importance is the growth of the ratio of GDP to population (GDP per capita), which is also called per capita income.

24.5.2.1 GDP Per Capita

It is a measure of the total output of a country that takes the gross domestic product (GDP) and divides it by the number of people in the country. The per capita GDP is especially useful when comparing one country to another because it shows the relative performance of the countries. A rise in per capita GDP signals growth in the economy and tends to translate as an increase in productivity.

24.5.2.2 Foreign Direct Investment as a Percentage of GDP

Foreign direct investment (FDI) is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. An increase in FDI may be associated with improved economic growth due to the influx of capital and increased tax revenues for the host country. Host countries often try to channel FDI investment into new infrastructure and other projects to boost development.

24.6 Data Sources and Methodology

24.6.1 Data Sources

Data which help to describe the relationship between stock market development and economic growth has been collected from World Bank's World Development Indicator and Organization for Economic Co-operation and Development (OECD) 2013 data bases. Annual time serious data have been taken from the sampled countries of BRICS (Brazil, Russia, India, China and South Africa) and Turkey for 19 years covering the time span of 1994–2012.

24.6.2 Methodology

Market capitalization as a percentage of GDP (MCR), turnover ratio of stocks traded (TOR) and total values of stocks traded as a percentage of GDP (VTR) are used as proxies to measure stock market development. Besides, economic growth has been measured by two proxies namely, annual growth of GDP per capita and Foreign Direct Investment (FDI) as a percentage of GDP.

24.6.3 Model Specification

The study used the vector auto-regression (VAR) model to analyze the relationship between economic growth and stock market development. It is an econometric model used to capture the linear interdependencies among multiple time series. It is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series.

A VAR model describes the evolution of a set of k variables (called *endogenous variables*) over the same sample period ($t = 1,\ldots, T$) as a linear function of only their past values. The variables are collected in a $k \times 1$ vector y_t, which has as the ith element, $y_{i,t}$, the time t observation of the ith variable.

A *p-th order VAR*, denoted **VAR (*p*)**, is

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + e_t,$$

The dependent variables, economic growth, Y_1 and Y_2 were proxied by per capita Gross Domestic Product or simply abbreviated as (GDP) and Direct Investment as a percentage of GDP or shortly (FDI). Market capitalization as a percentage of GDP shortly (MCR), turnover ratio of stocks traded abbreviated as (TOR) and total values of stocks traded as a percentage of GDP simply (VTR) are

used to designate the independent variables X_1, X_2 and X_3 which assumed to measure stock market development. Based on the theoretical and empirical views, the relationship between economic growth and stock market development can be specified in two ways as:

$$\text{GDP per capita} = c_0 + c_1 * \text{MCR} + c_2 * \text{TOR} + c_3 * \text{VTR} + e_t$$

$$\text{FDI as percentage of GDP} = c_0 + c_1 * \text{MCR} + c_2 * \text{TOR} + c_3 * \text{VTR} + e_t$$

24.6.3.1 Unit Root Test

A key role in time series analysis is played by processes whose properties, or some of them, do not vary in time. Thus, one significant property of a vector autoregressive process is that its variables are stationary. However, financial and economic time series intrinsically demonstrate some form of volatility due to their dynamic nature. This non-stationary can be reflected in the form of trends, cycles, random walks, or a blend of all three. Non stationary data are usually erratic and cannot be modeled or forecasted. It is therefore essential to check the stationarity of the time series as if non stationary time series are not addressed accordingly, the regression will often exhibit unauthentic results.

Therefore, to get consistent-and-reliable outcomes, the non-stationary data has to be altered into a stationary one, usually through differencing. In order to test whether the series being discussed are stationary or not, and to verify their order of integration, the different unit root tests may be utilized. In this study, Augmented Dickey–Fuller test (ADF) that is a test for a unit root in a time series sample, has been used. At 5 % level of significance, results demonstrate that all the underlying variables (GDP, FDI, MCR, TOR and VTR) attained stationarity after a first difference.

Then, a VAR model is constructed, the results of which are shown below:

24.7 Major Findings

24.7.1 Vector Autoregression (VAR) Model Results

As it is depicted in Table 24.1, market capitalization ratio (MCR) with lag 1 positively and significantly affects the foreign direct investment (FDI) of Russia whereas other independent variables become insignificant to affect FDI for Russia.

Table 24.1 FDI and independent variable MCR

	Coefficient	Std. error	t-statistic	Prob.
C(5) MCR(−1)	0.045559	0.016864	2.701548	0.01

$\text{FDI}_{\text{Russia}} = c_0 + 0.045559 * \text{MCR}\ (-1)$

Table 24.2 India: Dependent variable FDI and GDP and independent variables MCR, TOR and VTR

	Coefficient	Std. error	t-statistic	Prob.
C(5) MCR(−1)	0.028633	0.012420	2.305452	0.0282
C(16) MCR(−1)	−0.205818	0.071990	−2.858976	0.0077
C(17) MCR(−2)	−0.188375	0.079143	−2.380187	0.0239
C(18) TOR(−1)	−0.188413	0.066353	−2.839568	0.0080
C(18) TOR(−2)	0.072431	0.034085	2.125014	0.0419
C(20) VTR(−1)	0.440769	0.155380	2.836710	0.0081

$FDI_{India} = c_0 + 0.028633 * MCR(-1)$
$GDP_{India} = c_0 + -0.205818 * MCR(-1) + -0.188375 * MCR(-2) + -0.188413 * TOR(-1) + 0.072431 * TOR(-2) + 0.440769 * VTR(-1)$

Table 24.3 China: Dependent variable FDI and GDP and independent variables MCR, TOR and VTR

	Coefficient	Std. error	t-statistic	Prob.
C(6) MCR(−2)	−0.039949	0.011508	−3.471523	0.0016
C(16) MCR(−1)	0.092176	0.041777	2.206365	0.0352
C(17) MCR(−2)	−0.092325	0.031127	−2.966048	0.0059
C(20) VTR(−1)	−0.060926	0.027886	−2.184814	0.0368
C(21) VTR(−2)	0.053342	0.017728	3.008818	0.0053

$FDI_{China} = c_0 + -0.039949 * MCR(-2)$
$GDP_{China} = c_0 + 0.092176 * MCR(-1) + (-0.092325) * MCR(-2) + (-0.060926) * VTR(-1) + 0.053342 * VTR(-2)$

As it is indicated in Table 24.2, market capitalization ratio (MCR) with lag 1 positively and significantly explain the change in dependent variable FDI whereas, MCR with lags 1 and 2 and turnover ratio (TOR) with lag 1 negatively and significantly explain the dependent variable GDP while TOR with lag 2 and VTR with lag 1 positively and significantly explain **FDI** (Table 24.3).

The foreign direct investment of China has been negatively affected by market capitalization ratio with lag 1. Likewise, market capitalization ratio with lag 2 and the total value of stocks traded with lag 1 negatively influence the GDP. Conversely, market capitalization ratio with lag 1 and VTR with lag 2 positively influence the GDP.

To put it briefly, the outcome of VAR model using the least square estimation method demonstrates mixed findings for the sampled countries. Statistically significant results have been found for Russia, India and China. Stock market development proxied by market capitalization ratio affects economic growth of Russia and India which is represented by FDI as a percentage of GDP similar to the findings of Levine and Zervos (1998), Mohtadi and Agarwal (2001), Mercan and

Göçer (2013) and Atje and Jovanovic (1993). When GDP used as proxy, results varied negatively and positively for India and China. The auto regression results of Brazil, South Africa and Turkey are statistically insignificant.

24.7.2 Granger Causality Test

Granger-Causality is implemented to scrutinize the direction of causality between economic growth and stock market development. An optimal lag length of 2 is used. The results are given below (Tables 24.4, 24.5, 24.6, 24.7, 24.8, 24.9):

The above Granger causality test model outcome tables reveal that Market capitalization ratio uni-directionally causes both the dependent variables GDP and FDI of Russia. Hence, stock market development catalysis economic growth for Russia. For China, it is the economic growth represented by GDP and FDI that affects stock market development signified by TOR while uni-directional casualty between stock market development through VTR and MCR and economic development via FDI and GDP respectively portrayed. Nevertheless, economic growth

Table 24.4 Russia pairwise Granger-Causality tests

Null hypothesis	Obs	F-statistic	Prob.
MCR does not Granger Cause FDI	17	12.3672	0.0012
MCR does not Granger Cause GDP	17	3.99669	0.0467

Table 24.5 China pairwise Granger-Causality tests

Null hypothesis	Obs	F-statistic	Prob.
FDI does not Granger Cause TOR	17	4.45760	0.0357
GDP does not Granger Cause TOR	17	4.63167	0.0323

Table 24.6 Turkey pairwise Granger-Causality tests

Null hypothesis	Obs	F-statistic	Prob.
VTR does not Granger Cause FDI	17	4.13628	0.0430
MCR does not Granger Cause GDP	17	7.84780	0.0066
GDP does not Granger Cause TOR	17	5.30498	0.0224

Table 24.7 Brazil pairwise Granger-Causality tests

Null hypothesis	Obs	F-statistic	Prob.
FDI does not Granger Cause TOR	17	4.58262	0.0332
GDP does not Granger Cause TOR	17	17.5708	0.0003

Table 24.8 South Africa pairwise Granger-Causality tests

Null hypothesis	Obs	F-statistic	Prob.
MCR does not Granger Cause GDP	17	4.45099	0.0358

Table 24.9 India pairwise Granger-Causality tests

Null hypothesis	Obs	F-statistic	Prob.
MCR does not Granger Cause FDI	17	19.6102	0.0002
GDP does not Granger Cause FDI	17	4.32906	0.0384

promotes the stock market development for Brazil through FDI and GDP unidirectionally causes TOR. Finally, stock market development through MCR of both South Africa and India fosters the economic growth via advancing GDP and FDI correspondingly.

Briefly, the Ganger causality test model uncovers that stock market development significantly and robustly influences economic growth for Russia, India, Turkey and South Africa whereas for Brazil and China it is the economic growth which promotes stock market progress at 5 % level of significance. This finding is similar to the empirical study by Gürsoy and Müslümov (2000).

24.8 Conclusion

This study empirically investigates the complex links between stock market development and economic growth in BRICS (Brazil, Russia, India, China and South Africa) and Turkey during the years 1994–2012 within a vector auto regression VAR framework and Granger causality test model. Significant positive links were revealed by VAR results, indicating that stock market development positively and significantly affects the economic growth of Russia, India and China. Conversely, the auto regression results of Brazil, South Africa and Turkey becomes statistically insignificant for the period. The former empirical results do shore up the theoretical literature (e.g., Levine 1991); in signifying that the stock market development prompts higher growth because it shrinks both liquidity and productivity shocks. In addition, it corroborates the notion that market size is positively correlated with the ability to mobilize capital and diversify risk thereby promote growth. Significant positive correlation between liquidity of stock markets and economic growth came across for China and India. Liquidity is an important attribute of stock markets because, in theory, liquid markets advance the allocation of capital and boost prospects for long-term economic growth.

The Ganger causality test model uncovers that stock market development significantly and robustly influences economic growth for Russia, India, Turkey and South Africa whereas for Brazil and China. It is the economic growth which promotes stock market progress through enhancing liquidity. Akin to the VAR

result, market capitalization ratio which is a measure of market size affects the economic growth of the former countries whereas turnover ratio that is used to gauge liquidity influences the later ones.

The findings of this study should be seen with vigilance due to subjective nature of picking the variables to measure stock market development and economic growth, the nature and timing of data, selection of statistical model and interpretation of the outcome. The complexities of stock markets and their relationship with economic growth prevented us from generalizing their positive link. Accordingly, the need of further research is apparent in order to obtain more evidence about the relationship between the stock markets and economic growth.

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Chapter 25
Teachers' and Principals' Views on Principals' Characteristics and Importance of Principal's Characteristics in Chaos

Nursel Yardibi

Abstract Leaders' characteristics, leaders' management style, and leaders' philosophy influence success and productivity of organization, because leaders are responsible primarily from all processes and events that take place in organization. Administrators are certainly one of the most important factors to create organizational culture. Organizations' success, creating a strong organizational culture, continuity of that culture is associated directly with administrator's characteristics, behaviors and management style. If principals cannot manage crisis situations and chaos in work environment, that organization should not function. Aim of the study is that to determine views of teachers' and administrators' on school principals' characteristics that empowering school culture. School principals' using effective communication techniques, behaving proactive, being fair, objective, self-confident are critically important for organizations, teachers, students and families. Responsibility of management is major, administrators should be aware of administrators' influence power on organization and organization members. Administrator regulations should be revised. Personality tests should be applied to administrator candidates rather than written and oral examination.

Keywords Principal characteristics · Principal · Teacher · Chaos

25.1 Introduction

Just how the lifeblood of all living beings are water and air, the lifeblood of the organization is successful and effective management (Şahin 2010). The most important element for continuing success of an organization and for change in organizational culture is leader (Willcoxson and Millet 2000). Leaders' characteristics, leaders' management style, and leaders' philosophy influence success and

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productivity of organization, because leaders are responsible primarily from all processes and events that take place in organization

Schein (2004) defined leaders' roles in effective and productive organizations;

- Development and effectively working of groups and organizations are depends on leaders and relationships of individuals in organization.
- Leadership in organizational development is necessary to determine problems in organizations and to cope with them
- Leaders' must combine their foresights with organization's mission, goals, purposes and procedures for development of an organization
- Leaders should have necessary abilities and insight in order to maintain the effectiveness of an organization.

To realize individuals' goals and organization's goals, administrators should analyze in detail "individuals' cultural values, general culture of the society and organizational culture of organization that manage the administrator" and then should adopt their management style according to this analysis (Şahin 2010). If there is no administrator whose are dominant elements of an organization, we cannot speak on organization and management (Çelikten 2003). So, administrators are certainly one of the most important factors to create organizational culture. According to many researches' results, successful schools have strong organizational culture, in these success there have been schools consensus, strong purposes, leader administrators, responsible teachers and students (Karcıoğlu and Yakupoğulları 2000).

Basic dynamics of managerial effectiveness are managerial roles, management philosophy and administrators' characteristics, these are necessary to realize organizational and individual goals in effective and efficient manner (Şahin 2010). Leaders determine fundamentals of organizational behavior by affecting formal and informal structure of organization (Çelikten 2003). Some schools have poisonous culture, discrimination has been living between teachers and school members, morale is bad, teachers forgot the purpose of service to students, and destructive criticisms have become dominant in such schools (Demirkol and Savaş 2012). In those schools, this poisonous culture brings chaos to schools, because strong organizational culture has not been occurred. So, coping with these chaotic situations are highly difficult.

Teachers, students and parents are proud of the school which they belong; these common feelings provide convergence and cohesion between administrator, teachers, students and parents in schools that their culture has been created by successful and effective leaders (Özdemir 2006). Organizations' success, creating a strong organizational culture, continuity of that culture is associated directly with administrator's characteristics, behaviors and management style. Because, undoubtedly, the most important sense of being human is that feel precious (Yaman 2009).

Effective leader is that have developed leadership sense, willing to work in different environments, applying the most appropriate leadership style according to situation, to determine ability of the group, relationship between employees, working subjects (Çelikten 2003). Administrators should know organization members very well; understand clearly their behaviors to associate individual and

organizational purposes in organization and to realize these purposes effectively and efficiently for both sides (Şahin 2010).

School principal should give importance goals of school, should be permanently and clearly an example on school values should react on critical events in school and take place in this events, should reward students and teachers to motivate them (Çelikten 2003). It is clear that principals' characteristics influence organization positively or negatively.

25.2 A Quantitative Research on Characteristics of School Principals

Aim of the study is that to determine views of teachers' and administrators' on school principals' characteristics that empowering school culture. Correlational survey model from casual-comparative type was used in this research. Survey model's aim is describe a situation that lived in past or living in present (Karasar 2006).

Research universe was consisted of 5,328 teachers and 302 administrators who have been working in public school in Zonguldak. Stratified sampling method from random sampling methods was used to determine sample. Research sample was consisted of 655 teachers and 125 administrators. Characteristics of principals are given in Table 25.1.

According to Table 25.1; %84 of participants are teacher (n = 655), %16 of participants are administrator (n = 125). Education level of %9.5 participants are associate level (n = 74), %84.2'si of them undergraduate level (n = 657), %6.3'ü of them graduate level (n = 49). %70.1 of them have been working in primary school (n = 547), %15.8 of them (n = 123) vocational high school, %14.1 of them (n = 110) in academic high school.

School Culture Scale's School Principal's Characteristics Section was used as data collection tool that developed by Şimşek (2003) and personal information form

Table 25.1 Characteristics of participants

Characteristics of participants		n	%
Branch	Teacher	655	84.0
	Principal	125	16.0
Education level	Associate	74	9.5
	Undergraduate	657	84.2
	Graduate	49	6.3
School types	Primary school	547	70.1
	Vocational high school	123	15.8
	Academic high school	110	14.1
Total		780	100

that developed by researchers. There are seven items in school principal's characteristics section. SPSS program was used in statistical analysis.

Mean and standard deviation calculated to determine views of teachers' and administrators' on school principals' characteristics that empowering school culture. One-way ANOVA was used to test significance teachers' perceptions about school principals' characteristics that empowering school culture, according to education level and school types and Scheffe test was used.

If mean of teachers' and administrators' responds are between 4.30 and 5.00, this means school principals' skill is "high level effective"; if mean of teachers' and administrators' responds are between 3.40 and 4.39, this means school principals' skill is "effective but need improvement"; if mean of teachers' and administrators' responds are between 2.60 and 3.39, this means school principals' skill is "medium"; if mean of teachers' and administrators' responds are between 1.80 and 1.00, this means school principals' skill is "inefficient".

Teachers' views about school principals' characteristics that empowering school culture is given in Table 25.2.

According to Table 25.2, due to teachers' views school principals' characteristics that empowering school culture are "effective but need improvement" level in all items. Principals' views about school principals' characteristics that empowering school culture is given in Table 25.3.

According to Table 25.3, due to principals' views school principals' characteristics that empowering school culture are "effective but need improvement" level in all items. Teachers and administrators views are examined by reference to the means, school principals' views are more positive than teachers'. Teachers' perceptions about school principals' characteristics that empowering school culture according to education level is given in Table 25.4.

According to Table 25.4; teachers' perceptions about school principals' characteristics that empowering school culture, according to education level, there is significantly difference in "*Our principal follows teachers with the aim of support*" item, $F(2,652) = 4.125$, $p < 0.05$. Results of Scheffe Test shows that teachers' with

Table 25.2 Descriptive statistics analysis on teachers' views about school principals' characteristics that empowering school culture

Our school principal,	N	$\bar{x}$	SS	Min.	MAK
Devotes himself/herself to realization of school's aims	655	4.01	0.919	1	5
Behaves objectively to teachers	655	3.98	0.986	1	5
Helps to create appropriate learning environment	655	3.98	0.942	1	5
Tries to meet the requirements of teachers, students and families	655	3.89	0.904	1	5
Tries to soften bureaucratic structure of the school	655	3.86	1.006	1	5
Follows teachers with the aim of support	655	3.81	0.973	1	5
Provides necessary guidance to school members	655	3.89	0.968	1	5

Table 25.3 Descriptive statistics analysis on principals' own views about school principals' characteristics that empowering school culture

Our school principal,	N	$\bar{x}$	SS	Min.	MAK
Devotes himself/herself to realization of school's aims	125	4.06	0.931	1	5
Behaves objectively to teachers	125	4.07	0.952	1	5
Helps to create appropriate learning environment	125	4.14	0.874	1	5
Tries to meet the requirements of teachers, students and families	125	4.06	0.878	1	5
Tries to soften bureaucratic structure of the school	125	3.94	0.948	1	5
Follows teachers with the aim of support	125	3.89	1.002	1	5
Provides necessary guidance to school members	125	3.94	0.953	1	5

associate degrees' views ($\bar{x} = 4.08$) on "*our principal follows teachers with the aim of support*" are more positive than teachers with graduate degrees' views ($\bar{x} = 3.53$). Teachers' with undergraduate degrees' views ($\bar{x} = 3.91$) on "*our principal follows teachers with the aim of support*" more positive than teachers with graduate degrees' views ($\bar{x} = 3.53$). Teachers' views are similar on other items, F(2,652) = 2.146, F(2,652) = 1.547, F(2,652) = 1.720, F(2,652) = 0.082, F(2,652) = 1.090, F(2,652) = 2.892, $p > 0.05$. While teachers' educational level have been increasing (Associate-undergraduate-graduate), teachers' views on principal's guidance differentiate, teacher can not find enough school principal's guidance.

Teachers' perceptions about school principals' characteristics that empowering school cultures, according to school types are given in Table 25.5.

According to Table 25.5; teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, tries to meet the requirements of teachers, students and families.*" item F(2,652) = 4.217, $p < 0.05$. Due to the results of Scheffe Test, views of teachers who work in primary school ($\bar{x} = 3.96$) on "*Our school principal, tries to meet the requirements of teachers, students and families.*" are more positive than views of teachers who work in vocational high school ($\bar{x} = 3.72$).

In addition, teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, tries to soften bureaucratic structure of the school.*" item F(2,652) = 7.900, $p < 0.05$. Results of Scheffe Test shows that views of teachers who work in primary school ($\bar{x} = 3.96$) on "*Our school principal, tries to soften bureaucratic structure of the school.*" are more positive than views of teachers who work in vocational high school ($\bar{x} = 3.66$) and also views of teachers who work in academic high school ($\bar{x} = 3.59$).

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, follows teachers with the aim of support.*" item F(2,652) = 8.266,

Table 25.4 Results of one-way ANOVA on teachers' perceptions about school principals' characteristics that empowering school culture, according to education level

Our school principal,	Education level	N	$\bar{x}$	SS	Sd (between groups)	Sd (within groups)	F	p	Significant difference
Devotes himself/herself to realization of school's aims	Associate	49	4.16	0.800	2	652	2.146	0.118	–
	Undergraduate	561	4.02	0.922					
	Graduate	45	3.78	0.974					
	Total	655	4.01	0.919					
Behaves objectively to teachers	Associate	49	4.02	0.924	2	652	1.547	0.214	–
	Undergraduate	561	4.00	0.974					
	Graduate	45	3.73	1.176					
	Total	655	3.98	0.986					
Helps to create appropriate learning environment	Associate	49	4.10	0.918	2	652	1.720	0.180	–
	Undergraduate	561	3.99	0.939					
	Graduate	45	3.76	0.981					
	Total	655	3.98	0.942					
Tries to meet the requirements of teachers, students and families	Associate	49	3.88	0.781	2	652	0.082	0.921	–
	Undergraduate	561	3.90	0.908					
	Graduate	45	3.84	0.999					
	Total	655	3.89	0.904					
Tries to soften bureaucratic structure of the school	Associate	49	3.90	0.848	2	652	1.090	0.337	–
	Undergraduate	561	3.87	1.000					
	Graduate	45	3.64	1.228					

(continued)

Table 25.4 (continued)

Our school principal,	Education level	N	$\bar{x}$	SS	Sd (between groups)	Sd (within groups)	F	p	Significant difference
	Total		3.86	1.006					
Follows teachers with the aim of support	Associate	49	3.92	0.886	2	652	2.892	0.056	–
	Undergraduate	561	3.83	0.972					
	Graduate	45	3.49	1.036					
	Total	655	3.81	0.973					
Provides necessary guidance to school members	Associate	49	4.08	0.812	2	652	4.125	0.017	Associate-graduate
	Undergraduate	561	3.91	0.962					
	Graduate	45	3.53	1.120					Undergraduate-graduate
	Total	655	3.89	0.968					

Table 25.5 Results of one-way ANOVA on teachers' perceptions about school principals' characteristics that empowering school culture, according to school types

Our school principal,	School types	N	$\bar{x}$	SS	Sd (between groups)	Sd (within groups)	F	p	Significant difference
Devotes himself/herself to realization of school's aims	Primary school	455	4.06	0.877	2	652	2.616	0.074	–
	Vocational high school	108	3.85	0.945					
	Academic high school	92	3.95	1.062					
	Total	655	4.01	0.919					
Behaves objectively to teachers	Primary School	455	4.04	0.959	2	652	2.214	0.110	–
	Vocational high school	108	3.87	0.948					
	Academic high school	92	3.85	1.138					
	Total	655	3.98	0.986					
Helps to create appropriate learning environment	Primary school	455	4.01	0.926	2	652	1.423	0.242	–
	Vocational high school	108	3.84	1.006					
	Academic high school	92	4.02	0.937					
	Total	655	3.98	0.942					
Tries to meet the requirements of teachers, students and families	Primary school	455	3.96	0.872	2	652	4.217	0.015	Primary school–Vocational high school
	Vocational high school	108	3.72	0.975					
	Academic high school	92	3.76	0.942					
	Total	655	3.89	0.904					

(continued)

Table 25.5 (continued)

Our school principal,	School types	N	$\bar{x}$	SS	Sd (between groups)	Sd (within groups)	F	p	Significant difference
Tries to soften bureaucratic structure of the school	Primary school	455	3.96	0.967	2	652	7.900	0.000	Primary school–Vocational high school
	Vocational high school	108	3.66	0.997					Primary school–Academic high school
	Academic high school	92	3.59	1.131					
	Total	655	3.86	1.006					
Follows teachers with the aim of support	Primary school	455	3.91	0.921	2	652	8.266	0.000	Primary school–Academic high school
	Vocational high school	108	3.68	0.975					
	Academic high school	92	3.50	1.134					
	Total	655	3.81	0.973					
Provides necessary guidance to school members	Primary school	455	3.97	0.906	2	652	4.633	0.010	Primary school–Academic high school
	Vocational high school	108	3.77	1.038					
	Academic high school	92	3.67	1.130					
	Total	655	3.89	0.968					

$p < 0.05$. Due to the results of Scheffe Test, views of teachers who work in primary school ($\overline{x} = 3.91$) on "*Our school principal, follows teachers with the aim of support.*" are more positive than views of teachers who work in academic high school ($\overline{x} = 3.50$).

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, provides necessary guidance to school members.*" item $F(2,652) = 4.633$, $p < 0.05$. Due to the results of Scheffe Test, views of teachers who work in primary school ($\overline{x} = 3.97$) on "*Our school principal, provides necessary guidance to school members.*" are more positive than views of teachers who work in academic high school ($\overline{x} = 3.67$).

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types are similar in "*Our school principal, devotes himself/herself to realization of school's aims.*", "*Our school principal, behaves objectively to teachers*", "*Our school principal, helps to create appropriate learning environment*" items, $F(2,652) = 2.616$, $F(2,652) = 2.214$, $F(2,652) = 1.423$, $p > 0.05$.

25.3 Importance of Principal's Characteristics in Chaos

Due to principals' and teachers' views school principals' characteristics that empowering school culture are "effective but need improvement" level in all items. Views of teachers and principals have been examined by reviewing means, principals' views have been observed that more positive than teachers'.

Teachers' perceptions about school principals' characteristics that empowering school culture, according to education level, there is significantly difference in "*Our principal follows teachers with the aim of support*" item. Results of Scheffe Test show that teachers' with associate degrees' views are more positive than teachers with graduate degrees' views. Teachers' with undergraduate degrees' views are more positive than teachers with graduate degrees' views. While teachers' educational level has been increasing (Associate-undergraduate-graduate), teachers' views on principal's guidance differentiate; teacher cannot find enough school principal's guidance. In addition, Şimşek (2003) searched correlation between school principal's communication skills and school culture by the sample of teachers who studied in secondary schools. According to this research results, school principal's communication skills are highly correlated with school culture, and this relationship differentiated with teachers' education level.

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, tries to meet the requirements of teachers, students and families.*" item. Due to the results of Scheffe Test, views of teachers who work in primary school are more positive than views of teachers who work in vocational high school. School principals have important responsibilities that providing employees'

productivity and satisfaction as well as students' achievement and motivation (Çelikten 2003).

Furthermore, Demirkol and Savaş (2012) investigated school principals' perception of school culture whether related to demographic variables; Multidimensional School Culture Scale has been applied to 144 school principals in this study. According to research results, due to the perception of school principals, school principals that work in pre-schools have less aggressive-defensive organization culture than school principals who work in primary school and high school.

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, tries to soften bureaucratic structure of the school.*" item. Due to the results of Scheffe Test, views of teachers who work in primary school are more positive than views of teachers who work in vocational high school and also views of teachers who work in academic high school. If organization culture is strong in any organization, less bureaucratic procedures are needed and organizational productivity is increasing (Khan 2005; Koşar and Çalık 2011).

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, follows teachers with the aim of support.*" item. Due to the results of Scheffe Test, views of teachers who work in primary school are more positive than views of teachers who work in academic high school. Koşar and Çalık (2011) investigated correlation between school principal's power style and organization culture due to teachers' perceptions by the sample of 424 teachers who studied in primary schools. According to this research results, school principal's personality power are positively correlated with gift power. In addition, bureaucratic culture is positively correlated with legitimate power and coercive power, due to the study results.

Teachers' perceptions about school principals' characteristics that empowering school culture, according to school types there is a significant difference in "*Our school principal, provides necessary guidance to school members.*" item. Due to the results of Scheffe Test, views of teachers who work in primary school are more positive than views of teachers who work in academic high school. Furthermore, Özdemir (2006) investigated expected and observed behaviors of school principals on creating school culture and introduce the school culture to environment due to the perceptions of ministry inspectors. According to this research results, school principals' some behaviors about give value to people such as considering criticisms and avoid giving priority to certain people are important to create school culture. School principals' levels of modeling on such behaviors are less than the other observed behaviors.

All in all, the study results show that principals' characteristics are important and can be affect the organization negatively or positively. Some of the basic leaders' characteristics broadly used today; ability to see potential opportunities, being able to create a general picture of the future, being able to convert opportunities into results, being able to develop people around, being able to open the potential of employees, ability to face changes and challenges, being able to take risks, self-belief and

confidence, high competence, always learning, reading, implementing his/her knowledge on practice, positive thinking and speaking, the initiative to manage, the sense of partnership, acting according to social and team interests, being able to admit his/her faults and mistakes, keeps the energy for acting and taking measures even in the case of failure (Shalgynbayeva 2014).

These all features determine organizations' culture, functioning, relationships coping strengths. It has been argued that the leaders of the future will be ones who can manage change and prepare their staff for it (Erçetin et al. 2013a). A leader should be able to (Erçetin 2000)

1. accept the problems emerging during the change or challenge as normal and natural
2. find different solutions to different problems
3. motivate the school members to create new ideas and behaviors
4. developing an atmosphere containing innovative and creative thoughts and actions
5. take risks for the organizational objective (s).

There are good examples of people dealing with chaos and this is true especially for the managers at schools (Erçetin et al. 2013b). When the organization envisions the future and possible probabilities, it will challenge change and uncertainty, and will make the chaos an opportunity to success (Erçetin and Kayman 2014). So, if principals cannot manage crisis situations and chaos in work environment, that organization should not function.

25.4 Conclusion

Communication is an important part of management process and organizational effort cannot succeed without communication (Yaman 2009). School principals' using effective communication techniques, behaving proactive, being fair, objective, self-confident are critically important for organizations, teachers, students and families. Responsibility of management is major, administrators should be aware of administrators' influence power on organization and organization members. Administrator regulations should be revised. Personality tests should be applied to administrator candidates rather than written and oral examination.

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Chapter 26
Social Networks: Connections in Structures

Şefika Şule Erçetin and Nilay Başar Neyişci

Abstract Social network is a structure made up of a set of social actors and a set of ties between these actors. The social network provides an analysis of the structure of social entities as well as a variety of theories explaining the patterns observed in these structures (Wasserman and Faust 1994). The nodes may be individuals, groups, organizations, or societies. It is focused on uncovering the patterning of people's interaction. These patterns are important features of the lives of the individuals. Our choices depend in large part on how that we are tied into the larger social network. In conclusion, investigating interactions is important for understanding patterns because interactions help to define and identify groups or organizations and the members within these entities. In addition, the investigation of interactions may provide a better understanding of how leaders may appear within organizations because interactions help to define structure and context.

Keywords Social networks · Structures · Connections in structures

26.1 Introduction

Social network is a structure made up of a set of social actors and a set of ties between these actors. The social network provides an analysis of the structure of social entities as well as a variety of theories explaining the patterns observed in

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these structures (Wasserman and Faust 1994). The nodes may be individuals, groups, organizations, or societies. Researchers have examined a broad range of types of ties. These include communication ties (such as who talks to whom, or who gives information or advice to whom), formal ties (such as who reports to whom), affective ties (such as who likes whom, or who trusts whom), material or workflow ties (such as who gives money or other resources to whom), proximity ties (who is spatially or electronically close to whom), and cognitive ties (such as who knows who knows whom) (Katz et al. 2004).

Social networks are an interdisciplinary field that emerged from social psychology, sociology, statistics, and graph theory. Georg Simmel mentioned early structural theories in sociology emphasizing the dynamics of triads and "web of group affiliations" (Scott and Davis 2003). Jacob Moreno is the first researcher developing the sociograms in the 1930s to study interpersonal relationships. These approaches were mathematically formalized in the 1950s (Wasserman and Faust 1994). Social network analysis is now one of the major paradigms in contemporary social and behavioral sciences. Together with other complex networks, it forms part of the nascent field of network science (Borgatti et al. 2009; Easley and Kleinberg 2010).

In the late 1890s, Émile Durkheim and Ferdinand Tönnies introduced the idea of social networks. Tönnies (1887) argued that social groups can exist as personal and direct social ties that either link individuals who share values and belief (Gemeinschaft) or impersonal, formal, and instrumental social links (Gesellschaft). Durkheim (1893) mentioned a non-individualistic explanation of social facts, arguing that social phenomena arise when interacting individuals constitute a reality that can no longer be accounted for in terms of the properties of individual actors. Georg Simmel pointed to the nature of networks and the effect of network size on interaction and examined the likelihood of interaction in loosely knit networks rather than groups (Wasserman and Faust 1994).

Several groups in psychology, anthropology, and mathematics make major contributions in the field. In psychology, Jacob L. Moreno began systematic recording and analysis of social interaction in classrooms and work groups in 1930s. In sociology, the early work of Talcott Parsons set the stage for taking a relational approach to understanding social structure (Parsons 1951). Later, the work of sociologist Peter Blau provides a strong impetus for analyzing the relational ties of social units with his work on social exchange theory (Blau 1960).

The social network is a theoretical construct in the social sciences to study relationships between individuals, groups, organizations, or even entire societies. Social network describes a social structure determined by such interactions. These interactions namely the ties through which social unit connects illustrates the convergence of the various social contacts of that unit. This relational theoretical approach indicates an axiom of the social network approach to understanding social interaction, as social phenomena should be primarily conceived and investigated through the properties of relations between and within units.

26.2 Types and Quality of Ties

Another aspect to analyze about the use of social capital in an organization is the types and quality of the ties in the network. Three aspects of network have to be considered in assessing the quality of the ties. They are direct ties, indirect ties, and structural holes (Ahuja 2000; Burt 1997; Granovetter 1973). The more direct ties an organization has, the greater the innovation output. Indirect ties also produce greater innovation output but are related to the level and quantity of direct ties. Structural holes, requiring competent and knowledgeable persons to connect different groups, are beneficial in large organizations. Optimal structure of networks depends on the objectives of the network members (Ahuja 2000; Hansen 1999).

Burt (1997) indicates that the number and quality of ties make a difference to the value of social capital in an organization. The value of social capital is contingent on the number of people doing the same job (Burt 1997). As the leader comprises more structural holes, more diverse contacts and the better quality of information will be gathered and shared (Burt 1997; Ahuja 2000; Granovetter 1973).

Social groups and actors would likely benefit from having both weak and strong ties for exchange of knowledge. Entities can quickly gather and share less complex information from a variety of sources with weak ties. More complex information would benefit from exchange in a strong network. As the leaders recognize the value of creating communities of practice to promote social capital in their groups, it will be critical to address the creation of efficient networks for building vertical and lateral capacity for both communication and transfer of knowledge purposes (MacIver and Farley 2004; Burch and Spillane 2004).

Few complete theories have been produced from social network analysis. One of them is the Heterophily Theory. The basis of Heterophily Theory is that numerous weak ties can be important in search of information, as cliques have a tendency to have more homogeneous opinions and share many common traits. This commonness is the reason for the members to be attracted together. However, being similar, each member of the clique would also know more or less what the other members knew. To find new information or insights, members of the clique will have to look beyond the clique to its other friends and acquaintances. This is what Granovetter named “the strength of weak ties” (Granovetter 1973).

26.3 Structural Holes

In the context of networks, social capital exists where people have an advantage because of their location in a network. Contacts in a network provide information, opportunities and perspectives that can be beneficial to the central actors in the network. Most social structures tend to be characterized by dense clusters of strong connection (Burt 2004). A network that bridges structural holes will provide network benefits that are in some degree additive. An ideal network structure has a

vine and cluster structure, providing access to many different clusters and structural holes (Burt 1992).

Networks with rich structural holes are a form of social capital in that they offer information benefits. The main actor in a network that bridges structural holes is able to access information from diverse sources and clusters (Burt 1992). This is beneficial to an individual's position because of the reaching information about opportunities whether network spans a wide range of contacts. In 2004, Burt studied 673 managers who ran the supply chain for one of America's largest electronics companies (Burt 2004). He found that managers who often discussed issues with other groups were better paid, received more positive job evaluations and were more likely to be promoted (Burt 2004). Thus, bridging structural holes can be beneficial to an organization, and in turn, to an individual's career.

In conclusion, investigating interactions is important for understanding patterns because interactions help to define and identify groups or organizations and the members within these entities. In addition, the investigation of interactions may provide a better understanding of how leaders may appear within organizations because interactions help to define structure and context. Network theorists contend that social context (rules, constraints, beliefs, norms, experiences, etc.) is understood and captured best by structural investigations.

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Chapter 27
Leadership in the Future Experts' Creativity Development with Scientific Research Activities

Shynar Ismuratova and Kadisha Shalgynbayeva

Abstract In today's society, providing education plays a significant role in social structure. As globalization took its course, the role of education has expanded and each country has built its own education system. In this process it is crucial that all the major changes get included in the education system of Kazakhstan Republic as well. Due to globalization, it is known that the country is in collaboration with others, and also has a strong base, independent with its own politics, in addition to having a socio-economic development strategy pointing towards 2050. If countries prefer not to adapt to the requirements of today's world, it is not possible to deal with complexity as a daily routine. The civilized social progress can be reached with scientific research activities that have a set of good intentions while targeting creativity in every stage. In today's global world, chaotic events and/or situations that seem minor in any place can cause very different or major effects in other places as imbedded in the famous 'butterfly effect'. Future experts should have inner, behavioral, intellectual and spiritual power to deal with unexpected and unforeseen crisis and chaotic situations and also they should have enough confidence and courage to reflect on solutions to these situations in research studies because future experts will be community leaders. In this chapter, we will discuss leadership in the future experts' creativity development with scientific research activities.

Keywords Future experts · Creativity development · Scientific research activities · Chaos · Leadership

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27.1 Introduction

In today's society, providing education plays a significant role in social structure. As globalization took its course, the role of education has expanded and each country has built its own education system. We expect education to prepare young people for the world of work and for economic independence; to enable them to live constructively in responsible communities; and to enable them to live in a tolerant, culturally diverse and rapidly changing society (NACCCE 1999). In this process it is crucial that all the major changes get included in the education system of Kazakhstan Republic as well. Therefore, it is undeniable that the concept of expanding the education system, led Kazakhstan Republic to reach out worldwide in order to continue providing education.

The world has grown interconnected and complex (Adams 2005). Due to globalization, it is known that the country is in collaboration with others, and also has a strong base, independent with its own politics in addition to having a socio-economic development strategy pointing towards 2050. If countries prefer not to adapt to the requirements of today's world, it is not possible to deal with complexity as a daily routine. This is because, according to Erçetin et al. (2013a), social constructs like societies, organizations and leadership are chaotic, inter-dependent, non-linear systems that are closely tied to initial conditions. Leadership and chaos can be considered fundamentally interconnected, topics of chaos and leadership have been classified, unitized and graded in a variety of ways (Erçetin et al. 2013a). Leadership is an interaction field between leaders and followers, there are good examples of people dealing with chaos and this is true especially for the managers at schools (Erçetin et al. 2013b).

A new set of demands and obligations has recently been put on the national graduate level education system. Due to this specific reason, the new Kazakhstan in the new world has been struggling with the expansion of the graduate level education system, in which, the indisputable **big obligation** is to develop the education system along with an established quality education and compare the experiences earned, determine a connection with its international leading examples while not losing sight of our national attributes.

In Kazakhstan Republic's national education standards that bind everyone, '*Today's education quality is explained, through the act of future graduate school experts providing education while offering an opportunity to solve one's own problems in different activities*'. In all of these ways the tasks of education are complex and difficult and also schools have a complex task (NACCCE 1999). Finally, the aim of today's graduate level education is to develop individuals who are smart, capable to compete, creative, independent, self-researching, productive, as well as being powerful leaders to deal with chaotic situations. With this action, the knowledge that is obtained through the research activities, the creative expertise and the development capabilities will reflect on the overall education qualities.

27.2 Creativity

The word creativity is used in different ways, in different contexts since it has an elusive definition, the problems of definition lie in its particular associations with the arts and in the complex nature of creative activity itself (NACCCE 1999). According to Philosopher Berdyaev (1994), *creativity* is—life's hidden spell, and people should look at life's each stepping stone with creativity, and that creativity also has moral and religious sides, and all these combined will shape up your life's character.

According to Potashnik (1990), the key indicators of creative personalities display a need to create things from scratch and to move towards developing the items that are being used daily, while avoiding repetitiveness, however paying close attention to creating unity. Creativity arises through the confluence of the following three components (Adams 2005):

- **Knowledge**: All the relevant understanding an individual brings to bear on a creative effort.
- **Creative Thinking**: Relates to how people approach problems and depends on personality
- and thinking/working style.
- **Motivation**: Motivation is generally accepted as key to creative production, and the most important motivators are intrinsic passion and interest in the work itself (Fig. 27.1).

Although creativity is often viewed as being associated with the notions of "genius" or exceptional ability, it can be productive for educators to view creativity instead as an orientation or disposition toward science activity that can be fostered

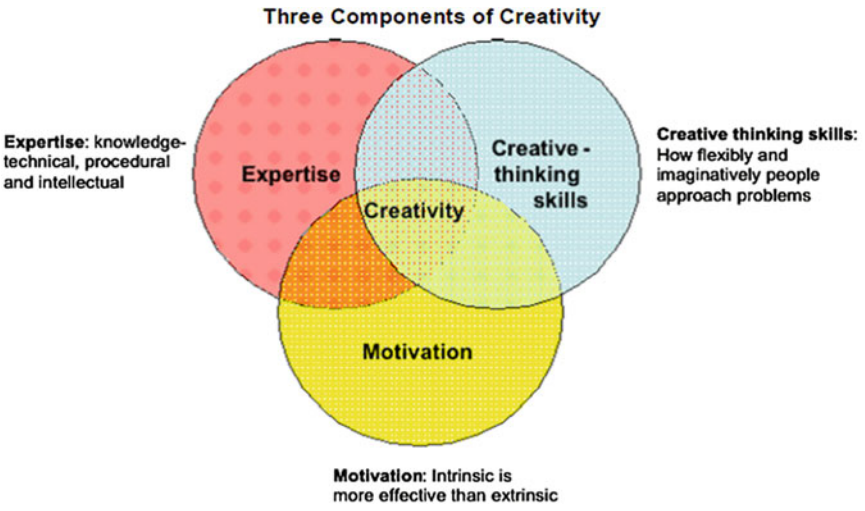

Fig. 27.1 Components of creativity. *Source* Adams (2005)

broadly in the general school population (Mirzaie et al. 2009). In our view, all people are capable of creative achievement in some area of activity; provided the conditions are right and they have acquired the relevant knowledge and skills (NACCCE 1999).

Kochetov (1959) stated: "The creative attribute means; the inclination to receive new information or product with minimal time, effort and cost requirement, but has qualitative and quantitative indicators and that is also superior than before." The ones who examine the creativity issues usually classify it as creative pedagogue—first, are the ones that catch one's attention with their personal vacations, scientific and pedagogic and psychological thinking and high level pedagogic skills, with their fine scientific research methods and developed pedagogical intuitive feelings, using their previous pedagogical experience, re-trained themselves in the professional education field.

According to psychologists, a person's creative interest is connected to their social status, personal feelings, and the activity that surrounds them. In an individual's chaotic work structure, their creativity stays bonded with their emotional freedom and reflects the core of their attachment to reality.

Furthermore, Simonton (1988) proposed that creativity is leadership because successful creative products induce people to think differently in important ways. By creative education we mean forms of education that develop young people's capacities for original ideas and action: by cultural education we mean forms of education that enable them to engage positively with the growing complexity and diversity of social values and ways of life (NACCCE 1999).

27.3 Complexity in Creativity Development

We are living in a complex world. Dealing with complexity is easier when we utilize collective knowledge and creativity. It is tempting to repeat the same strategies we have always used successfully as leaders but those same approaches may not work well when we are solving complex problems. To be successful leaders in a global society, we need to learn how to navigate through complexity.

In his article in Psychology Today, 'The Creative Personality', Mihaly Csikszentmihalyi cited by Linda Fisher Thornton (2012) writes that:

> Creative individuals are remarkable for their ability to adapt to almost any situation and to make do with whatever is at hand to reach their goals. If I had to express in one word what makes their personalities different from others, it is complexity. They show tendencies of thought and action that in most people are segregated. They contain contradictory extremes; instead of being an "individual," each of them is a "multitude."

Meanwhile the IBM (2010) poses some questions that we ought to ponder over when examining complexity of creativity:

- Why are some organizations consistently good at innovating and/or adapting while others seem to be blindsided by change?

- Is it because of their disciplined innovation process or the knowledge and skills of their people?
- Or is it their determination to build a culture where challenging assumptions is not only encouraged, but expected?
- What, specifically, enables leading-edge organizations to capitalize on the inherent complexity in today's environment and catalyze innovation within their business models, products and services?

An IBM Creative Leadership Study found that leaders who embrace the dynamic tension between creative disruption and operational efficiency can create new models of extraordinary value. According to the IBM 2010 Global CEO Study, the ability to embody creative leadership is among the most important attributes for capitalizing on complexity.

According to the IBM (2010), creative leadership in action enables a wide range of product, process and business model innovations. Organizations will need to act upon three imperatives to accelerate the development of creative capital:

- *Uncover the key capabilities of the creative organization*: Empower the organization's ability to understand how the world behaves. Expose those individuals who see opportunities where others do not and map out what is found. Connect ideas and people in novel ways. Try many and various ideas. Inspire belief that action is possible. Maintain the discipline to get things done.
- *Unlock and catalyze the creative capabilities of leaders*: Create high-impact, experiential learning tied to real business challenges. Develop inspirational role models who demonstrate accomplishment and empowered leadership. Unleash small, diverse teams to pursue bold ideas in response to challenges. Create work structures and incentives aligned with intrinsic motivation. Promote a culture of inspiring vision built on authenticity and powered by trust.
- *Unleash and scale organizational creativity*: Share information for collective vision. Tap into global expertise networks. Expand management and communication style repertoires. Build ad hoc constituencies of those sharing common goals. Influence collective behavior through real-time analytics.

Nevertheless, complexity and alignment have been constants in organizational theory in the past, though often casually dismissed as the duty of managers and not the province of visionary leaders. Recent calls to focus on complexity are welcomed, but they also miss the point by stressing only the inner psychology. In an objective view, both are ultimately shortsighted. Both are damaging to leaders striving to build great organizations (Guthrie and Venkatesh 2012).

Due to globalization and the revolution in information technology, institutions have become far more complex. The distance between New York and Bangalore has been reduced to mere bits and bytes, allowing organizations to grow beyond the constraints of time and place. These changes naturally introduce more competition, processes and sophistication. Moreover, individuals at every level of the organization contribute to complexity as employees look for new ways to achieve strategic goals or add value. Guthrie and Venkatesh (2012) thus contend that it is this

element of human dynamics in the workplace that injects another level of complexity, one that cannot always be addressed with a process or system change, or the right mental state. Instead, it demands a more robust and profound understanding of creative leadership inside organizations.

The creative leader sees opportunity in this organizational and human complexity. By analyzing the organization and by focusing on the power of alignment, leaders create harmony among all the various components of the organization. The result in this case is a culture of innovation and change.

However bringing about creativity within an organization is not a bed of roses. Indeed creativity development poses a bigger challenge than always discussed in literature. This study thus seeks to explore 'Leadership in the Future Experts' Creativity Development with Scientific Research Activities' as a way of offering a way out of the complex jig-saw.

27.4 Leadership in the Future Experts' Creativity Development with Scientific Research Activities

The civilized social progress can be reached with scientific research activities that have a set of good intentions while targeting creativity in every stage. Hence, due to today's socio-economic changes our society has an increased need for social individuals that can make decisions on their own and develop from them. For that reason, the event of globalization, and the society's size, its mechanism in order *to form the graduate schools' creativity through scientific research activity system, in the name of transformation and purposeful redirection of education and outside of education phase* have created one of the biggest concerns. The reason why we take this as the foundation is because, each country's moral, socio-economic development level is directly correlated with the population's level of knowledge that is obtained through scientific research in their lifetime and the fact that this knowledge has been used along with creativity. Because the fantastic knowledge that we gather through scientific research activities, along with the evaluated creativity, and the proper use with good intentions would lead us to find the newest thing.

Suhomlinski (1984) said: "In order for graduate studies not to remain a phase in one's intellectual life, it is crucial for them to be fun. Only then we will reach the level where the spiritual life will return to its own place, back to its owner and protector".

The future experts' information processing speed, their thought process and thinking capabilities, the core of their emotional development are directly related to the development of their scientific research and its creativity. Students need to be repeatedly reminded and shown how to be creative, to integrate material across subject areas, to question their own assumptions, and to imagine other viewpoints and possibilities (DeHaan 2009).

Yermentayeva et al. (2013) reflect on the following as key to self-development of research creativity of future teachers'

- the psychological condition is their reflective activities, personal and cognitive constructs.
- the pedagogical conditions are facilitative, interactive and innovative educational technologies in higher educational institutions,
- features are characterized by their integral features of consciousness, connecting the sense of responsibility, commitment to the activity, experiencing "Me", the motivation for self-development and cognitive activity,
- structure is defined as a complex integrative student presentation of himself in the context of the real and the ideal, the present and the future.

The future experts in graduate schools, in addition to the formation of the scientific research and creativity, depend on organizing research activities with their own knowledge and experience and is created by 'researching' the activities around them, for example; developing different outcomes regarding the topic, generating examples, interpreting the experiences and developing a meaning from it, searching for answers to issues that are being discussed, etc.

All these would lead us to an inductive method of making a transition from individual to general level, and called "instrumental pedagogy". The necessary condition to make education useful: Education materials need to be related to one another, the future expert needs to be active, and has to be curious, the need to provide education in their life, in their work, and in their thinking style need to follow one another. It means; future experts will ontogenesis towards repeated knowledge.

1. Gathering knowledge, also accrue as a coincidence that is based on freedom and willpower as well as organized actions.
2. When subject to learning new materials, the future experts will not only listen, see or feel but also get the urge to receive education as well as if they are subjective to provide education
3. Each and every class, seminar and innovative educational method during the graduate studies should be designed to improve the self-research quality, and the creative capabilities along with conscious thinking activities of our future experts.

The way to obtain creativity from our future experts who organize the scientific research methods in a productive way during their education, is directly connected to the professors' pedagogic knowledge and how they implement it to their teaching methods, along with desire to learn today's latest innovations.

The scientific research and formation of creativity in the future universities is the core for the enhancement of quality of the individual's creative capabilities. The effects of the scientific research during the future experts' education years, has a major impact in the enhancement of overall beliefs due to their continuous interest

for knowledge that leads to creativity. The following methods are the important factors in formation of scientific research and creativity in future universities:

- In the beginning, giving homework that requires creativity but with easy to find answers.
- To support the future expert's findings, and to help them develop these findings in the future.
- Encourage them to find their own mistakes, and provide them with group activities where they can exchange ideas, discuss different options, and brainstorm with others.
- Support the joy and the satisfaction they receive upon completing a given scientific research activity.
- Rewarding them for their creative desire and for their curiosity in the scientific research activities.
- To teach them the importance of their creative activity, its impact on individual and social level and how to finalize their thoughts.
- To have them reflect on their findings, what it would mean for their future activities, such as their jobs, and help them make connection with their own lives.

The formation of scientific research and creativity through systematic organization of homework, and conducting a research in relation to one's future job, is also related to the professors' professional authority.

It also depends on the professor's perception of their own self-worth, to encourage the future experts creatively, lead them to develop their creative side, to become experts in their fields and to broaden their knowledge by adding new and creative concepts, to deeply comprehend its nature, and to put their own signature on the future experts' growth and development as an instructional leadership, because professors as leaders shape future experts' structure as new leaders'.

The interest towards creating scientific research and creativity in future universities revolves around individual's worth in the activity, the development of social and personal characteristics. The reason behind being social is due to the social characteristics of the research's findings and the society's demand during the education phase. In addition, the reason why it is personal is simply because of the individual's life, knowledge and moral experience and the leading desire to satisfy the need that is also known as the core which differs from person to person.

Today's biggest challenge is to create scientific research and creativity in our future universities. However, in order to create scientific research and creativity, the professors also need to be creative themselves. Therefore, one needs to look for the beneficial aspects of education and use that as the scientific base; also one must pursue personal development and must have a talented professor. Because in today's education paradigm, based on the societal demands, each professor needs be creative, innovative, fast-thinking, and calculating the futuristic outcome of their teachings, and act accordingly in addition to being competent in their fields.

In connection with the formation of scientific research and creativity in the future universities, fast-thinking professional experts also get included in the creative

group. The creative broadcasting is also considered as a part of this group. Because their purpose is to enhance the creativity, and make our future experts become self-researchers, prepare them for the professional life while increasing the quality of their graduate school during their education stage. The creative group researches today's issues, evaluates them and use them so that the future experts may benefit from them.

In today's global world, chaotic events and/or situations that seem minor in any place can cause very different or major effects in other places, this is drawn from the famous 'butterfly effect'. Future experts should have inner, behavioral, intellectual and spiritual power to deal with unexpected and unforeseen crisis and chaotic situations and also they should have enough confidence and courage to reflect on key solutions to these situations in research studies. Because future experts will be community leaders.

27.5 Conclusion

Engaging learners in the excitement of science, helping them discover the value of evidence-based reasoning and higher-order cognitive skills, and teaching them to become creative problem solvers have long been goals of science education reformers, but the means to achieve these goals, especially methods to promote creative thinking in scientific problem solving, have not become widely known or used (DeHaan 2009).

In conclusion, a real person receiving an education, while paying attention to his/her moral needs and their own capabilities: "people not for knowledge, but the knowledge for people" is the way to refine the education process and to renew the basic good will principals. Only then, the authority of education will rise, and will be able to clearly identify the effects of education on the government and the status of the society overall.

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Chapter 28
The Conflict Management Styles Used by Managers of Private Primary Schools: An Example of Ankara

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Abstract Conflict is an inescapable phenomenon for organizations which must be managed well in order to produce good results. The situation gets even more exacerbated by the fact that conflicts in organizations are rooted within a high level of chaos and complexity. Indeed conflicts are chaotic and complex at varying degrees. This study was conducted with an aim of revealing the conflict management styles of private primary school managers in Ankara. Rahim Organizational Conflict Inventory II was used for collecting data. Population encompassed all private primary school mangers working in Ankara and the sample is thus 89 managers. According to the findings, the management style used most frequently is "dominating" and the one used least frequently is "avoiding". The conflict management styles of private primary school managers in Ankara change according to gender variable except integrating style. Some critical differences in conflict management styles in terms of gender, age and education variables were also investigated and established.

Keywords Conflict · Conflict management styles · Chaos and complexity

28.1 Introduction

Conflict is a naturel case for people and wherever people exist conflicts might equally take place (Sharpe and Johnson 2004, p. 7). Conflict is described as a case based on "inconsistency, uncertainty, disagreement and contradictions in relations" (Champoux 2006). Koçel (2003) describes conflict as a disagreement emerging from various reasons between two or more people or groups. When we think about conflict in view of its organizational side it is a kind of situation that reflects a group

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which is against the other or blocking passage to the aims of a group (Champoux 2006).

Though some managers think that conflict should be kept away from organizations, it is instead a basic organizational process that needs to be managed. Researchers think that conflict is vital for permanent development and for its constructive usage, conflict management attract a lot of attention (Champoux 2006).

Conflicts might be constructive or destructive. The way conflict is managed will determine its feature as "constructive or destructive". Depending on the case and feature prevalent, conflicts might be useful for an organization (Akın 2008).

There are many reasons that create conflict in organizations like "restricted resources, differences in perceiving of the aims, uncertainty in management, status and personality differences, management style differences, struggle for power inside the organization" (Koçel 2003). Meanwhile, Atiker (2004) adds "specialization" to these reasons.

Points of view about conflict have changed with the improvement brought by new approaches to organizations. In the "traditional idea" conflict is seen as a negative case and it is used with the same meaning as words like "violence, disaster" (Atiker 2004). This point of view made conflict perceived as a thing that organizations must stay far from (Aydın 2000). In the "behavioral idea" conflict is seen as a natural and inescapable case for complicated organizations (Aydın 2000). Conflict isn't a bad thing but, its positive social operations can only be revealed when it is managed well. Conflicts in organizations stem from the differences among people or groups and vanishing of the conflicts means losing these differences which feed the organizations (Atiker 2004). The third is "interactive idea" and the ones who have this idea believe that conflict is inacceptable and intensive conflicts must be resolved (Aydın 2000). The ones who adopt the "interactive idea" don't only accept that conflict is natural like the ones who believe in the "behavioral idea"; but also support the conflict for change and innovations.

The process of conflict starts with "potential conflict" and terminates with "ending of conflict" (Champoux 2006). "Potential conflict" is the existence of the factors that would create a potential conflict among people, groups or organizations (Champoux 2006). The second phase is the "perceived conflict" and in this phase, people and groups are aware of the conflict and both sides estimate the reasons for the conflict. When one or more sides start feeling tension or anxiety as a result of the disputes or misunderstandings "perceived conflict" gets converted into "felt conflict" (Atiker 2004). The fourth phase called "open conflict" is the term signifying real conflict happening.

Conflicts might be verbal, written or physical (Champoux 2006). At this phase it becomes something that needs to be managed (Atiker 2004). Meanwhile "Ending of the conflict" shows that conflict phases are over and is thus the end of conflict (Champoux 2006).

Conflict management includes approaches about what to do when a conflict exists. Being good at managing conflict is thus expected of all managers. The most important thing about conflict management is terminating the conflicts with a long lasting solution. The first thing expected from a manager about conflict management

is taking measures that block the existence of dysfunctional conflicts and trying to resolve the problems that can't otherwise be avoided (Akın 2008).

In literature many conflict management styles can be seen. In this study the Rahim Organizational Conflict Inventory ll will be used (Rahim 1983) because "integrating, obliging, dominating, avoiding, compromising" styles will be introduced. "Integrating" includes cooperation between both sides in finding an acceptable resolution. The differences between sides are revealed and they are dealt with. "Compromising" is a method in which both sides sacrifice in order to find a common point to resolve the conflict. "Dominating" is the strategy known as competition and when this method is used one side tries to make the other one adapt to its own demands. "Avoiding" is the strategy that depicts itself as not being interested in the situation until appropriate conditions exist. "Obliging" is the style used when one side has to obey the other's demands (Uysal 2004).

28.2 Complexity of Conflict Management

The traditional view of conflict, as a problematic condition always requiring reduction or elimination and whose conditions or outcomes can be predicted, is incompatible with a complex adaptive systems view of organizations. Thus, conventional approaches to reducing conflict are often futile because the fundamental properties of complex adaptive systems are the source of much organizational 'conflict.' Andrade et al. (2008), offer an alternative view of conflict as pattern fluctuations in complex adaptive systems. Rather than needing reduction or elimination, they postulate that conflict is the fuel that drives system growth and enables learning and adaptive behaviors, making innovation possible. To them therefore, instead of focusing on conflict reduction, managers are advised to encourage mindfulness, improvisation, and reconfiguration as responses to conflict that enable learning and effective adaptation.

Some new theories about the nature and dynamics of human systems in conflict arise from the study of complex adaptive systems (Hendrick 2009). For instance, harmony and consensus impede adaptation and creativity, which arise out of a tension between continuity and uncertainty. Just as life exists in an extremely thin layer of atmosphere surrounding the globe, life exists on the borderline between chaos and order.

Meanwhile, Hughes (2004) argues that these ideas present both opportunities and challenges for our understanding of human systems in conflict and about our ability to transform conflict. To him therefore, linearity, objectivity, rationality, and the like represent the organizing principles of the model of mediation that we often teach. Even so, it is largely known that the "art" of mediation does not follow this model and that our intuitive practice more closely mirrors the ideas of complex adaptive systems.

Hughes (2004), however, adds that the ideas arising from these fields pose a number of questions and challenges that we must confront. For example;

- Should we reject the idea of neutrality and impartiality and move toward a model that sees a neutral in conflict as a respectful participant?
- Should we begin with new metaphors?
- Instead of conflict resolution, should we refer to conflict transformation?
- Instead of managing conflict, would it be more productive to talk about cultivating organic change?
- Instead of a mediator's toolkit, might we refer to a mediator's palette with its myriad colors?
- Will using an art metaphor only create different problems?
- Is the mediator as artist a creator with the parties the raw materials out of which the mediator creates?

It is imperative to posit that we should not automatically value one metaphor over another, but should be mindful of their potential for creating new meaning within conflict. The challenge, then, is to develop a post-modem model for conflict transformation based upon our expanding knowledge of what it means to be human. The model must incorporate the ideas developed from complex adaptive systems, the neurosciences, linguistics, cognitive psychology, and postmodern philosophy. Development of a new model presents us with both a daunting challenge and an inspiring opportunity. In this study, while bearing in mind the literal and technical implication of conflict, the conflict management styles of school heads were explored.

28.3 Problem Statement

The problem case of this study is; "What are the conflict management styles that private primary school managers use to resolve conflicts?". The sub-problem is; "Do the styles change according to the manager's gender, age and educational level?"

28.4 Method

28.4.1 Research Model

The model for the research in question is survey. The aim of this study is revealing the conflict management styles of private primary school managers in Ankara.

28.4.2 Population and Sample

The population of the study is the private primary school managers who work in Ankara. 89 managers constitute the sample. The key features of the managers are as follows;

- 10 % of the participants are women; while 90 % of them are men.
- 8.6 % of the participants are at the age of "51–60"; 32.1 % of them are at the age of "31–40"; 59.3 % of them at the age of "41–50".
- 3.5 % of the participants graduated with master of education; 15.2 % of them graduated from a 2 year degree school; 81.3 % participants graduated from license education.

28.4.3 Scales Used in the Study

To measure conflict management styles of private primary school managers, "The Rahim Organizational Conflict Inventory" was used in this study. There are 28 items in this scale. It includes 5 dimensions called "integrating, obliging, dominating, avoiding, compromising". "1, 4, 5, 12, 22, 23, 28." items are about "integrating", "2, 10, 11, 13, 19, 24." items are about "obliging", "3, 6, 16, 17, 26, 27." items are about "avoiding", "7, 14, 15, 20." items are about "compromising", whilst "8, 9, 18, 21, 25." items are about "dominating".

28.4.4 Data Analysis and Interpretation

In this study to understand whether data distribution was normal or not Kolmogorov Simirnov test was used and to understand the homogeneity of variances Levene test was used. To evaluate the data "frequency, percentage, mean, standard deviation values and variance analysis" techniques were adopted. For understanding the meaning of means from the data, calculated "level ranges" benefited the study in question.

28.5 Findings and Comments

Findings are presented with tables.

According to Table 28.1, for each dimension differences were found between women and men except for the "integrating" dimension. The approach of managing conflict based on cooperation between both sides is used by both genders.

Table 28.1 Conflict management styles in terms of gender variable

	Gender	X	s	t-value
Integrating	Women	15.3271	4.04808	−1.317
	Men	15.9179	4.58676	
Obliging	Women	15.1391	3.92373	−3.265*
	Men	16.6119	4.85723	
Avoiding	Women	10.5301	3.37262	−3.811*
	Men	12.0224	4.26996	
Compromising	Women	14.1278	4.73990	−2.208*
	Men	15.2463	4.86113	
Dominating	Women	13.0075	2.33915	−3.439*
	Men	13.8955	2.62225	
Total	Women	68.1316	14.71418	−3.288*
	Men	73.6940	18.21147	

(*$p < 0.05$)

Each part's homogeneity of variance in terms of age groups is tested with Levene's test. According to the result of this test all parts' variances were found as homogeneous. Variance analysis was used for comparing more than two means.

Mean differences in terms of age variable were found for "avoiding and dominating" conflict management styles. Because the variances are homogeneous, multi comparisons are done with LSD test. According to Table 28.2, for "avoiding" style ages that create difference are "31–40 and 51–60". For "dominating" style ages that create difference are "31–40 and 51–60" and "41–50 and 51–60". These findings can be interpreted in a way that the managers at the age of "51–60" tend to use "dominating" style. With Levene's test, homogeneity value of each dimension's variances is tested in terms of educational level. As a result of this test all dimensions' variances were found homogenous. For comparing more than two independent means one-way analysis of variance was used.

According to Table 28.3, differences were found for each dimension except "dominating" style. In terms of the multiple comparisons done with LSD tests, groups that create differences are among "2 year-degree-license and license-graduate school" for "integrating"; "2 year-degree-license, 2 year-degree-graduate school and license-graduate school" for "obliging"; "2 year-degree-graduate school" for "avoiding"; "2 year degree-graduate school" for "compromising".

When Table 28.4 is evaluated in terms of calculated value ranges, "dominating" is the conflict management style used most with a "moderate" level. And other conflict management styles are used at the "low" level. According to the frequencies it can be said despite the usage of these styles shown in the table more vividly, other conflict management styles are also used.

Table 28.2 The results of ANOVA test that signify the conflict management styles in terms of the age variable

	Source of variance	Sum. of squares	Df	Mean square	F	Difference
Integrating	Groups	23.044	5	4.609	0.254	
	Error	7,148.706	394	18.144		
	Total	7,171.750	399			
Obliging	Groups	94.354	5	18.871	1.016	
	Error	7,316.623	394	18.570		
	Total	7,410.978	399			
Avoiding	Groups	156.631	5	31.326	2.252*	31–40 with 51–60
	Error	5,481.009	394	13.911		
	Total	5,637.640	399			
Compromising	Groups	85.261	5	17.052	0.736	
	Error	9,122.736	394	23.154		
	Total	9,207.998	399			
Dominating	Groups	72.627	5	14.525	2.423*	31–40 with 51–60 41–50 with 51–60
	Error	2,362.163	394	5.995		
	Total	2,434,790	399			
Total	Groups	1,190.190	5	238.038	0.910	
	Error	103,051.800	394	261.553		
	Total	104,241.990	399			

(*$p < 0.05$)

Means and means of means are presented below according to the variables handled (Table 28.5).

"Integrating" is the conflict management style whose mean of usage for women is at "moderate" level and for men at "low" level. "Dominating" is the conflict management style that is used at "moderate" level by both gender and other styles are used at low level no matter what the gender is (Table 28.5).

According to Table 28.6 "Integrating" style is used by the managers at the 31–40 age groups and it is at "moderate" level. "Dominating" is the style which is used by all managers from each age group at the "moderate" level. "Dominating" might be chosen a lot because the sample is selected from people who work as managers. Other styles for each group are used at the "low" level.

According to Table 28.7 "integrating and compromising" are used at the "high" level by the managers who graduated from a 2 year degree school. "Integrating" is used by managers from license and graduate school; "obliging" is used by

Table 28.3 The results of one-way analysis of variance test that signify the conflict management styles of the managers in terms of the education variable

	Source of variance	Sum. of squares	Df	Mean square	F	Difference
Integrating	Groups	442.144	4	110.536	6.488*	2 year-degree-license license-graduate school
	Error	6,729.606	395	17.037		
	Total	7,171.750	399			
Obliging	Groups	423.866	4	105.966	5.991*	2 year-degree-license 2 year-degree-graduate school license-graduate school
	Error	6,987.112	395	17.689		
	Total	7,410.977	399			
Avoiding	Groups	296.035	4	74.009	5,473*	2 year-degree-graduate school
	Error	5,341.605	395	13.523		
	Total	5,637.640	399			
Compromising	Groups	577.780	4	144.445	6.611*	2 year degree-graduate school
	Error	8,630.218	395	21.849		
	Total	9,207.998	399			
Dominating	Groups	43.659	4	10.915	1.803	
	Error	2,391.131	395	6.053		
	Total	2,434.790	399			
Total	Groups	6,780.068	4	1,695.017		2 year-degree-license
	Error	97,461.922	395	246.739		
	Total	104,241.990	399		6.870*	2 year-degree-graduate school license-graduate school

(*$p < 0.05$)

Table 28.4 Conflict management styles usage levels of the school managers

	Integrating	Obliging	Avoiding	Compromising	Dominating	Total
X	15.5250	15.6325	11.0300	14.5025	13.3050	69.9048
Number of items	7	6	6	4	5	28
Mean of means	2.5875	2.23321	2.206	2.417083	2.661	2.41051

Table 28.5 Conflict management styles usage levels of the school managers in terms of gender variable

	Gender	X	Number of items	Mean of means
Integrating	Women	15.327	7	2.554
	Men	15.917		2.652
Obliging	Women	15.135	6	2.162
	Men	16.611		2.373
Avoiding	Women	10.530	6	2.106
	Men	12.022		2.404
Compromising	Women	14.127	4	2.354
	Men	15.246		2.541
Dominating	Women	13.007	5	2.601
	Men	13.895		2.779
Total	Women	67.988	28	2.344
	Men	73.694		2.541

managers who graduated from a 2-year degree; “avoiding” is used by a 2-year degree graduate; “dominating” by managers who graduated from license and graduate school at a “moderate” level. When the educational level increases, the style of conflict management turns to dominating from integrating and compromising styles.

Table 28.6 Conflict management styles usage levels of the school managers in terms of age groups variable

	Age groups	X	Number of items	Mean of means
Integrating	31–40	15.8161	7	2.636
	41–50	15.5700		2.595
	51–60	15.3824		2.564
	Total	15.5250		2.588
Obliging	31–40	16.5287	6	2.361
	41–50	15.3400		2.191
	51–60	15.2941		2.185
	Total	15.6325		2.233
Avoiding	31–40	12.2069	6	2.441
	41–50	10.8000		2.16
	51–60	10.6471		2.129
	Total	11.0300		2.206
Compromising	31–40	15.1724	4	2.529
	41–50	13.9700		2.328
	51–60	14.6569		2.443
	Total	14.5025		2.417
Dominating	31–40	13.3908	5	2.678
	41–50	13.5400		2.708
	51–60	13.6961		2.739
	Total	13.3050		2.661
Total	31–40	73.1149	28	2.521
	41–50	69.2200		2.387
	51–60	69.6765		2.403
	Total	69.9950		2.414

Table 28.7 Conflict management styles usage levels of the school managers in terms of education level variable

	Education level	X	Number of item	Mean of means
Integrating	2 year degree	20.8182	7	3.47
	License	15.9806		2.663
	Graduate school	16.1525		2.692
	Total	15.5250		2.588
Obliging	2 year degree	20.0909	6	2.87
	License	16.3981		2.343
	Graduate school	16.2712		2.324
	Total	15.6325		2.233
Avoiding	2 year degree	15.0909	6	3.018
	License	11.2816		2.256
	Graduate school	11.8814		2.376
	Total	11.0300		2.206
Compromising	2 year degree	20.4545	4	3.409
	License	15.0097		2.502
	Graduate school	15.2034		2.534
	Total	14.5025		2.417
Dominating	2 year degree	12.9091	5	2.582
	License	13.0485		2.61
	Graduate school	14.0339		2.807
	Total	13.3050		2.661
Total	2 year degree	89.3636	28	3.082
	License	71.7184		2.473
	Graduate school	73.5424		2.536
	Total	69.9950		2.414

28.6 Conclusion

According to the findings of this study, the private primary school managers in Ankara are using these conflict management styles at a “moderate” level. This might be because they are not aware of these styles. The management style used by them most frequently is “dominating” and the one used least frequently is “avoiding”. The reason for this might be due to managers having high status and they want to be on the winner’s side most of the times.

The conflict management styles of private primary school managers in Ankara change according to gender variable except integrating style. Dominating is the conflict management style used most frequently by men and women.

Some of the conflict management styles change according to age variable. When the managers get older they tend to use dominating style. This is an expected result because people might pay more attention to the things that older people say.

Because dominating style is used by all managers from each education level, there were no key differences established in view of other conflict management styles. Generally the ones with less education have different conflict management styles. Except "dominating" other methods are used by the managers with less education. This might be because people with high education can persuade people more easily due to the information and experience they have.

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Chapter 29
Contemporary Leadership Theories

Mina Abbasiyannejad and Abu Daud Silong

Abstract This paper aims to show the relation between the two contemporary theories of leadership namely Psychodynamic and Neocharismatic. It also overviews these contemporary leadership theories and briefly introduces their concepts and meanings. It briefly demonstrates how these types of leadership affect followers by introducing the basics of their relationship. To have a general view of the aforementioned theories a few of their characteristics are discussed. Since any successful charismatic leadership requires a strong support by their followers, the psychological factors play a vital role in persuading and provoking subordinates to obey the leader without question.

Keywords Psychodynamic · Neocharismatic · Leadership · Contemporary theories

29.1 Introduction

Leadership plays a vital role in the success and failure of any organization. Society as a huge organization is not an exception. Many theories have discussed and evaluated leadership from different perspectives. Yukl in *Leadership In Organizations* explains that "Leadership is the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives (2010, p. 8). Classical theories include trait approach, the behavior or style approach, and the situational leadership approach. The aforementioned theories are criticized for their limitations on leadership perspectives. It is believed that classical approaches have "unidirectional personal influence of the leader on the followers. Leaders are traditionally seen as having a particular personality with traits different from those

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of followers" (Winkler 2010, p. 5). Another drawback of the classical approaches is that, they "failed to provide clear empirical evidence for the influence of traits on the emergence of leadership or leadership effectiveness as the result of a certain type of behavior". Therefore, just focusing on individual characteristics that change in different situations is not sufficient for leadership (Winkler 2010, p. 5). However, contemporary leadership theories provide a different picture of leadership which is regarded as "complex, dynamic and ambiguous". In this regard the diversity as well as complexity plays an important role in the realm of contemporary leadership. In Classical theories there are significant references to the characteristics and behavior of the leader while in the contemporary approaches the focus is on the complex interactive process (Winkler 2010, p. 6). To put it in the words of Van Seters and Field (1990) "leadership must be visionary; it must transform those who see the vision, and give them a new and stronger sense of purpose and meaning" (P.39). The next section introduces and discusses the two leadership theoretical approaches namely, psychodynamic and neocharismatic.

29.2 Discussion

This section overviews these contemporary leadership theories and briefly introduces their concepts and meanings. It demonstrates how these types of leadership affect followers and consequently societies by shedding lights on the underlying relationship between them. To have a general view of the aforementioned theories a few of their characteristics are discussed. Since any successful charismatic leadership requires a strong support by their followers, the psychological factors play a vital role in persuading and provoking subordinates to obey the leader without question.

29.2.1 Psychodynamic Approach

The origin of the psychodynamic approach could be attributed to Sigmund Freud's ideas of psychoanalysis as well as examples of depth psychology. Depth psychology basically concerns motives of human behavior while the unconscious plays a crucial role in individual perception and behavior. The psychodynamic approach deals with the personal and social dimensions of management and uses their terms, hypotheses, and models (Winkler 2010, p. 23). Kets de Vries in the "Prisoners of Leadership" explains the psychological factors affecting the work between leaders and followers. Goethals (2004) describes how idealizations of the leaders will lead to their followers and admirers perceive them in a totally positive light, and ignoring any kind of negative characteristics they may have. This type of perception exonerates them from any kind of criticism and provides them an excessive freedom, to do whatever they wish. Regarding who the successful leader is within the

psychodynamic context, Maccoby (2000) differentiates the strength among erotic, obsessive and narcissist personalities. In his opinion, leaders with an erotic personality are basically poor managers, since they require excessive approval. Obsessive leaders are considered better leaders due to their operational managing strategies such as being "critical and cautious". However, narcissists are compelling and capable of enticing followers for they can persuade us to visualize the picture of a great leader in our collective image (p. 70).

29.2.2 Neocharismatic Approach

In the Neocharismatic Leadership approach the most important factor is the process of change and as a result the transformation of followers (Winkler 2010, p. 31). The original charismatic leadership in organization was introduced by the German Sociologist, Weber (1946), who applied the term "charismatic" to the leaders in the secular world. Weber's category of three types of authority in society, which are the traditional, the rational-legal, and the charismatic, pointed to charismatic leadership as a prominent term to demonstrate a form of authority, which is understood through perception of an extraordinary individual (Conger and Kanungo 1998, p. 12). To Weber, the charismatic authority is based on "devotion to the exceptional sanctity, heroism, or exemplary character of an individual and of the normative patterns or order revealed or ordained by him" (Weber 1968, p. 215). It is described that the specific characteristics are what affect the followers significantly. These characteristics are, "dominance, self- security, a need to influence others, and a strong conviction in the moral integrity of his/her belief" (Winkler 2010, p. 32). According to House and Howell (1992, p. 102) personality traits precede the charismatic leadership. Weber in his From Max Weber: Essays in Sociology explains that an authentic charismatic leader feels great responsibility to those he rules. He is responsible except that he will personally and virtually "be the God-willed master" (Weber et al. 1946, p. 249). When there is charisma or idealized influence, the leader acts in an admirable way, which affects followers. These leaders demonstrate conviction and "appeal to followers on an emotional level". Then in the inspirational motivation level the leader visualizes a vision, which inspires the followers. Then they are able to challenge the followers with high standards, and picture the future goal, and make the effort meaningful (Judge and Piccolo 2004, p. 755).

29.3 Conclusion and Future Scopes

An overview of the contemporary Leadership theories shows the underlying relation between the psychodynamic approach and charismatic leadership. The charismatic leader must psychologically prepare and persuade his/her followers that

whatever he/she says and does is for their benefit, so that the followers who psychologically believe in their power will follow the commands without question. "Charismatic leaders facilitate the transformation of an historical or mythical ideal from a remote abstraction into an immediate psychological reality" (Kets de Vries 1988, p. 268). As it is shown, the idealized influence is the basic factor of success in these types of leadership, which generates a kind of glamorized trust of followers.

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Chapter 30
Comparison of the Models Adopted Regarding the Training and Appointment of School Administrators (Turkey, France, Denmark and England Sample)

Alican Pelit

Abstract Contemporary education systems are inextricably interwoven with chaos and complexity that we cannot talk about issues like educational management, training and appointment of staff in a chaos and complexity vacuum. In this study, training and appointment practices of school administrators were analyzed comparatively in Turkey, France, Denmark and England. After analyzing the training and appointment practices of school administrators in France, Denmark and England, the consequences have been compared with the training and appointment practices in Turkey. As a result of the comparison it was established that the training and appointment practices of school administrators in Turkey depict a certain level of complexity as they vary from time to time but these variations do not reflect an improvement and there are a variety of chaotic and complex structures in the training, selection and appointment of school administrators. When the states in the scope of the study are examined, it might easily be noticed that there were significant differences between the states in terms of training and appointment practices. Furthermore, one of the most remarkable differences between Turkey and the other states was noticed to be the training procedures. Consequently, within the scope of the study solutions to the problems in the training, selection and appointment of school administrators in Turkey were sought.

Keywords School administrator · Training and appointment of school administrators

30.1 Introduction

Administrative science includes various branches one of which is educational management. Management of schools, which is the application of educational management in a particular area, consists of the application of educational management

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to the school and the center of gravity of educational management rests on the school management (Bursalıoğlu 1987). The task of the school management is to achieve the goals set for schools through using all human and material sources in the most efficient manner.

In an ever-changing differing environment, school principals need leadership skills and knowledge so as to be able to carry out an effective organizational management that is oriented towards continuous learning and development, based on cooperation.

It will be a realistic approach to start solving the problems of the system of education by improving the skills and knowledge of school principals. The most important task of a school principal is to ensure the best environment for students to learn, and in this regard the school principal needs to possess sufficient knowledge and skills as an educational leader in order to achieve this. School management is considered to be the ground of educational management as well as its main and the most important component.

School management is a form of educational management that is oriented towards a particular organization (Binbaşıoğlu 1988). School management is included in educational management and it investigates the principles and techniques related to how schools at certain levels can be run most effectively in full accordance with the goals (Binbaşıoğlu 1998). The success of school principals in administrative processes depends on the consideration of their vocational skills and knowledge while they are being selected and appointed as well as on a good training. School managers, in order to be able to achieve their educational goals, need to work together with other individuals in their environment whose help they can use along with school personnel, students, and parents (Başaran 2000).

In Turkey, some regulations have been developed by the Ministry of National Education regarding appointment of individuals to school administration. Despite this, education and school management had not been considered to be an area of specialization for a long period of time. Thus no attempts had been carried out to train educational and school managers. Serving successfully as a teacher for a certain period of time had been regarded as sufficient to be appointed as an educational and school manager. No attention had been paid to the graduates of relevant departments in universities (Şişman 2002). This study concerns the investigation of the processes followed in Turkey, France, Denmark and Britain while training and appointing school managers so as to conduct detailed analyses for Turkey and to raise new suggestions in the light of these analyses.

30.2 Chaos and Complexity in Educational Management Systems

With *chaos* being defined as a state of utter confusion or disorder as well as a total lack of organization or order; and on the other hand, *complexity* being defined as the state or quality of being intricate or complex; (online dictionary) the terms may

seem rather incongruent with education systems which we view as largely organized, orderly and simplified. However that is only when systems are overtly examined and thus we miss out on the jig-saws that accrue to the systems as a result of their internal organization.

When subjected to human resource management practices, it is evidenced that the system is prone to chaos and complexity in a number of ways: firstly, understanding the way in which human resource management (HRM) is linked to organizational performance is still limited, despite recent advances that use a quantitative approach to argue for a strong positive relationship between 'High Performance Work Practices' and firm financial performance. Indeed Truss (2001) contends that successful organizations do not always implement 'best practice' Human Resource Management, and that there is frequently a discrepancy between intention and practice.

Outcomes at the individual and organizational levels are complex and often contradictory; this implies that we can even question the extent to which is it possible or meaningful to attempt to measure the interrelationship between Human Resource Management, at the level of the formal system, and organizational performance, without taking into consideration the role played by the informal organization in the process and implementation of Human Resource policies.

Finding new ways to keep employees happy, engaged, motivated and committed to working for the organization is not only complex but can be a full-time job on its own and some proposed solutions can often cost as much as the challenge to be solved.

Another aspect underpinning *Chaos and Complexity* in educational management is the fact that the unit of human resource management and development lacks acute independence, and thus has to depend on many other units leading to incompatibility and unnecessary delays here and there. This defies logic equally since most of what should be done requires approval and prior planning by other units (Bailyn 1993). This kills initiativeness, advancement and progress of the human resource development and management unit. It is not surprising therefore that work stalls at different levels awaiting approval.

This causes confused herein coined as chaos and this later translates into complexity of operations regarding Human Resource Development programs.

In the realm of appointment of staff a number of aspects remain contentious and thus obtain in chaos and complexity. Such issues influence the effectiveness and efficiency of the appointed staff. Two key issues can be brought out in this context: conflict of interest which refers to a situation where a conflict arises for an individual between two competing interests cannot be ruled out. These are often, but not exclusively, interests of public duty versus private interests. This refers to a reasonably perceived, potential or actual conflict of interest, the other being disputes over the content of position description or reclassification. In some cases the process of appointment of staff is hampered by the complex nature of documentation surrounding position description meaning some staff may not even know what they are bound to achieve (Truss 2001).

Chaos in educational management and more specifically attached to appointment or recruitment of staff in organizations as identified by Bailyn (1993) but further modified and extended to the effect of this analysis can therefore be observed in the following cases:

- The hiring of new employees to cater for a temporary job structure which implies that at the end of the task they remain irrelevant and demoralized. On many occasions education has witnessed para-professionals in various fields especially those brought in to teach computer science and literature but were to become surplus to requirements later.
- The setting of payment structures based on performance meaning that when the employees' performance either fall or rise, there would definitely be discrepancy in the salary system.
- The setting of salary structures basing on the competitive structures within the system meaning that despite the rate of returns you pay according to what your competitor is paying leading to well defined losses in the organization.
- The appointment of individuals based on the contemporary skills meaning that when the requirement for skills takes a new twist then the organization is in deep trouble. This can create untold chaos in the education system.
- The promotion of individuals based on their commitment to the organization's goals yet in actual sense they were only targeting their own goals meaning once they achieve their goals they become inconsistent and render less towards the cause of the organization.
- The changing of working schedules for employees as a way of bringing flexibility and break down of monotony in the organization meaning that either some employees may reject the move and thus become unmanageable or the new working schedule may bring inefficiency to the system when employees are not compatible with them.

The challenges of managing people in different countries indeed are problematized through the formulation of management approaches, the way these approaches have been shaped by national and other factors. The situation even gets more complex and chaotic when subjected to appointment of school managers who undertake execution of educational management roles. If countries do not come up with effective policies and processes, then organizations and institutions like schools are likely to find themselves on the 'edge of chaos' which is very critical indeed.

30.3 Statement of the Problem

Owing to the nature of complexity within the system of education and more specifically the training and appointment of staff, the statement of the research question for the study in focus is established as follows: "*What are the processes followed in Turkey, France, Denmark and Britain regarding the training and appointment of*

school managers?" In this study, sub-questions designed to answer the major research question are the following:

1. What are the models adopted by Turkey, France, Denmark and Britain regarding the training and appointment of school managers?
2. What are the similarities and differences between the models adopted by Turkey, France, Denmark and Britain regarding the training and appointment of school managers with respect to the following dimensions?
   (a) Requirements candidates need to fulfill in order to become school managers,
   (b) Level of education prior to the service,
   (c) Level of education in the period of service,
   (d) Institutions authorized with respect to the appointment of school managers,
   (e) Process of trial and evaluation for school managers.

30.4 Method

The research was conducted in accordance with the case study and multiple case study designs which are among qualitative research designs. The research population consists of Turkey and 27 EU countries. Stratified teleological sampling method within non-randomized sampling methods was used in order to determine the countries to be included in the research. For the purpose of collecting research data, document review method was used. Data obtained in the research were analyzed through descriptive analysis method.

30.5 Findings and Discussion

30.5.1 The Model Adopted by Turkey Regarding the Training and Appointment of School Managers

In Turkey, the regulations governing the procedures regarding the determination of the personnel to carry out the task of managing educational institutions within the Ministry of National Education are the Regulations regarding the Appointment and Transfer of the Managers of Educational Institutions within the Ministry of National Education issued on 13.08.2009 in the Official Gazette. According to the Regulations, general requirements with respect to the appointments are as follows:

(a) To be a university graduate or equivalent,
(b) To be no longer a teacher candidate nor civil servant candidate

(c) At least 3 years of experience as a teacher including the administrative duties included in these Regulations,
(d) To be a branch teacher assignable to the relevant institution as a teacher regarding his/her branch in accordance with the Decisions of Turkish Education Board,
(e) For individuals to be appointed to managing posts in educational institutions outside the places for which compulsory service is stipulated, to complete the compulsory service, to be exempt from such a duty or to be in a situation in which such a duty is delayed due to health-related or spouse-related issues,
(f) If any, to succeed in the competitive examination required for the relevant post.

A competitive examination is applied in order to determine individuals to be appointed as managers, chief deputy managers or deputy managers. Competitive examinations are graded over 100 points and those who get 70 points and above are considered to be successful. Managers at all levels in educational institutions within the scope of the Regulations are appointed by governors. Based on the results of competitive examinations, appointments to principal, chief deputy principal and deputy principal posts are realized in January-February in each relevant year. When deemed necessary by governors, depending on cadre possibilities and needs, on-demand appointments through transfer and other appointments can be realized in May, and compulsory transfers can be realized in August and September, apart from January and February.

In case more than one candidate to be appointed to manager posts get the same score, the candidates who completed their graduate studies, with longer term of office as Head Teacher, Specialist Teacher, or as Manager, and with longer term of office as a Teacher are given priority, respectively.

In Turkey, there are no legal requirements for having received an administrative training in order to be appointed as educational or school manager. Thus, educational administration trainings have not been attached importance by the ministry and therefore educational administration has not become an area of specialization (Kaya 1996: 278).

Just as no system can be trusted to accidents for its success, educational system —which is a system of utmost importance—should not be trusted to accidents. In order for a system to become successful, individuals to run that system must be well trained and properly selected, and a suitable atmosphere must be provided (Ilgar 2005).

30.5.2 The Model Adopted by France Regarding the Training and Appointment of School Managers

In France, employment processes of primary education and secondary education principals are quite different from each other.

30.5.2.1 Selection of Primary School Principals

In France, primary school principals are employed by local educational authorities. There are no deputy principal posts in primary schools (Education International 2007). There are no activities for the training of primary school principals prior to service and teaching experience of candidates are assessed for appointments in France.

The only general requirement for being appointed as a school principal in primary schools is to have two-years of teaching experience in a preschool or primary educational institution. Applications in this regard are received by the national education inspection in the Academy of Inspection and the preliminary consideration is again performed by the national education inspector. After the preliminary consideration, applications are sent to the interview committee formed in the educational region, consisting of the regional education inspector or the representative of regional education inspector, a national education inspector and a school principal. The committee reviews the applications and decides after interviewing candidates.

30.5.2.2 Selection of Secondary School Principals

Secondary school principals are employed by the Ministry of Education. At least 5-years of teaching experience is required for being appointed as a principal in secondary education. In France, secondary school principals may request a change of place after 3 years of service and they cannot serve in the same place more than 5 years (Education International 2007; Eurydice 2010).

Two stages must be passed successfully in order to be appointed as a school principal:

Firstly, candidates need to submit an official letter that provides information regarding their careers and their knowledge on administration as well as the breadth and variety of their vocational experience together with a letter of recommendation written by their supervisors.

Then, a session is held with candidates whose applications are accepted, in which candidates make their presentations and then they are required to take an entrance examination through which their vocational skills, knowledge, communication skills and motivation are assessed. The entrance exam consists of following steps (Eurypedia 2012, France):

- Preliminary preparation for the case study (2 h),
- The candidate's presentation regarding the case study (15 min),
- Interview (45 min).

Candidates who are admitted after the examination are appointed as deputy principals with the status of trainee administrative personnel for a period of 2 years. In this period, they attend a training program for the improvement of their skills they would need while performing their new duty. The program focuses on the

school organization, management of human resources as well as educational, pedagogical, administrative, legal and financial areas. Each candidate has an instructor who plans and assesses the educational process of the candidate and helps the candidates improve their skills they need. If the supervisor in charge of the program thinks that the candidate completed the program successfully, then the candidate is entitled to become a school principal.

30.5.3 The Model Adopted in Denmark Regarding the Training and Appointment of School Principals

In Denmark, there is an automatic promotion system for administrative functions. School principals are selected and appointed based on their own qualities and competence. Municipalities and provincial special administrations announce open positions. Principal candidates of these schools that provide education at this level, having evaluated and recommended by the school's consultative committee formed by teachers and parents, are appointed after the investigation and interview carried out by the municipal council. Successful completion of a two-year trial period enables them to remain at the post with the civil servant status. Municipal council evaluates the school principal based on its own discretion (Eurypedia 2012, Denmark).

In Denmark, there are no other qualities besides teaching education to be possessed by candidates in order to become a school principal. Municipal councils examine Danish teachers with good credentials and teaching experience and employ those who have the best qualities as school principals.

Denmark is increasing the importance given to school administration and has initiated three training programs for teachers in this regard (Taipale 2012):

1. From Teaching to Administering (Lærer till Leder)
2. Talent for Administration (Talent för Ledelse)
3. Leadership Skills (Viljieg ledervejen?)

In Denmark, almost 80 % of school principals attended the 150-h training program provided by Den Kommunale Højskole. Besides, secondary school principals may also complete graduate programs offered by various universities and higher educational institutions.

30.5.4 The Model Adopted in Britain Regarding the Training and Appointment of School Principals

National Professional Qualification for Headship (NPQH) was initiated in 1997 as a program to prepare school principal candidates for leadership positions. NPQH was

announced in 1997 and The National College for School Leadership (NCSL) was opened for its implementation. With the new regulation effected on April 1, 2009, NPQH was rendered compulsory for those who would like to be appointed as a school principal. Based on their needs, candidates attend the program for a period of 4–12 months. Within the scope of the program, candidates are required to complete three educational stages consisting of "Entrance Stage", "Improvement Stage", and "Graduation Stage" successfully (National College 2012).

At the Entrance Stage, candidates participate in a 2-day evaluation and development activity which ends with a feedback session that aims to reflect the duties of a school principal as well as the strong aspects of individuals and their aspects that need development. Successful candidates are admitted into the program as NPQH school principal candidates. Improvement Stage consists of working methods such as internship programs to be completed at the school, individual work materials, face-to-face training programs, training programs prepared and shared on-line, etc. Then, candidates are asked to prepare a portfolio indicating their improvement about the aspects they need to develop. At the Graduation Stage, candidates present their portfolios for evaluation when they are ready. Their work is evaluated in an interview and successful candidates complete the program.

Decision for the employment of the school principal is made by the administrative board of the relevant school. Local or central authorities do not have a say in with respect to who is to be selected as principal.

The college has four main goals: to ensure students' success through good leadership, to develop leadership inside and outside the school, to determine and train future's leaders, and to ensure a more strategic and fit-for-purpose national college that provides more than leadership to school principals (National College 2012).

30.5.5 Comparison of the Models Adopted by Turkey, France, Denmark and Britain Regarding the Training and Administration of School Principals

	Qualification requirements	Pre-service training	In-service training	Appointment	Trial and evaluation
Turkey	To be a university graduate To be no longer a teacher To succeed in the exam	There is no pre-service training requirement	There is in-service training that is left to the discretion of the personnel	The Ministry transferred its authority to the Directorates of National Education and to Governor's offices	There is no trial and evaluation process applies to principals in their training and appointment processes

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	Qualification requirements	Pre-service training	In-service training	Appointment	Trial and evaluation
France	To have two years of teaching experience for primary school principals To have five-years of teaching experience for secondary school principals	There is no pre-service training requirement for primary school principals. There is pre-service training requirement for secondary school principals	There are in-service trainings for primary and secondary school principals	Primary school principals are employed by local educational authorities. Secondary school principals are employed by the Ministry of Education	There is no trial and evaluation process for primary school principals. There is a status of trainee administrative personnel for a period of two years for secondary school principals
Denmark	To have a teaching education and teaching experience	There is no pre-service training requirement	There are in-service trainings	Municipal council evaluates the school principal based on its own discretion	There is a 2 year trial period
Britain	To complete NPQH program	There is pre-service training requirement	There are in-service trainings	Decision for employment of the school principal is made by the administrative board of the school	There is no trial and evaluation process for school principals

30.6 Conclusion and Recommendations

In all investigated countries, to be serving as a teacher is among the requirements for being appointed as a school principal. In Turkey, present practices and studies are seen to be related to selection and appointment processes rather than training of school principals. The fact that there is no training requirement for school principals prior to service indicates that school principals are being appointed without possessing necessary skills and knowledge, i.e., incompetently. In-service training programs and activities are organized for the training of the personnel at all stages within the Ministry of National Education. Participation in the in-service trainings is left to the discretion of the personnel. Besides, among investigated countries, it is

seen that only France has different processes regarding the selection of primary school and secondary school principals.

In Turkey, it is the Ministry of National Education which is centrally responsible for appointments. The Ministry transferred its authority to the Directorates of National Education and to Governor's Offices. There is a competitive examination for the determination of principal candidates in Turkey. It is seen that no trial and evaluation process applies to principals in their training and appointment processes and they are not removed unless they commit a criminal behavior after appointment in Turkey.

30.7 Recommendations

Premised on the findings of this comparative analysis, the following recommendations are being made for the betterment of training and appointment of school managers:

1. Legal texts and regulations governing Turkish Education System should render educational management a profession through a series of reformations.
2. Pre-service training should be made compulsory for candidates selected to be appointed as school principals. Appointments should be realized after candidates' level of knowledge and skills are rendered sufficient for such a duty.
3. Training of educational managers should be adopted as a serious policy and the Ministry of National Education should ensure that candidates receive required pre-service and in-service trainings, in effective cooperation with universities.
4. Individuals appointed as school principals must be constantly evaluated based on objective criteria and school principals must be prevented from remaining at the office without improving and adapting themselves.
5. In order to give prominence to the educational leadership characteristics of school principals, centralistic structure should leave them a sufficient space of freedom and discretion.

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Chapter 31
Complexity of Leadership in the Context of Political Governance in Niger

Mahamadou Yahaya

Abstract Niger is one of the African countries with two cultures; African and Asian (North African Arab and Islam civilization) yet European cultures are mixed into the country's system. Hence, in these last decades the European culture via colonization dominated others. Through the government system new changes cropped up; the decision makers were changed from the chief executives and religious leaders by the new European universities graduate elites. So, this change had a critical consequence on Niger's history and its future. This chapter examines Niger's political situation and the roles of leaders through exploration of Niger's background and its effect on the leaders. Hence, Niger one of last colonies of France, since independence to now its history is linked by problems generated by political, social and economic instability and the prevalence of ethnic, communal and religious crises. These problems call for the attention of many observers and researchers which most times are linked to the colonizers and their disciples. This study analyzes the complex relationship imbedded within the Nigerien history and its leaders' background and the state of chaos in the governance which still hampers the country's development. Therefore, the quest for good leadership as a sine-qua-non for governance and sustainable development is defended in the study.

Keywords Complexity · Leadership · Political governance

31.1 Introduction

Republic of Niger with 1,267,000 km^2, is bordering Algeria, Benin, Burkina Faso, Chad, Mali and Nigeria, according to the CIA estimation of July 2013, Republic of Niger has a population of 16,899,327 persons (CIA July 2013). Niger is one of the

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African countries with two cultures; African and Asian (North African Arab and Islam civilization) yet European cultures are mixed into the country's system. Hence, in these last decades the European culture via colonization dominated others. Through the government system new changes cropped up; the decision makers were changed from the chief executives and religious leaders by the new European universities graduate elites. So, this change had a critical consequence on Niger's history and its future. This study tries to investigate the roles of different decision makers and social representatives as well as the general public in the Niger, one of the poorest countries in the world.

31.1.1 Republic of Niger

The actual Niger was a part of the Songhai Empire, with the town of Gao as capital, that extended along the river Niger and into the Air Mountains in the north. On the other side of Niger there was the Kanem Empire that existed around Lake Chad extending over the eastern regions of Niger.

In the 10th century, trade between the Arab civilizations along the Mediterranean coast and the Songhai Empire was done during many centuries. Through their regular contact with the Arabs, the Kanem and Songhai empires converted to Islam. Meanwhile, as the whole of Niger was wedged in between the Kanem and Songai empires especially during its powerful and splendor seasons under Kankan Moussa and Askia Mohamed (1493–1528) and the Peul Empire of Sokoto soon (1754–1817) for many centuries it was greatly influenced by these policies (Geels 2006).

While the last Islamic empire in west Africa—Sokoto declined and the Damagaram (one of Niger's actual cities) state flourished, the first European explorers appeared on the scene in west Africa in the early years of the 19th century. Whatever, unknown to the indigenous inhabitants, Great Britain and France had started to divide up African territory on paper and the consequence of that continued to hamper most of the African countries one of which is actually Niger (Geels 2006). For example opines that the line that separates the French from the British between Niger and Nigeria was arranged according to their influence not according to the indigenous view or benefit.

31.1.2 The French Colonial Administration by 1908 and the Actual Niger (Republic of Niger)

The french colonial administration when they began to lose their military strategy in the most regions, they started focusing on the establishment of a political administration instead. As the French lacked means and manpower to establish direct rule over the new territory, they sought to convert and incorporate the existing local

authorities. This was a huge concession, since the traditional systems were feudal or aristocratic in character and not in compliance with the French administration system. The era between 1922 and 1946 was the time of classic colonial rule. With only moderate socio-structural changes and no clear administrative policy. Islam had become the favored religion by the colonizers, as the Muslim organization was more in concordance with French rule than indigenous animist structured entities (Geels 2006).

31.1.3 Independence of Niger

Following an agreement signed in July, 1960 the republic of Niger declared its independence in August 1960. Decree No 60-123 and law No 60-45 are those documents by which Niger achieved independence, and the same Low No 60-45 raised the state of Niger into an independent and sovereign state. After adopting the constitution of the Republic of Niger on February 25, 1959, the constituent assembly became the legislative assembly. The republic of Niger proclaimed its independence on August 3, 1960, the form of its future relationship with the French Republic is to determine the subsequent negotiations (Document for world p 527). After becoming independent Niger was divided into circles which were also sub-divided into sectors (later subdivisions) the circles and secateurs where all administered by French officers, later also French civilians. Under the colonial administration the traditional religious and political leaders were given the uniform title of chief du canton or chief du groupement, all with identical duties, obligations and prerogatives. They had to collect taxes and provide labor forces for public construction works.

When Niger achieved its full independence, Hamani Diori, the leader of PPN, became the first president of a repressive single-party civilian regime. Niger achieved full independence on 3 August 1960, Hamani Diori, became the first president of a repressive single-party civilian regime. He had closed ties with France though.

31.1.3.1 Leadership and Governance in Niger: Conceptual and Theoretical Commentaries

Definition of Leadership

There are many definitions of leadership that we read about in most of the books, but the central element in many definitions is that most definitions of leadership reflect the assumption that it involves a social influence process whereby intentional influence is exerted by one person or group over other people or groups to structure the activities and relationships in a group or organization (Yukl 2002).

One leadership researcher Munroe defined leadership as: the capacity to influence others through inspiration motivated by a passion, generate by a vision, produced by a conviction, ignited by a purpose (Munroe 2012).

In fact two schools believe that leadership skills are inborn, the other suggests that it can be acquired, according these two beliefs, the leadership styles and states whether they are appropriate to Niger's culture, social organization and economic factors will be analyzed.

The leadership question has become a recurring issue in the discourse on the African project in general and this will be studied around the Niger's case particularly. In fact, Niger as most constituted governments in Africa has been undergoing serious and deepening politico-economic crises. These problems generated by political, social and economic instability and the prevalence of ethnic, communal and religious crises have bedeviled Africa (Adejuwon 2012).

These problems' real causal sources are still being researched but most times the situation is linked to the leaders and their government styles in the continent. Niger, in West Africa is a good illustration with most military coup experience; the country has for few years, manifest the consequences of a government deficit and the challenge of democratic transition in the region (Zounmenou and Loua 2011).

In these last decades there have been a number of encouraging trends in leadership promotion in Africa by different Governments such as United State President Barak Obama's participation in a new program for the Young African Leader. There are also Regional groups like ECOWAS in West Africa, Non-government Organizations, Research Institutions and Independent Researchers that conduct different studies under what is needed in Africa for its development or leadership to improve.

31.1.3.2 Different Types of Leadership in Niger

According to the previous idea about leadership, the leadership styles that could be found in Niger are linked to the Niger's given culture, socio-political, ethnic and religious environment such as:

Charismatic-Traditional Leaders

These are the kinds of actual chiefs of areas by legacy; their fathers were the community heroes who triumphed over different tribute battles before the colonial era. But they became chiefs and tax collectors, commanders and labor providers for public construction to the colonial forces. They have some prerogative and freedom toward their society and obligation toward the colonial forces. These were mainly charismatic and autocratic leaders, but after independent they continued their same traditional chief roles, collecting taxes, resolving the family and community conflicts near the official law system, in this context they seem to be charismatic more

than autocratic the respect dimension is more important than force's dimension on their part.

Hence, in the case of family and community conflict, they combine several styles of leadership but they use more democratic style than other styles because in these circumstances, they seek to build consensus through participation, by taking the time to listen to others, accepting their views and winning their commitment by encouraging colleagues to express their opinion and thereby their vision, the leaders create an atmosphere of confidence, respect and participation in the decision making process and further reinforce flexibility and sense of responsibility and thus keep the staff morale at a very high level.

This style seems to take its resources from the tradition of consultation or discussion known as the village's square meeting by discussion of all important subjects by the community until a clear consensus is reached.

Humane-Oriented

Humane-oriented leaders focus on providing considerate and supportive guidance to their staff; they use mostly pedagogic style to achieve their goals.

In Niger, there are many kinds of leaders who use this leadership style, for example the religious leaders who use the pedagogic and charismatic leadership styles. This group which has a tradition of literacy in Arabic, reflected in the development of local styles of writing, was a consequence of the involvement of native actors in the political and cultural venture of Islam in the country or there are also a group of those who study Arabic in local schools and continue their study in North Africa and the Middle East. The second group is also of those who study in local areas and become knowledgeable and reference points in Islamic jurisprudence and conduct some work sometimes near the traditional chief. Both of them have legacy power to choose who become the future religious leaders in the areas where they are. But there are near these groups, independent religious leaders, these category fulfill also pedagogic style. They train their colleagues about the religious with the future in mind. They help them to become conscious of their strength and weakness and sharpen their personal and professional aspiration relative their religion. They gain many young followers because of the vision that can be calcified modern or new for the young generation, they seem to look like transformational leaders with their new live vision.

In addition, near this group there are civil society union leaders, who can be qualified by pedagogy and transformational leadership they help the society to understand what is happening in the government system and lead the different strikes against the government to improve the society's wellbeing and good governance.

Affective and Affiliate Leadership Style

This adopted by Nigerien chief executives, who given the various form of social pressure from the family and tribe, shake their leadership responsibilities and establish closer personal relationship with their staff or the family of their staffs. The politicians and their created patronal networks use the same method and mostly many affiliate themselves as well as their ethnics, villages or cities to the party or leaders.

Coercive and Commanding Leadership Style

This style demands an immediate and total submission; it leaves no room for personal initiative and consequently scuttles creativity and motivation. This style could be found in Niger after independence in the political leaders or managers. This style some people think that it is good to use in the high rate of illiteracy or low level of education areas like Niger but during the course of this study the case will be analyzed further.

Political Leaders

There are kinds of managers who make political decisions from hierarchical control of management called leaders according to positions. This category can be understood through the Oxford English dictionary's definition; political leadership is: the dignity, office, or position of a leader, esp. of a political party; ability to lead; the position of a group of people leading or influencing others within a given context; the group itself; the action or influence necessary for the direction or organization of effort in a group undertaking (Oxford English dictionary, online).

In the same line Janes Mc Gregor Burs has defined a central category for this type of leadership: a political leader does not simply fulfill the expectations of his followers, but rather introduces necessary social transformation process. And the American psychologist, Ronald Heifilz defined this precisely: it is not simply a matter of convincing people to follow a particular vision. Political leadership means motivating a society to recognize and deal with its problems.

However, in this field the first Nigerien political leader was Diori Hamani, he was the first PPN party's president and became the Republic of Niger's first president as it was lastly notified, after Diori Hamani many presidents were in the command of Niger from that we will try to classify the different kind of leaders who can be found in the Niger political arena.

31.2 Leadership and Governance in Niger During the Colonial Regime

Niger in the colonial administration times was ruled over as a territory by the colonial officers, but at the moment when they thought they could lose their military strategy; they converted and incorporated the existing local authorities. So, all of African colonized countries, upon obtaining independence from colonial forces in 1960s, the administration was replaced by the indigenous rulers.

In this era, with the new colonial disciples or those who had just finished their study from the European universities, the public mood was marked by exuberance and hope for immediate and substantial changes, but the reality in most of the countries was that the administration was mixed by military intervention and leadership failures amidst a broader socio-economic crisis characterized by poverty. The new political leadership quickly learned that the aftermath of colonial rule presented an enormous challenge to meaningful socio-economic development and state consolidation. The interplay of such challenges, personal ambitions, and political unrest prompted a downward spiral in politics. Deed, Niger is an example of that reality, environment of object poverty and reputedly political crises which finished by military coups. And another reality of the Nigerien politicians and managers everyone wants to be a political officer, remain in power and be in head of their party. In Niger since the post-colonial times to now political office was seen as a path away from poverty; a tendency to cling to political office quickly came about.

Additionally, the political activities still led the groundwork for the emergence of political parties along regional/ethnic lines and the patron-client relationships. To garner mass support in an environment dominated by poor transportation and communication infrastructure and wide dispersal of populations, politicians naturally turned toward their own villages and ethnic groups. It was among these groups that politicians could most effectively create large support bases which eventually would become political parties. One of the strategies employed by politicians to win support was to make promises of material assistance. Such promises in exchange for support and votes became the basis of the patron-client relationships that came to pervade the politic area.

New nationalist governments, nonetheless, came to power on the promise that they would work towards meeting the needs of all citizens, especially in the areas of health care, education, sanitation and infrastructure. Those seem to be the factors for the legitimacy of the independent government.

But weak government structures, lack of funds, and limited number of qualified leaders proved to be immense obstacles to the successful implementation of policies. So the expectations were high and could not be fulfilled immediately; hence political dissatisfaction and unrest resulted. High expectations, lack of financial resources, political fragmentation, lack of national unity, and inexperience conspired to create extremely insecure governments. However, patronage also reinforced the politicization of ethnicity as ethnic identity continued to remain one of the criteria for allocating resources. Perhaps most important is the effect of patronage on the

national coffers. Patronage, as a tool for political acquiescence, requires large amounts of money.

Niger leaders, in their attempts to build stable governments and remain in power, were forced to invest more and more resources into the patronage networks. This, in turn, had detrimental consequences on the ability to meet their financial obligations in general and to pursue any meaningful development policies in particular. The government's civilian or military, preoccupation with the consolidation of power and the accompanying use of patronage as a form of political control and governance led to a draining of state resources. Already meager resources, one could argue, were squandered on maintaining patron-client networks rather than invested in desperately needed development programs.

Governance continued on its downward spiral as people increasingly created their own communal support systems in response to the state's inability to provide services. The informal economy grew; corruption became rife; and credit dried up for Nigerien government.

31.3 Leadership and Governance in Niger in the Post-colonial Times

Since the independence of Niger in the early 1960s, Niger was ruled with the dual legacy of authoritarian rule and artificial nation states coalesced to pose complex challenges to the new Nigerien authority. Then the leaders were familiar with colonial administrative system which is not based on democratic foundation. Hence since the independence era to now the political leaders seemed to be the same actors or theirs' disciples. So, that politicians' behavior continues to hunger the Niger's democratization process. Niger has different language and ethnic groups, in the first time of independent the country was deeply divided according the tribal/ethnic societies more than nation or country. The politicians did their activities through their ethnic or tribal that burned the patron-client relationship, this relationship humps the country development because Niger's environment is dominated by poverty, political activity laid the groundwork for the emergence of political parties along the regional/ethnic lines and the patron-client relationship.

The politicization of ethnicity as ethnic identity continued to remain one of the criteria for allocating resources by the politicians' created patrons on the national coffers. They used them as a tool for political acquiescence, requiring large amounts of money. Niger leaders, in their attempts to build stable governments and remain in power, were forced to invest more and more resources into the patronage networks. This, in turn, had detrimental consequences on the ability to meet their financial obligations in general and to pursue any meaningful development policies in particular. That chaos and complex relationship the government, patronage and poorest group of society restrain the government to grant minimal government services and find the insufficient funds to develop its basic resources. However the abject

poverty marred with natural disasters, the authoritarian corruption, hump the government's basic activities, education, health and nutrition. In another hand the political office was seen as a path away from poverty, a tendency to cling to political office…

So, the consequences of these factors were many military interventions, many constitutions were overthrown, in around 60 year experiences seven constitutions were drafted.

The different crises background that put Niger in continuous chaos and complex situation culminated into the first leader and president being accused of corruption and lifting food aid supplies, and in April 1974 he was overthrown in a bloodily military coup led by Lieutenant Colonel Seyni Kountché. Kounché became the new president of a strict military regime, denouncing the previous civil constitution (Geels 2006: 20).

After Kounché's death after long illness, his chief of staff, Ali Chaibou, took over and embarked on a program to dismantle the supreme military council and articulate a new constitution. He created at that moment the Mouvement National pour une Societé de Development/National movement of a developing society (MNSD) and held the presidential elections with himself as the only candidate. Consequently, Saibou was elected president. But few months after his election the people were not satisfied with Saibou's shallow promises of a progressive approach that did not seen to materialize. So, another crisis was born, students and union labors participated in a wave of strikes and manifestations calling for democratic reforms and the introduction of a multiparty system. After a national conference held in July 1991, Saibou's government was suspended and an interim government under Amadou Chaibou was formed. The first free multiparty elections were held in 1993, and Mahamane Ousmane (CDS) was elected president.

Meanwhile, rivalries within the leaders whose were disciples of the colonial administration which it qualified by autocratic rule the multiparty coalition of nine political parties resulted in chaotic and inefficient government. The rivalry with and personal power could not survived long times together, the result was the government activities were blocked, the coalition prime minister was resigned and joined opposition and make opposition more strong than the executive power so the handicap the good work of the government. In January 1996, colonel İbrahim Baré Mainassara used this governmental impasse to justify a military coup.

The new constitution was drafted with promised elections, the elections took place but it was mulled by highly fraudulent and political manipulations fiddling with ballet boxes. Bare was one of the last military staff and a close with the former president Kounché and he was seen as a disciple of Kounché. Bare was also accused in his time of restricting the freedom of the press, violating human right and nepotism. That put the country from the bad to worse because the international donors refused to restore multilateral and bilateral economic aid, as result arrears in salary payments to civil servants and military led to strikes mutiny and general civil unrest.

In April 1999, a military coup was staged by the chief of his own presidential guard, Major Daouda Mallam Wanke. The military regime drafted also new

constitution to protect themselves by amnesty cod in July 1999 and in October and November of that year, seven candidates participated in the election that was eventually won by Mamadou Tandja.

The new president was one of the military council staff and one of Kounché close mate and somebody call the Kounché's disciple even then. Retired colonel and candidate for MNSD he was looked as a servant president into his first and a middle second mandate. Tanjda formed a coalition of the MNSD and the Democratic and Social Convention (CDS), and Hama AMADOU (MNSD) was appointed prime minister, he was also civil servant in the Kountché autocratic regime. While Ousmane Mamane, (former president), head of the CDS was elected speaker of the National Assembly (Geels 2006).

The elected government led by President Mamadou Tandja then served for 10 years in a context of political stability and democratic dispensation. Tandja was however accused of being insensitive to public opinion (Guide 22). Even though Tandja had ruled with the support of a coalition of political parties, sharp disagreements emerged as soon as he made public his intention to amend the constitution to allow himself a third term in office. The ensuing fragmentation of the ruling coalition made it difficult to pass the controversial amendment through parliament. Domestic political actors and regional leaders were puzzled by Tandja's decision to hold onto power after two successful terms that had partially restored economic growth and political stability, and had raised the prospect of a successful democratic transition. Niger's problems were too immense to be resolved by a 71-year-old leader in just three additional years. It was thought that Tandja's attempt to stay in power indefinitely was motivated more by the parochial interests of his administration than by concerns about national development. It is clear, however, that beyond the anticipated financial incentives from the uranium deals and oil discoveries, the fear among Tandja's closest ministers and collaborators of losing access to the privileges of power had an important influence on his decision to manipulate the constitution and the institutions that had made such a significant contribution to political stability and socio-economic improvement in the past decade.

Tandja's bid provoked widespread protest and his main support base, the Convention Démocratique et Sociale (CDS) of former President Mahamane Ousmane, withdrew eight ministers from the government in June 2009. The consolidated opposition denounced the developments as an institutional coup d'état. Some 230 political parties and NGOs joined to form the Front pour la Défense de la Démocratie (FDD) as tens of thousands rallied in the capital Niamey to challenge the president's bid. Laboring under the delusion of his being the 'savior of Niger', Tandja paid heed to neither the calls from opposition parties and civil society leaders, nor to the multiple missions from ECOWAS, the African Union (AU) and the country's development partners who urged him to refrain from violating his country's constitution and throwing Niger into unnecessary political turmoil. That pressure had a consequence of a military coup by General Salou Djibo on 18 February 2010 was seen an opportunity to restore democratic transition (Zounmenou and Loua 2011). The military junta overthrew the constitution and drafted the new one with limited

mandate. The transition qualified as a successful transition and the candidate for the opposition Parti Nigerien pour la Democratie et le Socialisme (PNDS) gained the elections and came president of Seventh Republic.

However, the new elected president won the election with coalition by his ancient longtime adversary who had created his new party LUMANA—Africa which is considered as a part of MNSD members who did not support Tandja in his last mandate projects.

Hama AMADOU was elected as speaker in the National Assembly. The president renewed his call to the opposition to join them for the government of national unity what the coalition membership party seemed to reject by withdrawing from the government while the important part of them continue with their ministerial and others important government posts against the decision of their party's official decision. The regime is still in power but the coalition is broken Hama's party resigned from the government but he still works as a speaker in the National Assembly and that seems to create new political tension in the country.

31.4 Chaos and Complexity in Niger's Political Policy and Political Leaders

Politics in Niger and political leaders can be qualified as the sources of the different crises and complex situations which hamper the country's development. Since the independence of the country, the first elites who came to the power continue to manipulate the political area that seems to be their career; the political office is still seen as a path away from poverty, and a tendency to cling to political office. So, the consequences there are more political manipulations and misunderstood within the leaders and the complex side military interventions that military scenarios are the guardians of democracy.

An observer of the Nigerien political arena since its independence to now can find that Niger is led by the same group, from civil managers to military managers Niger's fate is determined by that group and their disciples. In Niger administration in the high level seems repeatedly served by the same group and their families and disciples and that situation can be qualified as one of the factors which continue to hamper the administration's promotion and the development of the country.

On another hand, according The Niger's political leaders' background, most of them have colony experiences or were disciples of who have the colony experiences, their characteristic, belief system and undertaking of politicians leading came from the same sources. These realities create thinking that these behaviors were the main causes of the political troubles since the first president to now.

For example the first military coup which affected negatively the Nigerien political faith, that its politics is marred by crises and many military coups. So, the first coup was caused by the same situation which continues to dominate The Niger's environment and the public directly judge the politicians through their policies to

overthrow the hunger and fulfill the society's expectancy. The first coup was about hunger and food aid supply when the president was accused by inability to rescue the people from the hunger and was accused by corruption and lifting food aid supplies. That current event, which can be qualified as one of the bad examples of the Niger's history according to living experience and what happened before. It was the first coup experience which defined the complex relationship between military forces and civil servants and the more complex was how that event created into the citizens the idea that the military are the protectors of democracy from the politician's abuses.

After the death of the president of the strict military regime, his chief of staff took the power and began to do different reforms that did not satisfy the society. Student and union of labors created strikes and manifestations which led Niger through to the intermittent crises. The result was positive on one side because of democratic reforms and the introduction of multi-party system that seemed to satisfy the people. Unfortunately this reality was a dream and continues to be a dream, because of failure of that reform or misunderstanding of the democracy by the actors or their lack of capacity to use the democracy through the community. Meanwhile, this reality was told by the leader and mentors of the majority of the Nigerien leaders that "the democracy system cannot be used by the illiterate people" (Former president, Seyni Kountché).

May be what he thought about the Nigerien people in his life could be true, regardless of the reality, it is crystal clear that actual Niger still suffers because of the politicians. What can be most complex than when the democratic system makes the others think about crises and chaos situations.

The second military coup was when the multiparty elections president was elected, but the rivalries within the multiparty coalition of nine political parties had as resulted chaotic and inefficient government. This regime is combined by most of Nigerien political leaders that try, in their first experience and the necessity to work together, but the truth of the matter is that this cohabitation was short, when the leaders from the same country, the same conception of power and aspiring for authority and command could not be together to serve their lovely country. On the other hand the observers can qualify that situation as lack of experience of most of the leaders. On another hand actually, the same politicians in 2014, with nearly the scenarios like the previous coalition or more complicated, continue to hamper the good service of administration more than development activities service.

The third coup was when the military officer as a military officer tried to take over the intermitted crises within the political leaders and became president. The president, after drafting a new constitution and organizing elections which he claimed himself winner, was another chaos and complex situation. This is because consequent to that, the government was accused of restricting the freedom of the press, violating human rights and nepotism. International donors in response refused to restore multilateral and bilateral economic aid, while every aspect of country's economy was put under an IMF and World Bank Direction. That situation sent Niger from bad to worse, the government cannot pay the salaries, civil and military staffs took to strikes, mutiny and general civil unrest. So, the military coup was seen as a solution to finish this regime that took the life of Niger and was

obliged to begin a new process of reconciliation and new constitution and new elections and new plan of development.

After 9 month military transitional regime, the new democratic president was elected; He was also one of staff of the military members and he was seen as a close friend of president Kountché, he served as civil in different departments around the country and aboard as an ambassador. His Prime Minister was also a civil servant in the Kountché autocratic regime.

During 7 years of the regime everything seemed to go well with the two leaders but the rivalry between the parochialism of the president and his Prime Minister's one was invented. As a consequence the government that had been voted failed in Assembly. The Prime Minister was overthrown with his government and finally had been condemned and put in jail.

The president at the moment chose a new Prime Minister and gained more ability to use a control and an authority through the government activities. The president's accusation of being insensitive to public and international opinion by the public observes in one hand and in another hand the he was as a father of Nation. The first mandate was so quiet, and the second term also was quiet without two elements: the first one, the economic reform which was did to conform to the IMF and World Bank reforms; they imposed 19 % TVA on basic food products. The second one in 2005 there was food crisis that government forbids to cover by the Medias and the president officially denied that his people were starving and created the tension around the country and was commented in the international Medias. Anyway, the regime at the moment seemed to finish well and had been judged as a conflict-less period.

However, the regime designed the new Niger's development train with several projects which unfortunately were married by tragic consequences, additionally; the president was seen as one who only could save the country. This complex situation put Niger in the new crises which had been brought about by military coup. The situation was that the president near the term of his mandate wants more time to achieve his reforms; it was thought that the president's attempt to stay in power indefinitely was motivated more by the parochial interests of his administration than by concerns about national development (Zounmenou and Loua 2011). Indeed, that helped the junta to topple the regime with big financial consequences.

After the transition, the candidate for the opposition became president of Seventh Republic, meanwhile, the newly elected president won the election with coalition by his ancient longtime adversary who has created his new party. The rivalry between two leaders did not delay to display, the government development activities are affected by this situation, the political situation become the common subject around the different levels of the society. The regime is still in power but the coalition is brooked by the party resigning from the government and the complex side in this situation is that the latest coalition party's still works as a speaker in the National Assembly that is not a problem according the Nigerien constitution but it seems to hamper the government activities and the National Assembly activities. Also Niger seems to be in a new modal of political tension again.

31.5 Conclusion and Recommendations

Niger is a victim of its own history, since independence to now, the country is served by the same group of politicians or their disciples. In fact, the Niger nation is treated as their individual personal property. On the other hand, a decline in morals and discipline caused or combined with bad policies, eroded professional standards and ethics and weakened the system of governance; all these simply describe the Nigerian political arena realities. Poor government with the major challenges and lack of human resources and corruption created constant socio-economic crises and the military coup was supposed to be a solution to the country's democratization process.

However, as a major country of Africa the recent years' leadership style, transformational leadership is appropriate for all of them in order to fulfill the durable development of their respective countries. Most of the Nigerien political leadership is parochial rather than national; and corruptly converts national resources into its project of primitive accumulation. Ethnic diversity is manipulated to stay afloat to the detriment of national cohesion. There is an embarrassing lack of national heroes. The failure was usually explained either by the easy manipulability of the cultural pluralist background, or by the "two publics" antagonism. That can mean the most intricate characteristic of the African political leaders.

Also equally relevant and important is the absence of political will. A political will is the compelling force for sound leadership quality, the ability to do what is right, what is relevant and what is attainable within the context of patriotic nationalism. Political will very often means personal or group sacrifices. It implies the ability to implement policies that have a nationalistic importance and relevance without allowing pockets of interest to detract from what should naturally be of national benefit.

In fact, it has been said that a Nigerien man is by nature and training an autocrat who demands nothing but respect and obedience from his subordinates, and those younger and lower in status than him. Also in public sector, the leadership has been associated with certain undesirable traits such as double- standards, pursuance of selfish goals, lack of seriousness and indiscipline. However, that can be overcome by changing the education system which will be harmonized by the vision for transformation and today's realities of those working in the system.

In Niger there is need to change the new generation political leaders' mentality from the power concentrated in one political party and finally in the hand of one leader to shared power with team working. Dismantle the rise of the supremacy of the office of the President over all organs of government and teach them the reality of democracy that is the choice of the people within different competitors, far than their ambition, re-election in perpetuity without any competition. They should know also that the places which they occupy are not permanent, everything has a season.

The concentration of power to the hands of one man for its consequences, sometimes military coups and civil wars must be the lessons for the future generations.

Finally, the conclusion can be that the history of all great nations has been linked to visionary and purposeful leadership. Therefore for Niger it is still about the future, Niger's future is also linked to the future leader who can play significant roles in the socio-economic development and political emancipation of the country. Though Niger has a potentially to growth, the government system is so poor that the people seem to have lost their hope in the actual politicians.

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Chapter 32
The Development and Modernization of Minangkabau People in Sumatera Barat in Indonesia and Its Impact on Local Identity

Silfia Hanani

Abstract Development and modernization are government programs that are aimed at transforming a country into a more advanced condition. Since its independence in 1945, there have been three government systems conducting these programs in Indonesia. From 1945 to 1966, the programs of development and modernization were carried out by the Old Order regime. The New Order regime took the task in 1966 until it began to unravel in 1998. After a fundamental reform in 1998, the duty of carrying out development and modernization across the country is no longer in the hands of the central government in Jakarta, but handed over to local governances or provincial governances. It is also worth noting that reforms in 1998 granted local governments a greater autonomy to manage their regions. These three government systems have significant differences in fulfilling their responsibility in developing and modernizing Indonesia. Consequently, these differences also have a significant impact on creating scores of social changes, especially in terms of identity change of local people in Indonesia. The most prevalent difference, in regard to identity of the local people, can be observed between the rule of the New Order regime and the administration of local autonomy government.

Keywords Development · Modernization · Local identity

32.1 Content

The New Order administration has attempted to develop and modernize the people of Minangkabau in which during the processes, they have changed the ethnic style of government, namely *pemerintahan nagari* with village governmental system. However, after the reforms, the former system is reconstructed so that the Minangkabau people are able to re-practice their customary governmental system.

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Changes in local government system, both directly and indirectly, may influence the social dynamic of the Minangkabau people. Most importantly, these changes also affect this ethnic's social aspects. The most feasible problem from these changes is the magnitude of differences between the notion of development and modernization carried by the village government system and *pemerimtahan nagari.* In summary, therefore, the changes in question had a great implication on the rise and fall of the Minangkabau people's identity.

To investigate how changes in local identity emerge because of different policies of development and modernization carried by *pemerintahan nagari* and village governmental system, I have conducted interviews and delivered questionnaires to 350 respondents. To analyse the effect of the changes from *pemerintahan nagari* to village governmental system and the revival of *pemerintahan nagari* in the era of local autonomy, I utilize structural functional theory. This theory emphasizes that social changes result from changes in a particular society's system. These changes have two implications, namely: stability and instability. In Indonesia, the change from local style of governmental system to village governmental system and the revival of the former system are considered as changes in system, which lead to social changes pointing to stability and instability.

The change from local style of government system to village government system was regulated by the New Order rule in 1980 as one of its efforts to develop and modernize the country. It is found that this policy has marginalized the role of local norms and values. Worst, as in the case of the Minangkabau people, norms and values imposed by village governmental system are at odds with local customs. This change has accordingly generated many polemics and conflicts in the said society.

The most lucid social change observed as a result of the change from *pemerintahan nagari* to village governmental system is the diminishing level of unity in the customary society. It is caused by the village system which divides the customary geography of a *nagari* that makes the existence of a *nagari* threatened and paralyses its legal foundation to unite the people to achieve a common goal. Furthermore, the founding of village governmental system is also one of the crucial factors which led to the vanishing of the *nagari* autonomy, which had been preserved for a long time by the Minangkabau people. Moreover, the village governmental system also has a hand in destroying the authority of customary laws which has a direct effect on the management of *tanah ulayat* (customary land), as the *nagari*'s economic asset. During the village governmental system, *tanah ulayat* was controlled by unauthorized persons and was not utilized to the benefit of a *nagari* or towards prosperity of the people.

In Minangkabau land, due to the surplus of the budget, the New Order rule founded many villages. In other words, those villages were founded not on solid ground. As a result, the village governmental system only spawns problems in Minangkabau. To put it in another way, these problems deny the Minangkabau people social order and subsequently no development materializes. Thus, the village governmental system whose initial objective was to transform the people of Minangkabau is not achieved.

Development and modernization policies that do not consider social aspects, which are practiced by local people, have violated the role of customary laws, customary institutions, and social traditions which play a significant function in the building of social order. Moreover, this infringement has made customary approach to solve a particular social problem is largely crippled. Further, these policies have also caused many conflicts and social problems since the tools to watch the people's behavior have died out.

The village governmental system has also marginalized the role of customary institutions and terminated the existence of customary legislative and judicative bodies which have been founded by the *pemerintahan nagari*. Consequently, the head of the village will become the sole power holder, i.e. the absolute executive, which betrays the tradition of democracy cherished in the tradition of the Minangkabau people. Automatically, the installment of the head of the village by the central government has ended the tradition of elections and consensus which are a prominent characteristic of this ethnic. Worst, the diminishing of these traditions have denied the people education in politics and democracy. Moreover, the head of the village is also perceived as lacking the legitimate right to rule since he/she is not chosen directly by the people. As a result, their governments find it difficult to relate harmoniously with the common people. At the same time, this condition also prevents the people to actively participate in the development and modernization programs. Thus, consequent to the imposition of the village governmental system in Minangkabau, many social programs designed by the government do not seem to materialize.

The tradition of consensus also meets its decline in the social life of the people during the village governmental system. Many important decisions related to the well-being of the people are taken unilaterally by the central government and are passed on to the head of the village as its dignitary. In other words, the people are left with no choice other than complying with those decisions. Consequently, the tradition of mutual aid and cooperation, which are the social capital of the Minangkabau people, are gradually corroded. In short, the people of Minangkabau are contextually cornered as mere power subjects who are constantly demanded to act in accordance with the rules of the central government.

Another implication of the decline of the tradition of mutual aid and cooperation is the dependence of the development and modernization programs on the government budget. In fact, the people can be involved in helping the government to complete those programs. It is worth noting that this dependence on the government budget took grave toll after 1987 whereby the government of West Sumatra province, where the Minangkabau people reside, faced serious polemic challenges since several villages had to be merged into one village out of financial concerns for the central government which began to reduce its funds for village development and modernization programs. Subsequently, the village government could not speed up the effort to oversee prosperity of the people. Hence, poverty is still a major problem in villages and the initial objective of the founding of the village governmental system is not fully met.

Furthermore, the existence of the village governmental system in Minangkabau has also eroded the tradition of the people sitting together to discuss the development plans for their region. In other words, it is a down top planning in which people intend to develop what they need the most. On the contrary, the central government tends to nationalize its policies without considering the large number of different ethnicities in Indonesia and the multitude of differences they have. To put it in another way, the government's development and modernization program is a top-down policy. Sometimes this kind of policy becomes a serious blunder for the government since they give the people what they do not need or vice versa. Subsequently, the government fails to arrive at its objectives such as making poverty history in rural areas.

The people of *Minangkabau* value the philosophy of *adat basandi syarak, syarak basandi kitabullah* (Minangkabau customary laws are based on Islamic regulations which are derived from the holy Qur'an). In other words, in *Minangkabau* what the religion, which is officially Islam, has promulagated becomes the people customs. Meanwhile, during the reign of the village governmental system, this synergy experienced critical waning since the government did not provide enough facilities which can be utilized to carry on the tradition. Consequently, it is no wonder at all that a younger generation is deprived of this tradition, in other words, they are short of knowledge on both religion and custom. Hence, they are in the way of losing their identity as *Minangkabau* people. Thus, the village governmental system has made the *Minangkabau* culture, as a whole, prone to extinction.

On the contrary, after the fall of the New Order rule, the local governments are granted more autonomy. For this reason, the development programs are conducted against each ethnic's socio-political and cultural background. To put it in another way, modernization is no longer seen under the light of leaving the traditions behind. Hence, in Minangkabau, people are eager to reconstruct the system of *pemerintahan nagari*. Therefore, for the *Minangkabau* people, the era of local autonomy is the time to reconstruct their long lost tradition.

It is also important to trace the history of the rise and fall of the system of *pemerintahan nagari* in *Minangkabau*. During the time of Dutch colonialism, this system was acknowledged as written in Article 71 RR (*Regee-ringsreglement*) or Article 128 IS (*Indische-staatsregeling*). After the Japanese ousted the Dutch, they did not bother with the system, even, they legitimized it in Japanese Government Regulation No. 1 year 1942 and *Osamu Rei* Regulation No. 27 year 1942. After Indonesia gained its independence in 1945, this country was ruled by the Old Order regime. Interestingly, this regime did not mind with the system of *pemerintahan nagari*. In contrast, the New Order administration which came to power in 1966, issued a regulation to replace each ethnic's traditional governmental system with village governmental system, which automatically sent the Minangkabau governmental system into disappearance. However, this system was reconstructed in the era of local autonomy as written in Regulation No. 22 year 1999 and the Regulation of West Sumatra Government No. 9 year 2000.

Based on the regulation mentioned above, local government began to launch people-based development policies. It means, these policies consider and respect the local people's socio-cultural context. Hence, traditions and culture are no longer perceived as something old-fashioned. Interestingly, traditions and culture are currently seen as perfect partners for the government to complete their development policies. Therefore, it is not exaggerating if there is a claim that units of customary society are widely celebrated in Indonesia. It is in line with the principle of Chapter I, Article no 1, part 15 of Constitution No. 22 year 1999 which states that *a nagari is one of the customary society units which has the authority to rule and manage local people's affairs in regard to local customs and is acknowledged by national government*. Further, the Regulation of West Sumatra Government No. 9 year 2000 clearly states that:

> the system of pemerintahan nagari is perceived as effective in preserving the religion and traditions of the people of West Sumatra, who are democratic and have aspirations in materializing an independent society and pemerintahan nagari is also remarked as a way in which the people can actively and creatively involve in developing the region, the right the New Order rule has denied them.

Importantly, this regulation has authorized the reunification of the geographically divided *nagari* caused by the founding of the village governmental system instigated by the New Order administration. This unification is recognized as a crucial thing to be carried since it will found a *pemerintahan nagari* which has solid autonomy. The implication of this unification is to clarify the unit of the customary society of that *nagari* and to revive the function of the *nagari*'s customary institution and economic asset, namely *tanah ulayat*. Meanwhile, in the era of local autonomy, enormous changes took place in Minangkabau. For an instance, traditions which had been promoted by the village governmental system are radically changed to follow the needs of the *pemerintahan nagari*. One of the most prominent features of the revival of the system of *pemerintahan nagari* is that people began to practice many long lost traditions. It comes along with the rise of customary laws, customary institutions, *orang adat* (customary people), religious elites, and local democracy.

The ascendence of local democracy can be observed in the way the Minangkabau people vote for their leaders. In other words, currently, every head of the *nagari* is voted by the population of that *nagari* via popular elections. Subsequently, the people of Minangkabau have succeeded in releasing the hegemony of the central government. The most visible implication of the tradition of elections is that people have chance to undergo political education, which the village governmental system had disallowed them previously.

Moreover, the reconstruction of *balai adat* (customary hall) implies the return of the tradition of consensus among the Minangkabau people. Importantly, *balai adat* suggests that democracy finds its place among the people. The implication of the return of the customary hall is that people began to sit together to discuss and arrange their own development plans. In other words, the pattern of the *nagari*'s development is down-top, in contrast to the top-down pattern during the rule of

village governmental system. As a result, the *nagari'*s development programmes hit the right target. Therefore, the development programmes carried by the system of *pemerintahan nagari* are an effort to minimize the development programmes which are based on hegemony.

In addition, the era of local autonomy is marked by the return of the ideal democratic governmental system whereby there is no particular party that holds a supreme power. In the system of *nagar*, there are other two pivotal elements namely: legislative institution and judicative institution that keep an eye on how the executive institution runs the *nagari*. In other words, *pemerintahan nagari* resembles the administration of a modern republic. To be exact, *pemerintahan nagari* is a mini republic. Consequently, this development has empowered the authority of customary institutions and re-imposed the customary laws. It is also worth noting that the customary institution is a formal body, so that it will not be easily challenged by the central power.

Another objective of the re-activating of the customary institutions is to solve problems emerging within the society by approaching them from customary laws' point of view. Initially, customary institutions were founded to shoulder the task of internalizing customs with culture in people's everyday lives. However, as impinged earlier in this study, the founding of village governmental system has sent this institution into a dormant state for more than two decades, so that there is no institution responsible for educating the people in regard to their customs. Hence, we can also understand that efforts to re-activate customary institutions are ways to resolve social problems by using customary laws and are means to construct effective tools which are potential to maintaining socio-cultural based social stability. In addition, *pemerintahan nagari* also established religious institutions as an instrument to edify the people to live by their religion.

Presently, in many *nagaris,* people are busy organizing movements related to religious and traditional studies that are aimed at re-creating the *nagari*'s social dynamic, which is based on the philosophy of *adat basandi syarak, syarak basandi kitabullah*. Further, the current trend of returning to the system of *pemerintahan nagari* can be perceived as, on the one hand, an endeavour to restore the people's tradition, and on the other hand, to challenge the 'modern' tradition implanted by the central government. The clearest feature of this resistance effort is the re-implementation of customary rules. Afterwards, the dynamics of the *nagari*'s social life are experiencing transformation from the dynamics of modernization into a new dynamic which is derived from Minangkabau traditions and culture. This change is also followed by the return of the tradition of *hidup berkaum* (communal living) which is aimed at resisting the notion of individualism; a direct product of the village governmental system. The restoration of the system of *pemerintahan nagari* can be read as an attempt to reconstruct traditions and the dynamics of social life which fit Minangkabau culture. Hence, in the era of local autonomy, the people of Minangkabau are embracing their initial cultural identity, which the village governmental system has denied them. This change is actually caused by village governmental system's failure to develop and modernize the people. Moreover, it has been duly proven that the village governmental system has lacerated numerous

aspects that are responsible for social stability. In short, the failure of the government to develop and modernize the people is their insensitivity toward the people's culture and social values; they radically change the tradition and install a new culture which is completely different from the people's initial culture.

32.2 Conclusions

Conclusively, the village governmental system, which was originally planned to speed up the process of development and modernization, has fallen short. In the case of the people of Minangkabau, the village governmental system has generated many social conflicts which obviously slow down the various attempts to development. Furthermore, the village governmental system in Minangkabau has mouldered traditions, which are functional to preserve social stability. In other words, that system has failed to bring prosperity and social stability. Hence, in the era of local autonomy, the people of Minangkabau challenged that system and they re-constructed their once-marginalized governmental system.

This change is in line with functional theory, which states that stability is the fountain of harmony, dynamism, and integration in a society. If changes imposed to that society will only cause instability, it is normal to find out movements to revive the marginalized system to restore the stability. For instance, the people of Minangkabau identify that their traditional and social systems are able to conceive stability compared to what the New Order administration has enforced on them. Hence, it is not exaggerating to say that development and modernization programs, which are not based on traditions and cultural values, will never succeed. For the people of Minangkabau, the road to development and modernization is to go back to their own traditions. Therefore, there is solid ground to argue that traditions are supportive of development since they contain a worldview that materialises dynamism.

Learning from the fall and rise of the *pemerintahan nagari* system, it is clear that the development and modernization policies orchestrated by the New Order government have instigated changes in the identity of the Minangkabau people. This identity change is the direct result of the village governmental system policy that is completely contradictory to the system the people of Minangkabau traditionally practice. This change has made the identity of the Minangkabau people comply with what the village governmental system has designed. In other words, power is able to change identity. However, identity change can trigger social instability. Consequently, social conflicts will arise and the path to development and prosperity, as wished by government, are difficult to achieve.

In the era of local autonomy, Minangkabau social traditions are no longer seen as challenges to development and modernization. It means during the local autonomy era, those programs do not harm the people's identity anymore. In this context, it is wise if we refer to Eriksen (1993), who postulates that identity is changeable and the party who owns the power to do so can control the direction of

its transformation. In other words, those who rule the people can determine those people's identity. In the case of the people of Minangkabau, during the reign of the village governmental system with their development and modernization programs, the people's identity is the one that the authority directs them to adopt. On the contrary, during the era of local autonomy, when development and modernization programs are controlled by *pemerintahan nagari*, the people's identity goes along with what their traditions require them to embrace.

Therefore, the transformation from *pemerintahan nagari* to the village governmental system and vice versa is more than changes in terms of bureaucracy, administration, and governmental system. Accordingly, it has something to do with social changes which influence social stability and social order. In this context, the authority has to consider carefully whether their development and modernization programs will bring about stability or, in contrast, instability. Hence, those programs have to take into account the people's reception of the same programs. Important to note is that, the authority is not supposed to pressurize its will on the people. If the authority fails to do so, it has to be ready to bite the bullet and consequently its objectives are never obtained.

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Chapter 33
Family Leadership for Development of Rural Malay Herbal Entrepreneurship in Malaysia

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Abstract The aim of this study is to highlight on the role of rural family leadership in the development of herbal entrepreneurship. Majority of the Malay entrepreneurs failed in the development due to lack of entrepreneurial leadership. This is a qualitative exploratory research using phenomenology approach as it gave an in-depth explanation on the issues regarding rural Malay family-based herbal entrepreneurship development. This study was conducted in Forest Research Institute Malaysia (FRIM) during a herbal products promotional exhibition at Putra World Trade Centre (PWTC) with eight rural Malay herbal entrepreneurs in different highly populated Malays state of northern peninsular Malaysia namely, Kelantan, Kedah, Pahang, Perlis and Trengganu. The result showed family leadership is the major factor for the development of rural Malay herbal entrepreneurship and also suggested that the herbal development planners, government authorized agents need to focus on issues such as education, training, financial resources for development of rural Malay family based herbal entrepreneurship.

Keywords Rural entrepreneurship · Herbal products · Qualitative methodology · Phenomenology approach · Leadership

33.1 Introduction

Leadership is involved in every sector such as politics, large and small scale enterprises, institutions and other sectors. As a result the development of a country always depends on good leaders. Most of the developed and developing countries

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have changed their country economy through good leadership like Dr Mahathir (Malaysia), Nelsen Mandela (South Africa), Indira Gandhi (India). Therefore, the government of Malaysia is trying to increase the number of successful good leaders in every sector and approved more fund annually. Family leadership of rural entrepreneurship development is another economy growth engine in Malaysia. However, until today researchers have given little attention to this field (Afsaneh and Zaidatol 2010). Rural entrepreneurship development is a main national development strategy in many developed and developing countries in the world. Many scholars, academicians, researchers, government policy makers, economists believed that rural entrepreneurship is the main area for rural development and country economy growth. But previous study showed, only larger firms which contribute the country growth and quality of life. Now, it has been changed when many developing countries like Malaysia, China, Korea, Japan Taiwan and India have developed their economy through rural entrepreneurship development (Paul 2013). As a result, the government of Malaysia is increasing the annual budget for rural entrepreneurship development. So, general entrepreneurship is gradually developing but Malays contribution in this sector is very low relatively compared to other ethnic groups like Chinese (Hamidon 2009). Therefore, the government of Malaysia is trying to increase the number of successful Malays entrepreneurs and provide them full support as they need.

Herbal entrepreneurship is also another one of the economic growth engine for country development (Murray 2011). Third Natural Agriculture Policy in 1998–2010 has identified herbal products industry as new and future industry group. Malaysia herbal industry estimated market value is RM7.97 billion (Abu Kasim 2007). In 2003, Abdul Aziz mentioned that herbal products growth Malaysian has changed their life style emphasis on health and growing cost of the synthetic medicines.

Herbal entrepreneurship in rural area is managed mostly by Malay community for long ago as their family-based entrepreneurship. These all entrepreneurs operate it either in low-cost shop lots or in houses. Currently, 13 ministries and 52 government link companies are providing all facilities as their need such as training, education, financial support and sales promotion all the time. Excellent tropical climate, increase research and development activities tremendously increase herbal natural products demand and potential size of herbal based market (Ibrahim 2006; Jamai 2006). However, until today majority of rural Malays herbal entrepreneurs are facing numerous problems including shortage of raw materials, very limited large-scale cultivation activities, technology, skilled manpower and financial constraints (Hawa 2011; Viduriati et al. 2012; Nordin et al. 2008; Paul 2013) and lack of entrepreneurial family leadership. Despite all critical problems, there is lot of opportunities for development of herbal products in future (Ismail and Sulaiman 2007; Ellitan 2002). The research data showed there is a huge potential Malaysian herbal market but the involvement of Malay herbal entrepreneurs is still very low and at present performance of their entrepreneurship in its infancy stage relatively to Chinese and other ethnic groups in Malaysia.

33.2 Literature Review

Rural entrepreneurship plays a national development role in many countries like Korea, Japan, India, Malaysia and China. According to the Rural Poverty Report, 2001, 75 % population of the world in the poverty level and more than 1.3 billion people lived in poverty. In rural places, about 900 million peoples of the world are residing in rural village and these people are completely depended on agriculture and similar activities for their livelihoods. Rural entrepreneurship is a vital element of productivity and growth (Baumol 1993). Previous study showed that a strong positive relation between economic activity and performance (Zacharakis et al. 1999). Therefore, the present global world plays a number of critical roles for country economy development (Schumpeter 1934) of developed and developing countries through rural entrepreneurship. Rural entrepreneurship is inadequate infrastructure, low education, unskilled workers, very low income and culture not supportive for entrepreneurship development (Kulawczuk 1998). Fostering entrepreneurship create wealth and employment and the quality of life of rural populations (FAO Corporate Document Repository 1997).

The literature review indicates that rural entrepreneurship has received little research attention. Therefore, it is useful and timely to conduct studies on rural entrepreneurship development.

- **Education and knowledge and training**
  Human capital in rural entrepreneurship is directly involved in knowledge, education and also training to the rural herbal entrepreneurs. The main contributors of the entrepreneurs is low education is low to the growth ratio of country economy between urban and rural regions. Education always developed quality human capital and it is important for every rural entrepreneur to develop their entrepreneurship (Florida 2002; Paul 2013). On the other hand, rural development through entrepreneurship depends on technically strong people with human capital knowledge (Malecki 1997; Petrin and Gannon 1997).

The training programs involve not only in rural herbal entrepreneurship development, agriculture or other fields. But training program on various strategies and agriculture technique promote to identify opportunities in rural regions (Lohmoller 1990).

- **Social Network**
  The social network theory is recognized the entrepreneurial opportunities and entrepreneurial pursuits (Hills et al. 1999). The benefits of social networks for entrepreneurs of their entrepreneurship developments are information, customers, suppliers and others resources (Aldrich and Zimmer 1986). The development of rural Malay family-based herbal entrepreneurship is a necessity through social network (Dabson 2005).
- **Family Entrepreneurial Behavior**
  Basically, family-based entrepreneurship is lacking of conceptual and theoretical definition (Vought et al. 2008). Most of research scholars are using social

cognitive theory as conceptual frame work for entrepreneurship development (Hamidi et al. 2008; Kickul et al. 2008; Krueger et al. 2000). The main characteristics of this theory is a person behavior, environment and belief. As a result, researchers used the social efficacy theory to define entrepreneurial efficacy individual belief of their abilities to become successful entrepreneurs. Despite the numbers of literature related to entrepreneurship development but till now limited information on rural family-based entrepreneurship development (Afsaneh and Zaidatol 2010).

- **Family leadership for Entrepreneurship Development**
  From the literature point of view many studies were conducted in entrepreneurship in different areas but only few researchers look into family based entrepreneurship (Aldrich and Cliff 2003). Based on entrepreneurship definition, the leadership of rural entrepreneurship is a challenge to become successful entrepreneurs. Generally, family based leadership for rural entrepreneurship is very important for entrepreneurship development because of limited information particular this area.

33.3 Methodology

The purpose of the qualitative phenomenology research study was to explore the individual's personal experience of rural Malay family-based herbal entrepreneurship development. For the purpose of the study presented here, only rural Malay herbal entrepreneurs who had been in family-based entrepreneurship for minimum 8 years were included in the data analysis. A qualitative phenomenology approach was chosen for this study. According to Creswell (2005), qualitative is appropriate when 'the problems of the research need to explored in a deeper understanding'. Qualitative is also most appropriate when the researcher does not have specific variables to explore but rather is seeking to explore why or how something occurs (Creswell 2005).

The specific method of data collection and analysis, phenomenology is a research method that helps the researcher to gain the fullest insight into a person's lived individual experiences (Goulding 2005). Through the researcher interviewing respondents and ultimately transcribing and analyzing results, themes are uncovered. The research scholar, Goulding described through process of writing and rewriting the researcher gains additional perspective and insight into the research phenomenon. For this study, the researcher considered other qualitative research method approach like ethnography, grounded theory, and case study but the aim of phenomenology is uncover phenomenon through the exploration experiences, which is more applicable for understanding the lived experiences of rural Malay family-based herbal entrepreneurs (Priest 2002). The scholar described 'peoples who have lived the reality of the subject being investigated provide only legitimate source of data through which the researcher can access this reality. The purposive

sample of the rural Malay herbal entrepreneurs provided the research sample required for understanding characteristics identified as important to entrepreneurial success.

The eight informants selected for the research was Malay entrepreneurs who have started the herbal entrepreneurship for at least 8 years from five state of Penisular Malaysia namely Kelantan, Kedah, Pahang, Perlis and Trengganu. The informants were identified through a herbal promotional exhibition location in Peninsular Malaysia. The purposeful sample used allowed the researcher to' intentionally select individuals and sites to learn or understand the central phenomenon (Creswell 2005). The selection of rural Malay herbal family-based herbal entrepreneurs who have been operating their entrepreneurship for at least 8 years yielded insight the theme of the characteristics shared by entrepreneurs. Sanders wrote in the year of 1982, 'The person to be investigated are those who possess the characteristics under observation or those who can give reliable information on the phenomenon being researched'. Sanders mentioned that researchers using a phenomenological approach do not necessarily need large number of respondents lead to an improvement qualitative research. The scholar also suggested that a researcher conducting a phenomenological study should take in-depth interviews with a small number of respondents in order to keep the process effectively. The research focused on gaining interviews with eight rural Malay family-based herbal entrepreneurs and gradually analyzed the data. Interviewing of respondents continued until the achieved theoretical saturation point.

In a phenomenological study, the researcher need to ensure that respondents have life experiences that are reflective of data required for collected information from the respondents are reliable (Sanders 1982).

A researcher conducting a phenomenological study relies on data taken directly from the respondents through their self described views and experiences (Goulding 2005). For phenomenological research study need small number of respondents to get the potential data through in-depth interviews (Sanders 1982) and until reach the theoretical saturation point, no new themes emerged in the research process.

Phenomenology approach is used to collect data and understand a phenomenon based on a person's everyday life experience (Priest 2002). According to (Byrne 2001), 'as qualitative researchers, phenomenologist must follow an organized approach to answering their research question'. In general, most of the interviews for the study were tape recorded from starting to end by the researcher and transcribed the collected data within 48 h of the interview.

Sanders mentioned in the year of 1982, for phenomenology study interview transcriptions are critical relatively other qualitative research approach. Tape recording and transcribing the interviews 'permits the interview probe systematically and in-depth without the distraction of note taking'. The phenomenological study researchers are concerned with probing selected issues at length, capture respondent precise words and finally experience for analysis the data. Interview for the study to the respondents on average an hour to half an hour as long as researcher decided data is saturated.

According to Priest (2002) that individual life experience respondents are fit phenomenological study. "So, respondents need to have lived the reality of the subject being investigated".

The researcher's role is to discovered the essence through interpretation of the rich, textual data provided by respondents describing the particular experience being studied' (deMarrais and Tisdale 2002). The process of data analysis the researcher develops the deeper understanding of the phenomenon under this study. A transcendental phenomenological study in 1994 by Moustakas mentioned that the respondents lived experience related to the phenomenon for development of rural Malay family-based herbal entrepreneurship.

Any qualitative research need to understand meaning data from the respondents create interpretation. "Qualitative approach research data cannot be tested for 'validity' but using criteria based on objective of the study reality". Analysis of the collected research data the researcher transcribed all data maximum 2 days time and reviewed the data for accuracy and consistency. At the end of data collection from the field asked the respondent to verify accuracy of their given interview data. From the direct check with the respondent which will add to the dependability of the study.

Validity and reliability of the study ensure that provides data meaningful information the data which is free from errors for analysis and collection (Creswell 2005). For any qualitative research studies validity and reliability depends on member checking technique after data analysis or triangulation (Creswell 2005). But the qualitative researcher, Priest (2002) suggested for validity and reliability in phenomenological research need to evaluation the result, acknowledge subjective judge and additional verification from respondents. On the other way to enhance validity to do audit trail, identify personal bias, and also carefully established the accuracy of all data (Priest 2002).

33.4 Result and Discussions

For analysis purpose of interview data, it was started with the coding process. The transcribed interviews were read all in order to locate the relevant segments. From the data identified the category as their similarities. The details of the eight respondents' information are stated below.

- **Respondent 1 (R1)**: Puan Haslinada is 45 years old, the owner of the Malay family-based small scale herbal manufacturer "A" in Kelantan. She got here primary education from here born place, in Kelantan. It is their family business started in 1960 with capital RM200 and now capital increased to RM500K. At present, the company is running with 15 workers producing 15 products. The main products are food supplementary and cosmetics. The product has been selling only locally and can't go international market because of no GMP (Good Manufacturing Practice) facility at their manufacturing outlet. Monthly sales are

around RM100K at present. They have no social network to sell directly to the different drug stores, through only online marketing and government support promotional sales in different locations. The owner of the company is hard working and has a strong experience to develop family business. For financial constraints, technical knowledge know how and new rules by the Ministry of Health to follow GMP guidelines they can't develop the entrepreneurship.

- **Respondent 2 (R2)**: The entrepreneur's age is 47 and started it in 1989 by the name "B" of his home town Kelantan. This company is running by their all family members until now. They limited budget for the monthly expenditure because of limited capital to run this business. The owner has a strong leadership credibility to smoothly develop it. Therefore, they are sales gradually increased every month. For lack of education, lack of technical knowledge on product development and financial problem they need government support to become a successful rural Malay herbal entrepreneurs.
- **Respondent 3 (R3)**: The herbal family enterprise was established in 1999 at Kedah in his village by the name of "C". It is their family business and all are surviving from it income. At the age of 20 he took over this after his father passes away. They are sales only monthly RM50K with five products. "In our family now no family leader to run this and we need entrepreneurial leadership development skill through government training program and also want support finance, technical management immediately to development entrepreneurship. Other ways we have to closed down our family generation business permanently and look for job in near future". Finally, we are not happy with the government new GMP guidelines for production because we all hand to mouth rural herbal entrepreneurs.
- **Respondent 4 (R4)**: Mr 'X' hold his business degree in 1990 and from his family saving income to established this herbal business 15 years before in his village under the state of Kedah. They have four products and monthly sales around RM65K. All family members are involved in this family business. For their lack of social and marketing knowledge they are fully depend on on-line internet marketing and government supported promotional sales. He say "as professional I already make business development plan but we need badly strong support from our government such as financial facility, training on manufacturing knowledge. Then I can run my entrepreneurship as my development plan".
- **Respondent 5 (R5)**: He started his business since 1986 in Kedah by the name "F". The owner is now very happy with his present business growth after long time struggle to develop it. With the help of government link company (GLC) this company last year received RM100K loan from bank. There sales now RM90K and total operation team five. They want to development their production l, business management and entrepreneurial leadership skill from governmental support.
- **Respondents 6 (R6)**: In the year 1980, Mr 'Y' established entrepreneurship business in Perlis. All family members are involved in this family herbal business. In 2010, monthly sales RM60K but now increased to RM85–RM90

with three products namely food supplementary, diabetics and cosmetics. My father was a community leader in our village but never keep record business. As a result, we can't check business performance. We have not enough capital to buy raw materials and others necessary items timely. Sometimes my father production made slow though our products was demand in our community. We try so many ways get financial support but no one help us. This year, took loan with interest from a friend and now bit growing our business. We need full support for our human capital development and entrepreneurial leadership immediately.

- **Respondent 7 (R7)**: In 1983, Mr K was established this herbal enterprise at his village under the state of Trenganu with the capital of RM550.00 from family members saving money. Now capital increased to RM200,000.00 and total sales monthly from RM70 to RM90K. All family members are running this business since long time. They said "We are not following current GMP guidelines as small entrepreneurs and producing our products manually". Until today, only few rural Malay herbal follow the GMP instruction and remaining all own plan operating it since long. But government also understand our problem because they can't provide us financial resources and others critical technological barrier. We need full support at least certain year for our herbal entrepreneurship development, other ways will be reduced our total entrepreneurs day by day. Finally, lot of unnecessary guidelines from different organization so called GLC and government approved agents make us confused because we are rural entrepreneurs are lack of education.
- **Respondent 8 (R8)**: Mr "L" was born in Trengganu and established his enterprise in 1978. It is one of the oldest Malay herbal entrepreneurs in respondent interview list. Entrepreneur told that 95 % peoples are Malay but only few successful entrepreneurs and most of the owner facing lot of problem since long time such as finance, technology, operation management. Our products can't sale directly any drug store for lack of marketing knowledge and low standard product. Sometimes even we supplied but payment very late. That's why we always depend on social media and government supported sales. It is our Malay community biggest barrier that we can't do implementation anything for lack of finance. We want back up from government mainly finance and training at least certain years like Bangladesh.

Based on the respondent's data the seven common factors were identified for the lack of entrepreneurship development; (1) Attitude and mindsets, (2) Lack of competitiveness of sustainability, (3) Lack of entrepreneurial culture, (4) Lack of cooperation and networking, (5) Lack of entrepreneurial leadership, (6) Lack of financial support, (7) Government policy.

33.5 Conclusions and Recommendation

In conclusion, the study integrated the causes for the development rural Malay herbal entrepreneurship. The finding of this study showed that internal and external factors contributed to the lack of development among rural Malay family-based herbal entrepreneurs. The internal factors are negative attitude and mindsets, lack of entrepreneurial culture and leadership among community, lack of social networking and non-cooperation among Malay and fear of failure. On the other hand, the external factors are lack of sustainability and competitiveness among Malay family-based entrepreneurship, lack of financial resources and finally government policy.

The findings identified that government of Malaysia and others government link companies, has made plans to promote the rural Malay herbal entrepreneurs in development but until today successful ratio is very low as majority population compared to other ethnic groups. It is understood the main cause for development is inadequate financial support, strictly guidelines to follow GMP for production and government policy. In addition of this study was also identified that if Malay herbal entrepreneurs do not change their psychological behavior as entrepreneurs then they will lagging behind gradually. Finally, the government needs to modify current rules to help direct rural Malay family-based herbal entrepreneurs. The above steps the government of Malaysia were taken then rural Malay herbal entrepreneurship will develop rapidly and gradually the increase the number of successful herbal entrepreneurs in future.

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Chapter 34
Evaluating the Application of Possibility and Equality of Opportunity in Higher Education According to Chaos Theory

Müjdat Avcı, Mehmet Özbaş and Sait Akbaşlı

Abstract The purpose of this study is to evaluate the situations related to possibility and equality of opportunity in higher education in terms of chaos theory. During the research process, the aim was to determine the extent to which socio-economic chaos arising from student characteristics affected the possibility and equality of opportunity in higher education. In democratic countries, where it is considered that almost all professions with a high social status cannot be acquired without having a higher education qualification, higher education as a fundamental human right should be disseminated to different classes of the society. In this research, functions of a democratic educational administration upon the possibility and equality of opportunity in higher education in Turkey were discussed within the scope of sociologic variables. The population of "The Research for Equality of Opportunity and Possibility in Higher Education within the Concept of Democratic and Sociologic Features" included 29,477 students studying at Erzincan and Mersin Universities in 2012–2013 academic year; and the study sample included 776 students chosen with random cluster sampling model according to the faculties of both universities. Students with illiterate mothers were found to have benefited from the secondary education at a lower level than the other student groups. The student groups with high school and university graduate mothers were found to have benefited from the secondary education opportunities at a higher level.

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34.1 Introduction

The concept of democratic administration has fundamental responsibilities in order to provide all students with the right platform to benefit from higher education in accordance with the criteria of social justice, possibility and equality of opportunity, and sociological variables. Those responsibilities mainly depend on the actualization of accountable and controllable administrative applications. A democratic administration is obliged to provide for maintenance of the educational system by adapting an administrative mentality open to the general public. Meeting the criteria related to possibility and equality of opportunity during the higher education process is precisely an administrative responsibility that will provide everyone with the platform to benefit from their educational rights equally. The sociological differences existing within the contemporary higher education students clearly necessitate and call for the application of chaotic understanding in administration (Avcı and Özbaş 2013; Doğan 2012; Erçetin 2001; Goulielmos 2002; Hesapçıoğlu and Dündar 2011; Mutlu and Sakınç 2006).

34.2 Problem Statement

The prerequisite for possibility and equality of opportunity in education is providing for social justice. As in all teaching grades, one of the most important functions of public educational administration in higher education process is to build an educational system open to access of any class. An education system in which almost all social classes from the lowest to the highest can attain their learning opportunity and potential respectively requires chaotic understanding which considers differences and complexities in administration (Cramer 1998; Di Pietro 2003; Ferreira and Gignoux 2010; Roemer 1998; Töremen 2000).

In a social law state where a democratic administrative system is dominant, higher education should create a grade of learning which is open to access by students from any social class. In democratic countries, where it is considered that almost all professions with a high social status cannot be obtained without having a higher education qualification, it is necessary to spread out higher education to different social classes as a fundamental human right. The aforementioned explanations that can be accepted in the form of a theoretical democracy manifestation however cannot be propounded as much functional in practice (Akbaşlı 2010b; Akyüz 2012; Doğan 2012; Giddens 2000; Güven 2000; Hesapçıoğlu and Dündar 2011).

Possibility and equality of opportunity in higher education implies the state's provision of applications that will not dwell on discrimination in the distribution of public education sources between higher education institutions and the higher education students. In the Lima Declaration in which the possibility and equality of opportunity is dealt with basically and to which Turkey is one of the parties, the opportunity of access to higher education will be equalized to everybody without prevention to any classes of the society. Each member of a society has the right to take place within the academic worlds of countries as a student, teacher, researcher, worker or administrator without exposure to any form of discrimination (World University Service 1988).

Providing for possibility and equality of opportunity in higher education is an inevitable necessity for the democratic countries to meet the administrative requirements and application of human rights related to education. The individuals responsible for public education are required to actualize administrative applications in which they will evaluate the individual's benefit from the higher education process subjectively in terms of their sociological origin focusing on the differences rather than perceiving them as groups similar to each other through a generalizing approach. There are several features depending mainly upon sociological factors that differentiate the students from each other in higher education process as in any learning grades. Those can be dealt with as gender, educational status of parents, profession of parents, the residential area of the family, number of siblings, village-city location, ethnic origin, and religious differences (Akyüz 1991; Avcı and Özbaş 2013; Doğan 2012; Özbaş and Avcı 2013; Tezcan 1999). The aforementioned differences play an important role in affecting students' benefit from the possibility of opportunities at higher education either positively or negatively. Democratic administration should therefore consider all variables that can negatively affect the learning experiences of students (The Official Gazette 1981). The inequalities a student experiences at university level possess effects that can last for generations. This situation created by the sociological variables is caused by the social injustice and neoliberal education policies dominating the education system at its base. Certainly, we should not ignore the public education administration's applications leading to inequalities (Tural 2004).

Neoliberal education adapts the understanding of students' families to maintain their socio-economic origins. It rejects the intervention of state in the educational system in a way that will provide social justice as its being against the state's applying of the social law rules. In other words, it proposes that the education system should take a shape by its own as in the rules of the market economy. Accordingly educational systems cannot adequately provide for the equality of opportunity and possibility in higher education as in other learning grades. The inequality of opportunity and possibility in higher education has been one of the most critical challenges of the democratic administrations as well as the undemocratic countries (Akdeniz 1994; Kemerlioğlu et al. 1996; Öztürk 1993). Inequality of opportunity and possibility in education is a pathology arising from democratic countries' applications based upon social injustice.

34.3 Purpose of the Study

A chaotic administrative approach that will provide consideration of differences in democratic regime based educational systems and discuss chaos and irregularity through an integrated approach is needed (Özbaş 2013). In democratic countries, discussing the equality of opportunity and possibility in education within theory-practice based comprehensive researches is important in terms of both the development of democracy at a desired level and providing for the state to be accountable. For that reason, the equality of opportunity and possibility in Turkey was discussed within the scope of the functions of democratic educational administration and sociological variables; and they were evaluated according to the chaos theory. For that purpose, the research problem was expressed as below:

- What are the students' perceptions relating to the equality of opportunity and possibility in higher education according to chaos theory; and is there a statistically significant difference between the perceptions?

34.4 Method

"The Research on the Possibility and Equality of Opportunity in Higher Education According to Chaos Theory" is a descriptive study carried out in a comparative model. Comparative researches are the research models for determining the extent to which the independent variable or variables affect the dependent variable. The descriptive researches in terms of the comparative models are the ones in which the existing situation is determined as it is and as much clear as it can be (Tavşancıl 2006; Weinberg and Abramowitz 2002; Yıldırım and Şimşek 2011). During this research process, the independent variables of higher education students in terms of both the sociological and democratic factors included "gender, educational status of parents, profession of parents, and number of siblings."

34.4.1 Population and Sample

The population of "The Research on the Possibility and Equality of Opportunity in Higher Education According to Chaos Theory" included 29,447 students from Erzincan and Mersin Universities in the 2012–2013 academic year; and the sample included 776 students chosen randomly through the random cluster sampling model according to the faculties of both universities. In determining the number of students that will be included in the study, the study benefited from the tables of determining the sample according to population. During the research, the research scale was given to 880 students considering the possibility of losses; 700 of the

scales provided were returned. The percentage of the scales returned calculated according to the population was 90 % (700/776). Students from the Faculties of Education, Science and Arts, Economics and Administrative Sciences and Engineering were included in the research. It was decided to include 180 students from each faculty of the university, and 88 from each of the 2 universities. The research scales were given to each of the 22 students chosen randomly from the 1st, 2nd, 3rd, and 4th grades of the faculties.

34.4.2 Data Collection Tools

"The Scale for the Equality of Opportunity and Possibility in Higher Education According to Chaos Theory" used during this research process was the revised form of the scale used by Avcı and Özbaş (2013) in their study of "Perceptions of higher education students regarding the equality of opportunity and possibility in education in terms of sociological variables." During the preparation process of the scale, firstly a comprehensive literature review was carried out about the equality of possibility and opportunity, and sociological features of students in democratic educational systems within the scope of chaotic administrative approach. Thoughts of 127 students studying at science and arts, education, medicine, pharmacy, economics, business administration, and engineering faculties of universities and having different sociological and socio-economic profiles were sought for regarding the "Equality of Opportunity and Possibility in Higher Education" including 14 items through the face-to-face interview method (Baş and Akturan 2008; Yıldırım and Şimşek 2011).

In order to analyse the developed form in terms of content validity, academician evaluations from sociology, philosophy, and educational sciences departments were sought for. As result of the evaluations, 13 items having the feature of interlacing, and corresponding to other items and considered as not appropriate for the purpose of the study were excluded from the scale; so the number of items reduced from 63 to 50. In order to determine the reliability and content validity of the scale, a pre-implementation was conducted with the participation of 130 students. And in order to determine whether factor analysis could be utilized on the pre-implementation data or not, Kaiser Meyer Olkin (KMO) value was calculated. The KMO value was found to be 0.825. In order to determine whether the scale was mono or multi factoral, Principal Components Analysis and Varimax Rotation Method were performed on the pre-implementation data. As result of the analysis, 8 items which were not accepted as being among the factors considered theoretically during the preparation of the scale were excluded from the scale; and so the number of items reduced from 50 to 42. At the end of the statistical processes performed to the rest of the items, the scale was determined to have a multifactorial structure. In Table 34.1, the factors, explained in terms of variance rate, and reliability coefficients of the scale are presented.

Table 34.1 Factor variance rate and reliability coefficients of equality of opportunity and possibility in higher education scale

Factor	Explained variance (%)	Alpha (α)
Secondary education process	11.998	0.87
Socio-economic and cultural features	14.786	0.90
Higher education services	15.621	0.86

34.4.3 Data Analysis and Interpretation

In the research scale, the items prepared through the 5-point Likert approach were included. In the research, frequency (f), percentage (%), and arithmetic average ($\overline{X}$) values were used for the analysis of descriptive data. The data related to the variable of gender were analysed using the t-test used for unrelated samples in the research. The data related to the educational status of parents, profession of parents, and numbers of siblings were tested using the one way variance analysis. When the results related to variance analysis were significant, multiple comparisons were performed in order to find out the source of the difference. The level of significance was used as 0.05 in comparative analysis.

34.5 Findings and Interpretation

The research findings were interpreted firstly descriptively and then comparatively benefiting from comparative statistical analysis methods according to the independent variables of the research starting from the first factor.

34.5.1 Perceptions Related to the Variable of Gender

The female students considered that their schools provided more opportunities upon "meeting the fundamental needs such as eating, drinking, clothing, and sheltering during the secondary education process" (Item 1; $\overline{X} = 3.54$). As could be seen in Table 34.2, the highest level of male students' perceptions related to the secondary education process was related to the same issue (3.14). However, the perception averages of male students were lower than the female students. This finding can be interpreted in such a way that female students have benefited from the public opportunities in secondary education more than male students. Because in Turkey, female students are provided with more contribution in elementary and secondary education through the conditional cash transfer applied by the public education administration; and female students are given priority in benefiting from boarding and

Table 34.2 Possibility and equality of opportunity perceptions of higher education students according to gender

	N	$\overline{X}$	N	$\overline{X}$
1. Meeting the fundamental needs in secondary education	429	3.54	271	3.14
2. Vocational guidance and orientation in secondary education	429	2.20	271	2.16
3. Adequacy of the opportunities in the house the family lives in	429	3.47	271	3.11
4. Inequality in benefiting from educational opportunities	429	3.14	271	3.29
5. The effect of political views and cultural features on education	429	2.73	271	2.64
6. Communication of academicians with students	429	3.29	271	3.15
7. Support for solutions of socio-psychological problems	429	2.14	271	2.09

dormitory opportunities rather than the male students. This finding also revealed that positive discrimination is carried out on female students. Female students emphasized that they obtained the most inadequate educational service on "vocational guidance and orientation" (Item 2; $\overline{X} = 2.20$) in secondary education. The male students also had the same perception on this (Item 2; $\overline{X} = 2.16$). The findings revealed that students cannot benefit from guidance and orientation services adequately during the secondary education; and this finding also proved that school administrations are not adequate in fulfilling the guidance service functions efficiently.

The highest perception of female students in socio-economic and cultural features was related to "The opportunities of the house the family lives in" (Item 3; 3.47). This finding revealed that female students cared about and found the conditions of their families' houses adequate. This also suggested that the female students provided with access to higher education came from the middle or high income groups. The male students had lower perception on this issue. This can be interpreted in a way that the male students did not find the house opportunities of their families as adequate. Moreover, it was also understood that male students came from families having lower socio-economic classes than the female students. On the other hand, the male students in lower socio-economic classes could access higher education; however, this is not valid for the female students in the lower social classes. It can be suggested from this finding that the gender gap is still valid and increasingly reflected within the lower socio-economic classes; this discrimination is mostly against the females. The highest level of male students' perceptions related to the socio-economic features factor was "Some people in the society we live are more privileged to benefit from educational opportunities" (Item 4; 3.29). And the female students were found to have the same perception moreover at a similar rate. According to this, higher education students were of the opinion that there has been a general inequality, and accordingly injustice in the society regarding benefiting from the educational opportunities. According to the perceptions of female and male students, the averages with the lowest level in socio-economic features factor was on "The effect of political views or cultural features on benefiting from the educational opportunities" (Item 5).

On the factor of quality of higher education services, the students had the highest perception on "Lecturers' respectful and trustworthy communication with students" (Item 6). This finding can be interpreted in a way that lecturers give importance to respect, trust, and active and emphatic interaction in communication with their students who are adult individuals like their own. On the factor of quality of higher education services, the students had the lowest perception in general on "Taking the necessary support to solving socio-economic problems in higher education" (Item 7).

Whereas there was no statistically significant difference between the male and female student perceptions on the factor of quality of higher education services, statistically significant differences were determined in factors of the secondary education services' quality and socio-economic and cultural features. As can be seen in Table 34.3, the perception averages of female students related to the quality of secondary education services was (2.81) higher than the perception averages of male students (2.60). In this factor, the possibility ($p = 0.007$) of t value (2.143) was at a lower level than the chosen alpha significance level ($p < 0.05$*) [$t(698) = 2.143$, $p < 0.05$]. This finding revealed that female students benefited more from the secondary education services than the male students. On the other hand, it can also be inferred from the same finding that positive discrimination is extended to female students during the schooling and educational processes, and their education is more cared for and attended to.

Significant differences were also determined between the perceptions of female and male students on the factor of socio-economic features. According to the perceptions of female students (3.21), socio-economic factors affected their benefiting from higher education opportunities and possibilities more than the male students (3.03). According to this, socio-economic factors continue to direct female students in the educational process as in any areas of the social life. This proved that the traditional approach towards the female gender in our society has still been going on in higher education-even though its effect has lessened.

34.5.2 Perceptions Related to the Variable of Mother's Educational Status

During this research process, the educational status of the mother was discussed in 5 categories as "illiterate, literate, elementary education graduate, secondary education graduate, and university graduate." According to the descriptive data of the

Table 34.3 Comparing the perceptions of female and male students related to the quality of secondary education services

	N	$\overline{X}$	SS	SD	t	p
Female	429	2.81	1.08	698	2.143	0.007*
Male	271	2.60	1.17			

* $p < 0.05$

research, 148 (21.1 %) of the students' mothers were illiterate, 51 (7.3 %) were literate, 332 (47.4 %) were elementary education graduates, 78 (11.1 %) were secondary education graduates, 67 (9.6 %) were high school graduates, and 24 (3.4 %) were university graduates. According to these data, more than 1/5 of the mothers were illiterate, almost half of them were elementary education graduates, and only 3 % were university graduates. This revealed that there was a direct proportion between the educational status profiles of higher education students' mothers and their families' socio-economic levels. As is seen, the mothers who have an education average less than 5 years have provided their children with a 16 year education average. The data related to the variable of mother's education were interpreted using the one way variance analysis statistics. According to the data obtained from one way ANOVA statistic, the variable of mothers' educational status caused significant differences in the factors of secondary education services' quality and socio-economic features in terms of student perceptions. In order to find the source of the difference, LSD multiple comparison statistic was conducted. According to this statistical analysis, it was noticed that the students with illiterate mothers benefited from secondary education far less than the other student groups. This suggested that the educational status of mother was the most important of all variables that affect the educational process of a child.

34.5.3 Student Perceptions Related to the Profession of Parents

Ninety-two percent of the mothers were housewives, and 6 % were officers or workers. These rates proved that the mothers cannot be interpreted as being deprived of educational opportunities. However, studying of the students with unemployed mothers at the higher education strengthens the need and call for public education. This showed that the inequality of opportunity and possibility which cannot be eliminated in terms of mothers can be revealed at a specific level in terms of children. This case also proved that the socio-economic disadvantaged vicious circle or the existing poverty can only be broken in terms of mothers. According to the profession of fathers, 22 % of students' fathers were self-employed, 20 % were officers, 20 % were workers, 13 % were retired, and only 3 % were tradesmen. According to the variable of fathers' profession, the students with fathers who were officers had higher averages than the other professional groups among the student perceptions.

34.5.4 Perceptions Related to the Variable of Number of Siblings

Only 1/10 of students had single-child families, and more than 70 % had families with multiple children. According to this variable, there were significant differences in terms of benefiting from the secondary education services between the perceptions of students that have 1 or 2-child families and the ones with 6, 7, or 8 children and over. The students with families that have many children benefited from the secondary education services at a lower level. There were significant differences in socio-economic features factor between the perceptions of the children with 1–2 child families, the children of the families with 6–7 children and families with more than 8 children. The socio-economic variables of the children with multiple-child families were more disadvantaged in terms of benefiting from the educational opportunities than the children of families with few children.

34.6 Discussion of Findings

The Research on the Possibility and Equality of Opportunity in Higher Education According to Chaos Theory has revealed that the educational status of mothers was the most important variable in terms of benefiting from educational opportunities. In the research, the basic sociologic and socio-economic differences of students were discussed as "gender, educational status of mother, profession of parents, and the number of siblings." The factor of mothers' educational status created significant differences in terms of students benefiting from the educational opportunities at any grades of education in terms of both sociological and socio-economic factors; and created the source of chaos in social stratification. This case thus necessitates a chaotic approach to administrative applications. The basic reason for the higher education students not to benefit from the educational opportunities as those of secondary education arises from the inadequacy of the educational status.

In this research, it was revealed that without eliminating the negative effect caused by the inadequacy of mothers' educational status, the equality and possibility of opportunity cannot be provided for in higher education. For that reason, it is necessary to take all required administrative precautions to have the rate of girls' schooling up to 100 % starting from the pre-school teaching in the Turkish education system. In terms of the sociological and cultural factors, there have been several research findings that prove that the family socio-economic variables have the most critical effect on the school experiences of students among the other factors. Based on this, the researches that prove that the educational status of parents creates a versatile effect on learning opportunities of students have been remarkable (Bourguignon et al. 2007; Akbaşlı 2010a; Ferreira and Gignoux 2010; Özbaş 2012; Özbaş and Avcı 2013).

One of the most important results revealed by "The Research on the Equality and Possibility of Opportunity in Higher Education" was mother's employment level. This indicates that the families had low level of income in terms of economy because only the employment of the father is remarkable in the family; and the economic income provision of the family is only through the contribution of the father. In the research population which included the families with multiple children, it was established that the family income depends on the employment of the father; and the father's employment is related to the professions not higher education. According to this, it is clear that the share that can be allocated by the higher education students with low-income and crowded families to the educational expenses will remain at a highly low level. For that reason, applications of opportunity and possibility equality in higher education should be based upon an understanding giving prominence to social justice. It can be suggested that social justice in higher education will necessitate considering the needs of students in terms of their familial features and providing the necessary opportunities in this sense.

34.7 Conclusion and Suggestions

It has been established by this research on equality and possibility of opportunity in higher education according to chaos theory that socio-economic differences affect the learning experiences of female students. In terms of the female students, negative socio-economic factors create a sociological chaos. And the male students are affected by the socio-economic variables at a lower level than the female students. However, it was revealed that female students are more advantaged in terms of benefiting from the secondary education services than the male students. The basic reason for this is the positive discrimination. The female students accessing higher education generally come from families with higher socio-economic level. Political stability could not provide an important contribution to students in terms of benefiting from the higher education opportunities.

The students have a perception to the effect that academic counselling and pupil personnel services cannot meet their needs. The female students are disadvantageous in terms of benefiting from the higher education opportunities in terms of socio-economic and cultural factors. As the mothers' educational level increases, students are found to benefit from secondary and higher education opportunities more. The variable of mothers' educational status is a basic factor affecting the equality and possibility of opportunity in education at the highest level within the scope of students' benefiting from both secondary and higher educational processes, as well as socio-economic variables. Employment of the mother has a slight level of effect. The rate of education depending on the employment of the father is also at a fairly low level. The children of the families with multiple children are more disadvantaged in terms of benefiting from the educational opportunities.

At the end of the research, it is being suggested thus:

- To take necessary administrative precautions regarding students benefiting negatively from the educational opportunities due to their socio-economic and cultural features;
- To train the mothers with inadequate level of education without considering the grade of their children upon functional literacy within the scope of lifelong learning activities;
- To accept that the equality and possibility of opportunity in education cannot be provided for through making the students benefit from the opportunities of the school equally, but through considering the disadvantaged features of student families.

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Chapter 35
Chaos in Secondary Education Programs and Textbooks in Terms of Literature from Turkish Republic to Today

M. Abdullah Arslan

Abstract From the republic days to today, chaos in secondary education programs and textbooks in terms of literature has been deeply affecting every new generation and in no way allowing a cosmos/order. Solutions to the problems arising in education systems depend on the adopted national education policy in a country. The national education policy is actualized via education programs, especially the textbooks. For a long time, Ottomans could not decide about the issue of according to which model they would become westernized in education. It was observed that regulations were firstly made according to French sample, and then changed to German model and as of Republic period American-English model. From republic days to today, Turkish language and literature teaching program was prepared and applied by passing a grade level and sometimes passing a course and credit system as the basis, accordingly the textbooks were changed or restructured eighteen times during the periods 76 Ministers of National Education—with repetitions—were witnessed. In this paper, beside the fundamental problem; "Whether Turkish Literature and World Literature take part in secondary education programs and textbooks in an order, in a certain structure and in accordance with a purpose or not", how the Turkish Literature and World Literature take part in prepared programs and textbooks which were prepared within the frame of these programs; the characteristics of texts selected from related textbooks; how is their contribution to targeted man type and therefore the occurring chaos will be studied.

Keywords Chaos · Program · Textbook · Education · Turkish literature · World literature

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35.1 Introduction

Education is an applied field of science. For this reason, a solution for the problems in education must be sought in its source that's in the school or the education system as a whole. The solutions to problems arising in the education system in a country depend on the national education policy that is being followed (Demirel 1999). The national education policy is brought to life through education programs and accordingly through textbooks (Alaylioglu and Oguzkan 1976).

For a long time, Ottoman Empire could not decide about the model according to which it would westernize/modernize/innovate/develop education though many political balances in time brought about the necessity of changing the models of education. Nevertheless, it could be seen that the arrangements were first made according to the French example, later the German model, and to American-British model during the republican period.

The concepts of republicanism, nationalism, populism, statism, secularism and reformism on which the Republic is based show us the tasks undertaken by this period. These are the principles that the new generation should gain and internalize. So during the Republican era educational institutions both accelerated the process of information and also aimed at creating a new generation (MEB 1995; Özodaşık 1999; Yücel 1938).

In the Government Programme of 1920, you can find the following ideas regarding national education:

> To rearrange all our schools with the most contemporary and scientific principles in a consistent manner and to format their programs, to create textbooks in accordance with our nation's creation, character, history and social traditions, to create a dictionary of our language by collecting glossaries from public, to get the experts to write the social, historical and literary works that could revive the national spirit in us, to protect the old works having a national value, to get the works written in the field of science in the West and the East translated into our language, and thus working by paying special effort and care to national education which is the most critical factor to maintain a nation's life and presence (Öztürk 1968).

As mentioned above items like, "literature starting from cultural and historical aspects", "texts represent the period in which they occur", "the mentality of the era they were written", "national and universal values", "Turkish's position around civilization circles", "Turkish is the identity of the Turkish nation", "the Turkish way of life, thought, language joy, and developments specific to cultural life", "Turkish culture, history and literature form an inseparable whole", "Turkish people's development in culture, understanding, and enjoyment", "national and universal culture, thought, and elements of pleasure", "the periods of Turkish literature and the civilization circles Turkish nation inhabited" are directly or indirectly related to Turkish Literature out of Turkey and world literature (Çetisli 2008).

One of the most important elements of the education is curriculum, and the other one is the textbook. One of the conditions of a textbook to be a good educational tool is that it should be based on a good program while being prepared. Therefore, first and foremost responsibility falls to those who prepare the curriculum.

The second responsibility falls to those who prepare textbooks according to this curriculum (Ceyhan and Yigit 2003; Erdem 2005).

Individuals learn language and literature in school. Therefore, the teaching of language and literature is closely bound up with the development of culture. The role and importance of teaching Turkish Language and Literature in the school's function of promoting the culture, developing and empowering the student is great. Turkish Language and Literature Teachers, therefore, are in the first degree responsible for students in this regard (Kantemir 1976).

Overall, the total 18 program structures or changes have been identified since the first 1924 academic program until the last program addressed to high schools in 2005 (1340/1924, 1927, 1929, 1934, 1942, 1946, 1949–1950, 1952, 1954, 1955, 1956, 1957, 1976, 1991, 1992, 1995, 2005). It is known that 76 with reappointment or 63 different ministers ("proxy"s included) in the history of Republic of Turkey (Komisyon 1983).

During this process, the name of the course was changed as follows; Literature, Our Literary Innovation, French Literature Anthology, Literary History Lessons, History of Turkish Literature in the Last Century, History of Turkish Literature, Turkish and Western Literature with Samples, Turkish and Western Literature with Texts, Turkish Literature with Text, Western Literature with Text, Literary Texts, Turkish Language and Literature, Turkish Literature, etc. Sometimes it could be seen that literature and grammar lessons were separated from each other under Composition, Turkish Language, Language and Speech courses (Ergün 1997).

The chaos/uncertainty in education has always remained on the agenda and has never been transformed into cosmos (Yalçin 2006). From the first program of the history of the Republic until the last program, "literary history" focused change and restructuring can be seen. In 2005, a large and diverse change was undergone and the "unit" based program was prepared. Instead of having students in Turkish Literature lessons memorize the history of literature and literary personality information without knowing its function, text analysis, comprehension and interpretation skills were targeted to let them experience the joy of aesthetic life (Secondary Turkish Literature Course Program 2005 MEB 2007; Oguzkan 1985).

35.2 Historical Progress of Curriculum and Textbooks

In 1924, II. Heyet-i İlmiye was gathered and a curriculum for secondary schools was prepared. In this program, in which Mehmet Fuat (Köprülü), Ali Canip (Yöntem) and Süleyman Şevket took part in the literary part (Duman 1992: 1), it was requested that in high schools literature teaching should be based on texts and Western literature should be introduced. Reşat Nuri Güntekin, therefore, wrote the three-volume "Anthology of French Literature" for the realization of this goal (Duman 1992).

An "appendix" was added to the 1924 program in 1927. Accordingly, in V. grade, history of literature, annotated reading and written expression would be 1 h. This new application reduced the "Literary History" course in terms of duration.

With the Law of Unification in Education, issued in 1924, all schools were linked to the Ministry of Education and Madrasas were removed. Education was secularized, democratized.

Before 1938, a new structuring movement began in the national education system, democratic, secular and scientific education principles became the main source of educational philosophy (Kalaycı 2004). In 1928 after the adoption of new letters, there was a fundamental change in education and Arabic and Persian language courses were removed from secondary schools. In 1929, the literary program was reorganized under the name of "Turkish". These and other changes were made in 1934, 1937, 1938, 1942.

Though not in the program, in the textbook "Edebiyat Tarihi Dersleri, Servetifünun Edebiyatı, Lise III" by Levend (1938), under the heading of "Azerbaijani literature" "Azerbaijani literature" and "Turkistan circumstances" was included (pp. 344–351). In 1945 and afterwards, educational sciences got rid of European influence and started to be affected form U.S. education system views and practices. From time to time, Western educators (J. Dewey, Kühne, O. Buyse, E. W. Kemerrer) were asked to help in the development of education. Governments often reflected their own party desires excessively on education, therefore, a stable national education policy could not be followed (Akyuz 2001).

In the September 26, 1946 program, there was a "Reading and Literature" heading in the program. In the academic year 1949–1950, "Composition" was added to "Reading and Literature". The conspicuous words of this program are especially in the "Turkish literature at the beginning of 19th century" part, the acceleration of change in our social life and innovation due to the increased Western influence in our country in 18th century; the collapse of classical literature and its reasons. These phrases are important in indicating the direction of the Republic.

In 1952, high schools were made 4 years and "Western Literature" was included in the program due to its policy towards Westernization. On 13 September 1954, high schools were made 3 years again, but in 1955, 1956, and 1957 programs "Western Literature" took its place broadly. In the September 23, 1976 program, "World Literature" was used instead of "Western Literature". Also in this program again, "Turkish Literature out of Turkey" was also included.

Likewise, especially in textbooks, Kadı Burhanettin, Seyit Nesimi, Hatayi, Fuzulî, Ali Şir Nevaî, Mevlânâ etc. sometimes were included in Anatolia/Turkey literature, and sometimes under the title Hakaniye Turkish, Chagatai Turkish, Azerbaijani literature, Persian literature and so on. In some programs, the Greek epics such as Odissi and the Iliad were cited; the Turkish epics such as Manas have been ignored. Again at the back of Özön's "Last century History of Turkish Literature" (1945) textbook, in the "Literary Questions" sent to schools by the Ministry to be asked in "graduation/maturity" exams related to 1927–1940 school years, there were Western literature questions such as "Westernization issue in our literature" "Travelogues in World Literature" "Romantism" but there weren't any questions related to Turkish literature outside of Turkey (MEB 1981).

"Turkish Literature out of Turkey" was included in November 20, 1991 program together with World literature. On November 9, 1992, the "Course Passing and Credit System" was adopted and "History of Turkish Literature" was included in the program. But in the 1995–1996 academic years, though this program remained in effect, the "Grading System" was restored from the "Course Passing and Credit System".

Turkish Language and Literature courses have been taught in "general education", "vocational and technical high schools" that have at least 4 years of teaching since the 2005–2006 academic years. In this latest program, neither "World Literature" nor "Turkish Literature out of Turkey" was included; that is people and works related to literature were given only in consideration with the borders of Turkey.

35.2.1 The Situation in Programs and Related Textbooks

In Table 35.1, the number of writers shows the situation in which each writer was taken once.

As it can be seen from Table 35.1, from the Republic to the 2005 program, a total of 26 writers (9 %) from Turkish Literature out of Turkey, a total of 56 writers (20 %) from world literature, and a total of 194 writers (71 %) from Turkey and overall in total 276 writers were mentioned.

In the early programs of Republic (1924, 1927 and 1929), periods were usually preferred instead of giving the names of writers. However, in the textbooks written according to this program, world literature was given 28 % in 1924, 100 % in 1927, and 23 % in 1929. Turkish Literature out of Turkey in the 1929 textbooks was referred to as "Chagatai literature" or "Azerbaijani literature". The fact that World literature was given 46 % in the 1934 program, 29 % in 1952, 49 % in 1954–1955, 49 % in 1956 and 44 % in 1957 indicates that the new generation after the Republic was desired to be grown around world/western literature, on the contrary, the fact that world literature declined to 12 % in 1976, 13 % in 1991–1992–1995, and 4 % in 2005 reveals that feelings of nation and country are more important than the world/west thought.

In Table 35.2, the number of writers shows the situation in which each writer was taken once. Until the textbooks prepared in accordance with 2005, in Turkish Language and Literature textbooks, as suggested in the table, 57 (7 %) writers from Turkish Literature out of Turkey, 240 (33 %) writers from world literature, and 438

Table 35.1 A total of 276 writers from Republic programs to 2005 program

Turkey literature	Turkish literature out of Turkey	World literature
71 %	9 %	20 %
194 writers	26 writers	56 writers

Table 35.2 A total of 735 writers in the textbooks Republic programs to 2005 program

Turkey literature	Turkish literature out of Turkey	World literature
60 %	7 %	33 %
438 writers	57 writers	240 writers

(60 %) writers from Turkey literature, overall in total 735 writers were presented. It could be seen that more writers were presented in the textbooks according to the programs. Often in the programs, the period or type name was given rather than the name of writers. In textbooks, writers and their works were selected accordingly.

The reason of the World literature's 100 % percentage appearance in textbooks in 1927 is due to the fact that the Anthology of French Literature was the only textbook taught in schools. Turkish Literature out of Turkey was given 18 % in 1938 program, 6 % in textbooks; 12 % in 1949–1950 program; 15 % in 1976 textbooks, 13 % in 1991–1992 program, 11 % in textbooks. This condition reminds the following events respectively; Hatay issue, II. World War, the Cyprus problem and dissolution of the Soviet Union. That shows that in the wake of these incidents country and in particular nation ideas came forward.

In the 2005 program still being followed, and therefore in textbooks prepared according to this program, both Turkish Literature out of Turkey and world literature have been disregarded. The reason of the World literature's 4 % percentage appearance in textbooks is due to the fact that the proponents of that kind stand out too much, and so it cannot be ignored. Indeed, the literature accepted and taught throughout the history of the Republic within the boundaries of Turkey has the highest percentage both in the program (96 %) as well as in textbooks (84 %) in this year (Demir and Yilmaz 2006).

35.2.2 The Situation in 100 Essential Works, Osys and the National Council of Education

In the "100 Essential Works" recommended for secondary education by the Ministry of Education in 2005, there are four works and three writers from Turkish Literature out of Turkey. (Cengiz Aytmatov: Beyaz Gemi, Gün Olur Asra Bedel; Cengiz Dağcı: Onlar da İnsandı; Mehmet Selimoviç: Derviş ve Ölüm) (Table 35.3) (MEB 2013).

There has never been asked a question in ÖSS/ÖSYS, though Turkish Literature out of Turkey was included in 100 Essential Works (Table 35.4).

Table 35.3 TL, TLOT, WL included in 100 essential works

Turkey literature works	Turkish literature out of Turkey works	World literature works
72 %	4 %	24 %

Table 35.4 TL, TLOT, WL in OSS /OSYS

	Total number of the questions	Turkish literature out of Turkey questions		World literature questions	
		Number of questions	%	Number of questions	%
1974–1980	4–10	–		0–1	0–10
1981–1986	37–39	–		1–2	2–5
1987–1998	62–67	–		1–2	2–3
1999–2005	42–45	–		–	
2006–2009	17–20	–		2–3	12–15
2010–2013	56	–		2	4

Though Turkish Literature out of Turkey was included as a section in 1992 program and textbooks in accordance with it, there weren't any questions in the exams carried out until 2008 when this program was phased out gradually and this led the students not to pay any attention to it. Hence, it could be said that OSYM didn't consider the weight of a subject in the program or textbooks when writing the questions.

In 56 questions asked about Turkish Language and Literature in the new test system applied in 2010–2013 LYS-3, while there were no questions related to Turkish Literature out of Turkey; there weren't asked any questions about World Literature either apart from the terms related to poetry (monologue, pantomime, tuluat, comedy, tragedy, etc.) and movements (classicism, romanticism) (OSYM 2013).

35.2.3 The Situation in National Education Council

Eighteen National Education Councils were gathered between July 17–29 1939 and 01–05 November 2010. In Council decisions, Turkish is mentioned more than the Turkish language and literature education. Under different headings, Turkish teaching has been included in nine Councils (MEB 2013).

While Turkish education was given 3.13 % at 18 Councils, Turkish Language and Literature education was mentioned only (4) four Councils. In the decisions taken at those eighteen Council meetings, the emphasis of "Cooperation of education and common Turkish should be aimed with Turkish" at the 15th Council, and the expression of "Samples of Western and Eastern Literatures should also be included" at the 12th Council raise the necessity of teaching world literatures to students.

Consequently, all of these changes, of course, are important issues closely related to first and foremost students, parents, and then educational institutions.

- In today's program and textbooks, just as Turkish Literature out of Turkey is not included, world literature is not included either apart from movements.
- Course programs have been repeatedly edited or modified in parallel with the changes and innovations in the education process of Turkey's Western and political-style. Thus, the textbooks prepared in accordance with the program have been affected from this change/uncertainty.
- Turkish Literature out of Turkey in terms of Turkey's ties and unity with other Turkish Republics and communities; World Literature in terms of culture change and cultural interaction are extremely important. But the most important aspect is teaching students "what, why, how much and how".
- Turkish education lacks the quality of tradition and history. The idea of "continue" in the principle of change was only poorly understood. Positive restructuring, universality and locality, nativism are the fundamental characteristics of education.
- In our country, today there is always a new discussion related to education. 4 +4 +4 system, changes/uncertainties in SBS, casual style dressing issue, changes/uncertainties in the university entrance exam, attendance and report change in high school senior classes debate has persisted and recently experienced "dershane" shutdown process clearly reveals the chaotic state of our education system.
- Finally, throughout the history of Republic of Turkey, in our country, where it is known that 76 with reappointment or 63 different ministers ("proxy"s included) served, a state/continuity tradition must occur with positive change in terms of programs not in terms of education ministers.

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Chapter 36
Assessing the Impact of Project Atmosphere and Leaders on Risk Management in Chaotic Environments

Nilgün Dinçarslan Ergel and Ömer Livvarçin

Abstract Risk management is one of the most important activities in organizations and has been widely investigated by researchers. Predate studies generally focused on various reasons of risk and similarly on various tools and methodologies for risk mitigation. Although existing risk related researches cover most of the affecting parameters of risk, they ignore the influence of the atmosphere and the role of the leaders in affirming it. This study defines atmosphere as an umbrella concept to explain the total result of all constructive and destructive attitudes of project stakeholders. The impact of the atmosphere and the role of a leader have become more critical especially in chaotic environments. This study proposes both conceptual and analytical tools for the assessment of project atmosphere and determines roles for leaders from the perspective of risk management. The authors coin this methodology as "atmosphere management" and bottom line the leaders' vital role in the success of projects especially under conditions of high complexity and chaos.

Keywords Risk management · Project management · Project atmosphere · Atmosphere management

36.1 Introduction

Risk is the "possibility of loss or injury; someone or something that creates or suggests a hazard" (Regan 2003). Therefore risk management is one of the most important activities in organizations and has been widely investigated by researchers

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up to now. The Project Management Body of Knowledge (PMBOK) identified project risk management as the following six major processes (2013):

1. Plan risk management
2. Identify the risk
3. Perform qualitative risk analysis
4. Perform quantitative risk analysis
5. Plan risk responses
6. Control risks

Predate studies generally focused on various reasons of risk, risk probability, effect and magnitude. Various tools and methodologies for risk mitigation are developed.

Although existing risk related researches cover most of the affecting parameters of risk, they ignore the influence of the atmosphere and the role of the leaders in affirming it. Up to now stakeholder unexpected disagreements are evaluated as a risk item, however all risks which have been defined during the project life cycle change according to the invisible effect of the atmosphere.

Project risk management includes the process of conducting risk management planning, identification, analysis, response planning and controlling risk on a project. The objectives of project risk management are to increase the likelihood and impact of positive events on the project (PMBOK 2013).

General literature on risk management principles indicates that atmosphere management is ignored during all phases. However we claim that atmosphere management is a very important parameter for all risk management phases.

International Project Management Association (IPMA) develops the eye of competence structure. The eye of competence represents the integration of all the elements of project management as seen through the eyes of the project manager when evaluating a specific situation. The eye also represents clarity and vision. After processing the information received, the competent and responsible project manager takes appropriate action (2013). However it has not been mentioned directly as an atmosphere effect in literature, when managing the project with Project manager eye, behavioral competency conflict and crisis management skills come into prominence.

36.2 Proposed Model

All organizations, no matter whether they are small, medium, or large businesses (Smith and Stulz 1985) which operate in today's fast flowing dynamic business environments undoubtedly face various types of uncertainty (Makowskia 2005) and risk.

Adam Smith has also studied how the human brain mental balance or imbalance directs behavior. According to Smith in the beginning, mentality is in balance until

meeting the shock. Therefore it is obvious that uncertainty covers the shock and surprise. At this point risk is discussed with uncertainty (Alada 2000).

According to Hutchison, an environment of distrust causes skepticism, so it triggers chaos. An individual can meet uncertainty and risky situations easily within a chaotic environment (Yalcinkaya and Özsoy 2003). When managing a project we can see that all powerful vectors are spread all around, in this case Project Managers always stand alone and have to give right decisions. Up to now individual characteristic effects have always been felt, but not included Project management systematically. In this study we emphasize the phenomenon which existing researchers have felt so far. There is no problem even when the sun is shining during the project. When conflict clouds surround everywhere, conflicts become more critical and this signifies that you are managing a real project from now on. When the atmosphere is changed negatively, the expected magnitude of risks will be more critical. They may even get out of control (Fig. 36.1).

1. When atmosphere effect is positive and risk is small, it is the ideal environment and all project managers prefer such an environment.
2. When atmosphere effect is positive and risk is getting bigger, you must be ready for crisis management.
3. When atmosphere effect is negative and risk is small, it is unnecessary crisis. Go away without looking back.
4. When atmosphere effect is negative and risk is getting bigger, it is chaotic environment, it is very important to manage this environment fairly.

Chaotic atmosphere phases in projects, when atmosphere is positive in bidding phase it is very advantageous for the leader to be able to negotiate the contract items. But on the other hand when the atmosphere is negative, negotiations may be

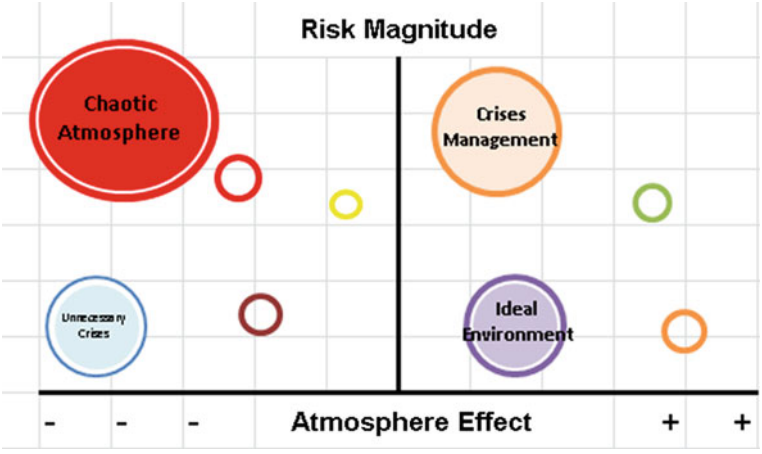

Fig. 36.1 Atmosphere effect versus risk magnitude

terminated after all. So a leader's strategic capability is very important and affects the atmosphere pattern. In project execution phase:

- Misunderstanding of existing requirements,
- Personnel changes in the middle of the project execution phase,
- Decreasing the budget, time or other project sources,
- Partial or full failure of the project,
- Stakeholder atmosphere degeneration,
- Self-disagreements may occur.

36.3 Conclusions

Although there is no broad consensus on the definition (Hillson 2003), risk might be generalized as a situation, event, or activity in which something of human (or organizational) value has been put at stake and where the outcome is uncertain (Jaeger et al. 2001).

Some researchers associate risk with possibilities of plan failures, threat of wrong decisions, situations of losing money, or profiting not as much as expected (e.g. Bolak 2004). Some others even demoted and solely connected risk with the probability of losing invested capital (e.g. Fidan 2009). On the contrary there are also more optimistic approaches. Citak (1999) for example, defines risk as the distribution of possibilities around the average of expected return and points out the gainful and harmful aspects of risk in collaboration with each other. Risk, in summary, is the summation all all uncertainties related to a particular human, organization or activity and embodies both opportunities and challenges simultaneously (Hillson and Murray-Webster 2006).

Every organization (be it for profit or non-profit, be it public or private) that wants to survive under changing economic conditions must have a plan to manage risks (Modigliani and Miller 1958; Merton 1989). Coping with risks is perhaps the most important objective an organization can expect from its management (Rawls and Smithson 1990).

When a real problem occurs, a leader should be flexible or may cause crises. Especially in chaotic environments the impact of the atmosphere and the role of a leader become more critical. If managers succeed in establishing a positive atmosphere within the project environment they will definitely decrease both the possibility and harmful effects of risk.

Organizations mostly engage in risk management by means of insurance, diversification, and hedging activities (Mason 1995). But the establishment of a positive atmosphere might be more crucial in most of the cases.

Risk management applications are not exclusively in the arena of finance. Managers from all aspects of business need to be trained in recognizing risk factors, diagnosing the causes of risk, and strategizing to make appropriate decisions to ensure desired outcomes. Regardless of which niche business one finds him/herself

in, the element of uncertainty and risk is a constant possibility in every organization (Livvarçin and Fikes 2009, 2010). Arrangement of risk atmosphere is usually the cheapest solution to deal with risk.

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Chapter 37
The Main Problems of High Quality Training of Future Specialists

Zhumabekova Fatima Niyazbekovna

Abstract Training is not complex but largely challenging too. To ask organizations to develop training programs that improve their staffs is quite complex too; while pondering over high quality training is relatively close to impossible. A number of challenges can be encountered in the process of training staff especially when the essence is securing the future of the organization by training future specialists. The main problems of training future specialists in Kazakhstan both in the near and far future were versatily considered in this study. Ways of high quality training of the future specialists, factors for the upgrading of qualifications and final conclusions were equally drawn. The modern labor market has a great influence on the requirements of the training of the future specialists such as being educated, creatively intelligent, be able to apply the knowledge in practice in any sphere. Therefore, the aspiration of the universities in the training of responsible, qualified, competitive and versatily developed competent specialists is an obvious process in the present stage. Because the society needs specialists who are really steady in terms of frequent changes of the contents and descriptions of the social and economic and as well spiritual development.

Keywords High quality training · Specialists · Complexity

37.1 Introduction

As a result of the realization of the state program of education development in RK for 2011–2020 it was pointed out that a uniform system would be provided. It would be a system ensuring training of professionals who are capable of finding creative approaches to any problem, understand the professional importance of their specialty and competitive specialists in their field. The program promotes the training of the future specialists conforming to modern requirements. Considering

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that this program is directed towards improvement of the knowledge quality in a new economic and welfare environment, necessity of reforming the education system of RK will be revealed. There are some features in the professional activity of the teachers. These are their ability to accept creatively scientific and pedagogical ideas, possession of the pedagogical competence and corresponding the theory and methods of teaching (Elaine 2007).

37.2 Complexity of High Quality Training

There is a growing realization that the development of employees' knowledge and skills in relation to teaching and community engagement requires the same deliberate nurturing that the development of research capacity has always enjoyed in some institutions (Odina 2012). The "sink or swim" orthodoxy in relation to new staff joining academia is no longer tenable. Nevertheless the whole process of training and the resulting quality of the trained people is no bed of roses.

To contribute to the transformation of the academic workforce nationally and in recognition of the complexity of academic work, there is need to develop a proposal for a structured, nationally funded and co-ordinated endeavour to grow the next generation of employees (Elaine 2007). This is because we may train individuals whose quality may add absolutely nothing to organizational growth and development.

Career planner.com warns training planners about the other factors involved in determining whether training is needed which include the complexity of the work environment, the rapid pace of organizational and technological change, and the growing number of jobs in fields that constantly generate new knowledge, and thus, require new skills. In addition, advances in learning theory have provided insights into how adults learn, and how training can be organized most effectively for them.

Meanwhile (Seefeldt and Peters 2000) add challenges arising from high caseloads, computer problems, and large amounts of paperwork.

It is however (Odina 2012) who draws a clear analysis by sifting out the major aspects of complexity related to training. These are:

Inappropriate Training When performance problems arise, the usual response is to provide training. However, training may not always be the appropriate solution. Training is often given as a reaction to perceived needs without taking time to analyze the root cause of performance issues. A training-needs assessment looks at gaps between current and desired performance, analyzes core problems and recommends interventions. Sometimes, the right response may not be training but other management solutions, such as improving work process, changing the work environment or communicating expectations.

Training Costs Training is an expense that some companies are not willing to pay. Small organizations may not be able to afford to hire a training consultant or to send their employees to formal training programs. But training is now more accessible through the use of technology. Online courses have made it easier and less costly to

train. Organizations can also use other training tools that do not cost anything, such as mentoring, on-the-job training and shadowing.

Return on Investment Training is an investment that must show returns. Often, it is difficult to see the actual impact of training. An evaluation form completed at the end of training only shows participant reactions. Senior management needs concrete proof, such as increase in productivity and sales. Training must also result in a decrease in errors, customer complaints, accidents and down time. Training becomes of value when it contributes to the bottom line. The HR department must provide metrics that support the training expense.

Elaine (Elaine 2007) offers her own version of complexity of training high quality employees citing the following:

Time Constraints Who has time to train? Assigning a mentor is a good idea, but it is hard to be assured that that mentor is giving the other employees the proper training.

High Rate of Turnover we give employee training to new employees, but how do we guarantee that they won't take that training and move on? Then we have to begin again with another new hire.

Overwhelming employees with too much information we have safety training, program training, procedure training…not only new employees, but seasoned employees alike can be inundated with too much training. How do we prioritize and manage a training program?

Inexperienced employees we hire someone we know is right for the job, but they're fresh out of college and while they may be somewhat knowledgeable, they're not necessarily trained for the actual job, or the work environment in general.

The uniqueness of each employee Each of the employees is different and the way they learn is different, too. How can we be assured that each of our employees is retaining the information that they're being trained on?

Such issues and questions attract not only serious concern and debate but also guide the training system for future specialists in varying organizations. In this study, the Main Problems of the High Quality Training of the Future Specialists are explored bearing in mind that the undertaking is largely complex so to speak.

37.3 Problems of the Training of the Specialists in Foreign Countries

The long-term analysis of changes in the system of higher education of both the near and far became the main mechanism for a quality education in many countries, therefore, the number of students who want to be educated abroad increases each

time. Due to the widely developed industrial system in such countries, highly qualified specialists is a value of these countries and one of the significant factors for cultural progress. Education is a basic element of each country which allows such a country to compete with other countries.

The policy of the education's consideration as a scientific social factor which creates conditions for development of the future experts from the people's progressive point of view is widely spread in the countries with a developed system of higher education (Turkey, Japan, England, Germany, Sweden, Finland, and France). The main reason for such a policy is that the content of education in these countries is based on achievements of psychology; therefore, this system is more psychological in comparison with the system of the future teachers' training in other countries of CIS. Special attention is paid on an individual training and goes for storing of the training material and self-government of the students in many developed countries.

For this reason students' independent study is carried out by teachers and estimation of the education is carried out on the basis of the requirements of international quality management and the main attention is directed to vocational training in the developed countries. In CIS countries, namely in Russia and Kazakhstan, the main attention is paid to general scientific training. Kazakhstan always pays great attention to:

- intensification of the training process by paying much attention to the student's independent work in the developed countries;
- realization of the programs for training of the highly qualified specialists;
- strengthening of the individual forms of the education;
- implementation of the modern methods and techniques of the training.

The major mode of being considered highly educated is getting higher education at a university in many developed countries of the world. In Japan 78.3 %, in France 85 %, in the USA of 91 % get university education and this is the only way to become full-fledged specialists within the higher education arena. Higher education is supplemented with education in colleges in Germany. The highest professional schools-colleges were opened for the new directions in the training of future specialists in 1970–1980. Future of higher education institutions in Turkey and in the world, higher education institutions of future have been discussed intensly in terms of purposes, structure and all dimensions (Erçetin 2001a, b, c, 2002). The necessity in non-traditional educational institutions recently increased due to information technologies and their demand in society. This is the way how we came to the education system integration by diversification of the old methods of the education system.

Carrying out the comparative and pedagogical analysis of the education systems is a methodical problem. The main aim is determination of higher education's position in social-economic and scientific-technical progress of the country. From this point of view, it is important to analyze higher education in the developed countries in a systematic way. World competition, objective conditions and

requirements of scientific progress are the reasons of searching for mechanisms of the professional specialists' training. Changes in education are clearly noticeable nowadays as follows:

- development of the higher education system in a macrostructure "science-manufacture";
- diversification of the educational institutions' functions by models of the chosen specialties;
- development of the structure on the training of the versatile specialists;
- establishment of the departments for the training of the specialists in separate educational institutions;
- development of continuous education;
- development of post-graduate educational activity;
- providing organized research work in the higher education system;
- training of specialists by inquiries and requirements of the manufactures.

For Kazakhstan which develops gradually, it is necessary to define the scientific and methodical bases for the development of the training of the future specialists and to develop the strategy of certain actions. Any action has to be scientifically reasonable, to have aim and an opportunity to be realized, only then it will have any results (Erçetin and Kayman 2014).

37.4 The Quality of Higher Education at the Training Specialists

Quality of the training of specialists which is a basis of our research, has to answer the purpose of the specialists training, norms, standards and requirements of the consumers, here inquiries of consumers are defined by applications which are submitted for the professional transformation. This concept is closely connected with the concept "quality of the higher education". They can be defined as follows:

The quality of higher education is a compliance of the aspects of the higher education to the purposes, needs, requirements, norms and standards of the educational process (Erçetin et al. 2013a). Quality of the future specialists training is described by the following indicators: deep studying of a subject; development of the aspiration to creativity; existence of the internal mechanism for knowledge of the unknown; motive for development of the ability to the independent work; existence of interest in the subjects; knowledge of the fundamental basis of science; new technologies of education; knowledge of pedagogics and psychology for organization of the educational process; existence of qualities such as independence, leadership and creativity.

There are ways of ensuring the quality of the education in science which include:

1. Ensuring the authority of a traditional institution of higher education, which means that the graduate of such an institution of higher education has a great opportunity for a good employment.
2. Ensuring compliance to the scientific standard, knowledge satisfying the client is considered as qualitative.
3. Providing for various manager-client requirements
4. Granting love and desire of consumer quality of education in the institution of higher education
5. Bringing democratic advantage to the region where the institution of higher education is located.

As it is specified in the World declaration adopted in the international conference, the quality of higher education is a multi-sided concept, covering complete university structures: training and academic programs, educational and research works, professional staff, students, educational material and resources (Erçetin et al. 2013b).

The problem encountered in training of specialists is considered up to these days. In a broad meaning the quality of higher education is defined by its compliance to requirements of the development of future and current social and economic state of the society, so as to measure how it is capable of satisfying inquiries of the society and people.

37.5 The Problem of the High Quality Training of the Future Specialists

It should be noted that the training by new technologies is systematically used. It seems valuable in analyzing the condition of the present vocational training of the future specialists. It is possible to refer to retraining of the specialists as interactive education, or even training by different technological methods. Modernization of the educational system is the requirement of the society nowadays. Modernization of the educational system has 3 stages in Kazakhstan.

- The first is optimization of the educational institutions and implementation of the modern technologies and techniques in the educational process.
- Second is paying special attention to the improvement of the quality of the teaching staff. It is necessary to treat more strictly the requirements of the development of teachers' qualifications. The integration centers for increasing of the teachers' qualifications have to work in each region.
- Third is the availability and advantage of the education services, and also drawing up an independent system for the qualification.

The modernization of the educational process in the training of the specialists has began to take root in the educational system. For instance, modern academic independence completely changed the education system. The basic principle of academic independence is that student learns subjects according to his own choice of specialization. Elective courses are trained in compliance with inquiries of the labor market. Strengthening of the directions and inquiries concerning the modernization of the educational process is planned. Moreover, there was much attention paid to studying of the languages, electronic education, inclusive education, solutions of the problems with small schools and preparation for 12 years studying. Training of highly intellectual future specialists, owning information technologies and directed to research work has to be qualitative. Training of the school teachers and scientists must follow the order in educational centers of training.

The institutions of higher education use different innovative methods for training of high quality specialists for competitiveness of Kazakhstan. The program "academic mobility" is widely used in many universities of the country. Allocation of a large number of grants, considering local specializations, modernization of the training material and development of online methods of studying are the main props of higher education in RK (Erçetin et al. 2013b).

While training future specialists, the quality of the education is always actual. It has some reasons thus:

- Change of the values system in a quickly developing society. People realized that the necessity of knowledge is not only for its facts and descriptions, but for predictive researches as well.
- Different quality of training programs, curricula and educational methodical complexes.
- Different material, social and intellectual opportunities of the graduates.

The major catalyst in the realization of educational reform is the teacher. The state social inquiry directs that teachers have a duty to formulate a competent personality who is ready to make a crucial decision at the level of kindergarten or school, and capable with solidarity and unindifferent to the country's future. The social truth and tendencies indicating it in the education system are directed to the qualified and professionally cultural specialists. It gives a huge opportunity to the consideration of the pedagogical services directed to corresponding developments of a new generation and getting quality education as process of studying is under control of the administration of the educational organizations and the teachers (Erçetin 2002).

Leadership and chaos can be considered fundamentally interconnected, topics of chaos and leadership have been classified, unitized and graded in a variety of ways (Erçetin et al. 2013a). There are good examples of people dealing with chaos and this is true especially for the managers at schools (Erçetin et al. 2013b). When the organization envisions the future and possible probabilities, it will challenge change and uncertainty, and will make the chaos an opportunity to success (Erçetin and Kayman 2014).

37.6 Main Conditions for Ensuring the Quality of the Training of the Future Specialists

Main conditions:

- usage of the technologies on the health care which grant a chance to create an educational process without harm and excess physical and psychological pressure for the younger generation;
- high quality of programs and methodical books which create the opportunity for carrying out the educational process according to the modern requirements and levels;
- development of environment knowledge, activity, expressing of own opinion in children and the assistance of the help to get used to the conditions of the world around.

Each of the conditions mentioned above is widely used at the high quality training of the future specialists. In our opinion, it is impossible to provide performance of each condition without the qualified teacher who organizes successfull development of the child. It is possible to list some qualities which should be owned by the modern future specialist:

- creativity and desire for self-development;
- motivation and readiness for modernization;
- understanding modern opportunities of educational institutions;
- ability and requirement for reflection.

We define the quality of the training of the future specialists by creation of a pedagogical process during the practice in the educational institutions and determining the level of professional skills like adoption of the correct decisions and competence of the teacher. Therefore, the parts of the professional qualification of the future specialists for successful organization of the educational process should be noted, these are: the organizational and methodical; educational; and scientific research. The organizational and methodical part of pedagogical qualification is a versatile content of the educational process, the choice of the technologies and correction of the activity system of the teacher, besides, this part helps to solve problems which can be arise between pupils, parents and the management of the school and also to achieve the objectives of education and a sociality of the younger generation (Erçetin 2002).

An essential part of the training of the future specialists is its didactic theory, professional education, skill and system of experiences. Education is a theoretical and practical aspect of the children's preschool education, and also gives the chance to seize organizational—methodical bases and the moral and personal contents of the development of the child in establishment of preschool education. It is necessary to undertake useful and creative methods for the development of the child on lessons at ensuring educational process for children of the preschool age. Essential research part of the pedagogical skill is a basis for the further development of the

teacher's pedagogical activity. It gives the chance to make out a difference of psychological-pedagogical and methodical information.

The modern system of professional education demands from the teacher not only understanding of their pedagogical duties, but also mastering reflexive part of the skill for communication with colleagues and administrations. Realization of that part depends on critical thinking, aspiration and competent analysis, ability to prove the positions and an aquisition of any information by teachers.

37.7 Development Factors of the Level of the Professional Qualification of the Future Specialists

There a number of factors which influence the level of professional qualification of future specialists as follows:

- knowledge of the methods and the techniques for the organization of the educational process for the preschool children;
- ratio of the pedagogical process participants (psychological-pedagogical and anatomo-physiological features) and the contents of variable pedagogical process;
- knowledge of the conditions for realization of the pedagogical processes (psychology and pedagogical, hygienic), etc.;
- ability to analyze the maintenance of different educational programs, their comparison and ability to distinguish marked-out features from other programs;
- ability to analyze the methodical literature connected with the different programs, ability of the choice of the necessary descriptions and didactic materials conforming to the certain requirements of the program;
- ability to distinguish the maintenance of the organization of children's life and features of the pedagogical conditions conforming to the requirements of the program and definition of the methods in education and training of the preschool children;
- ability to analyze and estimate the duty, role and place of the teacher in the educational program within the alternative preschool institutions (Erçetin 2001a).

Generally, all substructural parts of the professional qualification are directed to the practical activities of the preschool specialists, namely, the ability to resolve different pedagogical issues. Professional training of the teacher, that is his knowledge and practice acquired in the course of teaching and ability to rally personal and social features and values as well are the main compound of the professional qualification so, it is the factor for increasing the quality of education level in the preschool institutions.

37.8 Conclusion

We consider that it is necessary to make the right choice, to modelize, create a favorable situation for the communication of the teacher and student, to keep professional ethics and norms, to provide qualitative knowledge in the vocational training of future specialists. The modern labor market has a great influence on the requirements of the training of the future specialists such as being educated, creatively intelligent, be able to apply the knowledge in practice in any sphere. Therefore, the aspiration of the universities in the training of responsible, qualified, competitive and versatily developed competent specialists is an obvious process in the present stage. Because the society needs specialists who are really steady in terms of frequent changes of the contents and descriptions of the social and economic and as well spiritual development.

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Chapter 38
An Evaluation of the Classroom Teachers' Attitudes Towards the Constructivist Approach According to Complexity Theory: A Case of Mersin

Sait Akbaşlı and Lütfi Üredi

Abstract The major aim in this research was to analyze the relationship between the attitudes of primary school teachers towards the constructivist approach and the complexity features (gender, age, the grade they teach, professional seniority, the type of school where they carry out their duties and the school where they graduated from). The research was a descriptive study based on the single screening model. In order to determine the attitudes of primary school teachers towards the constructivist approach, a "Constructivist Approach Attitude Scale" developed by Evrekli et al. (2009) was adopted; and in order to determine the complexity features of primary school teachers, a "Complexity Information Form for Primary School Teachers" was used. The evaluation instruments were administered to 504 primary school teachers carrying out their duties in 32 primary schools in Akdeniz, Yenişehir, Toroslar and Mezitli central districts of Mersin province. According to the research results, the variables that affected the attitude towards the constructivist approach and created complexity were related to the gender of primary school teachers, their age, the grade they teach, their professional seniority, the type of school where they carry out their duties and the school they graduated from. The research revealed that majority of primary school teachers had a positive attitude towards the constructivist approach in terms of their views and there was no significant difference between their attitudes towards the constructivist approach and their gender, age and the grade they teach.

Keywords Primary school teacher · Constructivism · Approach · Attitude · Complexity theory

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38.1 Introduction

The transition from the industrial society to the knowledge society has been accelerated by the rapidly improving technology within a changing world. The education system, together with this new point of view, has renovated itself, and has overseen various reforms to meet the new human model. In accordance with this, Turkey adopted a curriculum based on the constructivist approach in programs at elementary education level in the 2005–2006 academic year. This new curriculum prepared within the scope of the new viewpoints was intended to put an end to rote learning and emphasis was put on preparation of the curriculum in accordance with an approach supporting and developing the active participation, making correct decisions and problem solving of an individual considering the existing experiences of individuals and the value of knowledge beyond the constructivist approaches. Through this curriculum, it was aimed to actualize a new understanding providing the opportunity for students to interact with their surrounding and considering the individual differences and students' own experiences as well as balancing the student and activity centered knowledge and skills. Due to its feature of facilitating and developing these aforementioned traits, the "constructivist approach" formed the basis of the curriculum.

Constructivism is an epistemology and a theory of learning premised on making meaning (Richardson 1997; Sewell 2002). According to this theory which explains the nature of knowledge and how people learn, people create new meanings through the interactions formed in terms of the ideas, events and activities they have encountered or experienced before. The knowledge is acquired through participation rather than repetition or memorizing. The learning structure in this approach is organized depending on activities such as active participation, analyzing, problem solving and cooperation with others (Abdal-Haqq 1998). Hackmann (2004) defined constructivism as a process in which the learners create their own reality, or interpret the meaning depending upon their own experiences and perceptions, and accordingly it is a process in which individuals use their knowledge to interpret previous experiences, mental structure, and the meaning of objects and events. For that reason, the constructivist approach purges the ideas on knowledge from only being some processes developing out of students, and puts the learner at the center of learning. The knowledge is a product structured by anyone as a result of interactions though their surrounding (Bhatnagar 1997). The constructivist approach accordingly supports teacher's processing, internalizing the newly acquired knowledge and associating it with the previous knowledge within the brain efficiently (Abdal-Haqq 1998). According to this approach, learning is a process of creating an understanding related to the world. The knowledge in the learning environment is produced through social interactions, and is specific to the individual (Fox 2001). According to Snyder et al. (1992 cited in Turgut 2001), the knowledge in constructivism has "a created, discovered and experienced structure." According to Applebee (1993), the knowledge in constructivism has a feature that cannot be defined absolutely, but structured through the social activities.

Although the constructivist learning approach has become popular in recent years, the real origin of constructivism goes back to the antique age philosophers such as Socrates, Plato, and Aristotle during the formation of knowledge. Moreover, Kant philosophy and thoughts of Italian philosopher Giambattista Vico in the 1800s and 1900s also provided a basis for the formation of the constructivist approach. At the beginning of the 20th century, it was dependent on names such as William James, John Dewey, F. C. Barlet, Jean Piaget and L. S. Vygotsky (Tezci and Gürol 2001). However, despite the contributions of all philosophers, Piaget (1896–1980) is accepted as the father of the modern constructivist approach. In "cognitive constructivism" understanding, Piaget suggested that the individuals adapt their mental schemes according to new ideas. This organization and adaptation process creates the main themes of constructivism (Fosnot 1996; Applefield et al. 2000; Durmuş 2001). Vygotsky (1896–1936) who developed a socio-cultural point of view to constructivist understanding emphasized the concept of cultural identity, the geographical area where the individual lives, and accordingly the spoken language on influencing the process of constructing knowledge in the brain. Vygotsky who emphasized the understanding of "social constructivism", accepted the point of view that the connections between people, communication ways such as sharing, discussion, comparison between the teachers and students are the origin of knowledge structuring (Senemoğlu 1998; Applefield et al. 2000; Tezci and Gürol 2001). The cooperative nature of social constructivism is different from the individual nature of cognitive constructivism. Social constructivism emphasizes social change considering the effect of cognitive development and culture. It recognizes the importance of social and cultural context since learning occurs in models such as cooperative learning and situated cognition. However, it is really hard to understand the cognitive structure of an individual without observing the interaction s/he presents within a culture. For that reason, both social interaction and personal knowledge constructions are important factors of cognitive development (Maypole and Davies 2001). The constructivist understanding at the present time has become the focus point of modern educational systems through its being student-centered. For that reason, it is considered that determining the deficiencies of constructivist approach related to practice and analyzing in terms of the complexity theory is important.

The theory of complexity was suggested by Stuart Kauffman. According to this theory, the organisms having several little pieces immediately adopt a regular life. The driving forces within the system provide these structures with the apparatus to intermingle with each other. According to Kauffman (1991), the mixture qualified as "the chemical soup" of the Old World has turned into complex metabolism activities with time. What existed in the beginning of Complexity Theory were the mathematical propositions created to develop the computer systems. For that reason, the supporters of the theory had difficulty in practicing this in real life.

According to Mitchell (2009), the theory of complexity is a system presenting difficult, immediate, self-induced, and organized behaviors. According to Battram (1999), the theory of complexity expresses the situation of the universe as rich and various as we cannot understand through conventional, mechanical or direct ways. We can understand many parts of the universe through these ways; however, the

cases with bigger and more inner relationships can only be understood through the principles and rules. And according to Cramer (1998), the theory of complexity is the logarithm of the number of opportunities necessary for a system's actualizing itself or the logarithm of the number of situations possible for the system. The broadest meaning of complexity theory defines the behavior of complex and natural social and humanistic systems. It expresses that social systems can be changeable and progressive (Tekel 2006). The theory of complexity emphasizes that the relationships in the complex systems such as organizations are not linear, and have a structure revealing unexpected results and arising choices in which the events cannot be predicted (Tetenbaum 1998; Erçetin 2013). Considering that there can be a relationship between the attitudes of primary school teachers towards the constructivist approach within the educational system both as a system and an organization and their complexity features have formed the basis for the emergence of this study.

In general, attitude is defined with words such as emotional-content ideas, beliefs, prejudices, tendencies, evaluation and readiness (Kadhiravan and Balasubramanian 1999). Attitude is a fact expressing a pre-tendency reaction the individuals have against anything around themselves, directing the behaviors of individuals and causing partiality during the decision-making process (Ülgen 1995; Tavşancıl 2002). According to Ekici (2002), attitude is seen as an important explanation of behavior through its cognitive, affective and behavioral dimensions. When considering that the individuals have numerous attitudes related to their surroundings, it can be clearly seen that creating attitudes for each one is difficult. For that reason, the individuals categorize subjects according to a specific criteria and create attitudes for these categorizations. It is not necessary for the individuals to be experienced directly in order for them to have an attitude towards a specific subject (Baysal and Tekarslan 1998). The individuals can also have various attitudes through observing others or depending on the knowledge acquired from mass media.

Attitude is accepted as one of the most important factors influencing motivation of teachers both positively and negatively. The attitudes which are the tendencies of individuals to act in a negative or positive behavior about the events or behaviors can be learned through the knowledge acquired from observations and acquisitions (Hatzios 1996). The attitudes of an individual are not visible; but anyone can be informed about the attitude of the individual related towards an object by observing their behaviors. If the attitude developed towards an object or event is positive, then the possibility of decisions being positive is also higher. For that reason, the attitudes have a quality of prudential decision (Ülgen 1995; Tavşancıl 2002). Measuring the attitudes in the educational process provides some benefits such as determining the attitudes of learner at a specific time period, predicting the future behavior, determining attitudes related to their current conditions, changing their present attitudes in order to create new attitudes and learning their current preferences. So, trying to describe the behaviors of individuals scientifically provides an opportunity to direct the behavior towards the better through prediction (Baysal and Tekarslan 1998; Öner 1997). The studies carried out in parallel with this have also revealed that attitudes of students are one of the most important factors playing a

critical role in the school successes of students. The students having a positive attitude towards school show more success than the ones having a negative attitude; and so they realise more benefits from the education program (McCoach 2002). In recent years, measurement and evaluation of teachers' attitudes in different stages of the educational process has become important. According to Maxwell (2002), our attitude at the beginning of a work affects the result of that work more than other factors. Primary school teachers' developing of a positive attitude towards the constructivist approach makes us believe that they will train more successful students in their classrooms. When the studies carried out in recent years were analyzed, the attitudes of primary school teachers towards the constructivist approach were found to have been dully established (Evrekli et al. 2009; Kesercioğlu et al. 2009; İnel et al. 2010; Kasapoğlu and Duban 2012; Üredi 2013).

38.2 Significance of the Research

As result of a more efficient and terminal educational quest in our country, starting to practice curricula based on the constructivist approach as of the 2005–2006 academic year has created many complexities and increased the number of problems that should be dealt with. The leading problem is teachers' attitude towards the constructivist approach. Overcoming the problems of constructivist approach based curriculum related to practice in our country necessitates the researches that will be carried out on the complexity features (Theory of Complexity) and attitudes of teachers.

38.2.1 Statement of the Problem

The aim of this study was to analyze the relationship between the attitudes of primary school teachers towards the constructivist approach and their complexity features.

38.3 Sub-problems

1. What are the attitudes of primary school teachers towards the constructivist approach?
2. Do the attitudes of primary school teachers towards the constructivist approach differ according to **complexity variables** (gender, their age, the grade they teach, their professional seniority, the type of school where they carry out their duty and the school they graduated from)?

38.4 Method

38.4.1 Research Model

In the research, single screening model which is one of the general screening models was used. During the research process, the single screening model was adopted to determine the variables one by one, or according to types or amounts (Karasar 2000). The attitudes of primary school teachers towards the constructivist approach were determined; moreover, attitudes of teachers towards the constructivist approach were analyzed in terms of their complexity features. Whether there was a significant difference or not according to the gender of teachers, their age, the grade they teach, their professional seniority, the type of school where they carry out their duties and the school they graduated from as the complexity variables of primary school teachers was investigated.

38.4.2 Sample and Population

The research population included primary school teachers carrying out their duties in all official primary schools in Mezitli, Yenişehir, Akdeniz and Toroslar central districts of Mersin province in the 2012–2013 academic years. The study sample included 32 primary schools chosen randomly among the schools having different socio-economic levels (low, medium, high). Totally 504 primary school teachers including 277 female and 227 male teachers formed the sample of the research. In the research, 22 % of teachers included into the sample worked in schools located within high socio-economic level surroundings, 49.0 % worked within medium socio-economic level surroundings, and 28.8 % worked within low socio-economic level surroundings. The personal data related to primary school teachers were analyzed, their frequency and percentage tables were created and presented in Table 38.1.

38.5 Data Collection Tools

38.5.1 Data Analysis

The collected data were analyzed using the SPSS Windows 17.0 statistical package program. Frequency (f) and percentage (%) distribution tables were created to describe the attitudes of primary school teachers towards the constructivist approach in the research. Whether the attitudes of primary school teachers towards the constructivist approach differed according to **complexity variables** (gender of teachers, their age, the grade they teach, their professional seniority, the type of

Table 38.1 Frequency and percentage distribution table related to the study group

Variables	Participants	f	(%)
Gender	Female	277	55.0
	Male	227	45.0
Age	21–25 years old	5	1.0
	26–30 years old	61	12.1
	31–35 years old	84	16.7
	36–40 years old	84	16.7
	41–45 years old	126	25.0
	46 years old and over	144	28.6
Seniority	1–5 years	36	7.1
	6–10 years	76	15.1
	11–15 years	100	19.8
	16–20 years	82	16.3
	21–25 years	103	20.4
	26 years and over	107	21.2
The grade taught	1st grade	52	10.3
	2nd grade	91	18.1
	3rd grade	146	29.0
	4th grade	215	42.7
Type of school where they work	State	460	91.3
	Private	44	8.7
School graduated from	Training Institute	60	11.9
	Higher Teacher Training Sc.	22	4.4
	Associate's degree	55	10.9
	Faculty of Education	249	49.4
	Other faculties	98	19.4
	Postgraduate	20	4.0

school where they carry out their duty and the school they graduated from) was determined using One Way Variance Analysis (ANOVA). And in order to determine whether there was a significant difference or not in primary school teachers' level of creating a constructivist learning environment according to the type of school where they carry out their duties, Unrelated Group t-test analysis was used. After ANOVA analysis, Scheffe test was conducted to determine the difference between the age, the grade they teach, their professional seniority and the school they graduated from. In obtaining the results, 0.05 level of significance was accepted as a standard criteria.

38.5.2 Findings

In the first sub-problem of the research, the attitude level of primary school teachers towards the constructivist approach was determined. Total average score was calculated in order to turn primary school teachers' attitude towards the constructivist approach into verbal expression. Average of attitude scale total score towards the constructivist approach was taken as 70.61 (SD = 11.58387), and it was accepted that the teachers that had higher scores than the averages had positive attitudes towards creating a constructivist learning environment and the ones who had lower scores than the averages had negative attitudes towards creating a constructivist learning environment.

As can be seen in Table 38.2, it was inferred from answers given by the primary school teachers to the constructivist approach attitude scale questions that 52.8 % had positive attitudes and 47.2 % had negative attitudes.

In the second sub-problem of the research, an answer to the question of whether primary school teachers' attitudes towards the constructivist approach differ according to the primary school teachers' *complexity variables* (gender, age, the grade they teach, their professional seniority, the type of school where they carry out their duty and the school they graduated from) was sought. Firstly, whether primary school teachers' attitude towards the constructivist approach differed according to gender and the type of school where they carry out their duties was analyzed. Unrelated group t-test was conducted to determine whether primary school teachers' attitude towards the constructivist approach differed according to gender and type of school where they carry out their duties (Table 38.2).

The analysis of results revealed that constructivist approach attitude scale average scores of male and female primary school teachers showed similarities. The unrelated group t-test result proved that there was no statistically significant difference ($p > 0.05$) between the primary school teachers' attitudes towards the

Table 38.2 Frequency and percentage distribution table related to attitude levels of primary school teachers towards the constructivist approach

Attitude	F	(%)
Positive attitude	266	52.8
Negative attitude	238	47.2
Total	504	100.0

Table 38.3 Unrelated Group t-test results related to the differences in primary school teachers' attitudes towards the constructivist approach according to gender

Gender	N	$\overline{X}$	Ss	Sd	t	*p*
Female	227	70.4457	11.34444	502	−1.049	0.295
Male	277	71.3636	13.87333			

N = 504 $*p < 0.05$ $**p < 0.01$

Table 38.4 Unrelated Group t-test results related to the differences in primary school teachers' attitudes towards the constructivist approach according to the type of school where they work

Type of school	N	$\overline{X}$	Ss	Sd	t	*p*
State	460	69.3833	11.63601	502	−2.166	0.031*
Private	44	71.6209	11.46374			

N = 504 *$p < 0.05$ **$p < 0.01$

constructivist approach according to gender. Attitude of female primary school teachers related to constructivist approach was ($\overline{X} = 70.44$), and the attitude of male primary school teachers related to constructivist approach was ($\overline{X} = 71.36$). This finding can be interpreted in a way that there was no significant difference between the attitude towards the constructivist approach and gender (Table 38.3).

According to the analysis of results, attitudes of primary school teachers showed a significant difference at $p < 0.05$ level of significance according to the type of school where they carry out their duties. Attitudes of the primary school teachers working in private schools ($\overline{X} = 71.62$) were more positive than the attitudes of primary school teachers working in state schools. This finding can be interpreted in a way that there was a significant difference between the attitude towards the constructivist approach and the type of school where they carry out their duties (Table 38.4).

In part two of the second sub-problem of the research, an attempt was made to establish whether the primary school teachers' level of creating a constructivist learning environment differed according to their age, the grade they teach, their professional seniority, and the school they graduated from. To achieve this, One Way Variance Analysis (ANOVA) was conducted. After the ANOVA analysis, Scheffe test was conducted to determine the age, grades, professional seniorities and graduation schools where attitudes of primary school teachers towards the constructivist approach differed.

The analysis of results revealed that attitudes of primary school teachers towards the constructivist approach did not show a significant difference according to their age $F(5.498) = 1.070$, $p > 0.05$. In other words, attitudes of primary school teachers towards the constructivist approach did not differ significantly according to their age (Table38.5).

The analysis of results proved that attitudes of primary school teachers towards the constructivist approach did not show a significant difference according to the grade they teach $(3.500) = 0.983$, $p > 0.05$. In other words, attitudes of primary school teachers towards the constructivist approach did not differ significantly according to the grade they train (Table 38.6).

The analysis of results revealed significant differences at $p < 0.01$ level of significance between the primary school teachers' attitude towards the constructivist approach and their professional seniority $F(5.500) = 4.384$, $p < 0.01$. In other words, attitudes of primary school teachers towards the constructivist approach changed significantly according to their professional seniority. Scheffe test results according to which factors the attitude towards the constructivist approach differs proved a statistically significant difference between the primary school teachers

Table 38.5 One way variance analysis and Scheffe test results related to whether attitudes of primary school teachers towards the constructivist approach differ according to their age

Age	N	$\overline{X}$	Ss	Sh		
21–25 years old	5	76.2000	7.12039	3.18434		
26–30 years old	61	71.8852	11.34915	1.45311		
31–35 years old	84	69.7500	12.00690	1.31006		
36–40 years old	84	69.6667	9.55054	1.04205		
41–45 years old	126	69.6270	12.21588	1.08828		
46 year and over	144	71.7986	12.01897	1.00158		
Total	504	70.6131	11.58387	0.51599		
Source of variance	Sum of squares	sd	Average of Squares	F	P	Significant difference
Intergroup	717.512	2	143.505	1.070*	0.376	–
Intragroup	66778.041	498	134.092			
Total	67495.554	503				

N = 504 *$p < 0.05$ **$p < 0.01$

Table 38.6 One way variance analysis and Scheffe test results related to whether attitudes of primary school teachers towards the constructivist approach differ according to the grade they teach

Trained grade	N	$\overline{X}$	Ss	Sh		
1st grade	52	70.2115	11.96783	1.65964		
2nd grade	91	71.5495	10.19288	1.06850		
3rd grade	146	69.3356	11.29008	0.93437		
4th grade	215	71.1814	12.22108	0.83347		
Total	504	70.6131	11.58387	0.51599		
Source of variance	Sum of squares	sd	Average of squares	F	P	Significant difference
Intergroup	395.873	3	131.958	0.983	0.400	–
Intragroup	67099.681	500	134.199			
Total	67495.554	503				

N = 504 *$p < .05$ **$p < .01$

having 6–10 years professional seniority and the ones having 21–25 years seniority. This difference was found in favor of teachers having 6–10 years professional seniority (Table 38.7).

The analysis of results revealed significant differences at $p < 0.01$ level of significance between the primary school teachers' attitude towards the constructivist approach and the school they graduated from $F (5.500) = 3.218$, $p < 0.01$. In

Table 38.7 One way variance analysis and Scheffe test results related to whether attitudes of primary school teachers towards the constructivist approach differ according to their professional seniority

Professional seniority	N	$\overline{X}$	Ss	Sh		
1–5 years	36	71.5000	11.90078	1.98346		
6–10 years	76	71.5132	11.88107	1.36285		
11–15 years	100	70.8800	10.89876	0.99988		
16–20 years	82	70.5244	12.64250	1.39613		
21–25 years	103	70.1456	13.25793	1.30634		
26 years and over	107	70.8785	10.27978	0.99378		
Total	504	70.6131	11.58387	0.51599		
Source of variance	Sum of squares	sd	Average of squares	F	P	Significant difference
Intergroup	174.319	5	34.864	4.385**	0.001	6–10 years > 21–25 years
Intragroup	67321.234	498	135.183			
Total	67495.554	503				

N = 504 *$p < 0.05$ **$p < 0.01$

Table 38.8 One way variance analysis and Scheffe test results related to whether attitudes of primary school teachers towards the constructivist approach differ according to the school they graduated from

School graduated from	N	$\overline{X}$	Ss	Sh		
Training Institute	60	70.6667	11.16239	1.44106		
Higher Teacher Edu Sc	22	69.9845	11.64342	2.48239		
Ass. Degree	55	70.9636	12.62414	1.70224		
Fac. of Education	249	72.9719	11.21182	3.11052		
Other faculties	98	69.9694	11.72930	1.18484		
Postgraduate	20	70.2000	14.04354	0.74023		
Total	504	70.6131	11.58387	0.51599		
Source of variance	Sum of squares	sd	Average of squares	F	P	Significant difference
Intergroup	424.427	5	84.885	3.218**	0.001	Educational Fac. > other fac.
Intragroup	67071.127	498	134.681			
Total	67495.554	503				

N = 504 *$p < 0.05$ **$p < 0.01$

other words, attitudes of primary school teachers towards the constructivist approach differed significantly according to the school they graduated from. Scheffe test results related to differing attitudes of primary school teachers towards the constructivist approach according to the school they graduated from revealed that there was a statistically significant difference between the average scores of Faculty of Education graduates and average scores of teachers who graduated from other Faculties. This difference was found in favor of the teachers who graduated from the Faculty of Education. When the research findings were analyzed the result in general was that primary school teachers who graduated from the Faculty of Education had a more positive attitude towards the constructivist approach than the ones who graduated from the Other Faculties. Average scores of primary school teachers who graduated from the Faculty of Education and average scores of the teachers who graduated from other Faculties showed a statistically significant difference. This difference was in favor of primary school teachers who graduated from the faculty of Education (Table38.8).

38.6 Discussion and Conclusion

According to the research results, the attitude of primary school teachers towards the constructivist approach was found to be positive. Primary school teachers' positive attitude towards the constructivist approach has also been indicated by other researches (Balım et al. 2009; Üredi and Tanriseven 2009; Üredi 2013). In a research carried out by Sert (2008), it was established that the teachers met the requirements of a constructivist curriculum at a high level. In the said research, it was found that there was no significant relationship between the attitudes of primary school teachers towards the constructivist approach and their gender. According to another result, a significant relationship was obtained between the attitudes of primary school teachers towards the constructivist approach and the type of school where they carry out their duties. The attitudes of primary school teachers working in private schools towards the constructivist approach were identified as more positive than the attitudes of primary school teachers working in state schools.

The constructivist approach which suggests active participation of the learners in the learning process provides opportunities such as obtaining more meaningful learning as well as developing independent thinking and problem solving skills. Many researches carried out abroad also support the view that a constructivist approach elicits positive results. In their study Simon and Schifter (1993) analyzed a constructivist curriculum and its effects on the learners. The constructivist approach developed at the end of seminars given to primary school teachers was found to be positively affecting the rate of success in standard tests and learners' considerations related to mathematics learning, and tendencies towards mathematics. Similarly, in a research carried out by Lord (1999), traditional and constructivist teaching approaches were compared within the scope of Environmental

Sciences lesson, and it was noticed that the students in the constructivist classroom took higher scores in exams than the ones in the traditional classrooms.

It was noticed that the attitudes of primary school teachers towards the constructivist approach did not differ significantly according to their age. Similarly, it was also concluded that the attitudes of primary school teachers towards the constructivist approach did not differ significantly according to the grade they teach. In other words, the attitudes of primary school teachers towards the constructivist approach did not differ significantly according to their age and the grade they teach.

A significant difference was however noticed between the attitudes of primary school teachers towards the constructivist approach and their professional seniority. The results related to this aspect revealed that the average scores of primary school teachers having 6–10 years professional seniority and the average scores of teachers having 21–25 years professional seniority showed a statistically significant difference. This difference was found in favor of teachers having 6–10 years professional seniority. The reason for this can be evaluated in such a way that the primary school teachers having 6–10 years professional seniority have not had much time of teaching since they were trained in their faculties. Similar to this result, it was established in a study carried out by Arslan (2011) that the teachers that have just started the teaching profession had higher level of knowledge related to constructivism than the ones who had been carrying out their duties for at least 15 years and over.

A significant relationship was also established between the attitudes of primary school teachers towards the constructivist approach and the school they graduated from. When the research findings were analyzed, it was concluded that the primary school teachers who graduated from the faculty of Education had a more positive attitude towards the constructivist approach than the ones who graduated from other Faculties.

Many studies conducted on constructivist learning revealed that it creates a positive effect on the viewpoints and beliefs of learners related to their learning experiences. In a study carried out by Maypole and Davies (2001) on high school students, viewpoints of high school students towards the learning experiences were analyzed using the constructivist theory in a history lesson. In this study, majority of the students who attended both traditional and constructivist classroom environments mentioned that they learned more and became more successful in completing their tasks in a constructivist classroom environment which was more entertaining. Similarly, in a study carried out by Wolf (1994) on high school students in a physics lesson, problem solving activities of learners were analyzed in a constructivist environment; and it was established that the students were more willing to collect data and presented a highly flexible behavior in situations in which their plans did not operate exactly.

In a study carried out by Çınar et al. (2006), the views of teachers and administrators related to constructivism were explored. The ones who participated in this research fully agreed with the view that this approach was student-centered, directed students towards thinking and searching, put the students away from memorizing, made educational activities more entertaining, and increased the social development of students. Furthermore, in another study carried out by Hovard et al.

(2000) on teachers, it was established that the beliefs of teachers related to epistemology changed as a result of a training program based on the constructivist teaching, and teachers were directed from an objectivist epistemology towards constructivism after the training process.

Positive attitudes of teachers towards the constructivist approach can be an important factor for adopting the constructivist approach during the teacher training process. Kim et al. (1998) concluded in their research that the educational process based upon constructivism had positive effects on pre-service teachers' planning and their teaching strategies. However, teachers need to have experiences based on constructivist practices not only during the pre-service period but also during their in-service trainings.

Beside the positive effects of the constructivist approach on learning, its limitation during the educational process is an important point to be emphasized. The constructivist approach which costs much rather than the traditional teaching and needs more educational sources can create complexities and chaos in the learning environment provided that the conditions that should be fulfilled cannot be actualized. In Turkey, classrooms are crowded schools in different socio-economic areas have different opportunities, material inadequacies, etc. accordingly they increase the limitations of a constructivist teaching approach in the realm of practice. For that reason, teacher training is the to unlocking the potential of a constructivist learning approach through providing opportunities for learners to take their own responsibilities, creating a democratic learning environment within the classroom and adopting a learner centered teaching approach rather than the teacher-centered one.

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Chapter 39
The Impact of Human Resource Management Functions on Corporate Image

Halil Seval and Hale Caner

Abstract In today's competitive world, organizations which create a feasible difference in their operations enjoy a competitive edge. For an organization, in addition to the role of business administration functions in creating the desired difference, human resource function has also an important role. However it ought to be recalled that human resources are highly complex especially in today's organizations and this only complicates the whole process of human resource management. The implication of this is that managers should be steadfast and aware of this challenge if they are to put across a worthwhile human resource management structure. In this research, 435 people who work in a pharmaceutical industry were surveyed in order to identify the role of human resource in improving the corporate image. Accordingly, one major as well as ten minor hypotheses were tested. The study took place in a situation where the industrial process today is characterized by extensive and intensive staff reductions and instability. So the results of this study can be tested again at a time when the industry is more stable, the study should thus be repeated and the new results should be compared to this study's results.

Keywords Human resource management · Corporate image · Complexity · Pharmaceutical industry

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39.1 Introduction

Human resources play an important role in the process of achieving the organizational vision; when the organization manages human resources well, it will ensure a clear difference from its competitors. One of the most important factors affecting organizational image is thus the process of human resource management.

Nowadays, human resource management occupies an important place in transforming the moral and social responsibilities which improve staff loyalty and creativity which ultimately contribute to achieving the organizational strategic goals. In this context, the goals of human resource, policies and planning should be integrated and be compatible with the organizational strategic goals. Human resource management process is a good tool which helps the organization to become bigger than its competitors. Because of this, strategic human resource management is defined in terms of compatible organizational strategic goals. Subsequently it is important to plan the actions of human resource management that can contribute to the achievement of the organizational objectives (Bingöl 2010).

The image reflects personnel perception in their minds, and there are many varieties of images such as; Mirror image, Umbrella image, Positive image, Negative image, Brand image, Product image etc.

When we look at organizational image in terms of the different kinds of images it seems as a chaotic concept. Organizational image was handled by different authors with different ways. Some authors think that image is a picture of knowledge in the mind, it is a link between the organizational mark and message, and it is also the concept of management's vision. According to the results of the different evaluations which have been done, organizational concept is a personal assessment of the organization's reputation, such as the concept which defines the identity of an institution (Köktürk et al. 2008).

Corporate image is a force which affects the internal and external factors of the organization. When the organizational corporate image is positive, it increases the organization's commitment and efficiency and helps it to reach its targets. According to the external environment term, corporate image is required to be positive for the good functioning of the organization which makes it popular among the competitors.

According to Rosenthal, corporate image, institutional identity, the staffs, goal groups (customers, partners) and the results obtained from the public are premised on four main points: comparing the organization with its competitors, thinking about the organization's corporate image, recognition, prestige and value of the institution (Okay 2012).

39.2 Complexity of Human Resources

The human enterprise is complex. When one considers that each individual is unique not only in composition, personality and character but also in interpersonal relationships. The sum of who we are is brought into the role and function that we

have within an organization (Truss 2004). To manage these similarities and differences in an work environment is not an easy task and requires particular approaches and skill.

There are many different approaches to managing human resources. Boards must undertake an approach that fits with their values and strategy, to hire the right people and manage them in a way that fulfills the board high level of responsibility to students and the community (Lawler 2005). Above all, they must find ways to fully engage their employees in the educational enterprise.

Human resources form the most important asset of school divisions they typically account for as much as 80 % of expenditures for a board of education. Furthermore, they are critical to the education enterprise. Therefore, the attention that boards of education give to human resource management needs to reflect this condition and value.

Colbert and Elizabeth (2011) while exploring the complexity perspective on strategic human resource management contend that over the past three decades, research on the contribution of human resources (HR), i.e. people, and human resource management (HRM), i.e. policies and practices, to organizational effectiveness has moved from operational to strategic: from examinations of discrete HR policies and practices to consideration of how the HR strategy supports, or even drives, the strategy of the organization or sub-unit.

Managers should therefore be aware that at the core of HRM studies are questions relating HR practices to workforce attributes and behaviors, and subsequently to organizational performance outcomes, with the basic assumption that HRM matters—that the structure, design and execution of HRM practices materially affect the knowledge, capabilities and behavior of people associated with the organization, and that better HRM translates to greater organizational effectiveness.

By viewing organizations as non-linear systems, focusing on interconnections between points in the system, and stressing the importance of network nodes in mediating organizational outcomes, complexity theory suggests, at a conceptual level, that the significance of human resource may lie more in processes than in policies and strategies.

Also important is the rapidly changing business environment and the increasing complexity of modern organizations. These and other changes have created a growing consensus that effective human capital management is critical to an organization's success (Jackson et al. 2003 cited by Lawler 2005). Bearing in mind how complex the human resources are, this study moved fast to explore the impact of human resource functions on corporate image.

This study will be about the factors that affect the distinction of the organization from its competitors, human resource management and corporate image. The main goal of this study is to analyze the effect of human resource management on the corporate image, and the relationship between both of them.

39.3 The Impact of Human Resource Management on Corporate Image

39.3.1 Human Resource Management

Human resources management is an inimitable process, it is about how one skill holder should manage the human resources effectively, according the law involves therefore it will be beneficial to the organization, individual and the environment (Kaynak et al. 1998).

Human resources management is a system that is concerned with how to ensure the effective and efficient use of human talents to accomplish the organizational goals (Maths and Jackson 2000).

According to Randall, good managing is the manager's role and it is defined according to the human resource management system in an organization, providing the best institution and the best public. Many factors put human resources management in an important place such as (finding the best employees, the best institutions, the best way to reach the public, an intense rivalry, existence of new little companies, the advantages of speed technology, the dynamic laws, the policy and social realities, the change of values and educational features, the quality of customers, quality and cheap goods needed and so on). Therefore, in this case the organizations have to change their practices (Randall 1995).

Human resources management focuses on two key elements, the first; using human resources effectively to reach the organizational goals and the second; promoting the development of the organization by providing for the employees' expectations. According to Ivancevich the human resources management can be summarized as below:

- Helpful to achieve the organizational objectives
- To employ a skilled and talented workforce
- Ensure well trained and high motivated employees in the organization,
- Make working in the organization attractive to improve the quality of working life
- Inform all employees about Human resources policy and its implementation
- Give importance to ethical policies and increase social responsibility
- Manage the changes for the benefit of individuals, groups, organizations and communities.

Human resources management looks at the human as a second plan and understands them as capital which improves the human resources activities of the organization as well as setting new strategic dimensions. The main objective of an organization is providing a useful model or plan that helps to integrate the policies and activities within the framework of logic and purpose to make all parts work together towards the goals.

Strategic human resources management is not only the organizational strategic supporter or simply supervises it; sometimes the factor of human resources itself can shape the organizational strategy (Leopold et al. 2005).

The strategy of an organization is defined by the human resources and the top manager together that helps to identify the strategy of organization in terms of the specific human resources. These applications help to reach the organizational goal by the employees enter into rivalry with each other (Dessler 2003).

The management's internal or external factors are not separated from each other's sharp lines. How the customers perceive the management influences the attitudes and behaviors of team members. Therefore, managers have to consider the internal customers when they implement strategies that will be applied in the process (Gürbüz 2010).

Efficient management of human resources is one of the main ways which positively affect the perception of the corporate image by the internal environment. Human resource functions are classified into planning, human resource discovery, selection and placement, training and development, career management, performance management, compensation management, staff relations and orientation.

39.3.2 Corporate Image

The long term success of the organization to achieve its internal and external goals depends on the powerfulness of its image.

> The image is how one person is seen and judged by others (Mooij 2005).

According to Kotler and Clark, "image is the process of a person's learning and perception about the corporate individual or corporate judgment, their impressions or evaluation. The images include; mirror image, umbrella image, organization's perceived image, foreign image, transfer image, current image, desired image, positive image, negative image, store image, product image, brand image and corporate image.

According to Marken, firm's image is all the objectives and plans of that organization defined as a perception. Firm's image is supported by the company's products, services, management style, communication activities and other operations worldwide.

Image today, is not only concerned with the marketing area; it is now a strategic tool that should be used by the manager. The organization should have a positive image which can help its continuity and strategic success. Providing a positive image through the marketing of one product or service helps to create a strong corporate image that improves the sale of products and services. The firm's positive image can help to provide good staff, the firm does not need only employees to succeed, its needs analysts, investors, customers and partners; accordingly all these should be attracted to the firm. The strength corporate image adds to the emotional

value of the firms' system, can make them distinguished and credible; and this helps to outstrip the competitors (Erdoğan et al. 2006).

All kinds of organization activities create an image in the minds of internal and external customers. The perception of corporate image by the persons who are in a relationship with the organization can be positive or negative. The main purpose of an organization is to achieve its objectives and perform its vision. The tactics and strategies used by the organization are key determinants which will help to attain the organizational image. One part of the tactics and strategies is completed by human resources management with a different kind of plan and application that helps to create a corporate image (Caner 2013).

39.3.3 Effects of Human Resource Management on Corporate Image

The human resource functions evaluated show that all these functions, one by one, affect corporate image. These functions are related with each other, when one function is negatively affected that automatically affects the others so, whatever can affect corporate image should not be neglected. When planning takes place around the human resource functions, it is necessary to achieve the organization's long-term objectives. When efficient planning is done employee turnover rate can be maintained at a particular level and internal and external perception which damage image can be reduced. Effective planning of human resource should be done to reach a positive corporate image perception which is considered as one of the prerequisites for any preferred management system.

"Effective personnel selection process and its implementation will create a positive impact on business performance". Nowadays, the intense competition of the internal and external markets, particularly affects employee performance positively and the management's market performance such as (satisfying customer's expectations, image of business in society, increasing the value and quality services etc.). Furthermore, motivation increases the productivity of a company, loyalty of employees towards the company and job satisfaction. As result, the market performance of a company will increase and will provide a competitive edge (Marangoz and Biber 2007).

Therefore, staff recruitment, selection and evaluation is a function that ought to be fulfilled in an efficient manner, for the organization's functionality and can affect the internal and external image of the corporate environment positively.

Nowadays, organizations have begun to give critical importance to the human resources function in other forms such as; educating the employees. With employee training, the organizations improve the employees' professional skills as well as their organizational commitment.

Staff training can influence a positive atmosphere within the corporate image perception in the organization. The created corporate image perception of the

employees and their organizational commitment will be positively reflected in the external environment (Caner 2013).

The career management of Human resources functions is concerned with the development of personnel skills and achievement of personnel goals within the administrative processes. And good staff satisfaction is directed towards the management process. When employees believe that a career plan is drawn better, they think that the assignments in the organization have been made on a rational basis; their organizational attachment brings a positive corporate image. When the employees think that they are evaluated by the performance management system in the organization, they will be motivated and that increases their efficiency. The high motivation in an organization improves the staffs' confidence and commitment that will positively affect the corporate image.

A fair management with a wages implementation system can incite and make the employees more productive. The effective management of fee system creates a positive organizational image perception within the employees. In the labor sector, the factors such as, health and safety, motivation, leadership and communication when it is successfully managed that positively affects corporate image perception. Therefore, in this study, the interaction between the human resource functions and employees' corporate image perception will be examined and established.

39.4 Methodology

39.4.1 The Goal of the Study

The goal of this research is, to determine the relationship between human resources management and the employees' corporate image perception in Ankara's pharmaceutical company.

The study was planned around Ankara's pharmaceutical company only, the employees in the pharmaceutical company in Ankara state, the number of workers in this company is estimated at 2,000 people. 518 people joined the study through the help of other employees in the sector and the researcher's effort. From 518 surveys which were distributed, 477 were completed by the workers, 42 of them were inaccurate or incomplete and were removed from the survey and 435 surveys were evaluated.

The results of the survey from the pharmaceutical company consisted of analyzing the demographic data by the SPSS data analysis program to find the frequency and percentage in terms of the employees' gender, age, educational level, marital status, and uptime in the organization, position in the management function and their net wage range while hypotheses were investigated by SPSS Chi-square method.

The main hypothesis of study is "*the impact of human resources management on the development of corporate image*". According to the main hypothesis therefore, the sub-hypotheses are:

H1 Employee's low turnover rate positively affects perception of corporate image

H2 There is a relationship between the corporate image and the supply of qualified personnel in the pharmaceutical industry

H3 There is a relationship between a company's employee training and a strong image of the pharmaceutical industry

H4 The organization's effective career planning creates a positive perception of the corporate image within the employees

H5 There is a relationship between the company's effective performance management and the employees' positive perception of the company's corporate image

H6 There is a positive relationship between the staffs' satisfaction with the Salary policy and the company's corporate image

H7 There is a positive relationship between the pharmaceutical company's measures taken for the workers' health and safety and the value of that company's corporate image

H8 There is a relationship between motivation activities implemented for employees in the pharmaceutical industry and their positive perception of corporate image

H9 There is a positive relationship between the subordinates being appreciated by managers in the pharmaceutical company and their perception of corporate image

H10 There is a relationship between an open communication environment offered to employees in the pharmaceutical company and the organization's corporate image.

Data Collection Methods and Tools

In this study as a data collection tool "the impact of human resources management in the development of corporate image" instrument was used. The 5 point Likert scale was used in the second part of the questionnaire. The people selected the options that were best to them. There were 'Accordingly Disagree', 'Disagree' 'Neutral', 'Agree' and 'Strongly Agree'.

Because I could not reach significant results with SPSS using a 5 point Likert scale Chi-square analysis software, the survey was evaluated through reduced program options in which only "Disagree", "Neutral" and "Agree" were selected.

39.4.2 Analysis of the Survey's Validity and Reliability

In this study, the reliability of the survey was calculated by SPSS 'Cronbach's Alpha Coefficient program'. Cronbach's alpha coefficient is located between 0 and 1 and in the analysis the place that it took 0.80 shows that it is highly reliable. Taking a 0.903 coefficient of 0.80 Alpha 1 has taken place. Therefore it is a highly reliable scale.

39.4.3 Evidence

The first part of this section, a survey of participants in terms of demographic information was made and the second part was about the results of the hypotheses.

39.4.4 The Demographic Results

The number and the rate from the drug company employees who completed the survey was 435 participants, 285 (male) (65.5 %) and 150 (women) (34.5 %). 12 participants aged 18–24 years (2.8 %), 25–31 years, 117 (26.9 %), 32–38 years 193 (44.4 %), 99 were 39 to 45 years (22.8 %) and 14 were 46 years and older (3.2 %). Regarding educational level, 11 (2.5 %) were of high school, 24 (5.5 %) associate degree, of 326 (74.9 %) degree, 72 (16.6 %) and 2 master and doctoral graduates (0.5 %). 271 (62.3 %) of the participants were married, while 164 (37.7 %) were single.

According to the analysis of the participants' working period in their affiliated organizations, there are 116 people between 0–3 years (26.7 %), 129 people between 4–7 years (29.7 %), 106 people between 8–11 years (24.4 %), 53 person 12–15 years (12.2 %) and 31 people over 16 years (7.1 %).

Considering the titles of participants, 354 were Medical Sales Representative (81.4), 31 Regional Directors (7.1 %), 15 Product Manager /Medical Directors (3.4 %), 8 Sales Managers (1 %, 8) and 27 others (6.2 %).

The different wages declared by the 435 participants are as follows: 6 of them (1.4 %) earn less than 1,500 TL 130 (29.9 %) of them earn between 1500–2500 TL, 163 (37.5 %) of them earn between 2501–3500 TL, 74 (17 %) are from 3501–4500 TL and 62 (14.3 %) earn more than 4,501 TL.

Evaluation of Hypotheses
Main hypothesis "the impact of human resources management on the development of corporate image" the second part of the survey was based on 3 Questions.

Main Hypothesis
According to Table 39.1, it is reported that, 361 participants out of the 435 participants who took part in the second part of the questionnaire answered the 3rd question.

Table 39.1 There is a positive impact between human resource activities and development of a corporate image

		Frequency	Percent	Valid Percent	cumulative Percentage
Available	Disagree	15	3.4	3.4	3.4
	Neutral	59	13.6	13.6	17.0
	Agree	361	83.0	83.0	100.0
	Total	435	100.0	100.0	

The assessment was conducted in Table 39.1 and as a percentage, 83 % of participants think that human resources activities have a positive impact on the development of a corporate image.

Sub Hypothesis

H_1 When the employee's turnover rate is low it affects the perception of corporate image positively (Table 39.2).

According to the chi-square test p-value is not significant (Table 39.3). Therefore, there is no significant relationship between the employees' low turnover rates with their positive perception of corporate image.

H_2 There is a relationship between corporate image and qualified personnel supply in the pharmaceutical industry (Table 39.4).

According to the result of Chi-square analysis, the p-value is significant, but not significant for the cell value as result in (Table 39.5). The relationship could be not obtained between the supply of qualified personnel with the perception of corporate image.

H_3 There is a relationship between the training given to employees of the company with a strong image hold in the pharmaceutical industry (Table 39.6).

According to Table 39.7 in the chi-square test p value was significant. Therefore, there is a relationship between corporate image perceptions with training in the organization.

As a result of this assessment in the pharmaceutical industry, it was determined that there is a significant relationship between the training given to employees and the company's strong image.

H_4 The organization's effective career planning creates a positive perception of the corporate image within the employees (Table 39.8).

Table 39.2 The relationship between corporate image and employee turnover rate

		At the organization where I work the employee's turnover rate is low			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		12	7	12	31
	The organization where I work has a good image (%)	38.70	22.60	38.70	100.00
	At the organization where I work the employee's turnover rate is low (%)	8.30	6.50	6.60	7.10
	Total (%)	2.80	1.60	2.80	7.10
Neutral		28	12	18	58
	The organization where I work has a good image (%)	48.30	20.70	31.00	100.00
	At the organization where I work the employee's turnover rate is low (%)	19.30	11.10	9.90	13.30
	Total (%)	6.40	2.80	4.10	13.30
Agree		105	89	152	346
	The organization where I work has a good image (%)	30.30	25.70	43.90	100.00
	At the organization where I work the employee's turnover rate is low (%)	72.40	82.40	83.50	79.50
	Total (%)	24.10	20.50	34.90	79.50
Total		145	108	182	435
	The organization where I work has a good image (%)	33.30	24.80	41.80	100.00
	At the organization where I work the employee's turnover rate is low (%)	100.00	100.00	100.00	100.00
	Total (%)	33.30	24.80	41.80	100.00

According to Table 39.9 the chi-square analysis indicates that the required p-value is significant. So, the relationship between the perception of corporate image and career planning is obtained.

Table 39.3 The relationship between the employee's turnover and corporate image on Chi-square test

	Value	Df	Sign asymptote (two-sided)
Pearson Chi-square	7,707[a]	4	0.103
Likelihood ratio	7,427	4	0.115
Linearity relationship	3,675	1	0.055
Current status of S	435		

[a] 0 cells (0.0 %) have expected count less than 5. The minimum expected count is 7.70

Table 39.4 The relationship between corporate image and qualified personnel supply

		The method followed for recruitment in the organization where I work, helps to provide qualified staff			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		9	8	14	31
	The organization where I work has a good image (%)	29.00	25.80	45.20	100.00
	The method followed for recruitment in the organization where I work, helps to provide qualified staff (%)	37.50	11.30	4.10	7.10
	Total (%)	2.10	1.80	3.20	7.10
Neutral		7	13	38	58
	The organization where I work has a good image (%)	12.10	22.40	65.50	100.00
	The method followed for recruitment in the organization where I work, helps to provide qualified staff (%)	29.20	18.30	11.20	13.30
	Total (%)	1.60	3.00	8.70	13.30
Agree		8	50	288	346
	The organization where I work has a good image (%)	2.30	14.50	83.20	100.00
	The method followed for recruitment in the organization where I work, helps so provide qualified staff (%)	33.30	70.40	84.70	79.50
	Total (%)	1.80	11.50	66.20	79.50
Total		24	71	340	435
	The organization where I work has a good image (%)	5.50	16.30	78.20	100.00
	The method followed for recruitment in the organization where I work, helps to provide qualified staff (%)	100.00	100.00	100.00	100.00
	Total (%)	5.50	16.30	78.20	100.00

Table 39.5 The relationship between supply of qualified personnel and corporate image, according to the chi-square test

	Value	Df	Sign asymptote (two-sided)
Pearson Chi-Square	52,439[a]	4	0.000
Likelihood Ratio	37,808	4	0.000
Linearity Relationship	46,219	1	0.000
Current status of S	435		

[a] 2 cells (22.2 %) have expected count less than 5. The minimum expected count is 1.71

Table 39.6 The relationship between corporate image and the training given to employees in an organization

		The method followed for recruitment in the organization where I work, helps to provide qualified staff			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		9	8	14	31
	The organization where I work has a good image (%)	29.00	25.80	45.20	100.00
	The method followed for recruitment in the organization where I work, helps to provide qualified staff (%)	37.50	11.30	4.10	7.10
	Total (%)	2.10	1.80	3.20	7.10
Neutral		7	13	38	58
	The organization where I work has a good image (%)	12.10	22.40	65.50	100.00
	The method followed for recruitment in the organization where I work, helps to provide qualified staff (%)	29.20	18.30	11.20	13.30
	Total (%)	1.60	3.00	8.70	13.30
Agree		8	50	288	346
	The organization where I work has a good image (%)	2.30	14.50	83.20	100.00
	The method followed for recruitment in the organization where I work. helps so provide qualified staff (%)	33.30	70.40	84.70	79.50
	Total (%)	1.80	11.50	66.20	79.50
Total		24	71	340	435
	The organization where I work has a good image (%)	5.50	16.30	78.20	100.00
	The method followed for recruitment in the organization where I work, helps to provide qualified staff (%)	100.00	100.00	100.00	100.00
	Total (%)	5.50	16.30	78.20	100.00

H_5 There is a relationship between the company's effective performance management and the employees' company corporate image perception (Table 39.10).

In Table 39.11, according to the chi-square test p-value was significant. So, a significant relationship between effective performance management with the employees' positive corporate image perception of the company is not obtained.

Table 39.7 The relationship between corporate image and training in the organization on Chi-square test

	Value	Df	Sign asymptote (two-sided)
Pearson Chi-square	90.937[a]	4	0.000
Likelihood ratio	71.633	4	0.000
Linearity relationship	80.617	1	0.000
Current status of S	435		

[a] 1 cells (11.1 %) have expected count less than 5. The minimum expected count is 4.06

Table 39.8 The relationship between corporate image and career planning

		In the organization where I work, I take adequate training			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		18	5	8	31
	The organization where I work has a good image (%)	58.10	16.10	25.80	100.00
	In the organization where I work, I take adequate training (%)	31.60	6.80	2.60	7.10
	Total (%)	4.10	1.10	1.80	7.10
Neutral		15	18	25	58
	The organization where I work has a good image (%)	25.90	31.00	43.10	100.00
	In the organization where I work, I take adequate training (%)	26.30	24.30	8.20	13.30
	Total (%)	3.40	4.10	5.70	13.30
Agree		24	51	271	346
	The organization where I work has a good image (%)	6.90	14.70	78.30	100.00
	In the organization where I work, I take adequate training (%)	42.10	68.90	89.10	79.50
	Total (%)	5.50	11.70	62.30	79.50
Total		57	74	304	435
	The organization where I work has a good image (%)	13.10	17.00	69.90	100.00
	In the organization where I work, I take adequate training (%)	100.00	100.00	100.00	100.00
	Total (%)	13.10	17.00	69.90	100.00

H_6 There is a positive relationship between staff satisfaction with the Salary policy and the company's corporate image (Table 39.12).

Table 39.9 The relationship between corporate image and career planning in terms of Chi-square Test

	Value	Df	Sign asymptote (two-sided)
Pearson Chi-square	31.839[a]	4	0.000
Likelihood ratio	29.961	4	0.000
Linearity relationship	27.706	1	0.000
Current status of S	435		

[a] 0 cells (0.0 %) have expected count less than 5. The minimum expected count is 5.91

Table 39.10 The relationship between corporate image and performance management

		In the organization where I work, the effective career planning is done			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		13	8	10	31
	The organization where I work has a good image (%)	41.90	25.80	32.30	100.00
	In the organization where I work, the effective career planning is done (%)	15.70	6.90	4.20	7.10
	Total (%)	3.00	1.80	2.30	7.10
Neutral		20	20	18	58
	The organization where I work has a good image (%)	34.50	34.50	31.00	100.00
	In the organization where I work, the effective career planning is done (%)	24.10	17.20	7.60	13.30
	Total (%)	4.60	4.60	4.10	13.30
Agree		50	88	208	346
	The organization where I work has a good image (%)	14.50	25.40	60.10	100.00
	In the organization where I work, the effective career planning is done (%)	60.20	75.90	88.10	79.50
	Total (%)	11.50	20.20	47.80	79.50
Total		83	116	236	435
	The organization where I work has a good image (%)	19.10	26.70	54.30	100.00
	In the organization where I work, the effective career planning is done (%)	100.00	100.00	100.00	100.00
	Total (%)	19.10	26.70	54.30	100.00

In Table 39.13, the obtained p value was significant. Therefore, a positive and significant relationship between the sector employees satisfied by their salary policies and the corporate image of firms where they work was obtained.

Table 39.11 The Chi-square test of the relationship between corporate image and performance management

	Value	Df	Signs of asimpt (2-sided)
Pearson Chi-square	48.952[a]	4	0.000
Likelihood ratio	44.711	4	0.000
Linearity relationship	37.899	1	0.000
Current status of S	435		

[a] 1 cells (11.1) have expected count less than 5. The minimum expected count is 4.13

Table 39.12 The relationship between corporate image and salary management policy

		In the organization where I work, an effective performance management is done			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		10	7	14	31
	The organization where I work has a good image (%)	32.30	22.60	45.20	100.00
	In the organization where I work, an effective performance management is done (%)	17.20	8.00	4.80	7.10
	Total (%)	2.30	1.60	3.20	7.10
Neutral		18	20	20	58
	The organization where I work has a good image (%)	31.00	34.50	34.50	100.00
	In the organization where I work, an effective performance management is done (%)	31.00	23.00	6.90	13.30
	Total (%)	4.10	4.60	4.60	13.30
Agree		30	60	256	346
	The organization where I work has a good image (%)	8.70	17.30	74.00	100.00
	In the organization where I work, an effective performance management is done (%)	51.70	69.00	88.30	79.50
	Total (%)	6.90	13.80	58.90	79.50
Total		58	87	290	435
	The organization where I work has a good image (%)	13.30	20.00	66.70	100.00
	In the organization where I work, an effective performance management is done (%)	100.00	100.00	100.00	100.00
	Total (%)	13.30	20.00	66.70	100.00

Table 39.13 Relationship between corporate image and salary management on the Chi-square test

	Value	Df	Signs of asimpt (2-sided)
Pearson Chi-square	54,648[a]	4	0.000
Likelihood ratio	49,538	4	0.000
Linearity relationship	49,668	1	0.000
Current status of S	435		

[a] 1 cells (11.1 %) have expected count less than 5. The minimum expected count is 4.92

H_7 There is a positive relationship between the pharmaceutical company's measures taken for the employees' health and safety with the value of that company's corporate image (Table 39.14).

Table 39.15, In the Chi-square test when p-value was evaluated it was significant. So, there is a positive and significant relationship between pharmaceutical companies' measures for occupational health and safety and value that the employees place on company corporate image.

H_8 There is a relationship between motivation activities implemented for employees in the pharmaceutical industry and their positive perception of corporate image (Table 39.16).

According to Table 39.17, the p-value is significant and according to that it is determined that there is a significant relationship between the activities motivating employees in the pharmaceutical sector with employees' corporate image perception.

H_9 There is a positive relationship between the subordinates being appreciated by managers in the pharmaceutical industry and their perception of corporate image (Table 39.18).

In Table 39.19, according to Chi-square test results the p value was significant. So it has been found that there is a positive and significant relationship between the managers' appreciation of subordinates and the perception of corporate image in the pharmaceutical industry.

H_{10} There is a relationship between the open communication environment pharmaceutical companies offer to employees and the organization's corporate image (Table 39.20).

In Table 39.21 according to the Chi-square test evaluated p-value was significant. So in the pharmaceutical companies, there is a significant relationship between open communication environments offered to employees and the corporate image.

Table 39.14 Relationship between corporate image and occupational health and safety applications

		At the organization where I work salary management is done			Total
		Disagree	Neutral	Agree	
Organization where I work has a good image					
Disagree					
	Organization where I work has a good image (%)	14	9	8	31
		45.20	29.00	25.80	100.00
	At the organization where I work salary management is done (%)	20.30	7.90	3.20	7.10
	Total (%)	3.20	2.10	1.80	7.10
Neutral		20	20	18	58
	Organization where I work has a good image (%)	34.50	34.50	31.00	100.00
	At the organization where I work salary management is done (%)	29.00	17.50	7.10	13.30
	Total (%)	4.60	4.60	4.10	13.30
Agree		35	85	226	346
	Organization where I work has a good image	10.10	24.60	65.30	100.00
	At the organization where I work salary management is done	50.70	74.60	89.70	79.50
	Total (%)	8.00	19.50	52.00	79.50
Total		69	114	252	435
	Organization where I work has a good image (%)	15.90	26.20	57.90	100.00
	At the organization where I work salary management is done (%)	100.00	100.00	100.00	100.00
	Total (%)	15.90	26.20	57.90	100.00

Table 39.15 The relationship between corporate image and occupational health and safety applications on the Chi-square test

	Value	Df	Signs of asimpt (2-sided)
Pearson Chi-square	71,777[a]	4	0.000
Likelihood ratio	59,162	4	0.000
Linearity relationship	67,193	1	0.000
Current status of S	435		

[a] 1 cells (11.1 %) have expected count less than 5. The minimum expected count is 2.85

Table 39.16 Relationship between corporate image and motivation

		In the organization where I work motivating applications are given			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		13	12	6	31
	The organization where I work has a good image (%)	41.90	38.70	19.40	100.00
	In the organization where I work motivating applications are given (%)	16.70	10.80	2.40	7.10
	Total (%)	3.00	2.80	1.40	7.10
Neutral		29	19	10	58
	The organization where I work has a good image (%)	50.00	32.80	17.20	100.00
	In the organization where I work motivating applications are given (%)	37.20	17.10	4.10	13.30
	Total (%)	6.70	4.40	2.30	13.30
Agree		36	80	230	346
	The organization where I work has a good image	10.40	23.10	66.50	100.00
	In the organization where I work motivating applications are given	46.20	72.10	93.50	79.50
	Total (%)	8.30	18.40	52.90	79.50
Total		78	111	246	435
	The organization where I work has a good image (%)	17.90	25.50	56.60	100.00
	In the organization where I work motivating applications are given (%)	100.00	100.00	100.00	100.00
	Total (%)	17.90	25.50	56.60	100.00

Table 39.17 Chi-square test of the relationship between motivation and Corporate Image

	Value	Df	Signs of asimpt (2-sided)
Pearson Chi-square	87,699[a]	4	0.000
Likelihood ratio	83,837	4	0.000
Linearity relationship	70,818	1	0.000
Current status of S	435		

[a] 0 cells (0.0 %) have expected count less than 5. The minimum expected count is 5.56

Table 39.18 The relationship between leadership and corporate image

		In the organization where I work the managers used the management functions effectively			Total
In the organization where I work has a good image					
Disagree		Disagree	Neural	Agree	
		10	12	9	31
	In the organization where I work has a good image (%)	32.30	38.70	29.00	100.00
	In the organization where I work the managers used the management functions effectively (%)	18.90	12.80	3.10	7.10
	Total (%)	2.30	2.80	2.10	7.10
Neutral		20	25	13	58
	In the organization where I work has a good image (%)	34.50	43.10	22.40	100.00
	In the organization where I work the managers used the management functions effectively (%)	37.70	26.60	4.50	13.30
	Total (%)	4.60	5.70	3.00	13.30
Agree		23	57	266	346
	In the organization where I work has a good image (%)	6.60	16.50	76.90	100.00
	In the organization where I work the managers used the management functions effectively (%)	43.40	60.60	92.40	79.50
	Total (%)	5.30	13.10	61.10	79.50
Total		53	94	288	435
	In the organization where I work has a good image (%)	12.20	21.60	66.20	100.00
	In the organization where I work the managers used the management functions effectively (%)	100.00	100.00	100.00	100.00
	Total (%)	12.20	21.60	66.20	100.00

39.5 Discussion of the Results

According to results of the research based on tests conducted on the sample of employees operating in Pharmaceutical companies, it has been established that, many of the human resource functions have an effect on the perception of corporate image.

Only H1 and H2 hypotheses were rejected. Particularly, the claim that "the low rate of employee turnover affects the perception of corporate image positively" should be rejected. Extensive research should be conducted on employee turnover rate and corporate image and how this may be eliminated in the company.

Table 39.19 The relationship between corporate image and leadership in terms of Chi-square test

	Value	Df	Signs of asimpt (2-sided)
Pearson Chi-square	92,669[a]	4	0.000
Likelihood ratio	87,303	4	0.000
Linearity relationship	74,222	1	0.000
Current status of S	435		

[a] 1 cells (11.1 %) have expected count less than 5. The minimum expected count is 3.78

Table 39.20 Relationship between corporate image and open communication environment offered to employees

		There is an open communication environment in the organization where I work			Total
		Disagree	Neutral	Agree	
The organization where I work has a good image					
Disagree		10	11	10	31
	The organization where I work has a good image (%)	32.30	35.50	32.30	100.00
	There is an open communication environment in the organization where I work (%)	12.30	14.70	3.60	7.10
	Total (%)	2.30	2.50	2.30	7.10
Neutral		30	12	16	58
	The organization where I work has a good image (%)	51.70	20.70	27.60	100.00
	There is an open communication environment in the organization where I work (%)	37.00	16.00	5.70	13.30
	Total (%)	6.90	2.80	3.70	13.30
Agree		41	52	253	346
	The organization where I work has a good image (%)	11.80	15.00	73.10	100.00
	There is an open communication environment in the organization where I work (%)	50.60	69.30	90.70	79.50
	Total (%)	9.40	12.00	58.20	79.50
Total		81	75	279	435
	The organization where I work has a good image (%)	18.60	17.20	64.10	100.00
	There is an open communication environment in the organization where I work (%)	100.00	100.00	100.00	100.00
	Total (%)	18.60	17.20	64.10	100.00

Table 39.21 The relationship between corporate image and existence of open communication on Chi-square test

	Value	Df	Signs of asimpt (2-sided)
Pearson Chi-square	74,462[a]	4	0.000
Likelihood ratio	66,784	4	0.000
Linearity relationship	50,857	1	0.000
Current status of S	435		

[a] 0 cells (0.0 %) have expected count less than 5. The minimum expected count is 5.34

For example, employee turnover rate may be high and yet not due to the company's management, it may be based on the existence of an industry's structural problems which affect the employees' evaluation of a company, so the established connection may be limited between employee's turnover rate and the corporate image.

Meanwhile the second hypothesis; H2 stating that "there is a relationship between qualified staff supply and organization corporate image in the pharmaceutical company" was also rejected. So, there is no relationship between human resource management functions such as, staff finding, selection and evaluation and corporate image.

According to two specified exceptions which were established, generally, human resource management can be positively influenced by the internal environment perception and the corporate image perception. This shows that HRM has an important role when it is positively directed within an organization.

When the results of research within the dynamic process of industry in recent years are assessed, the legal regulations that negatively affect employees and businesses in the sector should be considered. In the assessment of the survey questions of sector employees, the following cropped up; the psychological environment, the industry's current structure, suspicion of losing their jobs, which make them think that their image perception of the current company cannot be objective.

The study took place in a situation where the industrial process today is characterized by extensive and intensive staff reductions and instability. So the results of this study can be tested again at a time when the industry is more stable, the study should thus be repeated and the new results should be compared to this study's results.

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Chapter 40
Is It Really a Sisyphus Torture? Political Economy of Everyday Life

Ali Tarhan

Abstract For most of the modern people daily life represents a Sisyphus torture portrayed by Albert Camus. As in the myth, modern people rush to their jobs every morning and find them next morning almost untouched, like condemned Sisyphus. People tolerate this never ending torture because they are mostly unconscious about the descending rock. Only in rare cognizant moments this torture becomes visible, and this visibility uncovers the daily tragedy. Consequently, the daily tragedy of working men oscillates between these unconscious chaotic ascends and the occasionally conscious but regular descends. Radical philosophers, such as Henry Lefebvre, Theodor Adorno and Max Horkheimer have extensive analyses on everyday life and its patterns. Horkheimer especially emphasizes the old philosophical question on this subject. This question is the "connection between the economic life of society, the physical development of individuals, and the changes in the realm of culture in the narrower sense." These philosophers' studies create a path between philosophy and political economy. Contemporary political economy as an interdisciplinary research area turned its attention previously neglected domains by neoclassical economics, including philosophy. Consequently, this study's purpose is to follow this link and analyse the everyday life with its political economic patterns with a special reference to Lefebvre, Horkheimer and Adorno's works.

Keywords Daily life · Political economy · Lefebvre · Adorno · Horkheimer

40.1 Introduction

Camus (1942/2005) constructs a resemblance between everyday life of the modern people and Sisyphus torture. Sisyphus, stole the secrets of gods, is punished by them. The punishment is to roll up a rock to a hill all day long. In the nights this

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rock descends from the hill and every morning Sisyphus begins to roll the rock again. Like in the myth, modern people rush to their jobs every morning and find them next morning almost untouched like condemned Sisyphus. Camus accepts contemporary workmen's situations are no less absurd than Sisyphus. People tolerate this never ending torture because they are unconscious about the descending rock. Just in rare cognizant moments this torture becomes visible, and this visibility uncovers the everyday tragedy. This stone, with its every atom, creates a universe for the working people. As a consequence, the everyday tragedy of working men oscillates between these unconscious chaotic ascends and the seldom conscious but regular descends.

Therefore, modern individuals live in a paradoxical life, but most of them are unaware of the controversies of integration with the system. On the other hand, this unawareness makes the cost of integration higher. Therefore, individuals cannot afford to pay the whole invoice in their life spans. Contrary to the expectations, the total submission of the individual makes the situation easier for rulers to convince the individual that there is still way to go farther. Thus, satisfying the ruling strata turns into a vicious circle; a never-ending story. Situation of masses is even worse. The final aim of the mass culture, prepared by the same ruling strata, is to colonize the collective intellectual mind. Under the circumstances, the individual has very few open doors to save himself from this vicious circle. Moreover, the effects of the advertisement blur the minds of both individuals and the society.

Neoclassical economics has not paid enough attention to the patterns of everyday life. The reason of this omission is the exclusion of whole social phenomena from neoclassical theory (Nell 1980). Thus, these patterns, chaos of everyday life, and the tragedies of individuals have stayed within the realm of philosophy for a long period. On the other hand, contemporary political economy, as an interdisciplinary research area, has turned its attention to the neglected domains of neoclassical economics. Meuret (1988) defines this re-emerging political economy as the articulation of co-existing three forces within a society: "These forces [a]re those that all the authors of this century tried to articulate: the state, capitalism, and those who tried to protect themselves from their power". Meuret's emphasize on power broadens the framework of political economy and opens up new possibilities to analyze the everyday life of ordinary people.

Radical philosophers, such as Lefebvre (1994), Horkheimer (1992, 1995), Adorno (2001), and Adorno and Horkheimer (2002), have extensive analyses on everyday life and its patterns. These studies create a path between philosophy and political economy. Horkheimer (1995) questions the old philosophical question. This question is the "connection between the economic life of society, the physical development of individuals, and the changes in the realm of culture in the narrower sense." Adorno's philosophy also accepts modern culture as a persuasion process of the society in order to break its resistance to the capitalist hegemony (Witkin 2008). As a consequence, this study's purpose is to follow this link and analyse everyday life with its political economic patterns. Lefebvre, Horkheimer and Adorno's works have special references.

40.2 Everyday Life: Chaos or Order

Chaos is a basic nonlinear relationship system. In this system dependent variables are affected by different factors. The whole system may go to different paths; from equilibrium to disequilibrium depending on these factors. Thiéart and Forgues (1995) identify three types of equilibriums within this framework. The first one is a system affected by ineffective negative feedbacks. In this case the system always comes to the initial position. In second case, positive external factors may affect the system and these factors may reinforce an initial change. In this case the final route of the system is unclear. In the third type of movements, the system can be influenced by both negative and positive impacts at the same time. In this situation, the system is more dependent on the initial changes so that a small initial change may cause bigger changes in the whole system. These three equilibriums are stability, explosive instability and chaos, respectively. In addition, the chaotic and non-chaotic systems are interchangeable. Therefore, chaotic system may become a non-chaotic system during the course of time (Levy 1994). To draw a scientific result from these chaotic movements requires identifying the patterns of these movements. Thus, these hard to understand patterns necessitate a holistic approach in order to identify the changes between different levels of the analyzed phenomena (King 1989).

Another approach to identify the possible routes of chaotic movements comes from the study of centripetal and centrifugal forces. This analysis also provides grounds for transmitting the chaos theory from the realm of physics and mathematics to the social sciences. These two forces act in contradictory directions. According to Durkheim (1965), who is one of the leading figures in these analyses, these two forces cannot exist at the same time. However, modern studies accept the simultaneous existence of these two forces. The direction of movement is directed by the dominant force, and this approach can be applied to all branches of science (Ward 1905). Within the political economic framework, a society is subject to the integrating and disintegrating forces. Integrating forces are centripetal and disintegrating forces are centrifugal. The harmony of a society, therefore, depends on the balance between the centripetal and centrifugal forces; the stronger the centripetal forces the more harmonious the society, and vice versa. Political economically, a sustainable political and economic system is the key force to keep the society integrated. Therefore, the final stage is more or less dependent to the relations between the society and the surrounding economic environment. The ties between the society and economy in everyday life are almost invisible. In everyday life, individuals are in an unconscious state of consumption, so consumption comes in the form of production (De Certeau 1988). As a consequence, consumption creates the main difficulty to distinguish the patterns of everyday life within the nesting parameters.

It is not easy to define everyday life and its patterns even its widespread usage. This study adopts the general framework and definitions of Lefebvre's (1994) analyses to grasp an overview of everyday life. Lefebvre identifies three stages in

the creation process of everyday life. For Lefebvre, "the inventory of everyday life implies the negation of everyday life through dreams, images and symbols." The first stage is the production period. Production consists of a broader place in his model than Marxist thought. Production is both material production of goods and the spiritual production of society. Social relations are also produced at this stage. Lefebvre uses the three tiered Marxist approach at this stage to explain the socio-economic phenomena. The economical basis of society consists of material and wealth producing labour, and the division and organization of labour. Social relations take place in "structure". Jurisdiction, institutions, and ideologies create the "superstructure". What Lefebvre opposes is to oversimplification the importance of the social structure among the other components of economic body. Lefebvre, unlike classical Marxist thought, claims class interests cannot guarantee the totality of everyday life without external pushes. Hence, everyday life emerges as a residuum of all specific and specialized activities outside the social experience. Everyday life also means a critical social balance in a society which must be saved at all cost. At this point, a specific variation of alienation emerges. As the workers' direct ties are cut off with their production, and with the expansion of bureaucracy, a spiritual alienation appears in the society. The significance of this stage is the disappearance of great styles, symbols, and myths with the rise of the masses and democracy.

Evolution of everyday life introduces the second stage. This evolution takes place in eight steps. In the first step, quotidian and non-quotidian dissociate from each other. Dissociation of economics and direct returns, work and production, private and public affairs follow this phenomenon. Second is the decay of style. While style ceases, it is replaced by culture, art and aestheticism. Third, a sense of loss and absence of rhythm accompany the men's estrangement from nature. Fourth, signs are substituted for symbols. The fifth step is the dispersal of communities and the rise of individualism. Sixth step is a profane displacement of the sacred. At the next step, the division of labour and the specialization bring a loss of unity. However, ideology compensates this sense. The final step is anguish, which arises from the general sense of meaninglessness. As a consequence, everyday life becomes a burden for the individual. What important in this stage is the consumption. Consumption ceases to be a need for everyday life. Instead, the vision of the consumer and consumption takes place of needs. In this process the individual's awareness of his alienation is suppressed. New and endless alienations in everyday life strengthen this suppression.

The third stage of Lefebvre's model is to program everyday life to ensure its sustainability. What is programmed is the consumption. Therefore, Lefebvre's model reaches its peak with the concept of "the bureaucratic society of controlled consumption". Everyday life turns into a vicious circle of "production-consumption-production". Since the demand of consumers becomes a foreseeable situation, spontaneity ceases to exist as a natural part of everyday life. Moreover, controlled consumption does not just regulate consumption, but it regulates the satisfaction obtained from these goods. Satisfaction, pleasure and happiness gain different meanings at this point. Pleasure is restricted for aristocracy who knows how to live,

satisfaction for the bourgeoisie, and the happiness for almost none. In this type of societies it is the consumer that is consumed. New kinds of alienation emerge in this society; political, ideological, technological, bureaucratic and urban. However, their common point is to veil the economic alienation.

One of the preconditions of general suppression in a suppressed society is to control the consumption. This job is accomplished through the culture industry and advertising. As a consequence, most of the goods produced by the capitalist system are different just in appearance; they are the repeated forms of one cultural monopoly. All goods tend to become more and more identical. Moreover, the society and decision makers approve all actions taken by technology for the sake of technology. This tendency turns technology into a self-serving fetish. In accordance with this progress, technology owners gain a power over society equal to capitalists. In the end, the rationale of technology turns into the rationale of domination, and this rationale governs alienated society. This is also a technological alienation from the social point of view as Lefebvre elaborates. In another word, the society turns into a "technocratico-bureaucratic" society (Lefebvre 1994). Consumption turns into a choice between identical goods, which culture industry tries to believe the masses about their authenticity. Expected revolts against this control mechanism are suppressed by control of individual consciousness by culture industry. Technology also serves for unconsciousness of the public. The radio and television spectators have to receive more repeated programs, even their forms are different. (Horkheimer and Adorno 2002). Therefore, mass culture needs close attention to understand how it governs the everyday lives of individuals. Horkheimer and Adorno's analyses provide a broad spectrum of this realm.

40.3 Adorno and Horkheimer on Everyday Life and Mass Culture

Adorno and Horkheimer accept the culture industry as an instrument of social control (Kelnerr 2002). This is why they think that mass culture is the repeated form of a unique cultural monopoly. Within this cultural monopoly general and individual meet at the same point: the false identity. During the cultural indoctrination process, all goods gradually become more identical. Technology, as Lefebvre indicates, turns into a self-serving fetish. What is sacrificed here is the exile of the logic of the work from the social system (Horkheimer and Adorno 2002). Therefore, disappearance of borders between the work and the social system make all final products equal in their ingredients. Products of this industry appear in different forms and colours, in different price ranges, as if they were different in content. However, they all provide the same ingredient. However, people are categorized according to their consumption. Price ranges of mass-produced goods determine the social hierarchy of these products. At this point, quantification overcomes qualification. Everybody is free to pick up his prearranged products. This programmed

consumption makes the consumer a part of statistical figures. Individuals buy the same products, but entertain themselves with the illusion of their differences. This entertainment serves as a medium for consumers to identify and re-identify themselves (Dunn 2008). This can be applied to almost all products of the modern capitalist system. Never ending discussions over the qualities of these products can also endorse this uninterrupted misapprehension. Even the differences between the cheap and expensive models of a product are located in quantification. People rate all products by their quantitative properties; cars with their horse powers, or movies numbers of famous stars playing in a movie.

The culture industry's primary focus is on the effects of products instead of the work which created them. This blur makes unnecessary to maintain a border between the part and the whole. Thus, the basic dialectical relationship between the total and the part vanishes. There is no thesis and antithesis relationship between the whole and the part anymore. The part and the whole are intermixed in the consciousness of the people. Lefebvre also emphasize this partiality of wholeness and explains it with the fragmented nature of bourgeois thought (Gardiner 2000). The culture industry also filters the outside world for the disabled people. It brings the fort an idea that the world is in accordance with the movie which the audience just has seen. Fulfilled with this message in his head the moviegoer leaves the theatre in a happy mood. Even he later discovers some inconsistencies between the message of movie and his real world, he tries to change the image of the world in his head, instead of searching for a real world and its concrete parameters. To ensure the consumer's intellectual paralysis, the culture industry produces the same product continually with the same content just changing the package or actors. By the success of the culture industry moviegoers see the world with the movie producers' eyes; the newspaper readers recognize the world with the pens of editors, readers try to catch the intellectual fluctuations of the protagonist from the inner voices of the novelists. This process turns the spectators' imaginations as unnecessary parts of consumption. Everything comes to markets in a readily consumable form. Thus, the reactions of the spectators, or the passive receivers of the culture industry, are more or less automatic since what they get what they expected to get. Once the audience reaches at this point, the task is just to duplicate the program in an eternal pattern in order to secure the position of the spectators.

What is reproduced by the culture industry is unconsciousness of the people. This sameness can be traced in every form of art. In movies, stars act like as if they were a part of everyday life. Thus, it becomes impossible for spectators to distinguish the differentiations between the movies and everyday life. Stars are free to perform their arts, and use their own languages within the boundaries of the culture industry. Esoteric and exoteric knowledge become intrinsic parts of the system. This embedded knowledge defines all borders to be observed by artists. What is expected from the artists is to create new effects without even touching the content of the art. Once in a while, minor revolts can be stemmed from some artists. However, even in this case, the objections of the artists must be in accordance with the basic premises of the industry. At the end, the encountered product is nothing but a product of the system of non-culture (Horkheimer and Adorno 2002).

The fall of content gives way to the final aim: obedience to the social hierarchy. The mass culture, as the common aspect in every form of art, waits for ready to schematize and classify everything it grasps. This unified culture follows the people at every stage of their lives. Liberalism, as a formless thought, also grasps the rigidity of style as long as it is helpful to sustain the status quo. Contrary to the liberal thought, within the rigid system of economy, style novelties are not allowed. If people persist to be a dissident against the system, they are expected to reconcile with it as soon as possible. On the other hand, the liberal economy is open for the most talented men of the industry. The freedoms of the market for anyone else are nothing more than the freedom to starve. Doors of the society are closed to the dissidents. Tocqueville (1840/1998) says "You are free not to think as I do; your life, your property, everything shall remain yours, but from this day on you are a stranger among us." To be a stranger is to be stranded in the society. The ruling strata, as the dominant power of the society, can also control individuals by way of imposing an ethical system. These rules are hanged over the heads of lower classes like the sword of Damocles; so that there would be no need for further control of these classes for they could manipulate themselves on a day to day basis.

Another bail for the masses is the illusion of success. Again the sword is at work. The hunger of the masses for success is far greater than the ruling classes imposed upon them. On the contrary, this hunger could never be satisfied for the masses. Moreover, the feeling of success is always shadowed by the others' success. The liberal thought also puts a "zero sum game" on the scene which means one can only gain at the expense of another. This paradox brings a continual hunger for success into the foreground. In this point of dissatisfaction, the knowledge of the masses and experts are mixed up. Nobody could agree on a success of an artwork, or disagree on an unsuccessful piece of art. In this chaos, the culture industry goes on producing the same thing over and over since there is no criterion in the market that will defy this ever repeated style. In due course, the final stage of the culture industry and liberalism is the exclusion of the new. Every new movie with a fresh scenario, a novel with a new content seems so risky a business that one should not invest money for it. For the sake of investors, mediocrity alters the art to common taste. The natural products of this thought appear as ticket-box movies, bestsellers, and high volume magazines. The culture industry also encircles the amusements within its borders. The Culture industry turns amusement into a commercial good, which fits everybody's taste. Culture industry sees no harm to mix up the casino music with Beethoven as long as there is room in the market for this odd product. This is a final victory for the culture industry. While the serious art disappears from the screen, the light art fulfils its gap (Adorno and Horkheimer 2002).

Another aspect of the culture industry is its totality. In this sense, innovations are not more than small improvements in mass production of the culture. Hence, interest and attentions of consumers is directed to the technique, not to the content of product. In the culture industry, the best individuals are passive consumers who do not criticize the products of this industry; "No independent thinking must be expected from the audience: the product prescribes every reaction: not by its natural structure (which collapses under reflection), but by signals. Any logical connection

calling for mental effort is painstakingly avoided." (Adorno and Horkheimer 2002). Therefore, spectators are expected to see and react just as directed by the industry. In accordance with this stance, the consumer should not be left alone. Leaving them alone means allowing them to think about possible revolts which culture industry cannot afford. Elevating the pleasure to a high place follows the establishment of entertainment industry. Entertainment industry introduces pleasure as an opportunity of escaping from a stressed world. Helplessness and forgetfulness of the individual feed this industry. While the real culture leaves the screen, its gap filled by the intellectualization of amusement. Then, amusement turns into an ideal, and takes the place of high culture. The stereotypes and slogans are embedded in these ideal forms. As a consequence, the culture industry can control and direct personal emotions. As the culture industry gains more power, it would become easier to control and discipline the other sides of life. These efforts serve to ruin the character of the individual and make him as part of the great unthinking masses.

The final aim of the culture industry is to impersonalize the individual and to destroy his private realm (Horkheimer 1992). Therefore, it provides nothing about the explanation of life; "We have even learned how to identify abstract concepts as sales propaganda. Language based entirely on truth simply arouses impatience to get on with the business deal it is probably advancing. The words that are not means appear senseless; the others seem to be fiction, untrue. Value judgments are taken either as advertising or as empty talk. Accordingly ideology has been made vague and noncommittal, and thus neither clearer nor weaker" (Adorno and Horkheimer 2002). Horkheimer and Adorno's emphasis in this passage is on the vagueness provided by the culture industry in order to support the pre-engineered unconsciousness of the individual. Thus, the culture industry makes itself an irrefutable prophet, which dictates rights and wrongs in everyday life of individuals, even by dominating their dreams about the future with providing false expectations. The picture of life, after these efforts of the industry, is a blurred one. The individual has just one tool to catch the whole picture, and it is to give ear this eternal voice of the culture industry that restlessly duplicates the image of the world as if it was carrying a message to all mankind. In this sense, for Adorno, it is dangerous to ignore the power of the repeated voice of this industry. At this point, there is not enough choice for the individual. First choices are to catch up the masses, or to ignore the masses. The culture industry never brings fort the facts of the real world. Instead of it, it transfers the image of the world in it, and gives a suggestion that it also carries solutions of the problems of the individual. The enemy is the thinking individual.

The structure-superstructure paradigm creates an important difference between Adorno and classical radical thinkers. Adorno does not accept culture as a part of the superstructure. Therefore, culture is always like a functional lie (Jameson 1996). Thus, the culture industry, the individual, and individuality are just illusions. The unique existence chance of the individual is to conform to the rules of the generalized culture. Under the circumstances, individuality is nothing more than pseudo individuality. Another reason for the culture industry's dealing with individuality is that the individual represents the fragile side of society. He lives on a cutting edge of a knife. In order to keep him in the good side of the knife he should

be fed with the images of good and ideal stereotypes. Splitting their lives in their different social identities also disintegrate personalities. According to Adorno, this disintegration cannot last forever since the collapse of society will stop this process in the end.

To sum up, the real function of the culture industry is to create average people with the average personalities and intellects in order to keep the whole society in line with the requirements of the capitalist system. Therefore, the first enemy of the culture industry and the mass culture is independent personalities. The emergence of individuals is blocked by creating stereotypes of average personalities and concepts. Society faces no difficulty to accept these concepts and stereotypes. Another aspect is to create a success fetishism, which everybody runs after it. Unsurprisingly, the mass culture always allows the individuals for staying out of the system, as long as these individuals also accept being an exile in their society. Consequently, success fetishism and being an alien consist of the stick and carrot policy of the mass culture. The individual is squeezed between two evils, and turns into a mannequin in the hands of mass culture (Adorno 2001).

40.4 The Role of Advertising in Mass Culture

Advertising has a critical place in culture industry. Advertising is not a simple tool for time saving and market efficiency anymore. Every good in the market must be stamped with the advertiser's seal; otherwise, it will be the centre of the suspects about its quality (Adorno and Horkheimer 2002). Individual character is detached by advertising, and later these pieces are brought together to idolize an elusive and imitated illusionary being. What is done here is to repeat the main character continuously; a buying man, a loving or caring lady, and a good boy-that eats a certain brand of chocolates. Only its style is changed with different compounds of characters. This can be taken as the alienation of the consumer who cannot recognize anymore the use value of what he consumes. Advertising gives the goods a mystical nature that is separate from their initial or original features. Repetition also emphasizes this artificial nature's objectivity that all individual subjectivities become impotent before this subjectivity (Adorno 2001). With the collapse of the subjectivity of the individual, the individual gets caught in the same trap with the capitalists. Capitalist and individual become dependent parts of advertising. The former has to put more money on advertising in order to save the sustainability of his sales, and the latter buys just intensively advertised products.

However, in today's societies the position of the advertising seems different previously envisaged by the capitalist system. To begin with, the services of advertising are getting more expensive so that just big-scaled firms can afford to pay them. In addition, the managers of the advertising industry are from media monopolies; such as radio or television networks, which can establish the bridges between financial and industrial capital with relative ease. Since all the expenses in this area will eventually turn back into the initial payers' pocket; a crucial

competition in advertising is thought unnecessary. In an era of production, advertising also constitutes a prestigious position so that a firm which its goods are out of the advertisement circles must be ready to lose its status in the market. One striking example of this odd situation is seen in wartime. Despite the absence of their goods in the market, most firms keep advertising their goods in order to disseminate an image of their power. What is important here is the repetition of the brand name, the style, as in the culture industry.

By destroying the personalities of the people in public places, advertising turns into an omnipotent subsistence. It is high above the society, which supposedly it serves in. At this point, advertising is for the sake of advertising, and it acquires it actual social power. Then the stereotype of the culture industry comes to the picture. This the meeting point of the culture industry and advertising; they both keep the idea of repeated style, and just change its appearances. They both technically and economically merge in the same melting pot. The manipulation techniques of the culture industry and advertising match each other; the creation of intellectually impotent individuals. On the other hand, advertising empowers these individuals in certain areas, or for certain goods.

One of the taboos in the mass culture is curiosity. Curiosity is enemy of the new. Therefore, the curious citizen has to live with the idea of "there is nothing new under the sun." Consequently, what is meant by information is reduced to know what to buy in the market. For Adorno (2001) "Advertising becomes information when there is no longer anything to choose from, when the recognition of brand names has taken the place of choice, when at the same time the totality forces everyone who wishes to survive into consciously going along with the process. This is what happens under monopolistic mass culture". Domination of needs by the mass culture is realized in three stages: advertising, information, and command. All these stages are dissolved into one other. In a monopolized life, it is difficult for the people to revolt against the mass culture. He is the object of the mass culture, culture industry and advertisement firms (Adorno 2001).

40.5 A Critical Assessment and Conclusion

Unlike the physical or mathematical sciences, it is difficult to diagnose the patterns in the social sciences. It is also difficult to distinguish the chaotic movements from regular ones. Lefebvre, Adorno and Horkheimer's studies show that everyday lives of the people are far from being chaotic. Lefebvre explains the patterns of everyday life in a three staged reproduction model of society. Adorno and Horkheimer elaborate the accomplishment process of this model through the mass culture and advertisement industry. It may be concluded from their studies that the late capitalist era marks the end of individual thought and behaviour. Despite its revolutionary pushes during the Enlightenment, the bourgeois did not promote the individualism in its late period. Horkheimer defines this period as late capitalism (Taylor and Harris 2008). The main reason of this regression is the incalculability of

the individual behaviours which make difficult, if not impossible, to manipulate and govern the society according to the needs of the markets. Therefore, what advertising does is to sell off an illusionary passport to enter the ruling classes. With this logic, by purchasing something advertised in the newspapers or on television gives a two-way satisfaction to the consumer. First, he buys a ticket to enter the upper strata, and the second, he feels himself as if he were a producer of these goods. He does not feel himself as an unnecessary person anymore. Therefore, the main impulse in the masses is false-consciousness. The role of the mass culture is to develop and sustain this false consciousness in order to keep the status quo as it is.

Lefebvre, Adorno and Horkheimer imagine the socio-economic reproduction of a society in a repetitive form. Therefore, the analogy of Sisyphus matches with these thinkers' model. However, this approach does not recognize the progress, economic growth, and increasing wealth in modern societies. A repetitive form of everyday or annual life brings no economic progress and causes a vicious circle that does not reflect precisely the actual case. This paradoxical result stems from the under examination or neglect the dynamic factors in a capitalist economy. The dynamism of capitalist system is recognized by both radical and liberal thinkers. According to Marx (1953/1993) capitalism preserves itself by violent destructions. This is the base of dynamic capitalism. Schumpeter (1942/2008) also emphasizes the dynamism of capitalism. According to Schumpeter it is the creative destruction of old technologies for the benefit of new ones which keeps the capitalism as a dynamic system. The multiplier-accelerator analysis also gives important hints about the dynamism of capitalism. The multiplier is a number showing the changes in total income in an economy with investments. This indicates that if the multiplier is greater than one the final total income will be higher than the initial investments. Acceleration principle, on the other hand, shows that even the investments in an economy are in a constant level consumption has to increase in order to keep the investments at this level (Samuelson 1967).

Therefore, entrepreneurs in a capitalist economy are also in a Sisyphus like situation. They have to increase their sales and production just to save their positions. Classical Schumpeterian analysis suggests that the entrepreneurs accomplish this task by continual use of new technologies. However, this approach is subject to various constraints. First of all, applying new technologies in a production process requires longer time than the entrepreneurs could afford in their short term economic activities. Consequently, capitalist entrepreneurs could just make superficial changes in their products in the short run. Therefore, advertising is an inescapable part of short term sales. Investments are also risky in competitive markets. For that reason, entrepreneurs may prefer producing same goods in different appearances, and avoid from the risky investments. Thus, the short term behaviours of entrepreneurs look like the individual. However, the need for ever increasing sales of businessmen moves away the market economy from vicious circles. In a growing economy, business cycles randomly encounter with their starting points. Instead, they make upward spiral movements. Social preferences of capitalist entrepreneurs also depend on their short and long run economic predictions. In the short run they may prefer a habitual society to a chaotic one in order to keep their sales rising.

However, in the long run a more chaotic society may become more preferable to find a market for new technologies. The culture industry plays a critical role between these intersections of chaos an order. Culture industry and advertising may be helpful for preparing the preconditions of these transition eras.

As for the society; it can survive its coherence and harmony within the superstructure created by institutions and ideologies. As long as the centripetal forces of these institutions and ideologies exist, a society keeps up its entirety. During the times of crises or technological revolutions, centrifugal forces threat the harmony of society. As chaos theory suggests, fundamentals of a given society determine the final movement. As a consequence, all actors in capitalist societies are in a Sisyphus like position. However, the dynamism of the capitalism saves the situation from an open torture with the aid of culture industry. With the exception of times of crises, the dynamism and internal order of societies are determined by centrifugal and centripetal forces. These forces are so dynamic that every movement in a given society or economy requires a sui generis analysis within the framework of its special conditions.

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Chapter 41
Competence-Based Approach in the System of Forming Deontological Preparedness of Specialists

Kaliyabanu Kertayeva and Aida Meirkulova

Abstract For the implementation of the State Program of Education Development of the Republic of Kazakhstan for 2011–2020 a strategic plan of the Ministry of Education and Science was developed, whose mission was the formation and implementation of a state policy in the field of education and science, ensuring competitiveness and sustainable socio-economic growth. In accordance with this plan, the current policy of university and higher education is determined by the need to ensure efficient conditions of professional training of competent and competitive specialists for all sectors of the republic's economy, strengthening the intellectual potential and practice-oriented activities of high schools as well as its integration within science and industry in accordance with international educational standards. Nevertheless, one key element of deontological concern reflects the complexity of deontological ethics that all the specialists seeking an effective grasp and conceptualization of the concept ought to be abreast with. This paper concerns itself with search an array of fears by proposing a competence based approach to forming a system of deontological preparedness within the specialists.

Keywords Competence-based approach · System · Deontological preparedness · Complexity

41.1 Introduction

The current situation in education characterized by reform and renewal of content makes demands for the reconceptualization of the image of the education system. As a result, this increases the relevance of modernization of vocational education.

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The most important tool for this is a competence-based approach, which provides bridging gaps between the content of education and the possibilities of its practical use for a successful professional career. Effectiveness of a professional activity, of course, is linked to its personal characteristics. Therefore, in the conceptual structure of the competence-based approach, special attention should be paid to the problems of deontological training of specialists.

Deontology is a science which regards general problems of debt as a feature which is peculiar to forms of social necessities of humanity as a guide to action. This takes place in form of awareness of debt in personal and professional activities of any sphere. Debt is a moral form of awareness of need for action.

The great sage Confucius believed that "the duty to yourself lies in the fact that the inner essence of a person must be actually human dignity, which raises it above all other creatures: a man's duty not to violate the dignity of humanity as a whole… The duty in relation to others… the deepest respect for the rights and interests of other people…" (Fedoseyev et al. 1994).

From the viewpoint of Immanuel Kant a person acts morally when he or she acts on debt. "The path of duty, the true way of life should not be leaving for a single moment. And if he was abandoned at least for a single moment, the true, real life of a person ceases. …Only from it arise necessary conditions of dignity, which people can give to themselves. This is exactly the sublime which elevates man above himself (as a part of the sensory world)" (Fedoseyev et al. 1994).

From this it follows that in order not to stop the "real person's life", it is necessary to ensure its moral coexistence with the world, to teach "the deepest respect for the rights and interests of other people…". This teaching may require a competence-based approach in order to realize preparedness of the specialists who in turn can help in the teaching or training of others. The study in question explored this approach as well as related complexities and or challenges thereto.

41.2 Competence-Based Approach and Deontological Preparedness

The foregoing philosophical conclusions of sages about the moral function of debt and appropriate pedagogical generalizations allow us to talk about the purpose of implementation of the competency approach in vocational education which should be the formation of a competent professional with developed sense of duty, that is to say of deontological willingness to teaching.

In modern pedagogical science due attention is paid to the theoretical justification, static, dynamic characteristics of the competency approach in secondary and higher education (Baydenko VI, Zhampeisova KK, Zheksenbekova UB, IA Zimnyaya, E. Zeer F. Krajewski VV Hutorskoy AV, El'konin BD, etc.). Relevance of the competency approach in the system of vocational education cannot be over emphasized due to the fact that the model of education based on the competence

approach, will be a fundamental component of development and strengthening of the progressive development of any country.

Of particular importance is competency education in the formation of deontological readiness, as it provides not just knowledge of complex ability and skills to perform professional duties, but based also creative thinking, ability to navigate efficiently and effectively in a rapidly changing informative environment. To inculcate the ability to fulfillment of duty means to lay a solid foundation for a high moral character of actions that ensure an achievement of the relevant competencies.

The concept of deontological preparedness, which we regard as an integral component of competence of specialists in the sphere of "man-man", makes this essential quality a deep moral sense based on awareness and appropriation of professional duty, a sense of responsibility, personal affection for the occupation, responsiveness, and positive individual mental qualities. Unlike professional duty professional debt is an inner need, a deep conviction in the necessity of certain actions, and the need to follow a certain line of conduct. Formation of deontological consciousness occurs throughout the life of the specialist. But this process should begin as early as adolescence, so that the future specialist is able to cultivate in himself such quality of identity as confidence in the correctness of his judgments, i. e. he must work out his own beliefs, which will allow him to consciously act in accordance with his evaluative orientations. Belief that he gains through deontological training is the most perfect reflection in the reality of professional consciousness and its relation to professional duty.

It follows that the formation of deontological readiness of the student as a future specialist is defined as a process of the formation of his consciousness, in which occurs a process of realizing his debt and the need for implementation of professional activity corresponding to that debt. It refers to a state of consciousness where there is a reflection of objective responsibility of the student in ideas, feelings, beliefs, in the inner motives of professional activities and their realization in practice. Consequently, deontological consciousness provides positive motivation of man to his professional activities and awareness of the need of an assignment of required competencies.

We must recognize that today's education system still has no fundamental mechanism of introduction of phenomenon of deontological education of future professionals, particularly specialists in the sphere of "man-man". Problems of deontological training are discussed at conferences, at numerous international symposia, and at meetings of scientists, in articles and publications. But, nevertheless, there is lack of theoretical development of certain aspects of the formation of deontological readiness education. This implies that the value of deontological training in the formation of professional competence and quality of professional readiness of teachers is underestimated. Meanwhile, the two concepts "professional competence" and "deontological readiness" can hardly exist without each other.

As a result of professional education, a specialist must possess the competencies that characterize his readiness for a successful activity and a deontological readiness —a force, mobilizing all of its internal and external resources to achieve its goal. A competence orientation is especially important in the development of higher

professional education, if it is focused not only on the aggregate of specific knowledge, ability and skills, in which a future specialist should be aware of and has certain practical skills, but also on the formation of deontological readiness, ensuring the effectiveness of use of the above described qualities in professional activities.

Deontological readiness means not only knowledge and understanding, the assignment of deontological foundations of professional activity, but also the implementation of active works on its introduction in different areas of educational institutions. However, deontological consciousness characterizes the level of development of professional competence, priority of value orientations, i.e. level of development of competence, related to value reference points of the future specialist, his ability to see and understand the specifics of his professional activities, to realize his professional debt, destination, the ability to select objective and notional settings for his actions and deeds, and to take appropriate decisions. These competencies provide a mechanism of self-knowledge, self-education, and self-control as the subject of professional activities. Improvement of his "I-concept" depends on his own individual educational program. And this is possible only when a person can objectively evaluate himself, treat himself as a friend, when he might see himself not only from his own positions, but also look and see himself as others. This will help to ensure that his consciousness is able to produce objective ideas about the necessary unmistakable actions in immediate professional situations.

Formed deontological understanding is a consciousness of a teacher that he must have competence for independent learning activities, including elements of the logical, methodological, general educational, communicative activities. He should equally be aware of the path of self-creation and to aspire to create himself professionally. As such this would correspond with the model of deontological readiness. Therefore, undoubtedly, today it is becoming an actual necessity to radically upgrade the purposes, contents and forms of vocational education in secondary and higher education from the position of the formation of knowledge, ability, skill (KAS) to the position of formation of deontological preparedness for a future career.

Professional (educational, medical, legal, journalistic, social, etc.) deontology defines the standard of behavior of specialists in the sphere of his professional workings (Kertaeva 2009). Assimilation and appropriation of professional regulatory requirements helps him to consciously regulate his behavior. Formation of deontological readiness of the future experts in university—a difficult task, which requires, firstly, the teaching staff and the whole atmosphere of the university consistent to effective solution of this problem; secondly, the teaching of any discipline should be aimed at the formation of personal characteristics of the future specialists accordingly to the specifics of the future profession.

41.3 Complexity of Deontological Issues

Whereas deontological preparation of specialists would ideally sound a great undertaking, a number of criticisms abound:

A common criticism of deontological moral systems is that they provide no clear way to resolve conflicts between moral duties. A deontological moral system should include both a moral duty not to lie and one to keep others from harm, for example, but in the above situation how is a person to choose between those two moral duties? A popular response to this is to simply choose the "lesser of two evils," but that means relying on which of the two has the least evil consequences and, therefore, the moral choice is being made on a consequentialist rather than a deontological basis.

Some critics argue that deontological moral systems are, in fact, consequentialist moral systems in disguise. According to this argument, duties and obligations which set forth in deontological systems are actually those actions which have been demonstrated over long periods of time to have the best consequences. Eventually, they become enshrined in custom and law and people stop giving them or their consequences much thought they are simply assumed to be correct. Deontological ethics are thus ethics where the reasons for particular duties have been forgotten, even if things have completely changed.

A second criticism is that deontological moral systems do not readily allow for grey areas where the morality of an action is questionable. They are, rather, systems which are based upon absolutes absolute principles and absolute conclusions. In real life, however, moral questions more often involve grey areas than absolute black and white choices. We typically have conflicting duties, interests, and issues that make things difficult.

Another common criticism of deontological ethical theories is the question of just which duties qualify as those which we should all follow, regardless of the consequences. Duties which might have been valid in the 18th century are not necessarily valid now, but who is to say which ones should be abandoned and which are still valid? And if any are to be abandoned, how can we say that they really were moral duties back in the 18th century?

What is important to note in this case therefore is the fact that while engaging deontological preparation of individuals, we ought to recall the challenges and complexities that lay in waiting. When the organization envisions the future and possible probabilities, it will challenge change and uncertainty, and will make the chaos an opportunity to success (Erçetin and Kayman 2014). The training must be tailor-made to suit all challenging aspects to the specialist in question only then can it serve the purpose for which it is intended.

41.4 Conclusions and Recommendations

From what is described above follows that only the consistent implementation of complex targeted tasks will lead to the desired result i.e. the formation of a specialist ready with deontological competence for professional work. Modern education needs to develop a new methodology, the global theory, in which the objects of study are all parts of the educational system in their interaction with the community and man. UNESCO introduced the term "educology", by which it is meant the methodology of education and science about breeding of a holistic creative personality, who realizes himself as a subject of activity in the surrounding world. Such an approach involves primarily multiplicity and unity of education, simultaneous and equilibrium functioning of all of its components: training, breeding, creative development of their relationship and interdependence in the three-tier system of training of specialists.

Therefore, the system of vocational education should focus on the following processes:

- Creation of psycho-pedagogical conditions for the formation of deontological preparedness of experts that will provide them a worthy competence-feature, the ability to self-realization, self-determination of the identity of future specialist in the space of contemporary culture
- Creation of conducive and disclosure of creative potential of personality for the formation of critical thinking, value orientations and moral qualities with their subsequent mainstreaming in professional, scientific, and social activities in the University of Humanitarian Sphere

All this contributes to the humanization and humanitarization of education and it ensures recovery and enrichment of moral and intellectual potential of the nation, which is one of the strategic directions of modernization of the education system in the Republic of Kazakhstan.

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Chapter 42
Rural Malay Youth Leadership and Malaysian Herbal Entrepreneurship Development

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Abstract Malay youth leadership is the key factor for the development of rural Malay herbal entrepreneurship. This herbal entrepreneurship has been running by the elderly family members since start up it. As a result, the involvement of youth leadership for their entrepreneurship development is very limited and decreased their entrepreneurship growth day by day. This study was employed using a phenomenological qualitative research approach with ten rural Malay herbal entrepreneurs in Peninsular of Malaysia through in-depth interview of individual's life experience. It is revealed that youth leadership is the major issue for the development of rural Malay herbal entrepreneurship. The findings suggest that human and financial capital, technical knowledge know-how and government policy are important to increase the involvement of rural Malay youth in herbal entrepreneurship.

Keywords Leadership · Entrepreneurship · Herbal industry · Qualitative phenomenological approach · Government support

42.1 Introduction

Leadership is important in every sector of human life such as education, politics, organization, small medium enterprise and other related fields. At present, globally developed and developing countries have increased their entrepreneurship growth through youth leadership involvement like Korea, China, Japan and other countries

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(McMullen et al. 2008; Van praag and Versloot 2007). Rural entrepreneurship is mainly operated by elderly member of the family and they are not familiar with basic knowledge of current modern technology. This technology is highly accepted by young generation. Therefore, the government of Malaysia increase more budgets every year for youth leadership development in every sector and provides facilities for country's economy growth. So, general entrepreneurship is growing but rural Malay herbal is still in infancy stage due to youth entrepreneurial leadership (Paul et al. 2013).

Herbal entrepreneurship is another economy development area for Malaysia. Every year the herbal growth ratio globally is 10 % but Malaysia increases 15 % annually and also 69.4 % (National pharmaceutical council bureau (NPCB) 2011) people who depends on herbal products which is the highest ratio in the world. This herbal enterprise is mainly run by rural Malay as a majority of the country. Due to excellent climate, there is an increase in more research and development, increase natural products demand and the potential of herbal market (Ibrahim 2006). The market value of herbal industry is estimated RM7.97 billion (Abu Kasim 2007) and other researchers forecasted it would be reach to RM10 billion in a shorter period. Therefore, government of Malaysia is trying heart and soul to increase the number of successful youth rural herbal entrepreneurs annually. However, the involvement of rural Malay in technology related entrepreneurship like health herbal, cosmetics, pharmacies personal hygiene is very limited compared to other ethnic groups like Chinese, the second majority in Malaysia.

At present 13 ministries and 52 government link companies are involved in development of rural Malay herbal entrepreneurship like training, sales promotion and financial support for the genuine entrepreneurs based on their need. However, the contribution of Malay in the herbal industry growth is behind the Chinese entrepreneurs. At present, the Malaysian herbal industry is facing lots of problems to reach their target such as lack of raw materials, skill manpower, financial constrains and other related factors (Hawa 2011; Viduriati et al. 2012; Nordin et al. 2008). However, there are lots of scopes for improvement old and new products through contract herbal manufacturers, government authorized agent like Malaysia Agriculture Research Development Institute (MARDI) and Forestry Research Institute in Malaysia (FRIM). So, the above evident shows that herbal has a huge potential at herbal market and successful rural Malay youth herbal entrepreneurship is too low as a highly majority of the ethnic group. So far, herbal entrepreneurship update data is not available and also very few critical researchers have been conducted particularly in rural Malay youth involvement related herbal based entrepreneurship (Paul et al. 2014).

42.2 Methodology

It is a qualitative phenomenological approach, using in-depth interview among ten rural Malay youth from Peninsular of Malaysia. Small number of life experiences entrepreneur informants is more applicable for phenomenological qualitative

compared to case study, grounded theory and ethnography approaches to reach a saturation point of the study (Sanders 1982). For a phenomenological study, the researcher needs to confirm that respondents have life experiences and there data are reliable

42.3 Discussions, Conclusions and Recommendations

Based on the ten rural Malay herbal entrepreneurs main identified factors are; entrepreneurial attitude and mindsets, fear of success, lack of networking, lack of technical knowledge, financial constraints, lack of entrepreneurial leadership, lack of education and marketing, limited government financial support and new guidelines for production.

The finding showed that the government has made strong plans to increase more rural herbal entrepreneurial leader for rural entrepreneurship development but till now majority were unsuccessful. From the finding of this research revealed that the main causes are inadequate financial support and government guidelines for herbal production. In addition, it was found that it is very important to change rural Malay youth of their entrepreneurial current behavior for entrepreneurship, otherwise they will be far behind in development herbal business and also will be lagging behind rapidly and other ethnic groups will take this advantage to benefit in terms of making more profit gradually. On the other hand, the government needs to evaluate the current guidelines for rural Malay herbal entrepreneurs whether it benefits or not. Also government need to do new plan mainly for rural Malay herbal based on their need as for example certain year full support government and set up each state herbal development unit. This unit direct involved to the entrepreneurs and time to monitor it. To become successful entrepreneurs, give them proper positive guidelines namely achievement target, commitment, immediate decision making capacity like Chinese entrepreneurs, calculative risk taking capacity, tenacity and networking.

In addition, government and government link companies should recognize above mentioned factors that can play a significant role in developing rural Malay herbal entrepreneurship. There is a need to build more confidence and change their previous cultural mindset to becoming more youth entrepreneurs. The dynamic successful entrepreneurs should pay attention to develop the marketing development program, seminars and conferences network development that is related to government social groups and agencies. At the end, government policy makers overcome a misconception suffered by government authorized agents which majority of them is bureaucratic.

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Chapter 43
Integration of Roma in European Union Within Context of Complexity Theory in the New World

Tuğçe Atak

Abstract The article is an inception to approach integration of Roma issue in the context of complex systems. All the stories of Roma rise with an explanation about who they are by the reason of their unique history of travelling, obscurity and their incomparable dissimilarity from all that is left. This article will also start with a discourse about who are the Roma people and their history. After that, the article will mention about EU enlargement policies in Central and Eastern Europe, particularly to show up integration process and reasons for the shift of Roma policies. The other part will have a basic discourse on reasons of anti-gypsyism and related policies in EU to combat with it. These parts set off a briefing to think about the issue in context of complexity. Cultural dimension in the issue forms some questions which are related with the terms of the new world like globalization, universalism and cosmopolitanism by considering the change of the modern society in the next part. Finally the article approaches to complexity theory in social sciences to tend new perspectives on the Roma issue in the Europe with these new theories and brings some approaches and questions under the umbrella of complexity about the integration of Roma in EU.

Keywords Roma · Gypsies · Integration of Roma · EU · Enlargement · Complexity · Minorities · Rights of minorities

The article refers to the term ``Roma'' as as an umbrella name for all members of the Romani ethnic communities (such as Roma, Sinti, Kale, Gypsies, Ashkali, Egyptians, Yenish, Dom, Lom and Travellers) who speak different Romani language dialects and moved to the European lands and travelled into Europe. The term "Gypsy" is used as a wide-ranging name without any limitation for years of migrations and arrival places.

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43.1 Who Are Gypsies/Roma?

The history of Gypsies/Roma is a history of migration for centuries. It is generally gained recognition that the descended of Roma is from Northwest India and they left from India and began travelling into Europe around 14th century.[1]

The answer to the question "Who are Gypsies/Roma?" also includes questions about their past and original land particularly.[2] The concept of nationhood and nation-states needs link with land and blood for recognition of the relationship between a person and a land which also defines who the other or the alien is by taking into consideration absence of the bound of blood and land in the concept.[3] Thus "not belonging" in most nation states is using to identify Gypsies/Roma.[4]

It is clearly seen on history of Gypsies/Roma that the migration conduced to maintain their freedom and cultural vitality.[5] Therefore it is a rich history in a large territory with different cultural and linguistic wealth which was built by belonging to lands of the world. However, the idea that the origin of Gypsy population is defined by behaviours not by history or place is still common and it also constitutes some gaps to manipulate by outsiders.[6]

The history of Gypsies/Roma includes many small of migrants groups and different span of time for migrations to the several places from the beginning that constitute a composite population[7] even we can talk about some main genetic, linguistic or cultural similarities for all Gypsies. Therefore we should not forget that we are talking about a huge group of people which consist of different small groups and has multiple structures inside them without any systematic association.

The confusion about the term of Gypsy has risen in 20th century which is about racial connotation inside the term.[8] The term of Gypsy was using to indicate Gypsies as "persons of nomadic habit of life, whatever their race or origin."[9] Similarly in the UK, the Highways Act of 1959 and High Court in 1967 defined the Gypsies as a person who is travelling.[10] After 1976 Race Relations Acts, arguments

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[1] Chan C., & Guild, E. (2008). *Recent Migration of Roma in Europe*, OSCE Commissioner of Human Rights, p. 13.

[2] Marsh, Adrian Richard Nathaneal (2008), *"No promised land": history, historiography and the origins of the Gypsies.* PhD thesis, University of Greenwich, p. 72.

[3] *Idem.*

[4] *Ibid*., p. 73.

[5] Crowe, David M. (2007). The International and Historical Dimensions of Romani Migration in Central and Eastern Europe, *Nationalities Papers: The Journal of Nationalism and Ethnicity,* 31:1, 2003, p. 81.

[6] Hancock, Ian (2010). Mind The Doors! The Contribution of Linguistics. In Damien Le Bas & Thomas Acton (Ed.), *All Change! Romani Studies Through Romani Eyes,* (p. 7). University Hertfordshire Press.

[7] *Ibid.,* p. 17.

[8] Fraser, Angus (1992). *The Gypsies*, Blackwell Publishers, p. 2.

[9] Caravan Sites Act 1968 in English Law.

[10] Fraser, *The Gypsies*, p. 2.

about Gypsies and their protection by the legislation gave a start in Great Britain and Westminster Country Court in 1987 and then the Court of Appeal in 1988 agreed that "Traveller" was not synonymous with Gypsy and Gypsies were a racial group for the purposes of the Act.[11] On the other hand, the way of life is not sufficient definition for Gypsy because of Gypsies who have adopted a settled way of life. The rise of Gypsy national organizations from 1960s[12] formed a new awareness of the historical and cultural ties of Gypsies which can give more sufficient definition for Gypsy and recognition of their rights.

There are several Romani word corresponding to Gypsy like *Romanichal* for English Gypsy and English Gypsy immigrants in USA, Canada and Australia, *Calé* in Spain and southern France, *Kaale* in Finland, *Sinti* in Germany, *Manouches* in France, *Guphtoi* in Greece and *Roma* who immigrated to Eastern Europe.[13] *Rom* (single) or *Roma* (plural) is most common word to correspond Gypsies. Many international organizations are using the term of Roma for Gypsies in Europe. However some groups of Gypsies in Europe are defining themselves with different words like *Sinti, Egyptians, Ashkali* etc. and other local names.[14]

Besides the term of Gypsy, also the term of Rom/Roma is controversial. For example, Herman Brockhaus in 1884 said that origin of the word Rom comes from Indian word Dom, which refers to a low caste in all over in India.[15] Additionally, the words to refer Gypsies have differences with regards to their arrival place and speaking language. John Sampson constructed that the first migration was from India to Persia and after that, they moved to different regions and separated into three branches: *Dom* in the Middle East who speaks *Domari*, Lom in Armenia who speaks *Lomavren* and *Rom* in Europe who speaks *Romani*.[16] Sampson agreed with the idea of separation after first arrival however some authors like Turner and Colocci asserted different migrations chronologically and geographically and the reason for their resemblances can be a common Indian origin but the origin is not necessarily constituted only one population while still in India.[17]

After their arrival to the Europe during 14th century, villagers gave a range of names to express their supposed origins or identity. *Atsinganos* in Greek, *tsiganes* in French, *zigeuner* in German, *zingari* in İtalian and *ciganos* in Portuguese are some of the examples for the giving names for them.[18] In the 18th century linguistic science discovered that Romani language which is spoken by Roma in Europe is an

[11] *Ibid*., p. 5.

[12] *Ibid.,* p. 9.

[13] *Ibid.,* p. 8.

[14] For example, gypsies in Portugal call themselves in three different groups: Spanish Roma, Portuguse Roma and Chabotos.

[15] Hancock, *Mind The Doors! The Contribution of Linguistics,* p. 8.

[16] *Ibid*., p. 9.

[17] *Ibid.,* p. 10.

[18] Liégois, Jean Pierre (2007). *Roma in Europe*, Council of Europe, p. 18.

Indian one which is spoken in north-west of India and derived from to dialects close to the Sanskrit.[19] There is no only one standard for Romani language. Different dialects are used in different regions or different groups in Europe. Also according to Sampson's hypothesis which separates gypsies in three different groups; *Domari* and *Lomavren* languages from India which are non-European varieties of Romani are spoken by Gypsies who live in Middle East, Armenia, Georgia, and eastern Turkey.[20]

43.2 Brief History of Roma in the Last Centuries

The waves of migrations to Europe continued until 20th century. The conflict between Austria and Ottoman Empire during late 17th and early 18th centuries, freeing of Gypsy slaves in Romania in 19th century, The First and Second World War were the main producers for the new huge immigration waves for Gypsies in the last centuries.[21] During 19th century, the large numbers of Roma migrated to countries in Western Europe from Central Eastern European countries to have more stable conditions and to escape from big changes and their effects. However the western countries also practiced similar policies and attitudes to prevent their arrivals and settlements with pressure and forces.

All these external factors affected Roma/Gypsy people economic and social life. They become poorer and had unhealthy conditions and diseases. Besides that Nazi occupation started during last years of 1930s. Gypsies deported from many of countries in Europe to several concentration camps. Also some other countries took step for Nazi initiatives and orders. For example, France and Bulgaria build some temporary camps.[22] These were "final solution" for the Romani "problem". During these years between 400,000 and 500,000 Roma, Sinti, Gypsies disappeared.[23] They were killed on the spot or in prisons and deported camps like Auschwitz that is the place of "no soul, no word, not even a tear."[24] Large numbers of Roma died in the *Porrajmos*, Roma Holocaust, with estimates ranging from 80,000 to over a million.[25]

In the 20th century, after all these waves of migration, their invisible history shifted to the visible one by several contributions by forming a real history for

[19] *Idem.*

[20] Hancock, *Mind The Doors! The Contribution of Linguistics*, p. 8.

[21] Liégois, *Roma in Europe*, p. 22.

[22] *Ibid.,* p. 115.

[23] *Ibid*., p. 116.

[24] It is from a poem of Santino Spinelli which is titled as Auschwitz.

[25] Crowe, *The International and Historical Dimensions of Romani Migration in Central and Eastern Europe,* p. 86.

Roma in Europe. The new communist societies in Central Eastern Europe were a new hope for the Roma after World War II. After Stalin's death in 1953, the Roma began officially to reclaim their ethnic identity.[26] On other hand, the violence for Roma again increased after the collapse of communism in 1989 and Roma became the scapegoats for everything. The media provoked panic about Roma immigration among the public. In 1965, a radical shift has taken place within the Catholic Church with Vatican II. After Vatican II, Pope Paul VI made the change visible and he established a body tasked with coordinating and developing evangelism among the Gypsies.[27]

After the huge history of travelling during ten centuries, the current situation is still with uncertainty for Roma in the context of law, policies, and attitudes. Also this uncertainty is including injustice and lack of harmony between Roma/Gypsies and others. Assimilation policies have not resulted in integration or in adaptation thus transition and hesitation are obtaining for Roma policies.[28] However establishing international institutions, during 1980s and 1990s, tend to a new framework for research and action that might be very important development for new reasonable Roma policies.

Finally, in the 21st century, some polices for inclusion appeared in many European countries. The transformation of policy included controlling and management for Roma individuals in general. The inclusion way has shifted from assimilation to integration in many European countries. However inequality and discrimination are still attending for Roma.

In modern times, the great majority of the Roma/Gypsies are citizens of the states. Therefore they have the same rights and duties as any citizen in principle. Many constitutions also involve some rights for minorities. The questions arise at this point: How the ordinary legal rules applied to Roma to protect them collectively and individually? What kind of minority group are they when we take an account of their specific culture and lifestyle?[29] Roma people are without territory and a kin state. Also, it is not easy to define their common culture and language because of different practice in different regions. They are not accepted as a national minority. Mostly Roma groups are accepted as a dispersed minority or transnational minority on basis of their culture or non-territorial minority because of absence of homeland. This undefined situation prevents utilization of minority rights. Besides that the nomadic way of life is not acceptable in all the systems of regulations in states. There are many regulations for non-citizens if they want to move another country to live or work all in the world. In this case it is not so easy to decide to

[26] *Idem.*

[27] *Liégois, Roma in Europe,* p. 132.

[28] *Ibid.*, p. 133.

[29] *Ibid.,* p. 135.

leave from a country spontaneously for Rome people too. Additionally, limitations for freely movement in consideration of "*public order*", "*keeping the peace*", and "*protecting the environment*" could interfere with travelling of Roma.[30]

Another important developing in modern times, Roma/Gypsy organisations started to be more productive and effective on Roma policies through coordination with European organisations such as Council of Europe, EU bodies and the OSCE.[31] Romani experts and representatives started to take role in civil organisations and Romani-run organisations are increasing and acting successfully. Besides that the numbers of educated Roma are increasing and by this reason, innovative approaches are developing in the area with contributions of educated Roma people. This also prevents manipulations on the issue which are brought by *the Gypsy Industry.*[32]

43.3 EU Enlargement and a New Model of Integration of Roma

The enlargement of Council of Europe in the early 1990s, followed by the enlargement and integration of the European Union(EU) that a major factor in the development of Roma integration after 1989 in the post-communist world.[33] The 1997 accession negotiations which end with enlargement in 2004 and 2007[34] through Eastern Europe, paved the way for new regulations and protection for Roma minorities with other minorities in the Eastern European countries. The EU enlargement policy involves democratic and economic transformation in countries seeking to join and sets out a template for economic development with widen the European market. However the reasons for enlargement also related with security to ensure stability through sharing common rules and decision-making practices. Also it should be emphasised that the enlargement is about the identity of EU. Political influence and integration practice on the basis of protection and implementation of identity of EU.

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[30] *Ibid.,* p. 137.

[31] *Ibid.,* p. 143.

[32] Kwiek, Gregor Dufunia (2010). Afterword: Rom, Roma, Romani, Kale, Gypsies, Travellers, and Sinti … pick a name and stick with it, already! In Damien Le Bas & Thomas Acton (Ed.), *All Change! Romani Studies Through Romani Eyes*, (p. 82). University Hertfordshire Press.

[33] The term of Roma was accepted as an official name at 1st World Romani Congress in April 1971. Generally when intergovermental organizations and civil organizations refer to all gypsies in Europe with the term of Roma.

[34] Eight Central and Eastern European countries (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia), plus two Mediterranean countries (Malta and Cyprus) were able to join on 1 May 2004 and after that Romania and Bulgaria were able to join in EU on 1 January 2007.

The Copenhagen Criteria refers to EU membership requirements, brings out a merit-based system[35] to motivate states towards membership. The process to fulfil EU requirements developed a change on current policies and implementation for new ones which involve rights of minorities. Therefore Roma integration and protection their rights develop with several enforcements and specific programs. For example, between 2001 and 2003, the main pre-accession assistance program PHARE provided 77 million euro to Roma related projects in the candidate countries.[36]

Rights of minorities are addressed in the EU documents and democratic norms that are promoted through the enlargement process. The European Council in 1993 established a set of criteria for accession of Eastern and Central Europe countries that specified human rights and respect for and protection minorities as requirements.[37] Besides that the Charter of Fundamental Rights of the EU states that "*everyone is equal before the law*" in article 20 and "*any discrimination based on any ground such as sex, race, colour, ethnic or social origin, …membership of national minority, …shall be prohibited*." in article 21. The other multilateral organizations such as the UN, OSCE and Council of Europe also have several documents to provide for non-discrimination of individuals based on race and ethnicity. The OSCE's 1990 Copenhagen Meeting of the Conference on the Human Dimension of the CSCE[38] showed up a political framework and affirmed that "*the rights of persons belonging to national minorities as part of universally recognized human rights is an essential factor for peace, justice, stability and democracy in the participating states.*"[39]

As we could see above obviously the several documents and norm in the EU and the EU accession process ensure minority protection. Also the countries such as Hungary, Romania, Czech Republic that joined in the EU, in Eastern and Central Europe expose improvement on status of minorities and new policies for rights of Roma and integration of Roma. However there is a discussion on "*double-standard*" of EU on the basis of no recommendations for minority protection to the Western Europe countries. When the candidate countries have to fulfil some requirements for protection minorities and change their domestic policies, Western countries do not have this kind of sanctions. Thus the minority protection in EU is something the EU has preached rather than practiced.[40] For example, the Roma in Italy also face discrimination. The European Roma Rights Centre (ECCR) has

[35] Spirova, M., & Budd, D. (2012). The EU Accession Process and the Roma Minorities in New and Soon to be Member States. In Anca Pusca (Ed.), *Eastern European Roma in The EU: Mobility, Discrimination, Solutions*, (p. 49). International Debate Education Association Press.

[36] *Ibid.*, p. 51.

[37] *Ibid.*, p. 50.

[38] Previously the Organization for Security and Co-operation in Europe was the Commission for Security and Co-operation in Europe (CSCE).

[39] *Ibid.*, p. 51.

[40] *Idem*.

documented cases of abuse by the police and Roma in Italy have faced with restrictions on education, employment and mobility.[41] The documents shows us, attitudes for Roma and discrimination for Roma and other minorities in their societies are not different in Western European Countries and all the sanctions and related documents and norms on minority protection should commit for every EU countries equally. All the countries should address "the problem" and take an action to fix it. The EU Framework for National Roma Integration Strategies brings the solution of the double-standard problem created by the accession process and more concrete and stable EU wide policy structures on Roma issue.[42]

Another situation which needs a solution is the short-term political and local considerations to prevent discrimination for Roma and protect their rights. For example, after the extension of the visa free regime, the numbers showed us a large percentage of those who crossed into Western Europe were Eastern European Roma.[43] By considering this, forceful return of these new immigrants or encouragement of voluntary return with stipends to open up a new business in home happened with political and regional considerations.

The carrot and stick approach of the accession process of EU provided addressing the Roma issue in Eastern Europe and bring a new level for solutions. The wider EU with more Roma people made the problem more visible and gave a potential cooperation to change by funds and implementations. However the process is unfinished and several indicators like double-standard for Western countries, politic and regional considerations, economic crisis, nationalism, and prejudice in societies create different obstacles for a solution at all. In despite of these problems, also a significant shift in the EU's approach towards Roma policy happens through the Common EU Framework for National Roma Integration. The Common EU Framework for National Roma Integration Strategies up to 2020 prepared in 2011 aims to define and coordinate the obligations and responsibilities of the EU member-states and candidate countries towards their Roma populations based on four key national integration goals (housing, health, education and employment).[44]

43.4 Anti-Gypsyism

The integration of Roma also includes prevent anti-gypsyism/anti-romanyism alongside of policies to change their life conditions and practice their social and economical rights. Recently, different cases on Roma exclusion show up all in the

[41] *Ibid*., p. 78.

[42] *Ibid.,* p. 11.

[43] *Ibid.,* p. 2.

[44] Policy Assessment: EU Policies for Roma Inclusion (2011). Open Society Institute-Brussels. http://www.opensocietyfoundations.org/sites/default/files/2011-07%2520EU%2520Roma%2520Inclusion%2520Policies%2520final.pdf.

European territories via increasing of intolerance in societies. Racist violence is generally practiced by members of extremist groups and also mainstream politicians sometimes give political cover to groups and events.

The Roma are "without a land" but this is not a unique situation all in the world. However there is something which makes difference for Roma: Their culture does not value attachment to place.[45] There are several different inputs to define their culture in all different regions however outputs are very similar all in the world: negative prejudices for Roma and their culture, lack of harmony with society and consequently excluding from society. The prejudices constitute the main reasons for anti-gypsyism.

Protecting the civil rights of minority groups is practicing in democratic nation-states though the approaches are different for each country. However Roma do not fit well in any of these systems to protect their rights and create social, economical and political equality for them. The EU establishes rights for individuals to move and reside across state borders and to enjoy non-discrimination on the basis of nationality in the Charter of Fundamental Rights in EU.[46] In recent decades, the Union has expanded protection against discrimination, first in the field of gender, and then progressively in the field of race or ethnicity, and other grounds.[47] Also for the general minority rights regime, the United Nations adopted a Declaration on the Rights of Persons Belonging to National or Ethnic, Religious and Linguistic Minorities in 1992 and the Council of Europe drafted the Framework Convention for the Protection of National Minorities in 1995. After 1990's, in the last decades, a separate network of institutions has established dealing specifically with the Roma under the auspices of international organisations such as the Council of Europe, the OSCE and the EU, as well as international NGOs European Roma Rights and the European Roma Information Office.[48] However practicing all political, economical and social rights for Roma people still does not occur all in the European countries and the development for protection their individual and group rights and policies for integration are at different levels in each country. Besides that all these legal frameworks, financial instruments, institutional frameworks for policy coordination do not ensure enough practices to prevent anti-gypsyism.

Another issue is about tools to struggle with anti-gypsyism. The dilemma is universal individual rights are sufficient to promote the social inclusion of Roma and prevent the discrimination, or policies based on group differentiated minority rights with Roma specific norms are required to ensure the protection and exercise of their fundamental human rights.[49] It is also unclear that what kinds of minority rights should be promoted for affirmative action without allowing for provocations

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[45] Appelbaum, Diana Muir (2011). The Rootless Roma, The American Interest. http://www.the-american-interest.com/articles/2011/03/01/the-rootless-roma/.

[46] The Charter of Fundamental Rights of the EU article 21 guarantees non-discrimination and article 45 assures freedom of movement and of residence for citizens.

[47] Chan, Guild, *Recent Migration of Roma in Europe*, p. 16.

[48] Rövid, Márton (2011). One-size-fits-all Roma? On the Normative Dilemmas of the Emerging European Roma Policy, *Romani Studies* 5, Vol. 21, No. 1, p. 2.

[49] *Ibid.,* pp. 1–2.

which can bring on discrimination for people outside of the group. The answers are so controversial and changeable according the time and place, thus the effective common Roma policies for all in Europe could not be formed easily for social inclusion and combat with discrimination for Roma. On the other hand, it is very clear that fighting with discrimination and promote the ethnic difference of Roma is cheaper than improve the living conditions of the masses of Roma who do not have jobs, houses and food. However it is also known that anti-discrimination measures and the development of the poorest micro-regions cannot be efficient in themselves thus a Roma middle class has to emerge alongside a culture of equality and diversity like the social integration and recognition of the African-American community from the 1960s in USA.[50]

The anti-gypsyism is also need to discuss by interdisciplinary perspectives. Political, sociological and anthropological perspectives are main disciplines that could figure out comprehensive policies and frameworks to prevent anti-gypsyism. Furthermore the terms of interdisciplinary studies like cultural globalisation, multiculturalism or cultural pluralism, social complexity and diversity management in society could be discussed with Roma integration and anti-gypsyism issues to understand effectuality and correlation between fields. Dealing with factors that affect the system entirely forces to going further than cause effect relation. How the complexity of the process of integration Roma and the complexity in Roma communities would deal with complexity in society? What are the factors broking the equilibrium? How can we protect the stability in the sensitive society? Answering of these questions could help to understand the inclusion of Roma in this complex system of society and to generate effective Roma policies.

43.5 Cultural Dimension of Society in the New World

During 21st century, universalism of culture and creating a global idea-system are two of the main changes in the globalized world that we discuss on them in several areas.[51] Multiculturalism in societies is increasing as a result of the global world. It brings many new discourse and discussion on pros and cons for the nation-state, global economy, and policies of states and intergovernmental organizations. Rethinking on Roma culture with its relation cultural globalization would compose new perspectives on the inclusion of Roma in society.

A society's culture is tied up with its economic, political and other institutions and it is not free of contestation and change naturally.[52] Culture of society can have

[50] *Ibid.,* p. 20.

[51] For the path of globalization through centuries: Waters, Malcolm (1995). *Globalization*, Routledge, p. 159, figure 7.1.

[52] Parekh, Bhikhu (2000). *Rethinking Multiculturalism: Cultural Diversity and Political Theory*, Macmillan Press, pp. 151–152.

many different practices under different circumstances like time, place, conflict situation etc. thus it is not an stable, static and homogenous term that refers every time to the same agreements and interpretations. The active process of culture paves the way for the evolution of it which seems in Roma culture clearly. Mobility of their culture generates different practices which are assimilated with popular culture and consumerism system in the world under poor circumstances. On the one hand, the "new" culture of Roma stays discriminated from the cultures of other groups as a lower class, on the other hand their culture links up with global culture like the cultures of other groups. Moreover the changes and differences in Roma culture influences that who is inside and outside the group even non-Roma may classify subjects as Roma if they fit some stereotypes like being poor, dirty, travelling, living in caravan, etc.

Diversity management is also an anti-discrimination activity to combat with discrimination against immigrants and ethnic minorities. Cultural diversities with unequal opportunities generate exclusion for some groups like Roma in societies. Diversity management policies mostly include training the immigrants/minorities, making cultural allowances, challenging racist attitudes, combating discrimination, equal opportunities policies with positive action.[53] Besides that the general attitudes of society has changed during last modern times and it gives new meanings for the relations among individuals, groups, agencies, companies and states. Basic social organizing principle is shifting from collectivization between social class, groups and etc. to individualization and reflexivity furthermore inequality is formed by social risk position instead of social classes.[54] The situation imposes also collectiveness inside settled Roma groups in big cities and consciousness in the societies for anti-discrimination negatively. Inequality to reach social, economical, political rights and welfare was transformed to something that comes from nature and only responsible is ourselves. In addition to this, people in society are more ready to take risk by considering their benefits that can affect negatively to all of us environmentally or socially at the end.

Exclusion of Roma also brings a question to the minds about their place in this globalization process by a cosmopolitan perspective. How can we refer Roma and the other discriminated minority groups as cosmopolitan, citizen of world, without ability to reach same political, social, and economical rights for them? The irony also comes from being segregated at the lands of world when Roma people are travellers and people of world in regard to their culture.

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[53] Wrench, John (2008). *Diversity Management and Discrimination: Immigrants and Ethnic Minorities in EU*, Ashgate, p. 122.

[54] Scott, Alan (2000). Risk Society or Angst Society? Two Wievs of Risk, Consciousness and Community. In U. Beck, B. Adam and J. V. Loon, *The Risk Society and Beyond: Critical Issues for Social Theory*, (p. 35). Sage Publications.

43.6 Complexity Theory and Integration of Roma in EU

Basically, "*complexity theory which is rooted in chaos theory offers a new set of conceptual tools to help explain the diversity of and changes in contemporary modernities undergoing globalisation and offers new ways of thinking about diverse inequalities and social change in a global era*".[55] Particularly, the theory accepts non-linear dynamics for changes. In other words it suggests unpredictability instead of predictability in the cause and effect models. Non-linear dynamics result with instability thus the movement, change and unpredictability are necessary for survival in the system. The whole world and its systems are sensitive therefore massive and unpredictable changes in outcome could be produced by a small-scale change which is called as a "*butterfly effect*".[56] Also very similar conditions can produce very dissimilar outcomes in different situations thus the each action in similar conditions could not give always same success or conclusion.[57]

The method of forming cause and effect relation for the order in society is not sufficient to analyse society anymore. Particularly, under the complex systems the term of social complexity involve deterministic and random order with complex human behaviours. Social complexity reflects human behaviour as it is exercised in ongoing and increasingly extensive and more complicated circumstances of individual and group existence.[58] In this case the system is not built up on cause and effect relation, instead of this it uses non-linear relations between all dynamics. Besides that the sensitivity in complex system is a main point to consider effects of dynamics to each other and reasons for change on equilibrium within the frame of "*pragmatic holism*"[59] from individuals to groups.

When minority and integration issues are discussed by referring complex systems, it could help to understand challenges to protect balance between groups in society within the framework of holism. Addressing the issue integrally instead of regional or local perspectives could provide substantive solutions and policies for the minority groups. Nonetheless consideration of sensitive and complex relations and differences in regard to social classes, developing and democracy level of countries, culture, political systems is essential in complexity theory in the same class with integrity. For this reason complexity theory could give a new impulse to the policy or integration and minority issue in EU and Council of Europe.

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[55] Walby, Sylvia (2003). Complexity Theory, Globalisation and Diversity, University of Leeds. http://www.leeds.ac.uk/sociology/people/swdocs/Complexity%20Theory%20realism%20and%20path%20dependency.pdf.

[56] Research Methods in Education, Routledge. http://cw.routledge.com/textbooks/9780415368780/A/ch1doc.asp.

[57] *Idem.*

[58] Center for Social Complexity, Krasnow Institute for Advanced Study, George Mason University, http://krasnow.gmu.edu/socialcomplexity/what-is-social-complexity/.

[59] Simon, Herbert A. (1962), The Architecture of Complexity, *The American Philosophical Society*, Vol. 106, No. 6. pp. 467–482.

The complex systems also can bring a new point of view for the Roma issue in terms of understanding diversity in their culture, the mosaic structure of their young society, differences from other groups in the society, their movements from one place to another to survive, and what are the factors and effects for inequality and discrimination. Besides that understanding the disorder of Roma groups which is order in a complicated and different system could be effective to provide general social order in social system and to reduce unpredictability. The unsolvable problem with unstable chaos can find different answer with a perspective of complex system and social complexity through deliberative approach.

The article will not tell about the mathematical and statistical details in complexity theory however the importance of using quantitative resources in social sciences should not be forgotten. Insufficient statistical data about Roma population in Europe and the other numeric data based on gender, territory, employment, education level etc. should be considered from this point.

The visibility of the "Roma problem" increased with the last crisis in Italy, 2007 and France, 2010. These expulsions served to put the issue of anti-gypsyism high on the European Agenda and raise concern about the ability of EU countries to protect the basic rights of European citizens including freedom of movement.[60] These examples showed that crises can result with positive impact on the problem. However it does not mean that ongoing and increasing crises will end up with a positive impact always. Contrarily, they can come out with irreversible negative facts and affect other problems. Analysing facts with regard to complexity theory can ask about complex reasons, factors and their interaction each other to reach order in disorder.

43.7 Conclusion

Consequently, the world in 21st Century involves more complicated and interactive relations between states, companies, civil organizations, groups and individuals. These complicated relations influence all economic, social and political activities. "*The butterfly effect*" shows his impact all in the field clearly. Roma issue emerge because of this effect and take place in policies with different approaches for solution that is temporal and local mainly. Discrimination against Roma and violence against their rights affect success of the enlargement of EU and peaceful and secure identity of EU negatively. Also economically, not giving opportunities for Roma as employee in the market do not contribute the capital stock of liberal system. These situations compel EU to new policies for integration of Roma. Successful integration with protecting justice and equality and provide equal

[60] Spirova, Budd, *The EU Accession Process and the Roma Minorities in New and Soon to be Member States,* p. 3.

opportunities for Roma is ongoing process with a long way. Addressing Roma issue through complex systems can bring a breath of fresh air which is convenient with complex conditions and uncertainty based upon many other issues like economic crisis, diversity, and European identity in expanding EU.

Chapter 44
Leading and Managing Organizational Change in Chaos and Complexity

Çağlar Doğru

Abstract According to chaos theory, in today's world, we no longer live in a simple, stable and certain environment. As the chaos literature expands, the paradigm of control and equilibrium has almost left its place to the paradigm of chaos, randomness and disequilibrium. One of the most important assertions of chaos theory is that there is a fundamental order and structure behind the randomness and complexity. The complexity theory as well, designates the dynamic and complex systems replacing the linear models. Under such quantum mechanics, organizations need to change to survive and not to exclude themselves from the ecological system. In this paper, after analyzing chaos and complexity literature and theoretical background, the need for change, the types of change (technology, structure, people and product changes) and classifications of change (planned, emergent, incremental, radical change) will be analyzed. And the question of "How organizational change can be effectively led and managed in chaos and complexity?" will be answered. In this context, the purpose is to explore the management techniques to implement in organizational change and emphasize the role of leadership for effective change. And the paper will be concluded with the view that with the existence of chaos and complexity, change is vital for organizations and it depends on the effective leadership and management.

Keywords Organizational change · Chaos · Complexity

44.1 Introduction

First declared with the iconic work of Newton, "Philosophiae Naturalis Principia Mathematica" in 1687 and the following works, the Newtonian Paradigm of equilibrium existed nearly 300 years. This is because the environment and its

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components were predictable and stable themselves thus staying in equilibrium. The organizations were structured in such a way that both the internal and external factors were under control. But with conditions changing and emerging with every passing day, the so called 'equilibrium' has not been in equilibrium anymore. First dissected by Lorenz, the nonlinear dynamic system has been the explanatory factor for the unpredictable patterns of flow (Lorenz 1963).

44.2 Chaos and Complexity Framework

To explore the contents of chaos and complexity, chaos and complexity should be defined and resolved in the first place.

44.2.1 Chaos in General

Chaos theory emerged out of the field of biology in contrast to the Newtonian paradigm, which was tied to the fields of physics and math (Tetenbaum and Laurence 2011). Working on weather systems, Lorenz made significant contributions towards the 'Chaos Theory'. In his paper chaotic systems have been defined as: 'Processes that appear to proceed according to chance, even though their behaviour is in fact determined by precise laws' (Lorenz 1993).

To explore the meaning of chaos, the word itself is not anarchy or randomness. Chaos is order, but it is the invisible order. And also chaos is not merely the result of noise or interference, or even insufficient knowledge. Chaos implies the inherent "uncertainty principle" not like how we perceive the world but like how the world actually works (Cartwright 1991). The new science of chaos theory proposes that the environment is full of randomness and uncertainty. And the environment is characterized by surprise, rapid change and confusion and seems mostly out of control.

The focus of chaos is the web of feedback loops present in every system. In some systems, the feedback loops are linear; in others, nonlinear (Tetenbaum and Laurence 2011). As a main factor of chaos a nonlinear dynamic system is a system where relationships between time-dependent variables are nonlinear (Thietart and Forgues 1995). Among the characteristics of chaos are; order in chaos (Cartwrigth 1991) and self organizing (Tetenbaum and Laurence 2011). Order in chaos tells that order is born form disorderness. In his research Cartwright (1991) showed how order survived in chaos in his population model. The self organizing characteristic of chaos argues that no one is in control (Tetenbaum and Laurence 2011). Elements are organized on their own, not under any supervision.

Although chaos incorporates elements of chance, it is not random disorder. Rather, chaos theory attempts to understand the behavior of systems that cannot be predicted linearly, and it doesn't show conventional cause-and-effect manner over

time. And if it is held as a whole, these systems manifest definite patterns and structures (Murphy 1996). Chaos theory stems from the study of nonlinear dynamic systems. Nonlinear dynamic systems have specific properties that mathematicians have studied for more than a century (Thietart and Forgues 1995). Despite the fact that chaos theory originated from the context of physical sciences, other fields of sciences have recently interacted with the theory using non-linear relationships and complex interactions. Among the fields are, ecology, medicine, international relations, economics (Levy 1994) physics and chemistry (Thietart and Forgues 1995) and organizations and human relations.

Today social sciences have given an increasing emphasis on chaos when assessing relationships, especially on nonlinear dynamic systems with organizations because there are forces that push the system toward stability and order; which include the forces of planning, structuring and controlling. Other forces push the system toward instability and disorder. These are the forces of innovation, initiative and experimentation. These forces can lead to a complex situation: a chaotic organization (Thietart and Forgues 1995).

44.2.2 The Paradigm of Complexity

To understand the relationship between social sciences and complexity, there is a high need for understanding the complexity theory which also originated from physical sciences. Complexity has its roots in 'the butterfly effect' definition by Lorenz in 1969.

Complexity theory has emerged in the past twenty years as a new way to understand nature (Marion 2006). To define complexity theory, it is the study of complex, nonlinear, dynamic systems with feedback effects (Levy 1994). It is concerned with the fundamental logical properties of the behavior of nonlinear and network feedback systems, no matter where they are found (Stacey 1995). By this way, it reshapes the way we see organizations and relations in an organization.

Complexity theory originated from the biological and physical sciences and has migrated to the social sciences (Marion 2006). And especially without mathematics there wouldn't be complexity. As Manson (2001) argues, there is no one complexity theory, instead of it, there are complexity theories developed by different scientific disciplines, which gather under the general heading of complexity research (Burnes 2005). So, the question of why organizational theorists should pay attention to the science of complexity comes to mind. The answer to the question is, organizations are nonlinear, network feedback systems and it therefore follows logically that the fundamental properties of such systems should apply to organizations (Stacey 1995).

44.2.3 Comparing Chaos and Complexity

Scanning the literature on chaos and complexity, it is understood that the two terms are sometimes used interchangeably and sometimes a subset of each other. The fact however, is that chaos and complexity are different from each other.

Chaos and complexity theory reconciles the unpredictability of nonlinear dynamic systems with a sense of underlying order and structure. There are some significant differences between the two approaches. While chaos theory searches for a small number of deterministic mathematical functions driving a system; in population models, complexity theory is less concerned with underlying simplicity; it tends to rely on brute computing power to model large numbers of nodes connected by simple logical rules (Levy 1994). The complexity paradigm and chaos share the uncertainty and nonlinearity. And if it is necessary to compare the two aspects, complexity is less dynamic than chaos. The major difference between chaos and complexity is the fact that complex systems are adaptive (Marion 2006). It means complex systems have the tendency and capacity to adapt to the changes that occur inside and outside of them.

44.3 Leading and Managing Organizational Change

In chaos and complexity, organizations must adapt to the changing dynamics of its nature through effectively led and managed change. To achieve this, there are some approaches and management techniques to contend with.

44.3.1 Organizational Change

To understand how organizations change, management scholars have borrowed many concepts, metaphors, and theories from such disciplines, ranging from child development to evolutionary biology. Among these concepts include, punctuated equilibrium, stages of growth, processes of decay and death, population ecology, functional models of change and development, complexity and chaos theory (Van de Ven and Poole 1995).

Exploring and understanding organizational change is vital for theorists and researchers of both organization and other disciplines. While analyzing organizational change, first of all, the concept of change should be examined and then types of and approaches to organizational change should be scrutinized.

44.3.1.1 Definition of Change

Change, one type of event, is an empirical observation of difference in form, quality, or state over time in an organizational entity. The entity may be an individual's job, a work group, an organizational strategy, a program, a product, or the overall organization (Van de Ven and Poole 1995). According to another definition change is any alteration in people, structure and technology (Robbins and Coultier 2001).

44.3.2 Approaches to Organizational Change

Though there are many different approaches to organizational change and many ways of categorizing the same, there is a general agreement that the two dominant ones are the Planned and Emergent approaches (Burnes 2005).

44.3.2.1 The Planned Approach to Organizational Change

Since the approach of planned change was first mentioned by Kurt Lewin, lots of models have been developed to explain organizational change (Liu 2009). The term planned change by Kurt Lewin, distinguishes change that was consciously embarked upon and planned by an organization against the change that comes by accident, by impulse or that might be forced onto an organization (Marrow 1969).

According to Lewin, under the umbrella of the approach of planned change there seems to be Field Theory, Group Dynamics, Action Research and the Three Step model of change. Field theory suggests that field is the group environment and any change has its roots in the change of group behaviors. According to Back (1992) the formulation and behaviour of complex systems as described by Chaos and Catastrophe theorists bear striking similarities to Lewin's conceptualization of Field Theory (Burnes 2004b).

Group Dynamics emphasize that it is the group behavior that should be at the centre of change not individuals. And according to Schein (1988) the focus of change must be at the group level and should concentrate on factors such as group norms, roles, interactions and socialization processes to create 'disequilibrium' and change (Burnes 2004b).

Action Research refers to action oriented change capacity that search for the most suitable conditions for change. And another approach of Three Step model of change opines that successful change requires 'unfreezing' the status quo, 'changing' to a new state and 'refreezing' to make the change permanent. The mentioned term status quo is the equilibrium state. And to move from equilibrium situation, the 'unfreezing' step is strictly required (Robbins and Coultier 2001).

44.3.2.2 Organization Development

Organization development which can be classified as planned efforts of change can be defined as; a process applying behavioral science knowledge and practices to build organizations' capacity to change and achieve effectiveness (Cummings and Worley 2005). According to another definition, organizational development is a type of organizational change and it is a planned change at all levels of the organization especially, individual, group, intergroup, total system and interorganizational including also management and leadership development (Bradford and Burke 2005). Organizational development can also be defined as, a long-range effort which improves an organization's problem-solving and renewal processes by collaborative management of culture, using behavioral science with the help of a change agent (French and Bell 1973). Beckhard (1969) defines the concept of Organization Development as:

Organization development is an effort (1) planned, (2) organizationwide, and (3) managed from the top to (4) increase organization effectiveness and health through (5) planned interventions in the organization's "processes," using behavioral-science knowledge.

Organizational development is in a relationship with behavioral sciences through using knowledge and techniques with the aim of improving individual and organizational performance through trust, open confrontation of problems, employee empowerment and participation, the design of meaningful work, cooperation between groups and the full use of human potential (Daft 1995). In order to be successful at organizational development these actions have to be made by senior management.

Organizational development may be handled through survey feedback, team building and intergroup activities (Daft 1995). The intervention of survey feedback technique intends to gather information about the employees' feelings about the organization consisting of their motivation, job satisfaction, organizational identity, attitudes and work-related behaviour. These types of information will enhance the senior management to decide whether an organizational change is necessary and the degree of change. Other organizational interventions of teambuilding and intergroup activities designate the idea that when people work together they tend to be more creative and progressive for change.

44.3.3 Exploring Organizational Change Through Frequency and Magnitude

To manage change effectively, the problem of exploring and understanding the question of 'Is the change occurring once or is it continuous' and 'How big is the change?' should be answered. In the organizational change literature there are some approaches to answer these questions.

44.3.3.1 The Incremental Model of Organizational Change

The incremental model of change occurs through a series of continual progressions to sustain general equilibrium of the organization which very oftenly affects one part or one group of the organization (Daft 1995). Unlike other approaches to change, incremental change adapts to organizations gradually and in small magnitude (Miller and Friesen 1982) and separately with one goal and one problem at a time (Burnes 2004b).

The incremental model of change is not considered to be suitable for an organization that faces chaos or complexity as the model's profile is related to a more linear nature in itself. The model will fit an organization that lives in a more stable and less dynamic relationship between the inside and outside.

44.3.3.2 The Punctuated Equilibrium Model of Organizational Change

The basic thinking of the punctuated equilibrium model of change is that long periods of small, incremental change are interrupted by brief periods of discontinuous, radical change (Brown and Eisenhardt 1997). Romanelli and Tushman (1994) define equilibrium periods as long periods of stability. According to punctuated equilibrium theory organizations evolve through long periods of stability in their basic patterns of activity that are punctuated by relatively short bursts of fundamental change (revolutionary periods) (Romanelli and Tushman 1994). According to Gersick (1991);

> One paradigm that has heavily influenced our thinking about change processes is Darwin's model of evolution as a slow stream of small mutations, gradually shaped by environmental selection into novel forms. This concept of incremental, cumulative change has become pervasive; it is the way people have explained everything from geological erosion to skill acquisition. Within the field of evolutionary biology, however, Darwinian gradualism has been challenged.

Through a study, Brown and Eisenhardt had a conclusion that although the punctuated equilibrium model is in the foreground of academic interest, it is in the background of the experience of many firms (Brown and Eisenhardt 1997). So this model tends to be less practical compared to other organizational change models.

44.3.3.3 The Continuous Transformation Model of Organizational Change

In order to survive and go beyond surviving to compete with rivals, organizations should face change through rapid and continuous change rather than through an abrupt, punctuated change. These types of organizations continuously change and so instead of the traditional punctuated equilibrium view, in which change is primarily seen as rare, risky, and episodic, they choose the one in which change is

frequent, relentless, and even endemic to the firm (Brown and Eisenhardt 1997). The basic theme of the continuous transformational model of organizational change is that the environment in which organizations operate is changing and will continue to change rapidly and radically in an unpredictable way (Burnes 2004b).

Organizations which live in an unpredictable, under high level of uncertainty must use this continuous transformation model of organization change. As nonlinearity occurs in chaos and while there is no cause and effect relationship, organizations that are on the edge of chaos must certainly change in a continuous way, to cope with both chaos and complexity.

When there is a comparison between the three models of organizational change, the incremental model and the punctuated model is somewhat old fashioned than the continuous transformational model of organizational change because the characteristics of environments in which organizations live are changing in favour of the latter. As the environment becomes more and more complex and systems get more and more chaotic, incremental and equilibrium models cannot satisfy organizations by means of change.

44.3.3.4 Criticisms of the Planned Approach to Organizational Change

The planned approach to organizational change is subject to criticisms; firstly it is not being suitable for continuous organizational change. Another is that it emphasizes incremental and isolated change. The following criticism indicates that, it ignores the power and politics in organizations. The last one is that, this approach refers to only top-down change ignoring the case of bottom-up change (Burnes 2004b). As the planned approach is more suitable for stable environments, organizations in uncertain and complex environments cannot use this approach for organizational change. And unless incremental changes lead to transformational changes, it is true that planned approach stresses incremental change. As planned approach is not purely bottom-up, it also is not purely top down. But from the chaos perspective planned approach is not suitable because there is no linearity of any elements in the system. Plans are needed for continuous change as everything changes in chaos.

44.3.3.5 Emergent Approach to Organizational Change

According to emergent approach to organizational change, change is continuous, dynamic and this approach advocates of unpredictable and unplanned change (Burnes 2004a). There is a growing emphasis on the need for emergent change because of today's turbulent and unpredictable environment (Daft 1995). Emergent approach to organizational change stresses five features of organisations which include structures, cultures, organisational learning, managerial behaviour, and power and politics (Burnes 2004a).

The emergent approach to organizational change can be applicable in chaos and complex systems as well because in there, is a high level of uncertainty and unstability in and out of today's organizations. One of the important stems of the emergent approach is the processualists. These researchers are opposed to the planned approach. They are evaluating every single point of events and focus on relationships of individuals, groups and organizations (Burnes 2004a). The rationale behind this is, the prescriptive nature of planned approach doesn't suit the recent developments in the environment.

44.3.4 Types of Change

Change can be classified broadly into four types. These are, technology change, product and services change, structure change and people and culture change (Daft 1995). Technology change refers to the production processes' change that makes a difference in efficiency and capacity. The most important issue in technology change is keeping up with the complex environment and creating an atmosphere of accelerating creativity which is the basis for change. In tracing the marketplace of the organization, it must keep an eye on the changing customer needs and wants which is the main root of product and services change. Structure change is the change of the form of people's interrelations and coordination devices. In a dynamic, chaotic and complex environment an organization needs to be flexible and flatter structured. People and culture change refers to changes in skills, attitudes, behaviors and beliefs of employers in an organization.

44.3.5 Managing Change

First of all, an effective change in organizations needs to be oriented as bottom-up rather than top-down. This is because today's organizations live in a complex and uncertain environment facing chaotic systems. These conditions make it impossible for managers to plan and implement, so change begins and continuously transforms starting from the bottom of the organizations neglecting top-down change plans to all levels of organizations.

Instead of controlling employees, managers need to empower them. So in chaos and complexity, instead of managers directing and controlling change, they must lead the way that members of the organization are receptive to and have the necessary skills, motivation and power to take charge of change (Burnes 2004b). Living on the edge of chaos, organizations which are self organized and implementing unplanned and continuous change and innovation are more effective than others (Brown and Eisenhardt 1997). In nonlinear and chaotic systems, and in complexity as there are no cause and effect relationship, organizations will be effective through change by not a systematic and steady processes for instance like

top-down change management styles. In contrast there should be change leadership for both change and organizational effectiveness as the self organizing nature of these types of structures. So how can change be led effectively? The answer is vital for organizational change effectiveness in chaos and complexity.

Change can be led effectively first and most importantly by motivating change through creating readiness for change and overcoming resistance to change. Following a way of leading change effectively is creating a vision through describing the core ideology and constructing an envisioned future. Another way is developing political support through assessing change agent power and identifying and influencing stakeholders. At this point providing resources for change, developing new competencies and skills for group members and reinforcing new behaviors are critically important for a continuous change in complexity (Cummings and Worley 2005). Kotter's Eight Stage Process also suggests a map for leading change effectively. According to this process, there are eight steps for effective change leadership. The steps are respectively, establishing a sense of urgency, creating a guiding coalition, developing a vision and strategy, communicating the change vision, empowering broad-based action, generating short-term wins, consolidating gains and producing more change, anchoring new approaches in the culture (Kotter 1996). Among these are, since leadership means influencing others to attain goals, leading change occurs through mostly motivating organization members for change, by means of creating readiness for change and reducing resistance to change. These can be achieved through more empowerment of employees and flatter organizations.

44.4 Conclusion

Change occurs in every aspect of organizational life and to achieve effectiveness, organizations must adapt to change wherever it occurs. Today's nonlinear and dynamic systems create a chaotic environment with high level of complexity. The unpredictable and unplanned nature of systems force organizations to change. Change in this situation must be emergent rather than planned for organizations that are on the edge of chaos to be successful.

For organizations to survive and compete in the ecological system, change must be effectively led and managed. Unfortunately, today's self organizing and complex by nature organizations reject the change processes that are forced by managers. Instead, pumping up the creativity, change should occur by initiation of organization members from all levels. At this point change should be continuous, not discrete and should be carefully led to achieve effectiveness.

Effective leading of change occurs through understanding the chaotic and complex, uncertain, unpredictable, unplanned and dynamic nature of organizations, processes, relationships and environment. To adapt to these dynamics, organization members should be motivated for change, gain new skills for new perspectives and

they should be more and more empowered to gain a high level of participation. Flexibility in every single process and work relation is also another issue for leaders to implement for effective change management.

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Chapter 45
Improving School Leadership: A Way to Challenging Chaos

Esen Arzu Kayman

Abstract Changing and challenging students, schools, teachers, principals, countries and the world at large are the inevitable changes brought by chaos and uncertainty. Accordingly institutions fall and rise, when they fall they learn better to rise and rise again. The circumstances surrounding chaos and uncertainty have brought out new ideas and intelligent organizations. The most important factor in all countries is the children; how they should learn best or how best they should be taught and by whom remains profound, a question for reflection. Just because of this, school leaders are of great importance. The principals and teachers as well as stakeholders of the school can be the leaders to challenge the chaos and uncertainty to make the schools better places to learn, to practice and to teach. While the challenge with change and chaos is universal and permanent, the ways of challenging chaos and uncertainty can differ from one country to another. However up-to-date curriculums, self-organizing and intelligent schools remain the same. They are the schools, teachers, principals, parents and so on to continue challenging chaos and uncertainty at all times.

Keywords School leadership · Chaos · Self-organizing schools

45.1 Challenging Chaos: Is It Possible for the Educational Institutions?

As chaos is inevitable and unstoppable, we have to live with the fact as soon as possible and turn it into an advantage of change and an opportunity indeed. Everywhere and any time, we have the chaos with us. At schools, where the education must always go on and transform the students who are in a very-rapidly-changing

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environment, the leadership of both the principals and teachers is getting more and more important. Whatever it is called or named, the unchanged term is again leadership. There are lots of studies and researches on school development and leadership. Our aim is to narrow this broad subject down into school development and improving school leadership in accordance with the principal and teachers.

It is impossible to expect any institution be in equilibrium. In a chaotic world, it is actually nonsense to be steady. While managers refrain from chaos and chaotic situations, it is expected from a principal to fall down and rise with a self-organizing system. The logic of chaos management is that first you fail then stand-up and self-organize yourself while self-organizing, you confide in the colleagues and empower them to get organized again. Once the responsibilities are distributed well in the organization, the expectancy of self-organization is high (Balcı 2012). That is to say, if the members are aware of their duties, there is no problem with getting self-organized and do their best to get even more organized and start working again even in the event of a looming crisis.

Chaos is pronounced with unsolvable situations, confused people and uncontrollable variety. However, there are good examples of people dealing with chaos and this is true especially for the managers at schools (Erçetin et al. 2013a). Educational intuitions can challenge chaos by developing schools in terms of school leadership which is well distributed between the principal, the teachers, the school boards and others who can share in it. Moreover, we have to take the students and parents into consideration seriously.

School leadership can be achieved in a chaotic and uncertain environment by a strong leadership with a learning and intelligent organization. We have to discuss the way the educational institutions achieve them and be in position to challenge chaos.

The process of uncertainty and chaos has brought a new understanding to the leaders themselves and the leadership they serve. As in Turkey, existing in the same neighbourhood, the Arab Spring led complex and chaotic affairs in some countries have shown us that there many relations between chaos and leading. Will the leaders alter the chaotic atmosphere into a transformation for a positive change of the Arabian countries? (Erçetin et al. 2013b). What about the school principals or managers? Will they have or create the change to change and transform when their intuitions face the same conditions? It will be helpful to discuss the ways of emerging out of chaos.

There are some steps to follow in order to emerge out of chaos. A self-emerging organization is likely to achieve it.

(1) *Developing new perspectives on the meaning of control*; that is to say, allowing the organization generate its own management.
(2) *Design the use of power*; it is the creation of a group dynamic by developing new perspectives and mental models. This makes the group more critical and suggestive.
(3) *Encourage self-organizing groups*; it means creating a group dynamic and letting the groups in an organization organize their ideas and goals.

(4) *Provoke multiple cultures*; it aims to put an end to hierarchy and move the cultural diversity up and down to create new ideas.
(5) *Present Ambiguous Challenges Instead of Clear Long-term Objectives or Visions*; long term objectives can tire the members so it is a good idea to put across a reachable goal. In addition to this, if the goal or goals are not very clear, this is expected to evoke the members' creativity and power to search and find new ways.
(6) *Expose the Business to Challenging Situations;* both the leader(s) and the others have the thought to be better than anyone or the best, this ambitious approach will help everyone to challenge the change and the other better organizations.
(7) *Devote Explicit Attention to Improving Group Learning Skills*; if there is a mutual language and thinking ways through the group members, they will think and communicate better with each other to innovate.
(8) *Create Resource Slack;* there has to be an emergence plan or step for every uncertain situation for every kind of organization, there is a must for them that are to invest in management resource (Calogero and Halıcı 2011).

As seen above, the ways to challenge chaos are the same all around somehow. What about the schools and the principals? How do they achieve the ability of challenging change or chaos? Or how should they do that? What are the ways for school leaders to challenge chaos?

With the new way of understanding and comprehending the universe and new science, both the principals and teachers have to live with the uncertainty or change in peace. It is important to grasp the big picture with a holistic approach as well as putting emphasis on the details to access progress and the trends when they occur. Consequently data-collection, analysis and decision making can be possible with those details (Singer 2004).

School systems are so dynamic and complex that managing them requires a complex and changing leadership. School leaders should have an effective role of leading students, teachers and any other members of the school and school environment as well as being active learners even if leaders of learning first and developing their thinking skills and creativity and help the organization learn and challenge the changes (Cheng and Huber 2010).

The school leaders should be creative or have a tendency to be creative. A leader should be able to (1) accept the problems emerging during the change or challenge as normal and natural (2) find different solutions to different problems (3) motivate the school members to create new ideas and behaviours (4) developing an atmosphere containing innovative and creative thoughts and actions (5) take risks for the organizational objective (s) (Erçetin 2000).

A study on leadership and management in international context was made by OECD and shows that school leadership can be developed. While exploring this issue, OECD presents some objectives for implementing school leadership policies

that lead to improvement of teaching and learning in our new world. The objectives are as follows;

(1) focusing on the improvement of leadership in schools,
(2) focusing on the contemporary and effective development and implementation,
(3) making the share of lessons and policies through other countries,
(4) suggesting optional policies for governments to apply or be taken into consideration.

Taking the objectives into consideration, we can have a look at the activities in some of the OECD countries. Take Finland as an example, the principals as school leaders manage the school as well as teach the children in the evenings so that they don't feel themselves excluded from the school, teaching and the teachers, they don't think about themselves as bosses. That makes the school environment and learning environment available to teach and learn. Non-hierarchical relationships affect the job done at schools and consequently the Finnish students do best in PISA (Hargreaves and Pont 2007). If the principal or the teacher feels that he/she belongs to the institution, he/she welcomes every situation and adapts to it easily. That is self-organizing oneself and the others again. The challenge for school leaders is not only to make the best plans but also to adapt to the situations (Sandra and Edwardson 2013).

According to a study by Neyişçi and Potas there is a relation between uncertainty, chaos avoidance and individual qualities of the administrators; both age, gender and education level make the difference. It shows that principals and other school leaders should be supported to experience being flexible in the risky, chaotic and uncertain situations (Neyişçi and Potas 2012).

New legislations, funding both governmental and other, demands, socioeconomics trends may differ in time and each time we have to see them as evidence of disorder as well as signs that the education system is healthy enough to search for another new order. It means renewing and self-organizing itself (Sullivan 1999). The difficulties and problems are part of the chaotic matters of the social open system and of course education. The more the school leader(s) welcomes them all, the more they self-organize and adapt themselves.

The major duty of a school leader whether a principal or a teacher is to handle unpredictability, uncertainty, daily problems and accordingly, they have to focus on the people in the organization in order to assist them in teaching and learning at the highest level (Harris 2010).

While discussing the requirements for an effective school leader, it is important to mention that the needs, the musts or the shoulds may differ. There are some meaningful changes about the work of school leaders. But the universal and permanent ones are that the school leader will face some challenges and go on leading, take part in learning and adapting, finding meaningful and effective solutions to the problem in accordance with the circumstances they face (Volante and Earl 2012). Every different country and every different culture has different conditions but challenges remain the same. The principal and the teachers continue leading and teaching respectively as well as learning how to manage the school and its surroundings.

While the teaching content may differ day by day, the need for education will continue. Under uncertain conditions, when it becomes difficult to predict the future, the school principal as the leader may make the educational services possible and sustainable through crisis management. The school leader may be flexible enough to relate to the new situations and requirements in challenges and conflicts that the school itself has (Kayman and Erçetin 2011).

It is not so easy to be flexible and welcoming to the crises or the problems around the school. However, whether the principal or the teachers as the school leaders pretend to welcome the uncertainty and learn from the chaos and react again, this makes the institution intelligent and learning. It is of great honour and pleasure to be a school leader in an intelligent organization.

The principals' or the teachers' leadership depends on how much the schools are free or have the responsibilities to use initiatives. Central management as in our country makes it almost impossible to apply, that means we miss the opportunity to rise and go on walking taking the risks, apart and different from the other schools. The achievements of the school leadership help students' success increase. There is a positive correlation between the leadership and success of the teachers and the students. The more the organization manages the chaos and uncertainty, the more the organization is successful. According to a study on quantum leadership, (Kayman 2008) as the level of education of the trained principals about the leadership types and actions increases, the level of presenting the qualities of quantum leadership increases. This shows that if the school leaders are educated and trained about leading skills both theoretical and practical, it will enhance the leadership they present and the success of the school and the students. This can be programmed as a distance education up to present circumstances. Distance learning can be synchronized and interactive by the help of information technology. A distance learning module is a need to develop an innovation for leadership to apply at schools. These courses and classes can be in-service-training courses. The trainings and applications can be extended to lots of teachers and principals. Moreover, the teachers and the principals can have the courses acquainted with leadership and its applications to challenging chaos and uncertainty.

45.2 Conclusion

Developing the leadership of both the principals and the teachers is possible through in-service-training. Modern and fast-accessed trainings will be healthy and effective on the leadership. Overloaded at work, there is no time for the teachers or the principal to develop themselves both in their professions and leadership in Turkey. In general, distance education with a wide range of educational choice with different modules could be a chance for the teachers and the principals to have leadership educations and training. There is a great need to activate a system for the teachers and the principals working for the Ministry of National Education, both the government or private schools and their staff. There are some good examples to

be inspired with but not enough to be as effective as an e-learning system as yet. A distance learning or with a general extent e-learning model can be developed and practised to make the education better and the goals reachable.

When the organization envisions the future and possible probabilities, it will challenge change and uncertainty, and will make the chaos an opportunity to success (Erçetin and Kayman 2014). The envisioning is possible with decoding the codes; codes of renewing and self-organizing. A leadership module should be developed for the teachers and the principals in order to handle the difficulties to self-organize and challenge chaos and uncertainty. This can be done through a synchronized distance education. It is not impossible to reach it after the work hours to develop their leadership skills. If the trainings are done professionally and by professionals, they will be effective and this effect may be broad. The more reachable distance education is, the more effective it becomes. Strengthening the school leadership will make the schools more successful and strong enough to challenge chaos and uncertainty.

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Chapter 46
Managing Successful Projects to Prevent Chaos and Complexity in Organizations

Haydar Ateş

Abstract The concept of project management has been getting more and more important in this information age. The systems are getting bigger and complicated day-by-day. Every organization needs to keep ahead to be superior to its competitors and bring about development in the field. Actually, project management is not an issue for systems and organizations only, but for individuals as well. In this article, the main topic is project management in systems and organizations and how it can be executed effectively to prevent chaos and complexity. Project management's theoretical base and principles have been improved, but it requires time and effort to cultivate a quality project management culture. The big systems, organizations, and even governments have tried to work in project-based contexts to obtain better results. Well-managed projects prevent chaos and complexity in organizations. The project should be divided into phases, each phase should be outlined and executed step-by-step according to a specified timeline. Every phase should prepare a proper base for the next step. There have been some improved techniques and computer softwares on project management to help project managers and team members. These techniques may be different from each other because of the characteristics of varying areas. For that reason, it is very important to choose the best option for each project. Otherwise, it is possible to cause chaos in a project and this may affect the whole organization.

Keywords Project · Chaos · Complexity · Organization · Management

46.1 Introduction

The purpose of this article is to give basic facts, techniques, procedures, and some feedback about project management. In this context, the meaning of a project, the theoretical basis, the importance, the main characteristics of project managers, the

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project cycle, and some samples about good practices of project management are mentioned.

46.2 Background

The concepts of change and complexity have become more common issues in recent times in the business arena. In today's business environment, complexity has been increasing and everything changes so fast. It is very important to follow changes and being competitive, profitable, and productive in order to sustain improvement in the business environment.

Due to fast changes, business has become complex and complicated. The decision-making process has more and more aspects to be taken care of. The managers should engage many issues within a limited time. One of the best ways to deal with complex issues is to use "project management" method to obtain better results.

According to literature, project management has both art and science faces. The art points out special skills, such as leadership, trust, problem-solving approach, credibility, and expectation in management. On the other hand, the science points out systematic approach and using scientific methodology to manage the project and solve the problems during the project management process.

Project management has been practiced for about a century. The main idea is to consider all necessary aspects of the mission and bring together the manpower and resources to complete the mission, product, service, or result in a specified time, cost, and quality without creating any chaos or complexity in the organization.

The project has four main features: project team, a goal, defined time and budget, and an uncertainty about achievement (Baars 2006). The project manager is responsible to engage all of these issues. So, managing a project is not an easy task and it is different from other daily activities or standard business activities.

The project has some characteristics, such as being unique in nature, having a defined timetable, own budget, special resources, having some risks, and some challenges in order to make big changes in the organization (Method123 2003).

The project doesn't involve repetitive processes. Every project has a unique process, from the beginning to the end. This process has a special timescale. The start and end date is specified at the beginning. The dates and phases are marked on the timescale and the project team is responsible to follow it.

The project has its own budget to cover all expenses. It is very important to estimate the budget in the planning phase. Otherwise, it is possible to encounter financial problems to complete the project and it may not be easy to convince the management to finance an additional budget. The result may be failure because of insufficient budgeting.

Each project has some risks. The manager should estimate them and take precautions to control the risks. If the manager cannot estimate the risks, this may be a reason for the failure of the project.

Project management is also different from other management activities. It has own characteristics, such as; special skills or qualifications, management tools, and special processes. The project team members must have knowledge, skills, and experiences about the project. If not, it is important to complete necessary training before the beginning of the project. The manager is able to manage the project while using different tools. These tools should facilitate the control, reduce the risks, and provide feedback to correct and/or follow the project plan.

Serious management of the process should be implemented to control and monitor the time, budget, quality, risks, changes, and aspects of the project.

46.3 Project Phases

Each project cycle has four main phases. These are; initiation, planning, execution, and closure (Chandler 2004). During the initiation phase, it is very important to define the problem or aim of the project. Then, various solutions can be developed. After that, it is necessary to prepare feasibility reports for each solution and choose the best one. This phase should cover the selection of the project manager, terms of reference, outline the objectives, the structure of the project, office, and project team.

After choosing the best solution, the planning phase can be started. The planning phase should include sub-plans. These are project plan, resource plan, financial plan, quality plan, risk plan, acceptance plan, communication plan, and procurement plan. These plans may be different because of the characteristic of the project. This phase is very important in order to reach success. Everything should be taken care of and well-planned. Otherwise, it can be very difficult to make some changes during the execution phase and this can be a reason for failure.

The execution phase involves each activity of the project plan and how they are to be realized according to the timescale. During this phase, the project team should be ready to make some changes on the project plan according to outputs. At the end of this phase, the product or service must meet all accepted criteria and should be ready for delivery.

The closure phase involves final documentation for the phases and entire project cycle, delivery of the product to the customers, and termination of supplier contracts. This phase also should cover lessons-learned, reports and feedback for future projects.

46.4 Project Office

The project office is a physical structure for housing the project team and necessary equipment. The office consists of physical or virtual location, communication equipment, documentation, and necessary tools. There may be a central office and sub offices or the project team may use virtual environment.

46.4.1 Planning

Planning is important to ensure coverage of all activities during the execution phase. The details of the project plan must be prepared in this phase. These are; project plan, resource plan, financial plan, quality plan, risk plan, acceptance plan, communication plan, and procurement plan. There may be some other plans related with the characteristics and needs of the project.

46.4.1.1 Project Plan

The first step of the planning phase is to prepare a project plan. The project plan should begin with Work Breakdown Structure (WBS). WBS should cover the phases and their hierarchy, project activities, and tasks which should be accomplished. The project schedule should be ready at the end of this phase.

46.4.1.2 Resource Plan

The resource plan should refer to the type of resources, quantities, human resources with their responsibilities, roles, and their skill-sets, all equipment with their specifications, and purposes as well as material resources.

46.4.1.3 Financial Plan

The financial plan should include budget required for each phase of the project. The plan covers labor force, costs of equipment and materials. The financial plan is very important for the success of the project.

46.4.1.4 Quality Plan

The quality plan refers to the meaning of the quality for the project. It explains the quality targets for each phase, each part, and for the entire project. This plan also covers the technique for quality control.

46.4.1.5 Risk Plan

The risk plan covers the estimated risks and course of action for each risk. It is very important to reduce the risks and estimate them in advance to plan necessary precautions. Otherwise, the risk may be a big challenge to completion of the project. The unpredictable and uncontrolled risk is not a risk; it is a danger for the project.

46.4.1.6 Acceptance Plan

The acceptance plan should refer to all requirements of the project. This may be the customer needs or goal of the project. The acceptance criteria must be defined clearly in this plan.

46.4.1.7 Communication Plan

The communication plan covers not only the project team's requirements but also the communication between team and organization management/users as well.

46.4.1.8 Procurement Plan

The procurement plan covers all the necessary steps for the final product. The plan describes all parts of the product and schedule of procurement. This plan must be well-coordinated with suppliers and production line.

46.4.1.9 Execution

The execution phase is generally the longest one. The manager's control and coordination is very important. This phase provides physical appearance of the product.

46.4.1.10 Monitoring and Control

The team and project must be monitored and managed (Modesto and Tichapondwa 2009). The team manager engages activities and responsible members who are specified for each activity (NASA 2004). The manager should use very effective management tools to monitor and control the process. These tools depend on the manager's management and communication skills, leadership level, motivation techniques, and experience.

The manager should assemble the project team, assign the group leaders, and specify tasks for team members. Besides, it is important to give clear direction to team members, monitor all human aspects, and to mediate all parties who are involved in the project.

The project manager should have some skills to set up good monitoring and controlling systems (Wernham 2012). These are integration management, human resource management, time management, scope management, risk management, communication management, financial management, procurement management, and quality management (Barnes 2012).

46.4.1.11 Time Management

Time management seeks to ensure that all tasks are accomplished and completed on time. It seeks to determine which tasks should be done in which step, to estimate the duration of each activity, to allocate manpower and materials, to determine the order of each activity, to allocate timing of activities, and to designate the important deadlines. Project management should monitor progress and deadlines, and adjust timetables based on WBS.

46.4.1.12 Cost Management

Cost management is needed to control the project budget. The main issue is ensuring stay within a defined budget which prevents over-spending. Cost management is based on the salaries of team members and the cost of materials and tools.

The manager should monitor cash flowing, negotiation with suppliers and contractors, the difference between estimated and accurate costs, and budget adjustment.

46.4.1.13 Quality Management

The project must provide specified quality requirements. A list of quality requirements must be checked during the implementation of the project. These controls give confidence to the project manager to go to the next step. Project management should determine all the quality requirements during the planning phase and follow them during all the phases. Management should test the results according to the quality plan and solve quality problems to ensure the project will provide all the necessary qualifications.

46.4.1.14 Change Management

One of the most important tasks for the project manager is to manage changes during the project cycle. The main point is to manage changes within the project plan successfully. The source of changes may come from the project environment, technology changes, customer requirements, or within the project cycle feed-back.

46.4.1.15 Risk Management

One of the main characteristics of the project is uncertainty. The manager may control all other aspects of the project. But, estimating the risks and managing them is very important for the success of the project. The project manager should specify

the risks during planning phase and prepare course of action for each risk. The risks may be related with budget, manpower skills, technical issues, quality, organization, information, time, or other project aspects. The experienced manager should plan all the necessary steps to prevent risks.

46.4.1.16 Issue Management

The issue management is managing the current issues to follow the project plan safely. The manager and team must be ready to overcome any issues within the project to reach the project goals.

46.4.1.17 Procurement Management

The procurement management has two aspects: production process and external suppliers/contractors. Project management must monitor this with close attention to prevent any delays. Otherwise, any hiccup may cause some risks, over budget spending, timetable problem, and technical problems.

46.4.1.18 Acceptance Management

Acceptance management provides all the necessary requirements for product acceptance and points out that it is ready to be delivered to the customers.

46.4.1.19 Communication Management

Communication management provides which messages to be created, delivered, and evaluated within the project team. The project manager may use some tools to provide this, such as Project Status Report, project management software, or any other means.

46.5 Future Trends

The information age needs some more management issues besides the management aspects mentioned above. These are information technology management, project configuration management, and validity as well as confirmation management.

Information technology management covers the usage of new technologies, software development tools, and using new designs in the project process.

Project configuration management covers the description of configuration, the configuration statute evaluation, and controlling the configuration.

Validity and confirmation (V&C) management covers the V&C efforts to support procurement, planning the activities, creating concept, needs of activities, designing, implementing, and testing the activities, establishing, managing, and maintenance of the V&C activities.

Besides, the project managers must be aware of fast changes and apply "contingency approach" instead of "system approach". Because, everything is changing so fast, there is lots of information on agenda and it is very important to access the right information and use it at the right time, right place, and in right manner to be able to overcome difficulties and be a part of globalization.

46.6 Conclusion

The systems are getting bigger and getting more complicated day-by-day in this information age. Managing successful projects has become increasingly critical in order to prevent chaos and complexity in organizations. The traditional management approaches are not enough to overcome the needs of this age. The difficulties show themselves in delays, insufficient budgets, unwanted or insufficient results, unhappy customers, high pressure on project teams, and other unwanted and unexpected outcomes. There are lots of factors required to manage the projects successfully. The project team and especially project manager must be ready to manage, plan, take care of and coordinate many aspects. It is very important to bring together many inputs in the process and use them efficiently to reach the main goal. Clearly designated objectives, a well-designed management process, well-chosen management tools and means, and well-arranged roles for project team members are very important in order to obtain the best results. The management process should ensure that all project aspects are taken care of in decision-making and management processes. Besides, the project manager should have broad vision and point of view on project management techniques and be ready to apply contingency plans in case of need.

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Chapter 47
Postgraduate Students' Perceptions of Leadership in Politics: A Metaphor Analysis Sample of Hacettepe University, Department of Educational Sciences

Leyla Yılmaz Fındık

Abstract Leadership is one of the most widely researched and discussed topics. Rapid shifts in all areas are producing greater uncertainty resulting in the increasing necessity for researches related to what leadership really means. Researches in leadership have therefore concentrated on gaining a better understanding of the leadership that contributes to the development of an organization. Underpinning this approach, this study is an initial attempt at making metaphorical analysis of leadership in politics from postgraduate students' point of view. This study combines features from several metaphors to define leaderships in politics. The perception and consumption of postgraduate students mainly focus on individual skills, knowledge and competences of a leader. It is viewed from these metaphors that leadership is much more than just leading or influencing the others. The fact that all the participants perceive leaders as having these features or think must have is not clear enough but at the core of these definitions, leadership is about vision, direction, influence, organizing and inspiring people. It is generally about a complex perception associated with the changing and uncertain situations.

Keywords Leadership · Politics · Complexity · Metaphor · Perception

47.1 Introduction

Leadership continues to be a widely researched and energetically debated topic in all areas of organizational sciences because literally nothing gets accomplished without it (Yummarino 2013). Leadership is a historically concrete phenomenon; that is, its structure and methods change with the passage of time (Masciulli et al. 2009). Politics and leadership have a close meaning to each other as authority,

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power, control, cooperation and politics are special parts of organizations and groups (Erçetin 2000). Leadership is also an essential feature of all government and governance: on the one hand, weak leadership contributes to government failure; on the other hand, strong leadership is indispensable if success is targeted (Masciulli et al. 2009).

It is really difficult to determine the boundaries of leadership and politics as they tend to overlap each other (Erçetin 2000), may be, because of this, there is still no consensus on the essential nature of leadership in politics. It is also imperative to point out that systematic thought about politics began in Greece about two and a half millennia ago (Tucker 1995). "Politics is in its essential essence the pursuit and exercise of power, in the interest of those who pursue and exercise it. This means that politics in its essential nature is leadership of a political community and all the activity, including participatory activity by citizens, which may enter into the process of leadership (Tucker 1995, xv)."

The most fruitful way however, is to start with the question of what it is that the leaders do, try to do, in their capacities as leaders, what functions they do perform in the process of exerting influence upon their followers. We must specify what sort of "goods and services" leaders provide in the exercise of political power.

According to Plato's view, leadership has a directive function; moreover, a leader is one who gives direction to a collective's activities. The collective may be of any size or kind, may be a small informal group or may be a big one like universities or business cooperation. When it comes to political community such as a municipality, a province, a nation-state or an international organization, this means political leadership. A political leadership is one who gives direction, or meaningfully participates in the giving of direction, to the activities of a political community (Tucker 1995, 15).

In today's complex organizations, leaders face a numbing combination of challenges that demand the ability to manage change effectively (Caldwell et al. 2012, 184). Researches in the area of leadership have moved from an early focus on formal leadership, to the individual and their particular characteristics (Erçetin et al. 2013; Hard and Jónsdóttir 2013) through complexity leadership or quantum leadership (Erçetin 2000; Kayman and Erçetin 2011; Fris and Laridou 2006; Hannah et al. 2013). Leaders often operate in complex situations in which they have to make decisions in this changing environment (Hannah et al. 2013, 393). These changing situations create uncertainty and unpredictability (Erçetin and Kamacı 2008) about what leaders are supposed to do. Because of this, leadership is about complexity to accomplish in uncertain and changing situations. To try to make all these approaches clear, additional research is needed that focuses on the complex approaches about leadership rather than formal ones just focusing on leader's characteristics (Erçetin 2000; Erçetin et al. 2013).

Tucker (1995, 12), defines leadership as "leaders including followers to act for certain goals that represent the values and the motivations -the wants and needs, the aspiration and expectations- of both leaders and followers". Yummarino (2013, 150), made a summarized definition of leadership thus

> Leadership is a multi-level (person, dyad, group, collective) leader-follower interaction process that occurs in a particular situation (context) where a leader (e.g., superior, supervisor) and followers (e.g., subordinates, direct reports) share a purpose (vision, mission) and jointly accomplish things (e.g., goals, objectives, tasks) willingly (e.g., without coercion).

Kayman and Erçetin (2011) emphasized that quantum leadership is an interaction field between the leader and followers and also cannot be structured or estimated. This arouses a new approach that both the leaders and followers participate in and contribute to the processes (Kayman and Erçetin 2011; Tucker 1995). It is this new approach that renders leadership a complex undertaking for both the leaders and the led whilst attracting the attention of other stakeholders and researchers alike.

47.2 Purpose

The purpose of this study is to reveal how postgraduate students conceptualize their opinions to define leadership in politics using metaphorical images. Leadership in politics is being modified and enhanced by the perceptions based on metaphorical thinking.

47.3 Methods

The study group consisted of 34 volunteer postgraduate students at the Department of Educational Science at Hacettepe University. The study was conducted in November 2013. The demographic features of the study group are given in Table 47.1. As shown, the study group comprised of 34 students; 24 of them are female and 10 of them are male. 15 of them are studying in the department of Educational Administration Supervision Planning and Economics; 12 in Educational Measurement and Evaluation; 6 in Curriculum and Instruction and 1 in Psychological Counseling and Guidance.

Table 47.1 The demographic features of the study group

Program	Degree		Gender		Total
	Master	Ph. D.	Female	Male	
Educational Administration Supervision Planning and Economics	10	5	11	4	15
Educational Measurement and Evaluation	1	11	7	5	12
Curriculum and Instruction	–	6	5	1	6
Psychological Counseling and Guidance	–	1	1		1
Total	11	23	24	10	34

Qualitative research design was used in data collection. Data was collected by a form comprising of open-ended questions and personal information such as gender and programs they are studying via internet. The study focused on the fundamental importance of metaphorical thinking in analyzing leadership in politics. Metaphor is a popular subject for academic writers. However, there are relatively few references to it, and virtually no works on the interrelationship between metaphor and leadership in politics.

Metaphor analysis is an approach to represent the intentions underlying language use and is therefore important in analyzing the design of leadership in politics in this study. The study involves first making a metaphor, then identifying metaphors and explaining them. The second part enables the participants to explain why metaphors are chosen. Then all the metaphors used by postgraduate students are listed under the features of leadership.

47.4 Research Limitations/Implications

Reported limitations are based on a study group comprising of postgraduate students at Hacettepe University in 2013. Future research should investigate a larger group and expand the dimensions to different fields other than leadership.

47.5 Findings

Listed below are a number of metaphors given by the participants to define characteristics of leadership in politics (Table 47.2).

Metaphors such as "Signpost, Helm, Compass, Arrow mark, North Star (2), Sun, Hero, and Torch" specify that directing seems to be the heart of a leadership and therefore, is the central point around which accomplishment of goals hinges. These frequently used metaphors for directing overlap with the idea emphasized in the study of scholars that the literal definition of leadership is the behavior of an individual when he is directing the activities of a group with a focus on a shared goal (Bernotavicz et al. 2013; Tucker 1995; Yummarino 2013). Metaphors also signify that the leader is the one who is the director of change, creating opportunities to move in new directions and leading others where they otherwise would not go (Popa et al. 2011). Directing is the starting point and this feature guides, inspires and instructs the followers for the achievement of goals.

Metaphors such as "Head of a folk dance, Atatürk, North star" suggest that leaders are able to succeed in influencing others. It is all known that effective leaders influence followers. Yukl (2002) summarized these features, opining that "leadership is a process of influencing others to understand and agree about what needs to be done and how to do it." Clarke also emphasized that leadership is

Table 47.2 Metaphors and explanations

Features of leadership	Metaphors	Explanation
Direct	Signpost	Can easily make direction with minimum errors
	Helm	It makes it possible to get to the right or wrong destination. Even if every part of the ship is strong, without the helm it is impossible to succeed
	Compass	It is a tool which will enable us accomplish the goals. It helps us to proceed by leading us when we think we have got lost
	Arrow mark	Arrow mark has two short lines showing directions. It shows you not only the right way but also the right direction. May be it is a small sign but after following it, it makes sure you reach the right point
	North Star (2)	It shows colleagues the right way
		It leads you when you do not know where to go
Direct	Sun	It sheds light on our ways and inspires confidence
	Hero	S/he leads man and guards them. S/he is brave and gets ahead
	Torch	Leader is one who leads and enables us to make right decisions
Influence	Head of a folk dance	S/he influences the followers with competences and the ability of leading
	Atatürk	Leaders may depart this life but their influence lasts long as their thoughts and ideas still shed light year after year
	North star	It shines and impresses people
Organizing	Directing an orchestra	The chef of an orchestra unifies performers, sets the tempo, executes clear preparations and beats, and shapes the sound of the ensemble. A leader, like a chef, leads many people to be organized to reach the ultimate goals
	Team Sports	A group of individuals, on the same team, work together and contribute substantially to accomplish an ultimate goal which is usually to win
	Music	The art of arranging sounds in time. It has many components like communication, techniques and passion. Leader analyses the potential of colleagues to see the abilities. We will take pleasure with the results ensuing from potential analysis

(continued)

Table 47.2 (continued)

Features of leadership	Metaphors	Explanation
Having vision	Horse always racing in the front and killed when it gets older.	Racing always in the front requires discovering new things before the others. After getting older and dying, it is seen that your thoughts will disappear
	The ability of foreseeing	This means reaching the goals set by the organization after thinking about the conditions and making decisions
	A pair of shoes	A pair of comfortable shoes makes it possible to walk miles and miles and discover new things.
Drag the masses	Locomotive	S/he has the power to drag the masses behind where s/he goes followers are behind
	Sun	It is like a magic that blinds you when you look at it but still you can't stop following him/her
	Library	You cannot stay long hours with force. It dictates nothing to learn. It gives many alternatives and you are the one to take a decision on choosing what to take. You are there as you really want
Trust	Sun	It stands still there. It is warm and magnificent. Its standing there means everything will go well
		It is warm and makes you feel relaxed
	Head of a folk dance	It gives a feeling of confidence, unity and organizing
	North Star	Its presence gives you power and confidence. You know that you will never be lost wherever you are if you follow it. You know where it is when needed
	Root and wall of a building	You count on it as it is powerful
Determined	Snowdrop	Snowdrop blooms suddenly and you stare at this wonder and you start to think how this flower succeeds under these conditions
	Women in red dress	Women in red dress are brave and daring. She motivates, encourages and shows us how to stand up to others

(continued)

Table 47.2 (continued)

Features of leadership	Metaphors	Explanation
Sensitive to social environment	Bite that is difficult to digest	It also requires taking the responsibilities of the others. At first it seems to make decisions on your own, anyway one shouldn't require taking decisions on his/her own but thinks about many people while making decisions
	Sitting in the watchtower	You need to keep a watch around and respond to emergencies on-site and help if needed. Sitting there may make you feel high but you shouldn't forget that your duty is to help people in need
Adaptive	One good at flying kite	A good leader knows how to fly a kite facing the wind in a straight line
	Snowdrop	Under any conditions it can survive and flower
Wise and Intellectual	Rain drops falling from the sky	Each drop is full of knowledge and competences. A single drop of rain gets across this knowledge around and leads them
	Being a nice person	A nice person will raise other people
Power	Soul	It can't be seen but you can just feel it. While its presence inspires, in the absence of it life ends
Modest	Eating from the same dish	It has no ego but a big heart
Cool-headed	A huge ship	A giant ship docks at the seaside mysteriously. Man hesitates to come closer to the ship, in fact it does not know how to ride the tidal waves but suppress its feelings
Goal oriented	Flood	It sweeps anything around to reach the goal intended

essentially a process of interpersonal influence, whereby leaders exert influence over followers to achieve desired goals (2013, 136).

Metaphors "Directing an orchestra, Team Sports, Music" used for organizing indicate that characteristics can sometimes go beyond personal traits, and touch on areas such as organizational consciousness or knowledge. With these metaphors it is understood that leaders are the ones who understand what the organization wants to achieve, and know how it can be accomplished. They create networks within the organization to help their groups get work done, and are just as adept at breaking down organizational barriers to progress. This also implies that the leader must be able to work with others to meet organizational goals, and shift focus as necessary. Bishop (2013, 78) reveals that they must first realize and address the diversity. Then

they must harness the power of the differences, they uncover by addressing those nuances when developing strategies to enhance their competitive advantage.

Metaphors "Horse always racing in the front and killed when it gets older, The ability of foreseeing, A pair of shoes" demonstrate that a leader with **vision** has a clear, vivid picture of where to go, as well as a firm grasp on what success looks like and how to achieve it. It also appears that leaders need to think not only short term but also long term (Yummarino 2013, 152).

Metaphors used to explain dragging the masses focus on not just following but on creating opportunities to move in new directions and leading others where they otherwise would not go, or facilitator of change, exploiting opportunities to help others go where they want to go anyway or at least do not object to going.

Metaphors define trust and confidence with "Sun, Head of a folk dance, North Star, Root and wall of a building". These phrases mean that the leader must arrange everything so well that you do not need to think in detailed. All the explanations highlight the fact that leadership depends on trust, and trust depends on followers knowing that their leaders are there whenever needed and you can count on them. This also indicates that the highest standards of moral leadership that leaders merit the trust and followership of others (Ciulla et al. 2005). However this perception of leadership versus the fact that today's leaders seem incapable of earning the trust of their employees or the support of society at large (Caldwell et al. 2012, 175).

The features of leadership "Determined" explained by "Snowdrop and Women in red dress" shows us that a leader needs to do more than just set the example for others to follow; they also need to play a big role in achieving the goals of the organization. Especially the metaphor "Snowdrop" suggests that through their skills, leaders maintain a high level of performance in their organizations, and they are able to help keep their workforce motivated even when faced with a seemingly impossible situation. Yammarino (2013, 151) indicates similar processes that is, leaders are predetermined, or that they emerge and fulfill certain functions and create positive climates.

Metaphors such as "Bite that is difficult to digest, Sitting in the watch-tower" were used to define the leader as being sensitive to the social environment. The leader has the ability to understand other people's feelings and problems. This is an important characteristic of a leader to stay alert and adapt their style to meet the demands of the current environment.

Being adaptive enables an organism to thrive in a new or challenging environment. New environments and new dreams demand new strategies and abilities, as well as the leadership to mobilize them. Adaptive leadership is the practice of mobilizing people to tackle tough challenges and thrive (Heifetz et al. 2009). Complex contexts and environment require leaders to be highly adaptive and to adjust their behavioral responses to meet diverse role demands (Hannah et al. 2013).

Some perceptions related to leaders and metaphorical thinking just relies on culture and tradition such as head of a folk dance, eating from the same dishand snowdrop. This also reveals that leadership culturally framed (Erçetin 2000; Hard and Jónsdóttir 2013). Bishop (2013, 78), indicates that how we perceive the world

is, to a great extent, shaped by our culture however, he adds that leaders must transcend cultural boundaries.

Other metaphors chosen to express the characteristics of a leader also include wise/intellectual, powerful, modest, cool-headed and goal-oriented. All these features demonstrate that a leader cannot only be defined with just one feature but a multiplicity.

47.6 Discussion

Definitions of leadership are moving from the simple to the more complex as the world is changing rapidly. Leadership is not merely a matter of possessing certain traits such as directing, influencing followers or leading but leadership requires mastery of a competency based skill set that adapts to these changing or uncertain situations.

This study explored postgraduate students' perceptions of leadership in politics via metaphors. Metaphorical analysis is more often a matter of helping us to see things differently and to feel differently about leadership in politics. From ancient to modern times, the power of metaphor in the creation, articulation, and realization is undisputed. Analyzing metaphors thus not only gives access to the tacit knowledge and mental models which shape the individual understanding of the self, but also to the cultural models provided by language to express individuality, self-concept and the 'inner world' (Moser 2000). The study also enables us to see the differences between what the perspectives on leadership are and what is really perceived about leadership and its traits from the postgraduate students' point of view.

This study gives overarching expressions to the concept of leadership in politics. The participants as pedagogues or other educational specialists made their focus leadership excellent. Furthermore, some metaphors used by postgraduate students suggest that leadership is still often viewed from a historically characteristic paradigm. What these perceptions had in common was that leaders were viewed as "leading, directing, influencing, accomplishing the goal of the organization, daring, confident, powerful, determined, cool-headed, goal-oriented". These expressions target personal competencies and highlights individual skills, knowledge and competencies associated with complex leader roles.

The fact that all the participants perceive leaders as having these features or think must have is not clear enough but at the core of these definitions, leadership is about vision, direction, influence, organizing and inspiring people. These frequently used phrases show us that leadership is much more complex than merely defined with just a word. Furthermore, more recently perspectives on leadership have shifted our understanding of leadership away from its traditional to a more complex one may be, complexity leadership or much more (Clarke 2013, 137). This also implies that deeper understanding of leaders and leadership are by no means concluded or completed.

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Chapter 48
Evaluating the Primary School Teachers' Level of Forming a Constructivist Learning Environment According to Chaos Theory

Lütfi Üredi

Abstract The aim of this research was to evaluate the primary school teachers' level of forming a constructivist learning environment according to chaos theory in terms of different variables (gender, age, the grade they teach, their professional seniority, the type of school where they work and the school they graduated from). For that purpose, relational screening model was used in the research. Primary school teachers' level of creating a constructivist learning environment was determined with a "Constructivist Learning Environment Questionnaire" developed by Tenenbaum et al. (2001) and converted into Turkish by Fer and Cırık (2006). Meanwhile "Chaos Variables Information Form for Primary School Teachers" was used in order to determine the variable features of primary school teachers. The assessment instruments were administered to 504 primary school teachers carrying out their duties in 32 primary schools in Akdeniz, Yenişehir, Toroslar and Mezitli central districts of Mersin province in the 2012–2013 academic years. According to the research results, the variables that mostly affected the level of creating a constructivist learning environment and led to chaos were related to gender of the primary school teacher, their age, the grade they teach, professional seniority, the type of school where they work and the school they graduated from.

Keywords Primary school teacher · Constructivism · Chaos · Chaos theory · Learning environment

48.1 Introduction

In our rapidly changing world, uncertainties have also increased rapidly, and especially in Turkey, uncertainties in economy, politics and educational system have been experienced intensely. In the process of adaptation to the European

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Union, these uncertainties increased through the adoption of educational programs based on the constructivist approach being put into practice in the 2005–2006 academic years and this has created a chaotic environment.

The uncertainties towards practice in educational programs viewed as being dependent upon the constructivist approach have brought us face-to-face with chaos. For that reason, the education system shaping the future of our country should not be left to chaos which implies uncertainty and the reasons for the rise of chaos should be analyzed in order to be eliminated.

48.2 The Concept of Chaos and Chaos Theory

Chaos is used for explaining the situation of uncertainty, commotion, and disorder in daily language (Yeşilorman 2006). In its real meaning, chaos corresponds to disorder, commotion and mess (TDK Dictionary 1988). Different from its use in daily language, the concept of chaos is used to mean "the order within disorder" scientifically. Shortly, there is a significant difference between its use in daily language and in its scientific use. The theoretical physicist Jensen who offered the most appropriate definition related the concept expressed as chaos to "the irregular and unpredictable behavior of complex and nonlinear dynamic systems" (Gleick 1995).

According to Briggs and Peat (2001), chaos is defined as a discipline investigating the interdependent situations and processes forming the basis of events and existing within the event seeming as random. Kaneko and Tsuda (2001 cited in Ertürk 2012) defined the concept of chaos as an unpredictable movement within the systems. This definition expresses the theory of chaos as unpredictability in the system. According to Liang (2004 cited in Tekel 2006), chaos is defined as the analyzing of dynamic systems, "disorder" and "confusion", a process, a dynamic element emerging through the changes within systems over time. In other words, chaos implies the presence of events impossible to predict in terms of their match with the results and the cross-factorial relationships present in these events are sensitive and unpredictable towards each other (Ertürk 2012).

The theory of chaos is related to complex, nonlinear and dynamic systems; for that reason, theoretically, it is a post-modern structure accepting the presence of difference with confusion and questioning the deterministic positivism (Çobanoğlu 2008). The results of events are not systematically knowable; however, they can be predicted depending upon the possibilities. The view that lies on the basis of chaos theory is that the events seeming as unimportant and unrelated can affect the result of the major events. According to this theory, the events in the world have complex and dynamic structures including a hidden order inside but seem as in a disorderly state (Stilwell 1996; Gleick 2000).

The theory of chaos deals with the complex system both in nature and in society. The theory of chaos adopts the linear thinking tendency, and suggests that linear events and cases never exist in natural and social systems (Baş 2003; Mutlu and Sakınç 2006). The most specific feature related to chaos theory universally is "the

life taking place between order and disorder " (Gleick 2000). One of the most important successes of this theory is its explanation and description of how simple determinative relationships lead to unpredictable results (Gleick 1995).

No considerable idea related to the concept and theory of chaos, had been produced until the twentieth century. Firstly, it started through the studies of French mathematician Jules Henri Poincare in 1882. Among the all classical physicists and mathematicians who studied dynamic systems, Henri Poincare was the scientist who understood the concept of chaos best mentioning that "the small differences under the initial conditions can create very big differences in the final case" (Karaçay 2004; Gürsakal 2007). Although Jules Henri Poincare was accepted as the father of chaos concept and theory, the then meteorology professor Edward Lorenz provided the most important contribution to the theory in 1961 (Gürsakal 2007; Öge 2005; Truvalı 2002).

The theory of chaos was firstly used as a discovery by the physical sciences. According to Özünel (2008), this new fact proved itself in many fields of psychology, culture, and social sciences. In recent years, more scientific studies have started being conducted within the realm of social sciences. Erçetin et al. (2013) conducted a study related to leadership in chaotic environments.

Discussing the theory of chaos in social sciences gives a different point of view to this field. Through this point of view, we expect to make an evaluation considering the several negative factors we cannot notice and assess in the education system. Ertürk (2012) emphasized that Douglas and Elliott clearly mentioned the increasing value of chaos theory in social sciences and this promises to discover the complexity of social cases better.

48.3 The Origin and Definition of Constructivism

The real origin of the concept of constructivism depends upon the understanding of the skeptics related to the absolute knowledge of the real world. The philosophy-based explanations of this approach are depended upon Kant philosophy of the 1800s and 1900s, the thought of Italian philosopher Giambattista Vico and names such as William James, John Dewey, F.C. Barlet, Jean Piaget and L.S. Vygotsky in the beginning of the 20th century (Tezci and Gürol 2001). The concept of constructivism emerged as result of Bruner's defining of "Discovery Learning" as constructivism and Piaget's definition of his own views as constructivism. Piaget is considered to be the father of constructivist theory. The constructivist approach is associated with different concepts such as "productive learning", "postmodern program" and "educational semiotics" (Applefield et al. 2000).

Constructivism is a philosophy of knowledge and a theory of learning and making meaning. According to this theory which provides an explanation related to how people learn and the nature of knowledge, people create new meanings through the interactions they establish between the ideas, events and activities they have encountered or acquired before. The knowledge is acquired through participation

rather than repeating or memorizing (Sewell 2002). According to the constructivist point of view, the learners create their meaning structures and organize their own learning environments autonomously (O'Donnell 1997).

Jonnasen (1991) defined constructivism as "a process in which the learners create their own realities or interpret the meaning depending on their own experiences or perceptions, and accordingly the individual uses the knowledge to interpret the meanings of previous experiences, mental structures, objects, and events". Therefore, the constructivist approach positions the learner at the center of learning through its viewpoint toward knowledge. The knowledge is a product structured personally through a person's interaction with the environment (Bhatnagar 1997). The knowledge has a feature that cannot be defined absolutely, but structured actively through the social activities (Applebee 1993).

48.4 The Features of a Constructivist Learning Environment

In forming a constructivist learning environment, features such as presenting multiple explanations of reality, providing the information to be reproduced, emphasizing the duties to be in a meaningful sense, supporting intellectual reflection on experiences, supporting production of information through context and sense, and producing information in cooperation with social negotiations, has been at the forefront (Tezci and Gürol 2001). Beside these features, the researches that have been carried out have also proved the characteristics of a constructivist learning environment. In the study of Hand et al. (1997), creating a classroom environment depending on the constructivist learning approach and how learners perceived a classroom environment prepared according to constructivist approach were analyzed. At the end of the research, it was established that the learners had the chance to use their own ideas and knowledge freely, got aware of their changing roles and responsibilities within the classroom and their self-confidence increased through participation in the teaching and learning process.

Tenenbaum et al. (2001) identified the characteristics of a constructivist learning environment as follows:

1. **Arguments, discussions, and debates**: Supporting problem solving and higher order thinking skills of learners. Providing tests to their own thoughts while trying to understand the thoughts of others. Providing feedback to increase the participation of learners.
2. **Conceptual conflicts and dilemmas**: Creating of a condition of imbalance. Providing the conflicts to be discussed as well as creating qualified situations against the hypothesis of learners.
3. **Sharing ideas with others**: Providing for learners' interaction with each other and their teachers. Learners' sharing their thoughts in social environments.

4. **Material and resources targeting solutions**: The materials support establishment of empathy, positive thinking and learner-centered learning. Using physical instruments supportive for the participation of learners into the learning activities. Using the data obtained from basic sources to arrange the complexity of the real world.
5. **Motivation toward reflections and concept investigation**: Developing the thinking and understanding skills of learners. Providing feedback to learners related to their doubts, thinking and problems. Revealing the viewpoints of learners and valuing them. Deducing reflective inferences as a result of learning. Presenting the content and views through a multiple viewpoint. Supporting the development of higher order cognitive features such as categorization, analyzing, prediction and creativity.
6. **Meeting learners' needs**: Providing the learners with the ability and competence to determine their own learning targets. The subject areas being related to the experiences of learners. Presenting problems to learners which they can associate with their own. Arranging the curriculum according to the needs of learners.
7. **Making meaningful real life examples**: Structuring the learning around the basic concepts. Supporting efficient learning through asking thought-provoking and open-ended questions. The subject areas being related to practice. Supporting learning with a rich learning environment including real life situations in order for learners to have experiences.

48.5 The Principles of Creating a Constructivist Learning Environment

The principles that should be considered while creating a constructivist learning environment has been mentioned as follows (Brooks and Brooks 1993; Lebow 1993; Wilson et al. 1995):

1. One-to-one education with a student should be actualized; the student should be helped to acquire behaviors providing opportunities for them to arrange their own learning processes.
2. A learning activity providing both autonomy and control should be created.
3. The learning purposes should be achieved as result of the learning practices.
4. The process of self-regulation in learning should be supported.
5. The voluntary participation of students in the learning processes should be provided.
6. Students' multiple viewpoints should be explored.
7. The students should be directed to questions arousing their interest towards the subject.
8. Structuring of learning within the frame of basic concepts should be provided.

9. Student learning should be evaluated within the context of the teaching process.
10. Constructivist teaching design should be holistic and spiral. The learner should turn to content and make sense at higher levels.
11. In order to understand whether the content is appropriate or not, teachers and students should cooperate during the design process.

Providing that these conditions are fulfilled, the requirements of a constructivist learning environment become actualized.

48.6 The Role of a Teacher in Constructivist Learning Environment

In a constructivist learning environment, teachers are the ones who establish a dialogue with learners and help them to construct their own knowledge. According to this feature, teachers know the learners in terms of their various characteristics and place within the center of learning.

The roles of teachers in a constructivist learning environment have been described as follows (Alesandrini and Larson 2002; Brooks and Brooks 1993; Güneş and Asan 2000; Jadallah 2000; Şimşek 2004; Tobin 1993):

1. Presents some problems and directs the discoveries of learners through guidance.
2. Should have a feature that facilitates and directs learners to reach their targets and making sense of what they learn.
3. Creates a classroom environment where practices are performed and discoveries and researches are organized.
4. Examines the views of students and values of those views.
5. Evaluates the daily status of learners during daily classroom studies.
6. Guides the discussions of learners.
7. Asks questions raising the curiosity and interest of students and implores them to ask questions.
8. Determines which learning will be encouraged in arrangement of the learning environment.
9. Provides the technological instruments to be used and collects the information at first hand.
10. Helps the learners to create new knowledge and associate their present knowledge with the previous one.
11. Gives time to students for using their creativity, drawing analogies and communicating.
12. Encourages the learners to ask their own questions, practicing their own experiences and finding results on their own.

The teacher whose main role is to create an environment that will facilitate learning in terms of learners is an important factor of the constructivist approach.

A constructivist teacher should direct the process of teaching-learning, should be a guide to students, prepare an efficient learning environment and have a strong command of the field of knowledge.

48.7 The Role of a Student in Constructivist Learning Environment

The roles of learners in a constructivist learning environment have been established as follows (Bhatnagar 1997; Güneş and Asan 2000; Semerci 2001):

1. Construct their learning benefiting from their own experiences.
2. Are in a dialogue with their teachers and each other.
3. Make discussions asking open ended questions in a thought-provoking setting to each other.
4. Are enterprising and autonomous.
5. Are the producers and users of knowledge rather than being mere stores.
6. Benefit from any opportunities that can contribute upon their mental schemes.
7. Use raw data, first resources and interactive materials.

Because the student is at the center of learning in a constructivist learning environment, interest and needs of a student is the first degree determinant of the factors within the learning environment. The learning activities in this approach are organized on the basis of activities such as the active participation of student, analyzing, problem solving and cooperation with others. According to this approach, learning is the process of creating an understanding related to the world. In the learning environment, the knowledge is produced through social interactions and is specific to the individual (Fox 2001). This viewpoint related to knowledge and learning necessitates a democratic classroom appearance. Besides, a democratic process in a classroom environment provides learners with the opportunity of being active and free; it also allows teachers to have the chance of being more productive.

Researchers have emphasized that the most critical factor determining the features of a constructivist learning environment is the interest and needs of students and their individual characteristics. The researches that have been carried out related to the constructivist learning environment have revealed that the constructivist program has positive effects on the academic success of learners (Lord 1999; Maypole and Davies 2001), their thinking skills (Tynjala 1998) and problem solving skills (Wolf 1994). Similarly, there have also been studies in Turkey related to the positive effects of the constructivist learning environment on the academic success of students (Bukova-Güzel 2007; Gültepe et al. 2008), their creativity (Tezci and Gürol 2002) and student and teacher views (Altun and Büyükduman 2007; Üredi and Üredi 2009).

In Turkey, practice of the constructivist approach based on the primary education curriculum started in the 2005–2006 academic year was accompanied with some

challenges. The leading challenge among them is the teachers' level of presenting behaviors appropriate for the constructivist learning environment. In Turkey, overcoming the challenges related to practicing a constructivist approach based program necessitates understanding of the researches carried out on the various variables related to teachers. For that reason, in this study, primary school teachers' level of creating a constructivist classroom environment according to chaos theory was analyzed in terms of different variables. In this research, the primary school teachers' level of forming a constructivist learning environment according to chaos theory in terms of various variables (gender, age, the grade they teach, their professional seniority, the type of school where they work and the school they graduated from) was evaluated. In accordance with this purpose, answers to these sub-problems were sought for:

1. What is the primary school teachers' level of forming a constructivist learning environment?
2. Does the primary school teachers' level of forming a constructivist learning environment show a significant difference according to gender and the type of school where they work (the variables creating chaos)?
3. Does the primary school teachers' level of forming a constructivist learning environment differ according to the variables of age, the grade they teach, their professional seniority, and the type of school where they work (the variables creating chaos)?

48.8 Method

48.8.1 Research Model

Relational screening model was used in the research. The relational screening is performed to determine the relationship between two or more variables and obtain clues related to cause-effect (Büyüköztürk et al. 2008). Primary school teachers' level of forming a constructivist learning environment was described and moreover, the teachers' level of creating a constructivist learning environment was analyzed in terms of some variables.

48.8.2 Population and Sample

The research population included primary school teachers carrying out their duties in all official primary schools in central districts (Mezitli, Yenişehir, Akdeniz and Toroslar) of Mersin province in the 2012–2013 academic years. The research sample included 32 primary schools chosen randomly in schools that have different socio-economic levels (high, medium, low). And the sample included 504 primary school

teachers including 277 female and 227 male teachers. In terms of gender, 55.0 % of the sample included female and 45.0 % included male teachers. According to age, 1.0 % were 21–25 years old, 12.1 % were 26–30 years old, 16.7 % were 31–35 years old, 16.7 % were 36–40 years old, 25.0 % were 41–45 years old, 28.6 % were 46 and over. According to the professional seniority, 7.1 % of teachers had 1–5 years, 15.1 % had 6–10 years, 19.8 % had 11–15 years, 16.3 % had 16–20 years, 20.4 % had 21–25 years and 21.2 % had 26 years and over. According to the grade they teach, 10.3 % trained the 1st grade, 18.1 % trained the 2nd grade, 29.0 % trained the 3rd grade and 42.7 % trained the 4th grades. According to the type of school where they worked, 91.3 % of teachers work in state schools and 8.7 % work in private schools. According to the type of school graduated from, 11.9 % of teachers graduated from training institutes, 4.4 % from higher teacher education schools, 10.9 % from the associate degree programs, 4.0 % from the postgraduate degree school, 49.4 % from faculties of education and 19.4 % from other faculties. According to the type of school graduated from, the teachers who graduated from "other" schools included the ones who graduated from the faculties other than the Faculty of Education (For example; The Faculty of Arts and Science, Faculty of Agriculture, The Faculty of Economics and Administrative Sciences, etc.).

48.8.3 Data Collection Tools

In the research, "Chaos Variables Information Form for Primary School Teachers" and "Constructivist Learning Environment Questionnaire" were used as data collection tools.

48.8.3.1 Chaos Variables Information Form for Primary School Teachers

In order to collect various variable data related to teachers included into the research group, "Chaos Variables Information Form for Primary School Teachers" was developed by the researcher. In "Chaos Variables Information Form for Primary School Teachers" questions related to the gender, age, the grade they train, their professional seniority in teaching profession, the type of school where they work and the school they graduated from was included.

48.8.3.2 The Constructivist Learning Environment Questionnaire (CLEQ)

In the research, "Constructivist Learning Environment Questionnaire" developed by Tenenbaum et al. (2001) and converted to Turkish by Fer and Cırık (2006) was used to determine the primary school teachers' level of creating a constructivist

learning environment. The evaluation instrument included 30 items and 7 sub-factors describing the appearance of a constructivist learning environment. These sub-factors were arguments, discussions, debates (5 items, α = .90), conceptual conflicts and dilemmas (3 items, α = .94), sharing ideas with others (4 items, α = .90), materials and resources targeted toward solutions (3 items, α = .90), motivation toward reflections and concept investigation (6 items, α = .89), meeting learners' needs (5 items, α = .89) and making meaning, real life examples (4 items, α = .90). The scale was a 5-point Likert type evaluation instrument. The grades determined from one to five varied between "never" and "always". Cronbach Alpha internal consistency coefficients related to the dimensions of the evaluation instrument varied between .89 and .94.

48.8.3.3 Data Analysis

In the research, frequency (f) and percentage (%) distribution tables were created to describe the primary school teachers' level of forming a constructivist learning environment. Whether primary school teachers' level of creating a constructivist learning environment showed a significant difference or not according to the gender and type of school (the variables creating chaos) was determined using unrelated group t-test. Whether it showed a significant difference according to age, the grade they teach, the professional seniority and type of school graduated from (the variables creating chaos) was determined using One Way Variance Analysis (ANOVA). Tukey test was conducted to determine among which variables (age, the grade they teach, professional seniority and the school they graduated finally) the difference of creating a constructivist learning environment exists. In all statistical analyses, .05 level of significance was accepted as the criteria. The data obtained from the research was analyzed using the SPSS Windows 17.0 statistical package program.

48.9 Findings

48.9.1 Findings Related to the First Sub-problem

Factor total scores obtained from the answers of primary school teachers to the constructivist learning environment questionnaire were categorized as low, medium and high.

When Table 48.1 was analyzed, majority of primary school teachers in total (f = 347, %68.8) were found to create the constructivist learning environment at medium level. Whereas 15.1 % of primary school teachers created the constructivist learning environment at low level, 16.1 % created it at a high level.

Table 48.1 Frequency and percentage distribution table related to primary school teachers' level of creating a constructivist learning environment

Constructivist learning environment	Low		Medium		High	
	f	%	f	%	f	%
Arguments, discussions, debates	96	19.0	312	61.9	96	19.0
Conceptual conflicts and dilemmas	127	25.2	248	49.2	129	25.6
Sharing ideas with others	90	17.9	272	54.0	142	28.2
Materials and resources targeted toward solutions	49	9.7	361	71.6	94	18.7
Motivation toward reflections and concept investigation	95	18.8	289	57.3	120	23.8
Meeting learners' needs	104	20.6	150	29.8	250	49.6
Making meaningful real life examples	90	17.9	305	60.5	109	21.6
Total	76	15.1	347	68.8	81	16.1

48.9.2 Findings Related to the Second Sub-problem

When Table 48.2 was analyzed, it was realized that female and male teachers' constructivist learning environment questionnaire score averages were similar to each other. As result of the unrelated t-test, there was no statistically significant difference ($p > .05$) within the context of constructivist learning environment's general and sub-factors.

When Table 48.3 was analyzed, it was noticed that primary school teachers' constructivist learning environment questionnaire related to the type of school where they work showed significant difference at $p < .01$ level of significance in sub-dimensions of arguments, discussions, debates; sharing ideas with others, materials and resources targeting solutions, motivation toward reflections and concept investigation, and meeting learners' needs. It was also established that primary school teachers' sub-dimensions of conceptual conflicts and dilemmas and making meaningful real life examples showed no significant difference according to the type of school where they carried out their duty ($p > .05$). The primary school teachers' level of creating a constructivist learning environment working in private schools was found to be higher than the primary school teachers working in state schools. In this table, the difference between the school type groups the primary school teachers worked in was evaluated as a statistically strong difference.

48.9.3 Findings Related to the Third Sub-problem

When Table 48.4 was analyzed, significant differences at $p < .01$ level of significance were noticed between primary school teachers' level of creating a

Table 48.2 Unrelated group t-test results according to the difference of primary school teachers' creating a constructivist learning environment in terms of gender

CLEQ	Gender	N	$\bar{x}$	SD	Sh	Sd	t	p
Arguments, discussions, debates	Male	227	19.6875	3.3006	.2223	502	–3.496	.251
	Female	277	19.2655	3.3400	.1722			
Conceptual conflicts and dilemmas	Male	227	7.7266	2.8415	.2363	502	–6.276	.242
	Female	277	8.0708	2.5428	.1625			
Sharing ideas with others	Male	227	16.6641	2.5294	.2374	502	–4.627	.551
	Female	277	16.4956	2.5669	.1801			
Materials and resources targeted toward solutions	Male	227	12.0703	1.9968	.1908	502	–4.941	.141
	Female	277	11.7434	2.0035	.2135			
Motivation toward reflections and concept investigation	Male	227	22.9766	3.7405	.1861	502	–3.054	.953
	Female	277	22.9513	3.9308	.1892			
Meeting learners' needs	Male	227	18.7734	2.9248	.1731	502	–6.178	.131
	Female	277	18.2257	3.4522	.1226			
Making meaningful real life examples	Male	227	16.8438	6.0853	.1491	502	–5.013	.126
	Female	277	15.9735	2.6058	.1127			
Total	Male	227	113.2159	19.7692	.6682	502	–1.503	.133
	Female	277	114.9747	21.0853	.5179			

constructivist learning environment according to their age. This difference was also observed in all other sub-dimensions of constructivist learning environment questionnaire apart from the sub-dimensions of conceptual conflicts and dilemmas, sharing ideas with others, making meaning and real life examples. Tukey test results conducted to determine which ages were related with the level of creating a constructivist learning environment showed parallelism in scale dimensions. According to these results, it can be said that the primary school teachers between 26–30 years old created a constructivist classroom environment at a higher level than the primary school teachers between 31–35 years old. According to the research result, the primary school teachers between 26–30 years old can be said to have higher level of creating a constructivist learning environment than the teachers at 31–35, 41–45, and 46 years old and over; in terms of arguments, discussions and debates, material and resources targeted toward solutions, motivation toward reflections and concept investigation and meeting learners' needs. Moreover, according to the research results, the primary school teachers between 21–25 years old can also be said to have a higher level of creating a constructivist learning

Table 48.3 Unrelated group t-test results according to the difference of primary school teachers' creating a constructivist learning environment in terms of the type of school where they work

CLEQ	School type	N	$\bar{x}$	SD	Sh	Sd	t	p
Arguments, discussions, debates	State	460	17.7143	3.4519	.2426	502	–1.776	.001
	Private	44	20.5500	3.5906	.1927			
Conceptual conflicts and dilemmas	State	460	8.1864	2.4528	.2867	502	–1.841	.897
	Private	44	7.9250	2.3413	.1823			
Sharing ideas with others	State	460	15.5714	2.9367	.2271	502	–2.390	.001
	Private	44	17.3000	2.6774	.1957			
Materials and resources targeted toward solutions	State	460	10.1571	2.7449	.1891	502	–3.658	.001
	Private	44	11.8500	1.9541	.2124			
Motivation toward reflections and concept investigation	State	460	24.0800	4.0612	.1689	502		.001
	Private	44	25.5686	3.2534	.1721			
Meeting learners' needs	State	460	14.9286	3.4094	.1964	502		.001
	Private	44	20.9000	13.9091	.1793			
Making meaningful real life examples	State	460	15.1541	6.0853	.2134	502	–0.864	.642
	Private	44	16.7314	2.6058	.1467			
Total	State	460	112.6739	20.4118	.9517	502	–.406	.001
	Private	44	114.3409	21.9544	3.3097			

environment than the teachers at 31–35, 41–45, and 46 years old and over; in terms of materials and resources targeted toward solutions, motivation toward reflections and concept investigation, and meeting learners' needs.

When Table 48.5 was analyzed, the highest arithmetic averages related to the constructivist learning environment were noticed to be in primary school teachers training the 2nd and 4th grades. However, this arithmetic average difference noticed between the teachers training the different grades was observed to create no statistically significant difference apart from the two dimensions of the constructivist learning environment questionnaire. The result of the research revealed that motivation toward reflections and concept investigation ($p < .01$) and meeting learners' needs ($p < .05$) as features of the constructivist learning environment showed difference according to the levels of forming a constructivist learning environment. According to this result, a significant difference at $p < .01$ level of significance was

Table 48.4 One way variance analysis and Tukey test results related to whether primary school teachers' level of creating a constructivist learning environment differs according to their age

CLEQ	Seniority	N	X	SD	F	p	Significant difference
Arguments, discussions, debates	21–25 ages	5	17.4320	7.23187	5.096**	.001	26–30 > 41–45 ages
	26–30 ages	61	18.3889	4.46241			
	31–35 ages	84	19.5417	5.47872			
	36–40 ages	84	16.9684	4.11911			
	41–45 ages	126	15.2447	4.44639			
	46 ages and over	144	16.2624	4.23343			
	Total	504	17.5980	4.53644			
Conceptual conflicts and dilemmas	21–25 ages	5	7.8120	1.64837	.453	.781	–
	26–30 ages	61	8.1879	2.45143			
	31–35 ages	84	7.8826	2.90968			
	36–40 ages	84	7.9784	2.78213			
	41–45 ages	126	8.7843	2.49706			
	46 ages and over	144	7.8541	2.56871			
	Total	504	7.9950	2.38360			
Sharing ideas with others	21–25 ages	5	13.8520	2.83647	.958	.474	–
	26–30 ages	61	12.1667	3.27957			
	31–35 ages	84	11.8333	3.25631			
	36–40 ages	84	11.9789	2.89821			
	41–45 ages	126	12.4219	2.98521			
	46 ages and over	144	11.7521	2.89214			
	Total	504	12.2506	2.90294			

(continued)

Table 48.4 (continued)

CLEQ	Seniority	N	X	SD	F	p	Significant difference
Materials and resources targeted toward solutions	21–25 ages	5	14.5038	3.75235	2.453*	.039	21–25 > 46 and over ages
	26–30 ages	61	13.8746	4.63211			
	31–35 ages	84	12.5857	4.02236			
	36–40 ages	84	13.5389	3.78542			
	41–45 ages	126	15.2345	4.85328			
	46 ages and over	144	12.6254	4.32104			
	Total	504	13.9564	3.85254			
	Total	504	113.732	20.52893			
Motivation toward reflections and concept investigation	21–25 ages	5	17.5346	7.43125	4.257**	.001	26–30 > 31–35 ages
	26–30 ages	61	19.6245	5.59871			
	31–35 ages	84	15.8417	4.56243			
	36–40 ages	84	16.9988	4.31912			
	41–45 ages	126	18.2849	4.47631			
	46 ages and over	144	17.3512	5.12141			
	Total	504	17.5980	4.53644			
Meeting learners' needs	21–25 ages	5	14.3937	3.89562	2.748*	.033	21–25 > 46 ages and over
	26–30 ages	61	13.5985	4.57901			
	31–35 ages	84	13.6871	4.02563			
	36–40 ages	84	13.3692	3.52761			

(continued)

Table 48.4 (continued)

CLEQ	Seniority	N	X	SD	F	p	Significant difference
	41–45 ages	126	15.0354	4.84768			
	46 ages and over	144	13.0021	3.75614			
	Total	504	13.8561	3.87094			
Making meaningful real life examples	21–25 ages	5	12.1874	4.22351	.864*	.549	–
	26–30 ages	61	11.9334	3.75123			
	31–35 ages	84	10.4621	3.33214			
	36–40 ages	84	11.6312	2.89521			
	41–45 ages	126	11.7956	3.12456			
	46 ages and over	144	11.9561	3.45685			
	Total	504	11.9866	3.13773			
Total	21–25 ages	5	114.200	26.30969	3.085**	.001	26–30 > 31–35 ages
	26–30 ages	61	116.409	16.51199			
	31–35 ages	84	107.821	22.01049			
	36–40 ages	84	109.773	22.26746			
	41–45 ages	126	116.571	18.98733			
	46 ages and over	144	114.854	20.49321			
	Total	504	113.732	20.52893			

N = 504; *$p < .05$; **$p < .01$

Table 48.5 One way variance analysis and Tukey test results related to whether primary school teachers' level of creating a constructivist learning environment differs according to the grade they teach

CLEQ	Seniority	N	X	SD	F	p	Significant difference
Arguments, discussions, debates	1st grade	52	18.1230	2.4587	.482	.069	–
	2nd grade	91	19.1859	4.2541			
	3rd grade	146	19.4213	3.4124			
	4th grade	215	19.5674	3.2222			
	Total	504	19.5284	3.4475			
Conceptual conflicts and dilemmas	1st grade	52	7.8030	2.24397	.463	.763	–
	2nd grade	91	8.1987	2.55362			
	3rd grade	146	7.8315	2.85635			
	4th grade	215	7.9894	2.22142			
	Total	504	7.9986	2.35760			
Sharing ideas with others	1st grade	52	12.6210	3.31091	.936	.443	–
	2nd grade	91	12.1487	3.22341			
	3rd grade	146	11.8562	3.21136			
	4th grade	215	11.9999	2.85212			
	Total	504	12.2496	2.98594			
Materials and resources targeted toward solutions	1st grade	52	9.1100	3.26237	.797*	.583	–
	2nd grade	91	9.3459	2.78552			
	3rd grade	146	8.1124	2.63217			
	4th grade	215	8.7785	2.04751			
	Total	504	8.9686	2.25411			

(continued)

Table 48.5 (continued)

CLEQ	Seniority	N	X	SD	F	p	Significant difference
Motivation toward reflections and concept investigation	1st grade	52	19.1002	7.36287	2.125**	.001	2nd grade > 3rd grade
	2nd grade	91	17.5210	5.47958			
	3rd grade	146	15.6118	4.36451			
	4th grade	215	16.8524	4.13451			
	Total	504	17.3210	4.58649			
Meeting learners' needs	1st grade	52	15.0120	4.23458	2.629*	.034	2nd grade > 3rd grade
	2nd grade	91	13.8857	4.55871			
	3rd grade	146	12.4988	4.03543			
	4th grade	215	13.4286	3.66874			
	Total	504	13.5568	3.91254			
Making meaningful real life examples	1st grade	52	12.5080	4.35692	.984	.621	–
	2nd grade	91	11.8956	3.89852			
	3rd grade	146	10.9842	3.22549			
	4th grade	215	11.2234	2.92655			
	Total	504	11.4845	3.23783			
Total	1st grade	52	112.038	21.58155	.825	.065	–
	2nd grade	91	118.879	18.39132			
	3rd grade	146	111.917	21.01642			
	4th grade	215	113.195	20.58034			
	Total	504	113.732	20.52893			

N = 504; *$p < .05$; **$p < .01$

established in favor of the teachers training the 2nd grade between the teachers training the 2nd grade and the teachers training the 3rd grade in terms of forming a learning environment based upon the feature of motivation toward reflections and concept investigation. In terms of meeting learners' needs, a significant difference at $p < .05$ level of significance was established in favor of the teachers training the 2nd grade between the teachers training the 2nd grade and the teachers training the 3rd grade.

When Table 48.6 was analyzed, significant difference at $p < .01$ level of significance was noticed between the primary school teachers' level of forming a constructivist learning environment and their professional seniority. This difference was noticed collaterally in all sub-dimensions of the constructivist learning environment questionnaire apart from the sub-dimensions of conceptual conflicts and dilemmas, sharing ideas with others and motivation toward reflections and concept investigation. Tukey test results showed parallelism with the scale sub-dimensions. According to this result, score averages of the teachers having 26 years and over professional seniority and the score averages of the teachers having 11–15 years professional seniority revealed statistically significant difference in terms of total questionnaire, arguments, discussions and debates, materials and resources targeted toward solutions, meeting learners' needs, and making meaningful real life examples. This difference was found in favor of the teachers having 26 years and over professional seniority. When the research findings were analyzed, the result that emerged generally was that the primary school teachers having higher professional seniority created a more constructivist learning environment than the ones having lower professional seniority.

When Table 48.7 was analyzed, significant differences at $p < .01$ level of significance were noticed between primary school teachers' level of creating a constructivist learning environment according to the type of school they graduated from. This difference was noticed collaterally in all sub-dimensions of the constructivist learning environment questionnaire apart from the sub-dimension of motivation toward reflections and concept investigation. Tukey test results performed related to differing of the level for creating a constructivist learning environment according to the type of school graduated from showed parallelism in scale dimensions. According to this result, score averages of Faculty of Education graduate primary school teachers and score averages of other Faculties graduate primary school teachers revealed a statistically significant difference in total scale and arguments, discussions and debates, sharing ideas with others, materials and resources targeted toward solutions, meeting learners' needs, and making meaningful real life examples sub-dimensions. This difference was found in favor of Faculty of Education graduate primary school teachers. When the research findings were analyzed, the result that emerged generally was that Faculty of Education graduate primary school teachers created a more constructivist learning environment than the other faculties' graduate primary school teachers.

Table 48.6 One way variance analysis and Tukey test results related to whether primary school teachers' level of creating a constructivist learning environment differs according to their professional seniority

	Seniority	N	X	SD	F	p	Significant difference
Arguments, discussions, debates	1–5 years	36	18.9592	3.1041	5.495**	.001	26 and over > 11–15 years
	6–10 years	76	17.9020	3.0694			
	11–15 years	100	17.7149	3.4624			
	16–20 years	82	20.6510	3.5914			
	21–25 years	103	21.2360	2.4548			
	26 years and over	107	20.5484	2.6912			
	Total	504	19.4361	3.4513			
Conceptual conflicts and dilemmas	1–5 years	36	8.1884	2.4351	.395	.786	–
	6–10 years	76	7.9350	2.3535			
	11–15 years	100	7.9366	2.5621			
	16–20 years	82	7.8022	3.1192			
	21–25 years	103	7.4210	3.2482			
	26 years and over	107	8.0010	2.9419			
	Total	504	7.9642	2.6578			
Sharing ideas with others	1–5 years	36	12.5600	2.85297	.836	.453	-
	6–10 years	76	12.3502	2.88128			
	11–15 years	100	12.1857	3.28644			
	16–20 years	82	11.9383	3.03704			
	21–25 years	103	11.9749	2.89712			
	26 years and over	107	12.3289	2.78872			
	Total	504	12.2646	2.90294			

(continued)

Table 48.6 (continued)

	Seniority	N	X	SD	F	p	Significant difference
Materials and resources targeted toward solutions	1–5 years	36	16.2397	2.6821	9.193*	.037	26 and over > 11–15 years
	6–10 years	76	15.6843	2.3685			
	11–15 years	100	15.5844	2.9367			
	16–20 years	82	17.9240	2.3975			
	21–25 years	103	16.7640	2.1653			
	26 years and over	107	17.7656	2.1081			
	Total	504	16.5565	2.5511			
Motivation toward reflections and concept investigation	1–5 years	36	9.1888	2.4948	.784	.652	–
	6–10 years	76	8.9100	2.3456			
	11–15 years	100	8.8286	2.5578			
	16–20 years	82	8.6000	3.0199			
	21–25 years	103	8.5000	3.2542			
	26 years and over	107	9.0000	2.9487			
	Total	504	8.9482	2.6473			
Meeting learners' needs	1–5 years	36	17.3352	2.5531	4.629**	.001	26 and over > 11–15 years
	6–10 years	76	17.3454	3.0563			
	11–15 years	100	16.5890	3.5676			
	16–20 years	82	17.7756	3.2168			
	21–25 years	103	19.6118	2.5789			
	26 years and over	107	18.8628	2.4624			
	Total	504	18.4857	3.2847			

(continued)

Table 48.6 (continued)

	Seniority	N	X	SD	F	p	Significant difference
Making meaningful real life examples	1–5 years	36	15.4527	2.3462	7.745*	.028	26 and over > 11–15 years
	6–10 years	76	15.2602	2.2308			
	11–15 years	100	14.9466	3.5096			
	16–20 years	82	17.4668	2.1623			
	21–25 years	103	16.3450	2.4654			
	26 years and over	107	17.1200	2.9231			
	Total	504	16.3898	4.2331			
Total	1–5 years	36	120.527	17.2915	3.525**	.001	26 and over > 11–15 years
	6–10 years	76	111.320	19.3849			
	11–15 years	100	109.263	22.2287			
	16–20 years	82	112.719	21.3317			
	21–25 years	103	115.048	21.7406			
	26 years and over	107	116.383	18.7866			
	Total	504	113.732	20.5289			

N = 504; *$p < .05$; **$p < .01$

Table 48.7 One way variance analysis and Tukey test results related to whether primary school teachers' level of creating a constructivist learning environment differs according to the school they graduated from

CLEQ	Fin. Grd. Sch.	N	X	SD	F	p	Significant difference
Arguments, discussions, debates	Training Inst.	60	16.2000	3.78624	2.286**	.001	Educational Fac. > Other Fac.
	High Teac. Edu. Sch.	22	14.2456	3.99562			
	Ass. Degree	55	12.7739	3.43540			
	Educational Fac.	249	14.5421	2.66579			
	Other Fac.	98	12.5595	3.45020			
	Post graduate	20	12.9980	3.51248			
	Total	504	14.3578	3.34856			
Conceptual conflicts and dilemmas	Training Inst.	60	6.9070	1.64517	.763	.867	–
	High Teac. Edu. Sch.	22	8.2667	2.43142			
	Ass. Degree	55	7.9125	2.92865			
	Educational Fac.	249	7.9684	2.20934			
	Other Fac.	98	8.0645	2.34712			
	Post graduate	20	7.6541	2.45612			
	Total	504	7.9840	2.39460			
Sharing ideas with others	Training Inst.	60	12.6000	2.87417	2.936**	.001	Educational Fac. > Other Fac.
	High Teac. Edu. Sch.	22	12.1667	3.27651			
	Ass. Degree	55	11.8333	3.02465			
	Educational Fac.	249	12.9789	2.84587			
	Other Fac.	98	11.4219	2.83877			
	Post graduate	20	11.7851	3.14562			
	Total	504	12.2506	2.90294			

(continued)

Table 48.7 (continued)

CLEQ	Fin. Grd. Sch.	N	X	SD	F	p	Significant difference
Materials and resources targeted toward solutions	Training Inst.	60	9.0400	3.24365	2.567*	.001	Educational Fac. > Other Fac.
	High Teac. Edu. Sch.	22	9.3889	2.78542			
	Ass. Degree	55	8.1042	2.61236			
	Educational Fac.	249	9.7895	2.05641			
	Other Fac.	98	8.1038	2.15874			
	Post graduate	20	8.3120	2.56421			
	Total	504	8.9603	2.24571			
Motivation toward reflections and concept investigation	Training Inst.	60	8.2868	2.4538	.484	.741	–
	High Teac. Edu. Sch.	22	7.7256	2.3443			
	Ass. Degree	55	7.8288	2.5571			
	Educational Fac.	249	7.6060	3.0182			
	Other Fac.	98	7.8020	3.2562			
	Post graduate	20	8.0000	2.9457			
	Total	504	7.9663	2.6599			
Meeting learners' needs	Training Inst.	60	15.0000	4.84768	2.529**	.001	Educational Fac. > Other Fac.
	High Teac. Edu. Sch.	22	13.5556	4.57901			
	Ass. Degree	55	13.5833	4.02563			
	Educational Fac.	249	14.3789	3.79461			
	Other Fac.	98	12.1038	3.66235			
	Post graduate	20	13.3030	3.68234			
	Total	504	13.8561	3.87094			

(continued)

Table 48.7 (continued)

CLEQ	Fin. Grd. Sch.	N	X	SD	F	p	Significant difference
Making meaningful real life examples	Training Inst.	60	11.6080	3.33590	3.894*	.028	Educational Fac. > Other Fac.
	High Teac. Edu. Sch.	22	11.8333	3.85395			
	Ass. Degree	55	10.3542	3.22549			
	Educational Fac.	249	12.1474	2.91354			
	Other Fac.	98	11.2164	3.08229			
	Post graduate	20	13.6540	4.44552			
	Total	504	11.6263	3.16283			
Total	Training Inst.	60	116.200	18.8776	2.788**	.001	Educational Fac. > Other Fac.
	High Teac. Edu. Sch.	22	110.954	25.2369			
	Ass. Degree	55	112.843	18.2497			
	Educational Fac.	249	119.818	19.4813			
	Other Fac.	98	112.153	18.5452			
	Post graduate	20	121.900	17.7256			
	Total	504	113.732	20.5289			

N = 504; *$p < .05$; **$p < .01$

48.10 Discussion and Conclusion

According to the result obtained by the research, majority of primary school teachers were found to create a constructivist learning environment at a medium level. Theoretically, there have been studies revealing that the curriculums are appropriate to the principles and standards of the constructivist approach (Sert 2008). In a study carried out by Üredi and Üredi (2009), majority of teachers were found to create a constructivist learning environment at a medium level. Besides, a research carried out by Sert (2008) obtained key results to the effect that teachers met the requirements of a constructivist curriculum at medium level. Furthermore, the studies depending on researchers' observations have indicated different findings. In a research conducted by Ünal and Akpınar (2006), it was found out that although teachers had ideas related to the importance of a constructivist learning environment, they could not present constructivist behaviors within the classroom environment. On the other hand, in a research carried out by Howard et al. (2000) on pre-service teachers, it was established that the practices based upon the constructivist approach caused a change from the objectivist epistemology towards a constructivist epistemology. In their research Kim et al. (1998) obtained results to the effect that a teaching process based on constructivism had a positive effect on pre-service teachers' planning and their teaching. However, teachers need to have experiences depending on constructivist practices not only during the pre-service period but also during their in-service trainings.

Majority of primary school teachers' creating a constructivist learning environment at a medium level, make us believe that they encounter some problems in practice. The researches conducted have indicated that problems such as inadequate resources, crowded classrooms, unclear evaluation, inadequacy of in-service training and physical sub-structure deficiencies exist in creating a constructivist learning environment (Gözütok et al. 2005; Sert 2008; Üredi 2013; Yapıcı and Leblebiciler 2007).

In the research, it was noticed that constructivist learning environment questionnaire of female and male teachers showed similarities to each other. It was established that there was no statistically significant difference within the context of constructivist learning environment's general and factors according to the gender of primary school teachers. The primary school teachers' level of creating a constructivist learning environment in private school was higher than the levels of primary school teachers working in state schools.

It was noticed that there were significant differences between the primary school teachers' level of creating a constructivist learning environment according to their age. Related to age, the level of creating a constructivist learning environment differed, it can be said that the primary school teachers between 26–30 years old formed a constructivist learning environment at a higher level than the primary school teachers between 31–35 years old. According to another result of the research, the highest arithmetic averages related to constructivist learning environment were found to be in primary school teachers training the 2nd and 4th

grades. According to this result, a significant difference was established in favor of teachers training the 2nd grade between the teachers training the 2nd grade and the ones training the 3rd grade in terms of creating the learning environment based upon the feature of motivation toward reflection and concept investigation. In terms of meeting the learners' needs, a significant difference was established in favor of teachers training the 2nd grade between the teachers training the 2nd grade and the ones training the 3rd grade.

Significant differences were also noticed between the primary school teachers' level of creating a constructivist learning environment according to their professional seniority. Professional seniority reveals itself as an important variable in teaching practices. In their study, Işıkoğlu et al. (2009) specified that the teachers with higher professional seniority had student centered teaching belief at a higher level. Similarly, Ünal and Akpınar (2006) postulate that teachers having lower professional seniority, create a more traditional learning environment. In their study, Tanrıseven et al. (2010) opined that there was a significant difference according to the views of primary school supervisors between the professional seniority and creating a constructivist learning environment. In the research, a statistically significant difference was established between the average scores of the teachers having professional seniority of 26 years and over and average scores of teachers with professional seniority of 11–15 years in total of the scale. This difference was found in favor of the teachers having professional seniority of 26 years and over.

Although there have been studies determining the relationship between the age and seniority of teachers and their emotional exhaustion and professional desensitization (Cemaloğlu and Erdemoğlu 2007), the result obtained from the research group showed parallelism with such findings. Moreover, in his study Tanrıöğen (2000) obtained a significant difference in favor of the teachers having 6–10 years professional seniority between the attitudes of teachers having 1–5 years and 11 years and over seniority towards change and the attitudes of teachers having 6–10 years seniority towards change. According to this result, the teachers having high professional seniority have more positive attitude towards practicing and actualizing the new ideas. Accordingly, the relationship between the professional seniority of teachers and the teaching practices can differ according to the characteristics of the sample group. In our research, significant differences were noticed between primary school teachers' level of creating a constructivist learning environment according to the type of school they graduated from. In scale total of the level of creating a constructivist learning environment according to type of school graduated from, the score averages of primary school teachers who graduated from the Faculty of Education showed statistically significant difference with the score averages of primary school teachers who graduated from other faculties. The result that emerged in general was that primary school teachers who graduated from the Faculty of Education were found to create a more constructivist learning environment than the primary school teachers who graduated from other faculties.

Increasing the primary school teachers' level of creating a constructivist learning environment can be possible through adopting a period of raising teachers'

competence using student-centered learning as a base. In a study carried out by Howard McGee et al. (2000) on pre-service teachers, it was established that practices depending on the constructivist approach caused a change from the objectivist epistemology to a constructivist epistemology. In their research Kim et al. (1998) obtained a critical result that a teaching process based on constructivism had a positive effect on pre-service teachers' planning and their teaching strategies. However, teachers need to have experiences depending on constructivist practices not only during the pre-service period but also during their in-service trainings.

Consequently, reflecting on a constructivist learning environment not only on the perception of teachers but also their practices seems possible through a constructivist teacher training system besides overcoming the challenges and problems revealed in researches. For that reason, the quality of the constructivist approach is considered to improve through reflections on both in-service trainings and teacher training programs. Organization of in-service trainings that can be used to overcome the needs of this challenge in accordance with the constructivist approach can be offered as a suggestion to increase the level of creating a constructivist learning environment.

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