

Andrew R. Thomas · Nicolae Al. Pop
Constantin Bratianu *Editors*

The Changing Business Landscape of Romania

Lessons for and from
Transition Economies

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Introduction

Andrew R. Thomas

Romania stands at the crossroads of Europe, Asia, and the Middle East. Since 1990, when the country experienced the bloodiest revolution of all of the Warsaw Pact members, Romania has gone through withering change. While the formal transition from a totalitarian, communist state was completed in 2007 with Romania's accession to the European Union, the adaptation of the nation's people and business climate to a market-based economy is a daily occurrence.

In the 2000s, in the lead-up to EU accession, Romania was one of the largest recipients of foreign direct investment in the world. While multinational corporations poured in hundreds of billions of dollars, there was also a restructuring of the way the business was conducted. Western systems of management and organization—foreign to most Romanian academics and business people—almost overnight transformed the way the marketplace was perceived.

Romania's entrepreneurs were quick to adapt to the new ways, leveraging new opportunities in the environment. Fortunes were made. Multinationals also burgeoned in Romania. Companies like Microsoft, General Electric, Timken, Kraft, P&G, Renault, and dozens of others successfully took advantage of the possibilities created by a relatively well-educated population that was moving into the middle class.

For the most part, however, researchers and scholars were caught off guard by the quickening pace of business change in Romania. Only until very recently has the academic community at large been able to wade through the murkiness and begin to see what the new landscape looks like. It is the purpose of this edited volume, which includes the work of some of Romania's finest business scholars, to provide even greater clarity to the current and future scene.

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As Romania sits at the crossroads between East and West, this volume begins with an exploration of various management structures as they adapt to organizational learning across cultures.

Drilling down into the notion of culture further, the next chapter investigates culture's impact on competitiveness and knowledge sharing across eastern Europe.

With Romania being the EU's largest agricultural producers, the [Chap. 3](#) looks at how the organic food movement has been playing out within the country and what that means both at home and at abroad.

Along with its accession to the EU in 2007, many thought adopting the euro would be the next logical step. The economic crisis in Europe has stalled this prospect for the short term. Still, it is important to recognize what the euro means to Romania as the country continues its transition. This is what [Chap. 4](#) is about.

[Chapter 5](#) takes an in-depth look at the Romanian energy sector and how attitudes might be shaped around the use of new technologies.

The investment in Romania's transport infrastructure has been the focus of much work and effort. Following the 1990 revolution, the world learned a lot about what Romanians always knew: It was very difficult to move cargo and people around the country. [Chapter 6](#) details a possible solution to the continuing transport challenges in Romania.

The recent 20th anniversary of the Romanian Revolution had many looking back to what level of progress toward an open market was made. [Chapter 7](#) digs deep into how Romania's state-owned enterprises have fared since 1990.

[Chapter 8](#) gives us a case study of the Romanian business environment that looks at how a company's internal structure is impacted by its competitive strategy and vice versa.

As the Romanian economy has evolved since 1990, the Romanian consumer has as well. [Chapter 9](#) delves into what those changes have looked like and what they mean for domestic and foreign firms.

The greening of the economy is being driven, in part, by cooperation between firms and government. [Chapter 10](#) looks at Romania's "green clusters" and how they are working among themselves.

Continuing with the theme of consumer behavior in [Chaps. 9, 11](#) undertakes an analysis of how integrated marketing communication has played a role in the development of the Romanian marketplace.

Youth employment is a major concern around the world. [Chapter 12](#) investigates the Romanian labor market for young people.

Building on this theme, [Chap. 13](#) explores the concept of excellence and how it plays out at a Romanian business school.

[Chapter 14](#) delves into how fuzzy models in managerial decision making play a role in Romanian firms.

This volume concludes with a penetrating look at managing customer relationships in the Romanian telecommunications market.

It is intended that each of these chapters will provide a foundation for further research and insight into the perils and promises faced by countries in transition.

Thank you for reading!

The Multifield Structure of Organizational Knowledge

Constantin Bratianu and Ivona Orzea

Abstract The purpose of this chapter is to present a coherent analysis of the multifield structure of organizational knowledge. This new analysis goes beyond the metaphor of knowledge as stuff, or knowledge as stocks and flows, to the metaphor of knowledge as energy. The organizational knowledge is considered as a dynamic integration of the cognitive knowledge field, emotional knowledge field, and spiritual knowledge field. The chapter evidences the main characteristics of these fields and then describes the multiple forms of knowledge. Cognitive knowledge, emotional knowledge, and spiritual knowledge constitute the fundamental triple helix of the organizational knowledge field. The chapter advances the hypothesis of knowledge transformation from one form into another one, especially cognitive knowledge transformation into emotional knowledge, and of the emotional knowledge into the cognitive knowledge.

1 Understanding Knowledge

Understanding knowledge has been always a challenge for people since the beginnings of the humankind. Philosophers were among the first to ask themselves about what knowledge is and how can it be properly used. Knowledge is a fuzzy concept and sometimes an elusive object. “What is positively known by some is denied by others; knowledge is alternatively discovered and invented, forgotten, rediscovered, and invented anew; it is highly theoretical yet intensely practical; it is at once a combination of magical delight and cold logical form, subjective and

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objective, the source of human dignity, and possibly a cause of man's destruction." (Capaldi 1969: vii).

Even during ancient times, there were many disputes about the nature and meaning of knowledge. While for some philosophers knowledge was a result of both perception and thinking, for some others knowledge was a result only of the mind work. For instance, Socrates promoted the thesis that man is the measure of all things, and that knowledge is a result of perception: "Perception, then, is always something that is, and, as being knowledge, it is infallible." (Russel 1972: 149). On the other hand, Plato considered that knowledge cannot be derived from perception, and that the only worthy way of talking about knowledge is to consider only concepts and ideas. Perceptions may be confusing and misleading, but mind is the only one to guide us for reaching the truth. "We perceive hard and soft through touch, but it is the mind that judges that they exist and that they are contraries. Only the mind can reach existence, and we cannot reach truth if we do not reach existence." (Russel 1972: 152).

After some centuries of debates on the nature and meaning of knowledge, a new branch of philosophy developed, epistemology, as a discipline dedicated to the theory of knowledge. Epistemology is also concerned with norms and guidelines for acquiring and using knowledge effectively. Our purpose is not to deal with epistemology and its debates, but to construct for the organizational knowledge a sense-making framework, and to provide a new perspective of interpreting organizational knowledge as a field, like energy field in science. Going beyond the metaphors of "knowledge as stuff" or "knowledge as stocks and flows," we aim at opening new directions of research for understanding the organizational knowledge dynamics. The structure of this chapter is the following: discussing the two main paradigms of interpreting knowledge, that is, the Western and Eastern paradigms; presenting the most important metaphors used in knowledge management, and advancing the multifield theory of organizational knowledge.

2 The Western Paradigm

According to Kuhn (1970: 23), "a paradigm is an accepted model or pattern" of understanding and explaining phenomena from the real life through theoretical lenses. The Western paradigm conceives knowledge as a result of the rational mental processes. Knowledge means processing data using rational methods and not the impression we may have from looking at a certain object. Following the direction of Plato, Descartes contributed decisively to the success of the rational knowledge paradigm. His conclusion, *Cogito, ergo sum!*, made history and created the Cartesian dualism of the body and mind. That means that the mind is more important than the body, and that my mind is more important than others. I do exist because I think. If I stop thinking, there would be no evidence of my existence. "Knowledge by the senses is confused, and shared with animals; but now I have stripped the wax of its clothes, and mentally perceive it naked. From my sensibly

seeing the wax, my own existence follows with certainty, but not that of the wax. Knowledge of external things must be by the mind, not by the senses.” (Russel 1972: 565).

Illusions could be arguments in favor of these above remarks. Also, from the medical practice, we learn about a strange phenomenon called “phantoms in the brain.” An individual who has an amputated arm may experience a phantom arm. That person can feel that arm in a particular position in space, and even he can try to move it. However, the person can see very clearly that there is no arm anymore (Frith 2007).

The Western paradigm imposed a clear distinction between “subjective” and “objective” knowledge, and it promoted the scientific thinking. In management, this paradigm contributed to the development of the rational decision-making process, and bounded rationality. “Rational choice processes are the fundamentals of microeconomic models of resource allocation, political theories of coalition formation, statistical decision theories, and many other theories and models throughout the social sciences.” (March 1994: 3). The Western paradigm contributed to the development of the cognitive organizational knowledge (Baskerville and Dulipovici 2006; Nonaka 1994; Nonaka and Toyama 2003; Schiuma 2009; Styhre 2004).

3 The Eastern Paradigm

This paradigm reflects mostly the traditional thinking of India, China, and Japan based on the Buddhism and Confucianism teachings. The most important contributions have been made by the Japanese authors. According to Nonaka and Takeuchi (1995), the Japanese intellectual tradition is structured around the following three main ideas: (1) there is an integrative perspective between people and nature; (2) there is unity between mind and body; and (3) there is unity between any single individual and others from the same community. In the Japanese culture, people integrate within the natural environment and they feel like being a part of the flow of time and space. There is no fixed time and space reference system, and their language contains many concrete images from the direct environment. Most Japanese names reflect beautiful places and phenomena from their natural landscape.

The same integral perspective has been used for understanding knowledge. According to Nonaka and Takeuchi (1995: 29), “For the Japanese, knowledge means wisdom that is acquired from the perspective of the entire personality. This orientation has provided a basis for valuing personal and physical experience over indirect, intellectual capital.” This conception can be found in the *samurai* education and training. Its aim is to reach wisdom through physical instruction and training. “Allow your wisdom to develop by constantly striving to perfect yourself in your own art and by understanding the arts of others. When you understand yourself and you understand the enemy you cannot be defeated.” (Kaufman 1994: 27). The most important consequence of this Eastern perspective is the fact that

knowledge is not restricted to the filtered rational thinking. Knowledge includes all aspects of the human experience, regardless of their subjective or objective nature. Knowledge includes emotions, images, symbols, insights, intuitions, hunches, ideals, values, and the like (Nonaka 1994; Nonaka and Konno 1998; Nonaka and Takeuchi 1995; Nonaka and Toyama 2003). Thus, knowledge has got a very large spectrum of meanings able to reflect all aspects of the human life. The Eastern paradigm contributed to the development of the emotional and spiritual organizational knowledge.

4 Knowledge Metaphors

Understanding knowledge is a rather difficult process since knowledge is an abstract concept. There is no material object for which knowledge to be a reflection in our mind. “We use metaphor to map elements of things we are familiar with in the real world (organisms, resources, products) onto the concept of knowledge to make it compressible. Knowledge is not a concept that has a clearly delineated structure. Whatever structure it has it gets through metaphor.” (Andriessen 2006: 96). Metaphors are part of our thinking process. We think through metaphors even if we are not always aware of this complex process.

Metaphors go beyond the language structures deep into our mind and action. Recent data coming from linguistic research demonstrate that our conceptual framework has a metaphorical nature. Knowing is a metaphorical process that develops from known experience and mental structures to unknown domains. We use known concepts, things, and facts to describe and explain new and unknown ones. Using metaphors, we map a new experience or a semantic domain of a new concept in terms of a known experience or known concept trying to extend the known field over the unknown one (Andriessen 2006, 2008; Cornelissen et al. 2008; Fleming 2005; Lakoff and Johnson 1999, 2003; Pinker 1994, 2007).

4.1 Knowledge as Stuff Metaphor

In the economic thought, knowledge is considered as a resource. Thus, the extension from tangible assets to the intangible ones means just a simple metaphor with a source domain reflecting a physical object. As Andriessen remarks (2008: 8), “We act as if knowledge is a thing. This has many advantages because things can be counted, controlled, and managed. However, things are also objective and neural, so the metaphor assumes that knowledge is objective; that it can be stored and retrieved without any distortion; that it can be transferred from one human being to another without interpretation.” Knowledge as stuff metaphor is more frequently used by the Western authors since the metaphor integrates in the rational paradigm. It is a very appealing metaphor since we may use concepts like for the other material resources

in order to deal with the organization resources. Thus, we can create, store, retrieve, transfer, accumulate, pack, take, and give knowledge. However, the metaphor extends the linear thinking that is characteristic for tangible assets into the domain of knowledge that is intangible, and that means to introduce errors in understanding knowledge evaluation and knowledge management. For instance, according to the linear thinking, we may consider that the organizational knowledge is an aggregate result obtained by summing up all employees' individual knowledge. In other words, organizational knowledge is proportional with the number of employees. The more employees the organization has, the larger the organizational knowledge would be (Bratianu and Vasilache 2010). But this would be a wrong result since knowledge does not add up like physical objects. Another shortcoming of this metaphor is the fact that knowledge is interpreted as a static object. The operational management of any enterprise demonstrates the fact that organizational knowledge is dynamic and evolves in time as a function of the knowledge strategies developed by the top management. Organizational knowledge develops in time as a result of organizational learning (Baskerville and Dulipovici 2006; De Toni et al. 2011; Schiuma 2009; Sveiby 2001).

4.2 Knowledge as Stocks and Flows Metaphor

This is a complex metaphor since it contains actually two basic metaphors. The first one is knowledge as a stock, which means knowledge as stuff, and the second one is knowledge as a fluid flow. The metaphor incorporates time and allows for knowledge variation within the organization. As Nissen remarks (2006: XX), "To the extent that organizational knowledge does not exist in the form needed for application or at the place and time required to enable work performance, then it must flow from how it exists and where it is located to how and where it is needed. This is the concept of knowledge flows." Expanding the metaphor to the whole organization, we may imagine knowledge as being a water flow system composed of reservoirs and pipelines connecting them. However, in nature or in engineering systems, fluids flow as a result of differences in the pressure fields or in the gravity field. In the literature concerning organizational knowledge, there is no such explanation. That means that knowledge as stocks and flows is an elliptical metaphor. Although the metaphor offers new opportunities for research and a larger spectrum of meanings for managers, it remains in the realm of tangible assets.

4.3 Knowledge as Energy Field

We know from physics that energy exists in nature and technology as a field, which is a nonsubstantial existential entity. Energy is related to mass through the Einstein's famous formula $E = mc^2$. There are different forms of energy, and thus

different energy fields. They may exist as independent fields or as integrated multifields. For instance, the gravity field, the thermal field of a heated body, and the magnetic field of a magnetic object are independent fields. An electrical coil may generate both an electrical field and a magnetic field that are in a dynamic interaction. Also, in a flow of fluids, we can identify a field of velocities and a field of pressures that are in a dynamic interaction. We may consider even a thermal field being overlapping on the velocity and pressure fields. To analyze such a multifield problem, engineers use complex partial differential equations and the laws of conservation of mass, momentum, and energy.

The metaphor “knowledge as energy” has been introduced by Bratianu and Andriessen (2008). The semantic source domain is *energy* and the target domain is *knowledge*. This metaphor is very close to the Japanese way of conceiving knowledge as “ideals, values and emotions” (Nonaka and Takeuchi 1995: 9). Also, in his seminal paper about how metaphors contribute in understanding and using knowledge in organizations, Andriessen (2008) introduces the metaphor “knowledge as love.” If *love* is an insightful analogy for individual knowledge, *field* analogy is much more adequate for organizational knowledge. The *knowledge field* of a generic organization integrates all the knowledge contributions from the employees and displays all the features of an energy field.

The knowledge field is conceived as an entity able to integrate all individual knowledge contributions from a certain organization and to map the whole organizational knowledge as a continuum in time and space. It is a nonuniform and nonlinear field of forces that is changing continuously in time. The field nonuniformity generates forces that stimulate the knowledge flows throughout the organization. These fluxes of knowledge are oriented against the field gradient, that is, from the higher level of knowledge toward the lower level of knowledge. This is an important metaphorical result since it explains the knowledge flows in concordance with the entropy law (Bratianu 2010). In thermodynamics, we learn that heat is flowing naturally from a body with a higher temperature toward a body with a lower temperature. The reverse heat transfer can be accomplished only by consuming a mechanical work. Projecting this aspect into the knowledge field is extremely important for understanding knowledge-sharing and knowledge-transfer processes in conjunction to the knowledge distribution within the organization, and to the motivational system. Also, there are some specific knowledge-related factors that may stimulate or slow down the action of knowledge fluxes, like knowledge stickiness and knowledge absorptive capacity (Szulansky 1996, 2000; Szulansky and Jensen 2004).

5 Nonlinearity of the Knowledge Field

The metaphors based on tangible objects, like stuff, stock, and fluid flow project onto the target domain the linear thinking and linear accounting methods. This linearity property constitutes a tough barrier to be overcome in the decision-

making process if there is not a deep understanding of the knowledge intangible nature and nonlinear behavior. The *field* metaphor eliminates this limitation, and knowledge can be considered nonlinear (Bratianu 2008). In order to illustrate this idea, we shall use as a reference the mathematical concept of a linear space and its main properties. We shall demonstrate that the linearity properties cannot be applied within the knowledge field. For our demonstration, we shall consider S as a linear space from mathematical point of view, and K the organizational knowledge field. We shall consider each property that is valid for the linear space S, and then we shall see whether we can extend this property to the knowledge space K.

- *The addition property.* If a and b are scalars representing simple numbers in S, then the result of the addition operation $a + b$ is also in S. Let us consider now the K space and two elements belonging to this space: *computer* and *carrot*. The addition of these two elements $computer + carrot$ is meaningless, and thus, it does not satisfy the linearity requirement. We may consider some other example: *powerful* and *computer*. This time, $powerful + computer = powerful computer$ makes sense, but the linearity property remains unsatisfied for all elements belonging to the space K.
- *The multiplication property.* If a and c are elements in the space S, then the result of the multiplication ac belongs to S. If we consider now two elements of the K space, 7 and *love*, the result of the multiplication $7love$ is meaningless, and thus, it does not belong to K. The linear property is invalidated for the space K.
- *The commutative property.* If a , b , and c belong to S, then we have $a + b + c = c + b + a$. Let consider three elements in the K space: *Mike*, *eats*, and *cheese*. Then, we should have $Mike + eats + cheese = cheese + eats + Mike$. Here, the summation symbol is used to illustrate the aggregation of meanings. However, changing the order of elements in a sentence may yield strange results which cannot be accepted from the semantic point of view.
- *The associative property.* If a , b , and c belong to S, then we have $(a + b) + c = a + (b + c)$. Let consider three elements in the K space: *tall*, *Mike*, and *short*. Then, we should have $(tall + Mike) + short = tall + (Mike + short)$. If we consider addition as a semantic aggregation, then the first association could be interpreted as “Mike is tall.” However, the second association would be interpreted as “Mike is short,” which means that through association, the meaning is not preserved. That means that the associative property does not apply to the knowledge field, that is, the K space.
- *The identity element.* In the linear space S, there is an element defined as zero (0) such that we may write $a + 0 = a$. That means that this zero element does not change the addition result. In the knowledge space K, we cannot find such a neutral element, since even *zero* means something. The knowledge field does not have the identity element.
- *The inverse element.* In the linear space S, we can define an inverse element for any component of this space such that $a + (-a) = 0$. In this example, $(-a)$ is the inverse element of a . The equivalent operation for the knowledge field would be $(Mike\ is\ tall) + (Mike\ is\ not\ tall) = ?$ Actually, such kind of

situations may happen especially due to gossip and informal communication networks in organizations, but from the meaning point of view, the result yields ambiguity. Thus, we may conclude that there is no equivalent rule of the inverse element in the knowledge field K .

- *The superposition principle.* The superposition principle is a logical outcome of all properties of the linear spaces, and it is successfully applied in science where dealing with linear spaces. This principle is actually an extension of the addition property, since we aggregate events, activities, or tangible actions, and the outcome is meaningful. Also, the principle can be applied in the reverse way, from the whole body to its component elements. In management, this principle is recommended whenever there is a complex problem that can be broken down into smaller problems, which can be easily solved. Then, the individual solutions obtained for these simple problems can be aggregated into the general solution of the initial complex problem.

A classical illustration of how this principle works in management is given by Smith (1998: 12), considering the work of a pin-maker:

One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations; to put it on, is a peculiar business, to whiten the pins is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which, in some manufactories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them.

In the knowledge field, the superposition principle does not apply since meanings, emotions, intuitions, and values cannot be aggregated by applying linear methods.

They can be only integrated using the work of organizational integrators (Bratianu 2008; Bratianu et al. 2011). These integrators are conceived as powerful fields of forces able to integrate different elements into a whole structure, producing synergy. While *aggregation* is specific to a linear operation, without any synergy output, *integration* is specific to nonlinear operations with synergy output. The most important integrators for the organizational knowledge field we may consider are leadership, management, and organizational culture.

As a conclusion of all these testing rules of linearity, we consider that they have been invalidated for the knowledge space K , which means that the organizational knowledge field is nonlinear. For it, researchers must discover new rules and methods to deal with nonlinearity. It is a challenging task for the immediate future of the knowledge management theory.

6 The Multifield Organizational Knowledge

We would like to introduce this concept using a metaphor from physics. Let us consider a pot with water at the room temperature. The water is motionless. The only field of forces acting upon the water inside the pot is the gravity field. We put

the pot on a gas flame to heat the water. The heat source generates a thermal field that is induced into the water. Due to the nonuniformity of the thermal field within the water, there are nonuniform changes in the water density field. These nonuniformities generate motion under the action of the gravity field, such that water particles having a lower density are pushed upward by the Archimedean forces. That means that within the water body, there are now acting simultaneously the following fields: gravity field, thermal field, density field, velocity field, and the pressure field. All of these fields of forces exist and operate within the same body of the heated water, and they interact dynamically. In order to study such a complex process, researchers use the *multifield* concept. By analogy, we may consider that within a given organization, there are several knowledge fields which operate simultaneously as the generic organizational knowledge field. These fields interact dynamically and we can be aware of them only through the integral result of people attitude and behavior. Basically, for each form of knowledge, we may consider an organizational field, but things may become too complex to be analyzed. Thus, we shall consider that the fundamental components of any organizational knowledge multifield are the following: cognitive knowledge field, emotional knowledge field, and spiritual knowledge field.

6.1 The Cognitive Knowledge Field

The term *cognitive* has two different meanings. The first meaning is specific to the rational mental processes. The second meaning refers to an extended spectrum of all mental processes, of any type and any structure (Lakoff and Johnson 1999). We shall use in this chapter the specific meaning of the term. The cognitive knowledge field is considered in the Western paradigm the only organizational field, since knowledge is thought as an output of rational mental processes. Decision-making process is also framed on rationality or bounded rationality, which means rational knowledge. The cognitive knowledge is processed by the cognitive intelligence, mostly the mathematical and logical intelligences from the Gardner's framework of multiple intelligences. "I define an *intelligence* as a biopsychological potential to process specific forms of information in certain kinds of ways. Human beings have evolved diverse information-processing capacities—I term 'intelligences'—that allow them to solve problems or to fashion products." (Gardner 2006: 29).

The fundamental characteristic of this cognitive knowledge is the fact that it can be expressed, using the language, and becoming *explicit* knowledge. Explicit knowledge can be shared to other people, transformed through codification into documents or data bases, stored and retrieved, and transferred to other people or organizations. Codification means to transform knowledge into some specific formats and then made them available to the whole organization. For each organization, managers can decide the types of knowledge codification, and then how to map, model, or simulate the organizational knowledge field (Becerra-Fernandez and Sabherwal 2010; Davenport and Prusak 2000; Geisler and Wickramasinghe

2009; Jashapara 2011; Nonaka and Takeuchi 1995). A map of organizational knowledge is a graphical or structural representation of the cognitive knowledge within the organization. It describes the types of knowledge structures and the locations where it can be found and used. In order to develop such knowledge maps, it is necessary to design a questionnaire and to distribute it to all employees. The questions should identify all general and specific knowledge, skills, and experiences one may have in direct relation with his job. For example, each job in Microsoft should be described in terms of 40–60 knowledge competences necessary to perform it. All answers obtained from such questionnaires are processed and integrated into the organizational knowledge map (Davenport and Prusak 2000).

Managerial experience and cognitive science results demonstrate that we know much more than we can express using language. That means that much of the knowledge we acquired somehow through direct experience or as a result of learning and internalization could be found in our cognitive unconscious. Polanyi called this unconscious capacity the *tacit dimension* of knowing (Polanyi 1983). In their comparative analysis between the Western and the Eastern knowledge paradigms, Nonaka and Takeuchi underlined the importance of this tacit dimension for the Japanese companies: “They recognize that the knowledge expressed in words and numbers represents only the tip of the iceberg. They view knowledge as being primarily ‘tacit’—something not easily visible and expressible. Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or share with others.” (Nonaka and Takeuchi 1995: 8).

6.2 *The Emotional Knowledge Field*

The Eastern paradigm introduces emotional knowledge as an important part of the individual knowledge spectrum. The emotional knowledge field contains processed results of the sensory system, feelings, and emotions. Not everybody agrees with this oneness perspective, but it becomes more and more attractive due to its managerial applications. According to Nonaka and Takeuchi (1995: 9), “Highly subjective insights, intuitions, and hunches are an integral part of knowledge. Knowledge also embraces ideals, values, and emotions as well as images and symbols.” Emotional knowledge represents a key factor in a successful motivation process, and in stimulating innovations in organizations. Emotional knowledge contributes significantly to the decision-making process both in management and marketing, since people are primarily emotional decision makers (Fauconnier and Turner 2002; Gladwell 2005, 2010; Goleman 1995; Hill 2008; LeDoux 1998).

Recognizing that emotional knowledge was neglected from the realm of research and practice, Le Doux demonstrates that human brain is both cognitive and emotional: “But now it is time to put cognition back into its mental context—to reunite cognition and emotion in the mind. Minds have thoughts as well as emotions and the study of either without the other will never be fully satisfying.”

(Le Doux 1998: 39). Like tacit knowledge, emotional knowledge is very difficult to be expressed in words. It has to be understood in a different way and used according to this specific. Emotional knowledge is highly nonlinear by comparison with the cognitive knowledge.

Also, if cognitive knowledge can be described by only one extensive dimension, emotional knowledge can be described by two dimensions. One is the extensive dimension which contributes in evaluating the quantity of emotional knowledge. The other is the intensive dimension which contributes in evaluating the level of intensity. Since there is no such measuring system created, we may consider that emotional knowledge can be evaluated, at least in comparative terms, by using the concept of *emotion temperature* (Bratianu and Andriessen 2008). That means that for the same event, several persons may experience emotions of different intensity, that is, different temperature levels. Emotional knowledge is processed by the *emotional intelligence* (Goleman 1995). Leadership as an organizational integrator acts especially on the emotional knowledge determining a high level of employees' motivation.

Although Nonaka and Takeuchi (1995) recognize the importance of emotions in the Japanese management, they do not make a clear distinction between cognitive knowledge and emotional knowledge, and as a consequence, they do not show how emotional knowledge fits into their SECI model. It is an implicit understanding that emotional knowledge is a part of the tacit knowledge and it participate in this form to the socialization and externalization processes, but things are not clear enough (Bratianu 2010). The SECI model is based on the Newtonian dynamics and thus it can explain only the transformation of tacit knowledge into explicit knowledge through the process of *externalization*, and the transformation of explicit knowledge into tacit knowledge through the process of *internalization*. There is no room in their model for the transformation of the cognitive knowledge into emotional knowledge and the transformation of emotional knowledge into cognitive knowledge. In order to explain these complex processes, we need to change the paradigm, as we shall demonstrate further in this chapter.

6.3 The Spiritual Knowledge Field

The spiritual knowledge field contains deepest meanings, values, goals, and highest motivations at individual and organizational levels (Benefiel 2005; Reave 2005; Zohar and Marshall 2000, 2004). If cognitive knowledge is about what I think, and emotional knowledge is about what I feel, spiritual knowledge is about what I am. We need a sense of our life, and a vision to drive us toward the future. This assertion can be extended from the individual level up to the organizational level. Each organization integrates individual employee's values and beliefs creating this way the spiritual field. Although many people would say that organizations are neutral with respect to a value system since they have the job of producing products and services for the consumers, the truth is that each

organization contains a strong spiritual knowledge field. “Organizations are, after all, made up of people whose values and beliefs inescapably influence their thoughts and actions. The organizations themselves have histories, derived from people’s actions and words, that also express corporate values and beliefs.” (Davenport and Prusak 2000: 120).

Spiritual knowledge forces act upon all employees and generate necessary motivations for their efforts in achieving a sustainable competitive advantage. The vision and the mission of the company are deeply supported by the corporate values which are integrated into the spiritual knowledge field. In a living company, “The values of the company coexist with the values of individuals within the corporation—and every member is aware of this coexistence.” (De Geus 2002: 127). The most important integrators acting on spiritual knowledge field are leadership and organizational culture. Leadership defines the vision and the mission of the organization, and then it makes all necessary efforts this vision to be shared by all employees. Leaders promote the value system that becomes the decision-making guideline. However, some people may ask how then it is possible for some organizations to fail if their leaders act in concordance with a set of values and principles. The answer is very simple: Not all the values belong to the business ethical code. There are positive values like quality, trust, honesty, transparency and negative values like their counterpart nonquality, nontrust, nonhonesty, nontransparency. When a leader chooses a set of positive values for his decision-making process, then the organization aims at excellence and competitive advantage. When a leader chooses a set of negative values, then he serves his own interests even if the organization is driven to nonperformance and failure. In this situation, we can talk about dishonesty and *antimanagement*. A well-known example in this case is the collapse of the Enron company (Benston and Hartgraves 2002; Chatterjee 2003; Lev 2002).

Reave analyzed over 150 studies dedicated to spiritual knowledge field and spiritual leadership and found that their correlation to the organization performance could be well demonstrated since “there is a clear consistency between the values (in the sense of established ideals) and practices emphasized in many different spiritual teachings, and the values and practices of leaders who are able to motivate followers, create a positive ethical climate, inspire trust, promote positive work relationships, and achieve organizational goals.” (Reave 2005: 656).

6.4 The Law of Symmetry in Management

In science, we know that there are many laws that illustrate the asymmetry properties of different fields. For instance, the north pole of a given magnet attracts the south pole of another magnet and rejects the north pole of it. A small sphere that contains a positive electrical charge will attract another sphere with negative electrical charge and will reject a sphere with the same electrical charge.

In management, considering the spiritual knowledge field, practical evidence leads us to a law of symmetry. Thus, *value attracts value and rejects mediocrity. Mediocrity attracts mediocrity and rejects value.* That means that a manager who has high spiritual values and a very good professional background will attract similar people to work with him and will reject mediocrity. But a mediocre manager will choose around him only mediocre people and will reject real values. In conclusion, an organization can be destroyed from within by hiring a mediocre CEO. Although this law has never been discussed in the management books, it works in any organization. A demonstration can be made with almost all organizations from the former socialist countries in these last 20 years of economical transition. One of the explanations of this phenomenon is the lack of a solid and coherent spiritual knowledge field in organization, and a lack of understanding its importance in the organizational knowledge dynamics.

6.5 Organizational Knowledge Dynamics

The first consistent knowledge dynamics model has been developed by Nonaka and his coworkers (Nonaka 1994; Nonaka and Konno 1998; Nonaka and Takeuchi 1995; Nonaka and Toyama 2003). The SECI model contains two knowledge conversion processes and two knowledge-transfer processes. The conversion processes are internalization and externalization. Internalization refers to the conversion of explicit knowledge into tacit knowledge, and it is primarily an individual process. This conversion is a result of a learning process. The externalization process refers to the conversion of tacit knowledge into explicit knowledge. Using the metaphor *knowledge as energy* (Bratianu and Andriessen 2008), tacit knowledge can be considered as a knowledge potential being associated to the potential mechanical energy of a given body. The explicit knowledge can be associated with the kinetic energy. Thus, the knowledge dynamics matches the mechanical energy dynamics, but without the conservation energy requirement.

A new knowledge dynamics model has been promoted by Bratianu (2011) based on the thermodynamics paradigm. In this paradigm, the source domain contains mechanical energy and thermal energy, and the target domain contains cognitive knowledge and emotional knowledge. Although some people may be surprised by the novelty of this metaphor, it displays the possibility of transforming cognitive knowledge into emotional knowledge, and emotional knowledge into cognitive knowledge. For many authors, thoughts and emotions are two different psychological categories without any correlation or possible transformation. However, we consider that this dynamics is possible and actually it does happen in our brain through another unknown dynamics between the conscious and unconscious mind. “By treating emotions as unconscious processes that can sometimes give rise to conscious content, we lift the burden of the mind–body

problem from the shoulders of emotion researchers and allow them to get on with the problem of figuring out how the brain does its unconscious emotional business.” (Le Doux 1998: 269).

7 Conclusions

The aim of this chapter is to present a new perspective of the organizational knowledge based on the multifield concept and on a metaphorical construct. Integrating all aspects of the knowledge paradigms and metaphors concerning its understanding and dynamics, the present chapter develops a theoretical framework able to encompass the complex structure and processes of the organizational knowledge. While the Western paradigm is based on the Cartesian dualism between mind and body, and stresses the rational nature of knowledge, the Eastern paradigm comes as an integrative approach to knowledge nature and considers that everything related to human activity may contribute to the knowledge spectrum from well-defined ideas to fuzzy experience, emotions, intuitions, values, and beliefs.

The metaphorical approach considers the classical knowledge as stuff metaphor, knowledge as stocks and flows metaphor, and the less known knowledge as energy metaphor. The last metaphor leads to the assumption that knowledge can be considered as a field, that is, a mass-free entity spread continuously within a given space and time. This field is nonuniform and nonlinear, and due to its nonuniformity, it generates knowledge fluxes throughout the organization.

The organizational knowledge is considered as a complex multifield structure that is composed of cognitive knowledge, emotional knowledge, and spiritual knowledge. Also, it is made the distinction between explicit knowledge and tacit knowledge. These three fields are in a continuous interaction which generates knowledge conversions. The first conversions have been presented by Nonaka in his SECI model, namely the conversion of tacit knowledge into explicit knowledge and vice versa. Changing the perspective from Newtonian dynamics to thermodynamics, a new conversion process can be revealed: the transformation of cognitive knowledge into emotional knowledge and vice versa. Although many authors consider thoughts and emotions as being totally different phenomena, a dynamic model based on the thermodynamic transformations could be extremely useful for understanding the complexity of organizational knowledge and especially for improving the leadership performances.

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Investigation of National Culture's Impact on Competitiveness and Knowledge-Sharing Competences

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Abstract The twenty-first century offers new challenges for the global economy. Globalization is reflected in the cross-border trade in goods and services, international financial flows, and increasing flows of labor. On the score of the last one, for international business, culture is an important factor. The importance of national culture ensues from three points. Firstly, the nations are political units rooted in their history; secondly, the nationality has a symbolic value to people, and thirdly, the human thinking is conditioned by national cultural factors (Hofstede 1983). The aim of the research carried out by the Strategic Management Research Group was to study the characteristics and influences of national culture in different respects. The first idea was to identify the impact between cultural dimensions—measured by Fons Trompenaars—and national competitiveness of a country measured by International Institute for Management Development (IMD). Out of the cultural features, achieved status and neutral orientation are those that favorably influence competitiveness. The next purpose was to reveal that specific knowledge-sharing type and those competence groups achieved status and neutral orientation, as dominant dimensions of the national culture profile related to competitiveness. Based on these results, the Research Group has been interested on whether differences can be revealed on the individual level within these competence groups. By selecting middle managers as a target group, an empirical

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survey has been conducted, during which 400 middle managers working at medium- and large-sized enterprises in Hungary were investigated. The examined individual characteristics of middle managers were functional area, working years, and age. The results have shown that three competence groups (methodological competences needed for thinking, methodological competences used for work method and style, and social competences connected with communication skills) differ regarding these individual characteristics.

1 Introduction

For several decades Hungary was a part of the Communist bloc. Since the end of this period, fundamental changes have taken place in Hungary and in Central Eastern Europe. These changes, the development of the European common market, and the developing countries' increasing integration are all features that have contributed to the development of globalization (Gaál et al. 2007a, b, c). The changes and the development taking place in the society affect the formal rules which also change whatever the informal constraints show changes after a longer period of time (Bratianu 2011a, b; Bratianu and Orzea 2010).

Nowadays the most decisive process of our era is globalization, which covers not only the extension of connections, processes and structures worldwide, but also the development of the network of thoughts exceeding through borders, as well as the mutual interrelation and interdependence of problem situations and their participants. As a result of globalization, competition has intensified, the lives of nations and those of organizations have entwined, and the rules of the game have changed. Products and services are becoming more and more similar on an international level; nevertheless, the differences of the conditions influencing people's behavior, as a result of their national cultural determination, prevail for a long time. It means that the social and cultural factors play a considerable role in the life of an enterprise. Cultural aspects have an outstanding role in building up competences, necessary for the achievement of a better competitive position and its utilization both on the corporate and on the national level (Gaál et al. 2007a, b, c). Furthermore, the significance of the culture itself and the cultural differences have become more crucial for enterprises operating in several countries or on the international markets (Szabó et al. 2010). Thus, culture can be considered to be the fundamental source of sustainable economic and organizational development (Gaál et al. 2007a, b, c; Szabó et al. 2010).

In spite of operating in a highly dynamic and global environment, organizations do not equally adopt knowledge sharing in every country (Szabó et al. 2010). In addition, the way knowledge is shared within an organization is essential and central not only to the success of the organization where it takes place but also among those who share it, since those who take part in the knowledge-sharing process also benefit from it. Knowledge cannot be shared efficiently without

having the adequate competences. Thus, it is important to be aware of those competences that are necessary for knowledge sharing. From the large number of competences, those which are needed for knowledge sharing can be revealed with the help of those who will finally use them to share knowledge. These competences can be considered differently important by certain individual characteristics. This results in investigating those competence groups which enhance knowledge sharing and contributes to competitiveness on the national level.

2 Theoretical Background

2.1 Trompenaars' Model of National Cultures

In recent years, the number of books, articles, researches, and studies dealing with the examination of national cultures has increased (Hofstede 1980; Hall 1976; Lewis 1996). In the context of practice, Fons Trompenaars is one of the most well-known and acknowledged authors. Trompenaars and Hampden-Turner (2002) made a survey by using a set of questions to be answered by top- and middle-level leaders. The growing database contains the data of more than 50,000 managers from more than 100 countries. Trompenaars differentiated between the cultures of particular nations on the basis of the answers given as solutions to certain problems or dilemmas. According to the model, the culture of a nation can be described with the help of seven dimensions. The first five concern human relations; the sixth is connected with the person's relation to time, while in the seventh relation to the environment is expressed (Trompenaars and Hampden-Turner 2002).

The dimension of universalism/particularism expresses the following: In a universalistic culture, the general rules, values, and patterns are above the needs and demands of friends and relatives; in other words, the rules apply to everyone, without exception. In a particularistic culture, the rights of the family, those of friends and acquaintances, are superior to the general rules, accordingly, within given circumstances these rules can be neglected.

The individualism/communitarianism dimension is about the function of individuals or of the group. In individualistic cultures, people place individual interests above those of the community and it is expected that people make individual decisions. The quality of life is basically derived from the freedom and development of the individual. In a communitarian culture, the interests of the community are superior to those of the individuals and the quality of life will be improved in so far as individuals take care of other individuals.

The neutral/affective orientation refers to the extent of the manifestation of feelings. The members of a neutral culture abstain from expressing their feelings. In their opinion, the open expression of feelings is not decent and the brain is obliged to suppress them. Individuals with an emotional culture tend to express their feelings spontaneously, they find this natural and act accordingly.

The specific/diffuse nature of culture means the following: People coming from specific cultures start everything with the foundations. They analyze the basic elements one by one and then fit the elements together, thus rejoining the whole of the system. At the creation of human relations, they concentrate on one thing only, and they have a preference toward explicit, regulated relationships. In diffuse cultures, people start with the whole, they see every element in the reflection of the whole; they study relationships, which according to them are more important than particular elements. When creating relations, they are striving to connect the different areas of life, and they emphasize the importance of real, deep personal connections.

The fifth dimension is that of the achieved/scripted status. In cultures with achieved status, the status originates in that success and efficiency which the individual has attained in the course of his life. In cultures with scripted status, this status originates in the individual's descent, sex, age, riches, etc. Achieved status is connected with what the person has done, what he has achieved, while scripted status is concerned with whom the person is and what he has obtained due to his circumstances.

The dimension of time orientation points out whether the past, the present, or the future appears to be most important for the given culture. If a culture is mainly oriented toward the past, then that culture considers future to be the repetition of past experiences. Respect for the ancestors and that of collective history is typical in such cultures. A presence-oriented culture does not attach great importance either to past experience, or to future perspective. Present actions are in prominence. In a future-oriented culture, future perspectives captivate attention; the past is not regarded as very important from the point of view of the future.

Internal/external orientation is related to people's relationship to their environment. Every culture develops some sort of attitude toward their natural environment. Survival means either cooperation or opposition. Cultures with an internal orientation look upon nature with some mechanistic view. They perceive nature as a complicated mechanism, which can be directed though, if the necessary expertise is at hand. Man tries to influence nature to the possibly largest extent and to rule over it. At the same time, externally oriented people perceive nature organically. In their view, man is subordinated to the forces of nature; therefore, he has to live in harmony with his environment. Natural forces are to be understood and cooperated with. Accordingly, the activities of these people are adjusted to the external conditions (Gaál et al. 2007b).

2.2 Concept of Competitiveness

The concept of competitiveness has developed through history, at each stage bearing the marks of the prevailing ideologies of the age (Garelli 2006). The following are the views of some well-known economists on the determining factors of competitiveness.

Smith (1776) and classical economists identified four input factors: land, capital, natural resources, and labor, while Ricardo (1817) underlines the role of countries in competition. Marx (1867) highlighted the impact of the sociopolitical environment on economic development, and Weber (1930) established the relationship between values, religious beliefs, and the economic performance of nations. Schumpeter (1942) emphasized the role of the entrepreneur as a factor of competitiveness, while Drucker (1963) developed the concept of management. Solow (1957) studied the factors underlying economic growth, stressed the importance of education, technological innovation, and increased know-how. Porter (1990) has developed a systemic model, called the Competitiveness Diamond. He emphasizes that competitiveness involves the long-term determinants of productivity such as human capital, research and development, physical infrastructure, and innovation. Negroponte (1995) has refined the concept of “Knowledge” as the most recent input factor in competitiveness. Knowledge has become the driving force for economic growth in the new digital economy. Negroponte is one of the founders of the information age. He explains what being digital means and how our life can be enhanced by it in “The future is digital” (apud Gaál et al. 2009).

2.3 The Examination of Competitiveness

The concept of competitiveness can be articulated at four levels (Garelli 2011): (1) Efficiency: being better than others. (2) Choice: a strategic choice in identifying those domains where an activity represents a unique added value. (3) Resources: entails the mobilization of a variety of resources to implement such choices. These resources are drawn from government, infrastructure, technology, finance, education, etc. (4) Objectives: (a) focus on sustained profitability, which is the ability to generate an appropriate return on capital over a long period of time, (b) thrive on prosperity, a concept that can be defined as “economic growth,” (c) motivation by increases in standard of living.

The editor of the IMD of the World Competitiveness Yearbook expresses the following opinion (Garelli 2011): “The ‘wholeness’ described above is an important characteristic of competitiveness. Competence is the other. Nations and enterprises are in the ‘business’ of managing a set of competencies and skills to reach prosperity for one and profit for the other. The combination of both concepts leads to the following condensed definition of competitiveness: Competitiveness analyzes how nations and enterprises manage the totality of their competencies to achieve prosperity or profit” (Garelli 2011, p. 489).

From among the surveys dealing with the ranking of competitiveness, the most important is the World Competitiveness Report issued by the IMD since 1989 continually. The analyses rank 59 developed countries from the point of view of competitiveness. The World Competitiveness Yearbook (WCY) examines the connection between the national environment of the country (with the state playing

the most considerable role) and the value-producing processes (the latter aspect being connected with individuals and enterprises). The WCY concentrates on the consequences of the interaction of four factors of competitiveness: Economic performance, Government efficiency, Business efficiency, and Infrastructure.

The ranking of the countries is compiled on the basis of these four factors and 300 criteria. It is presumed that a healthy balance of these dimensions creates such a national environment that is capable of the maintenance of a world standard competitiveness. The factor measuring economic performance contains the usual indices of competitiveness, while the other three, being adjusted to the conception of the IMD, covers those environmental elements, the conscious development of which contributes to the improvement of the competitiveness of the country.

- The economic performance factor measures the macroeconomic development of domestic economy.
- The government efficiency factor shows the extent of how much government policy contributes to competitiveness.
- The business efficiency factor expresses the extent of the innovative and profitable operation of the enterprises.
- The infrastructure factor is the measure of how far the basic, the technological, the scientific, and the human resources meet the demands of the business sphere.

With respect to each factor, the outlined forces or dimension creates different environments in different countries. Competitiveness points beyond economic achievement. The three other factors describing the economic environment include such competitive factors (as the efficiency of governmental administration, the quality of education, or the productivity of manpower), which cannot be changed overnight. The four factors together try to define numerically the extent of how much the business environment helps the competitiveness of enterprises in a given country (Gaál et al. 2007b).

2.4 Knowledge Management and Knowledge Sharing

In the twenty-first century, organizations must compete in a complex and challenging context that is being transformed by numerous factors, from globalization and technological development, to the development, use, and exploitation of knowledge (Hitt et al. 1998). Organizations must do things differently in order to survive; they must look to new resources of competitive advantage. In the era of knowledge economy, intellectual resources are key organizational assets that enable sustainable competitive advantage (Drucker 1998; Wenger and Snyder 2000).

The relevant literature shows that in the last several years, knowledge management has received wider attention in practice and research (Sveiby and Lloyd 1987; Nonaka and Takeuchi 1995; Drucker 1998). Knowledge management is a complex socio-technical system that encompasses various forms of knowledge creation, storage, representation, and sharing. Specific characteristics and functionality of

knowledge management systems are always based on assumptions inherent in cultural backgrounds of their managers. If these systems are used by people with national culture backgrounds, which differ from those of the managers, features intended to support knowledge generation and sharing may actually inhibit these processes (Branch 1997).

According to Lin (2007), knowledge sharing represents one of the key knowledge management processes in organizations and is fundamental for generating new ideas and developing new business opportunities. Huysman and de Wit (2002, p. 23) also stress the significance of knowledge sharing which according to them is nothing other than managing knowledge sharing. The reason why sharing knowledge within an organization plays a significant role is defined by Dunford (2000, p. 296) as follows: "much of the key knowledge is held by individuals unless there is some structure to retain it within the organizational memory." Finally, the goal of knowledge sharing according to Christensen (2007, p. 37) "can either be to create new knowledge by differently combining existing knowledge or to become better at exploiting existing knowledge."

Knowledge sharing has an important feature: It stays in the organizations long after the employees leave it. Thus, the leaders of organizations should be aware of this and recognize that the old paradigm "knowledge is power" cannot exist anymore. Accordingly, they should find ways to motivate and encourage colleagues to achieve the new paradigm of this century that emphasizes the "sharing knowledge is power" approach. Knowledge sharing will become realistic within the organization if employees who work there understand that sharing can support them in doing their jobs more effectively, helping their personal development, and retaining their jobs (Gaál et al. 2008). In view of this, one of the most significant challenges in knowledge management is the competence for motivating people to share their knowledge (Gaál et al. 2007a, b, c).

2.5 Competences

Harangi (2008, p. 28), claiming from the viewpoint of knowledge economy, has emphasized the importance of dealing with competences: "with the development of the knowledge economy more and more claim is established to competences and skills." Keen (1992, p. 115) created a rather wide definition of competence which is the "ability to handle a situation (even unforeseen)." Stoof (2005) considers attitudes, knowledge, and skills as important elements of competence which according to him are required in the jobs or tasks employees must fulfill. The definition of Gibb (1990, p. 21) is similar to this, except that it also contains motivation and describes competence as "an ability to perform certain tasks for which knowledge, skills, attitudes and motivations are necessary." The importance of requirements which is left out of the previously presented competence definitions is emphasized by Reinhardt and North (2003, p. 1374) according to whom competence "describes a relation between requirements placed on a person/group or self-created

requirements and these persons' skills and potentials to be able to meet these requirements." It can be seen that there is no single definition of competence.

Sonntag and Schäfer-Rauser (1993) investigated the self-assessment of vocational competencies during which three special vocational competencies were assumed by them which are professional, methodological, and social competences. The competences based on the factors of professional, methodological, and social competences of Sonntag and Schäfer-Rauser (1993) were adapted by Forgács et al. (2002) as well. In their (Forgács et al. 2002) classification, professional competences contain capabilities and knowledge, while methodological competences consist of thinking and problem-solving, creativity and learning ability. Finally, social competences include communication and cooperation (Forgács et al. 2002). In the end, personal competences were also adapted by Forgács et al. (2002) which was investigated earlier by Kuhl and Fuhrmann (1997).

3 Analysis of Empirical Surveys

3.1 *Cultural Impact on Competitiveness*

3.1.1 Empirical Research on National Cultural Competitiveness

International research carried out by the Strategic Management Research Group at the University of Pannonia, Hungary, has studied characteristic features of cultures at national level related to competitiveness. The research (Gaál et al. 2007a) carried out involving Trompenaars Hampden-Turner Intercultural Management Consulting, Amsterdam, surveyed national cultural characteristics and the relationship between national culture and the competitiveness of a country.

The aim of the research performed at national level was to reveal to what extent (if any) culture is able to influence or even determine the development of the economy (Gaál and Kovács 2006). Competitiveness is the most suitable characteristic for the description of development at national level, because it takes all influential factors into consideration. The use of competitiveness as a dependent variable is further supported by the fact that there is a lot of comparative data at our disposal concerning almost every developed country in the world. The independent variables of the model on the national level are made for the definition of culture, and for the corresponding cultural characteristics. The main goal of the analyses is the specification of those cultural peculiarities, which are connected with the competitiveness of countries.

Following the definition of cultural dimensions, the next task is to decide which of the two opposite orientations belonging to the given dimension exercises a positive influence on the competitiveness of the country. Cultural data related to the countries originate from Trompenaars' database. The features of national cultures are defined with the help of a uniform questionnaire. The database

contains values for the seven dimensions of the central model in relation to more than 100 countries. For the analysis of competitiveness, data from the 2005 Swiss IMD WCY were used (Garelli 2005). The IMD issues a ranking list yearly, using data from various indices. The values used for the ranking are percentage values. The value of the most competitive country is 100 % (Gaál et al. 2009).

3.1.2 Competitiveness and the Achieved Status Orientation

The survey confirmed that national culture has a considerable influence on the competitiveness of a country. From the cultural dimensions, achieved/ascribed status and neutral/affective orientation show the most significant connection with competitiveness. Within these two dimensions, competitiveness has a positive relationship with achieved status and neutral orientation. A higher level of achieved status orientation, as well as a higher level of neutral orientation, presumes a higher level of competitiveness.

Achieved/ascribed status orientation determines the competitiveness of countries to the largest extent. It is characteristic of achieved status-oriented cultures that social status derives from a person's achievement and success. Contrasting with this is ascribed status orientation, which characteristically connects status with age, social order, gender, qualifications, etc. Achieved status orientation is the part of modernization, a key to success in economic and business life. The compensation of achievement initiates a self-inducting process, which makes people work even harder to secure appreciation. If a nation inspires the spread of achieved status orientation in business, that nation can expect to be successful in economic life.

Ascribed status orientation, on the contrary, hinders development. Nations with this kind of orientation are typically less developed. There are exceptions though. Some particularly successful countries award status to persons, technologies, and industries who or that will presumably play an important role in the future economy. Such are, for example, Hong Kong, Singapore, and Japan, where the prominent status is given to the elderly. Such ascribed status, in accordance with their values, contributes to the achievement of certain goals. Achieved status orientation can also be detected in these countries, since achievement is considered to be of outstanding importance in school education. Later, however, cooperation will come into prominence, so emphasis shifts from the individual to communal merits. People with a record of outstanding individual achievement will be appointed to be the leaders of working communities (Gaál et al. 2008) (Fig. 1, Table 1).

3.1.3 Competitiveness and the Neutral Orientation

The other factor influencing competitiveness is neutral/affective orientation. Countries that are more competitive characteristically represent a higher level of neutral orientation. While affective cultures can be characterized by the expression

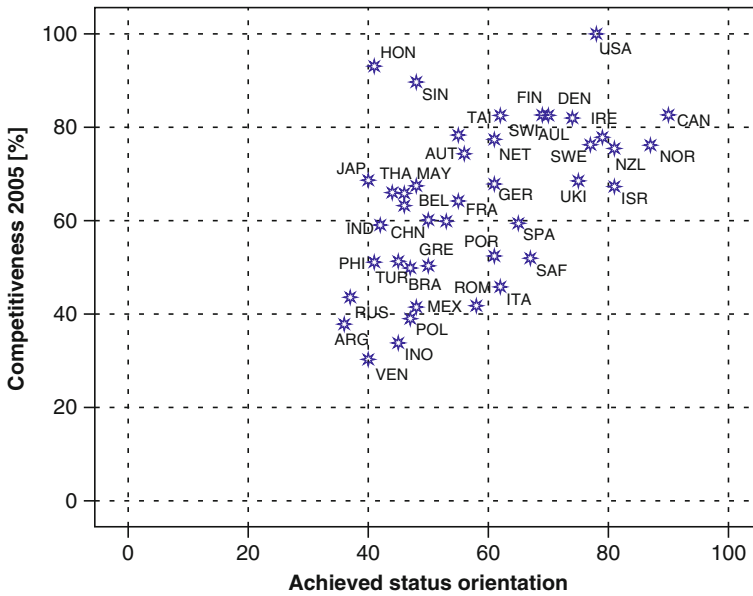


Fig. 1 The connection between competitiveness and the achieved status orientation of countries (Gaál et al. 2009)

Table 1 Country code list

ARG	Argentina	HUN	Hungary	POR	Portugal
AUL	Australia	IND	India	ROM	Romania
AUT	Austria	INO	Indonesia	RUS	Russia
BEL	Belgium	IRE	Ireland	SIN	Singapore
BRA	Brazil	ISR	Israel	SAF	Republic of South Africa
CAN	Canada	ITA	Italy	SPA	Spain
CHN	China	JAP	Japan	SWE	Sweden
CZE	Czech Republic	MAY	Malaysia	SWI	Switzerland
DEN	Denmark	MEX	Mexico	TAI	Taiwan
FIN	Finland	NET	Netherlands	THA	Thailand
FRA	France	NZL	New-Zealand	TUR	Turkey
GER	Germany	NOR	Norway	UKI	United Kingdom
GRE	Greek	PHI	Philippines	USA	United States of America
HON	Hong Kong	POL	Poland	VEN	Venezuela

of their feelings on a wide scale, neutral cultures tend to suppress people’s feelings. But this cultural peculiarity is limited not only to the expression of human feelings, but it also shows the extent of disengagement, and range of vision and open-mindedness in relation to foreign trends, traditions, and products. Open-mindedness is in fact a kind of ability, aimed at the acceptance and understanding

of the different value systems of cultures. In such countries, which have a high level of neutral orientation, people possess a global view of things and their scope of vision is broad.

However, if a country shows low values of neutral orientation, people can be characterized by a negative way of thinking. They are introverted and devoid of interest in things happening beyond their borders. Their actions are directed by affections, and their prevailing notions are nationalism and protectionism. These factors have a negative influence on the competitiveness of the country (Gaál et al. 2008) (Fig. 2).

On the basis of the collective analysis of Trompenaars' database for national culture, and of the competitiveness data of the 2005 WCY (Garelli 2005), it can be seen that there is a close connection between the competitiveness and cultural characteristics. Of the cultural features, achieved status and neutral orientation are those which favorably influence competitiveness. The more achievement and neutral oriented the country is, the more competitive it will be. A considerable improvement in competitiveness cannot be achieved without considering cultural features. When planning economic policy and a long-term strategy, cultural features must be considered and, in order to achieve significant improvement, sometimes even a change of culture might become necessary (Gaál et al. 2008).

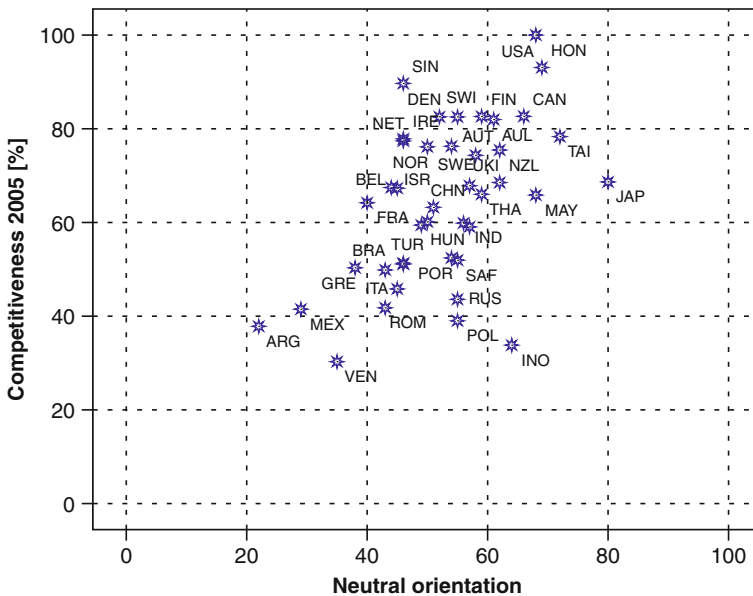


Fig. 2 The connection between competitiveness and the neutral orientation of countries (Gaál et al. 2009)

3.2 Cultural Impact on Competences Found Important for Knowledge Sharing

As a continuation of the above-mentioned study, the Strategic Management Research Group at the University of Pannonia, Hungary, has revealed the type of knowledge sharing generated at the dominant dimensions of the national culture profile related to competitiveness (Szabó et al. 2010). The aim of this study was to point out those competence groups that can be applied to these knowledge-sharing types.

3.2.1 Competence Groups Found Important for Knowledge Sharing

For this purpose, the Strategic Management Research Group has conducted a survey to unfold those competence groups that can be considered important for knowledge sharing. The above-mentioned authors' (Forgács et al. 2002; Kuhl and Fuhrmann 1997; Sonntag and Schäfer-Rauser 1993) classification of competences has been adopted for this examination. Based upon these classifications, seven competence groups have been differentiated since an assumption of separating seven groups has been made during the investigation. In addition, it has been expected to retain as much information of the original variables as possible with a smaller set of components that can explain the maximum amount of variance (Foster et al. 2006). Furthermore, a method that reduces the number of variables has been aimed at to be chosen (Myatt and Johnson 2009) which results in a lower number of components than the number of variables. As a result, principal component analysis (PCA) has been chosen (Szabó and Csepregi 2011). With PCA, seven separate principal components have been identified, which together with the variables loading on them, and their component loadings can be seen in Table 2.

3.2.2 Achieved Status Orientation, Neutral Orientation, Knowledge Sharing and Competences

By using the method of deductive logic, it could be stated that knowledge sharing in countries which have a high level of neutral orientation is based only on facts without subjective explanation and codification knowledge management strategy is applied (Szabó et al. 2010). To share knowledge based on facts, the methodological competences needed for thinking can be used. To accomplish knowledge sharing in such surroundings, it is necessary to have the system analysis capability and the systematizing ability as well, since those who receive first-hand information or knowledge should be able to integrate it into the level of their departments or groups. As a result, they will know how to put the received information or knowledge into practice. The ability of analysis is also important because it makes it possible to process and utilize the knowledge appropriately. By thinking

Table 2 Principal components and variables of competence groups found important for knowledge sharing

Name of the component	Name of the variable (component loadings)
1. Methodological competences needed for thinking	Logical thinking (0.667)
	Systematizing ability (0.733)
	Analytical ability (0.731)
2. Methodological competences used for work method and style	System analysis capability (0.608)
	Awareness of organizational goals (0.704)
	Result orientation (0.826)
3. Social competences connected with communication skills	Practical comprehension of tasks (0.607)
	Ability of summarizing (0.641)
	Easy capacity of understanding (0.814)
4. Social competences connected with cooperational skills	Ability of explaining (0.653)
	Capability of initiation (0.736)
	Capability of maintaining relationship (0.729)
	Objectivity (0.489)
	Ability of feedback (0.588)
5. Professional competences	Empathy (0.682)
	Working experiences gained in other special fields (0.706)
	Experience gained by individual interests (0.692)
6. Personal competences	Experience at other type of organizations (0.818)
	Experience at organizations similar to present one (0.676)
	Stamina (0.707)
7. Intercultural competences	Capability of undertaking tasks (0.806)
	Ability of managing stress (0.792)
	Studies abroad (0.892)
	Job in international surroundings (0.843)
	Job abroad (0.934)

logically, the necessary knowledge can be taken out of the knowledge set after which it is feasible to process and share it alongside some kind of logic.

On the other hand, conscious knowledge sharing that is based on what to share and what to ask for is generated by achievement orientation, since in these cultures, social status derives from personal achievement and success (Szabó et al. 2010). Knowledge can only be shared consciously if the sharer is aware of and can identify himself with the organizational goals, is able to comprehend the tasks practically, and can interpret the shared knowledge to the appropriate level where it is needed and finally convert it to the level of fulfillment. In addition to share the knowledge consciously, the ability of summarizing is also indispensable since as a result of a prior knowledge selection, only the most necessary knowledge is shared with others. Thus, the knowledge-sharing process materializes within a much

shorter time. If the sharer has the ability of explaining and can share anything in plain language, then he is able to communicate knowledge in a manner that is understandable and perceivable at the receivers' level. Based on these competences, it can be stated that methodological competences used for work method and style, and social competences connected with communication skills are needed for conscious knowledge sharing.

3.3 Individual Characteristic's Impact on Competences Found Important for Knowledge Sharing

In view of the competence groups that contribute to the knowledge sharing facilitating the competitiveness of nations, the Strategic Management Research Group has been interested in whether differences can be revealed on the level of individuals within these competence groups. Middle managers as individuals have been selected as a target group. The reason of choosing them is that they can be found in the middle of their organizations, thus they are related not only to their peers but also to the top-level and the first-level management. Their special position within their organization also results in being a role model for the employees of their department or group, having a key position in vertical communication, being responsible for achieving business objectives by setting goals for their own department or group, giving suggestion and feedback to the top management for helping the improvement of the organization.

The middle manager's functional area, the middle manager's active working years, which are spent at the investigated organization, and the middle manager's age as individual characteristics have been defined to be investigated. The category of the middle manager's functional area is interested in the working field in which the middle manager works. The middle manager's "active working years" category reveals how long the middle manager has been working at the given organization. The category regarding the middle manager's age asks about the age of the middle manager.

Regarding the investigation, the following question needed to be answered:

Q: Do middle managers, who work at medium- and large-sized enterprises in Hungary, find competence groups, which on the one hand are important for knowledge sharing and on the other hand contribute to national competitiveness, just as important based on their individual characteristics?

To answer this question, a model has been created which is presented Fig. 3.

In order to answer our research question regarding individual characteristics influencing the competence groups found important for knowledge sharing, the following proposition has been stated.

H: Difference can be found within methodological competences needed for thinking, methodological competences used for work method and style, and social competences connected with communication skills that contribute to national

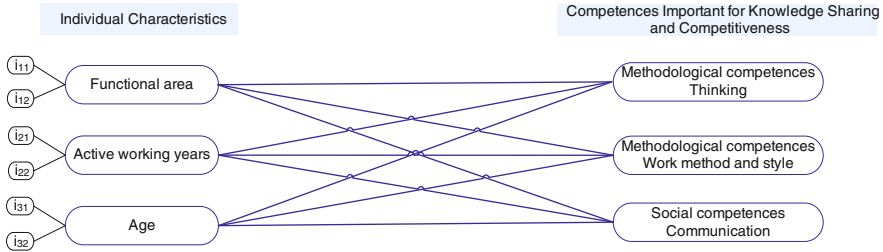


Fig. 3 The relationships between competence groups and individual characteristics

competitiveness on the basis of the individual characteristics of middle managers who work at medium- and large-sized enterprises in Hungary.

The empirical study of this investigation has been based on a quantitative research during which econometric analysis has been made on the database collected with a questionnaire. This questionnaire has been sent to the enterprises of middle managers working at medium- and large-sized enterprises in Hungary. A total of 4,000 medium- and large-sized enterprises have been selected randomly, and questionnaires have been sent to these enterprises and 400 questionnaires have been returned since 2007.

For testing the proposition, the method of a decision tree has been used to reveal the differences within the competence groups found important for knowledge sharing regarding individual characteristics as influencing factors because with this method, it has been possible to reveal classes within the selected competence groups. After the separation of classes, alternating conditional expectations or (multivariate) analysis of variance and post hoc test could be applied. From these available methods, depending on the number of classes revealed, an analysis of variance or post hoc test has been chosen, since the study aimed to reveal whether significant differences exist based on individual characteristics in the classes created within the competence groups. Since the individual characteristics have matched these characteristics, these two methods were the best for this analysis.

3.3.1 Knowledge Sharing at Neutral Orientation and Competence Groups

Concerning the investigation of methodological competences needed for thinking that contributes to knowledge sharing based on facts, it has been possible to reveal two classes based on individual characteristics that show differences. These two groups, which can be seen in Fig. 4, are separated based on the middle manager’s functional area (Gaál et al. 2011).

An ANOVA test has been conducted to reveal whether the mean value of the group with the most favorable result regarding the investigated competence group has significantly differed from the mean value of the group with the least favorable

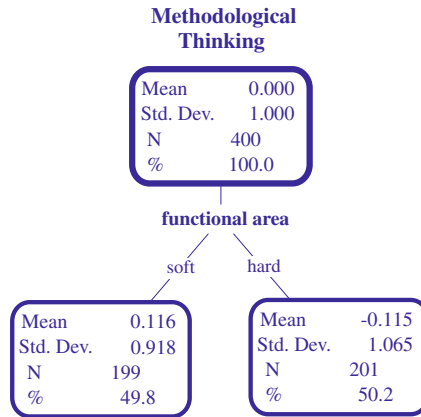


Fig. 4 Classes revealed within methodological competences used for thinking

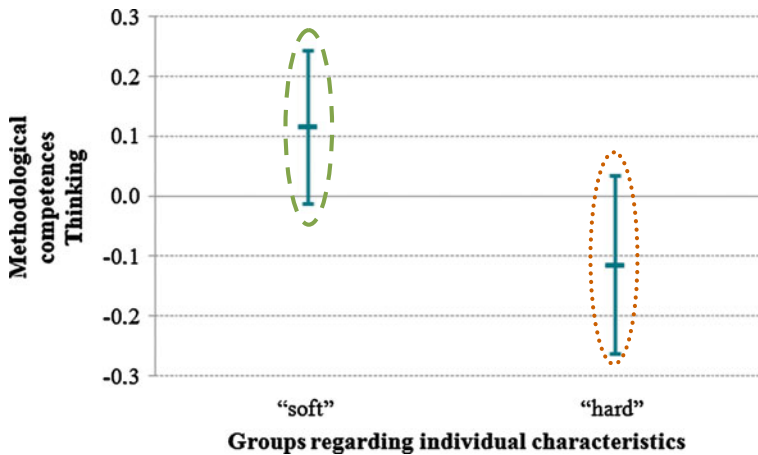


Fig. 5 The group means of methodological competences needed for thinking (Csepregi 2012)

result. As Fig. 5 presents, the group with most favorable result has consisted of middle managers working in “soft” fields, while the group with least favorable result has included middle managers working in “hard” fields (Table 3).

According to the F test of the ANOVA, a significant difference has existed between the means of the most and the least favorable results regarding methodological competences needed for thinking. Thus, the following statements can be drawn based upon this result:

Those middle managers who have worked in “soft” fields as in the fields of HR, R&D, project management, commerce, purchasing, sales, and marketing find methodological competences needed for thinking more important for knowledge sharing. While those middle managers who have worked in “hard” fields as in the

Table 3 The ANOVA result of the groups of methodological competences needed for thinking ANOVA

<i>Methodological competences needed for thinking</i>					
	Sum of squares	df	Mean square	F	Sig
Between groups	5.298	1	5.298	5.355	0.021
Within groups	393.702	398	0.989		
Total	399.000	399			

(Gaál et al. 2011)

fields of manufacturing, production, maintenance, logistics, quality management, finance, accountancy, and controlling find methodological competences needed for thinking less important for knowledge sharing.

The reason why middle managers working in the “soft” fields find methodological competences needed for thinking important for knowledge sharing can be explained as follows. These middle managers’ jobs require the system analysis capability, they have to think logically, have to be able to summarize or analyze things which facilitate the sharing of knowledge. To sell something, middle managers need to summarize the important features of the product or service and also to think it through logically how they will sell the product or service. On the other hand, middle managers working in the fields of R&D and project management need to have the ability of systematization when conducting research or developing or installing something new (Csepregi 2012).

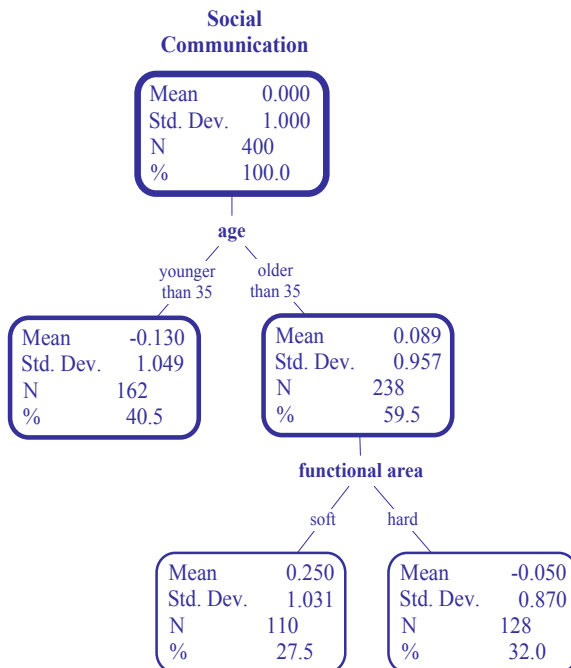
On the other hand, the reason why managers working in “hard” fields do not find competences regarding thinking so important is that the rules, procedures, terms, the numeric plans, and their realization in these fields are fixed and dominate their jobs. They do not require continuous modification, and already contain the necessary summary, as they have already been logically thought through, and systemized (Csepregi 2012).

3.3.2 Knowledge Sharing at Achieved Status Orientation and Competence Groups

Regarding the competence groups needed for conscious knowledge sharing by using the method of a decision tree, it has been possible to reveal classes within social competences connected with communication skills. The diagram of the decision tree can be seen in Fig. 6. Based on individual characteristics, no classes have been revealed within methodological competences used for work method and style (Gaál et al. 2011).

As it can be seen, primarily the middle manager’s age and secondly the middle manager’s functional area have been revealed as individual characteristics influencing social competences connected with communication skills. In this case, the middle manager’s age is the strongest classifier while the middle manager’s functional area is the second strongest classifier.

Fig. 6 Classes revealed within social competences connected with communicational skills



By using analysis of variance, the group means of the classes identified by the decision tree within this competence group have been compared in pairs. Afterward, the groups with the most favorable results within each class have been separated from the groups with the least favorable results. This separation does not mean that the groups with the most favorable result regarding the investigated competence group in all cases show significant difference from the group with the least favorable result. The separated classes according to being the most and the least favorable ones can be found in Table 4.

Since more than two classes have been formed using the method of a decision tree, with the combination of the most and the least favorable results of the classes, additional groups have been created. On these groups, a post hoc test has been needed to be conducted, since the post hoc test compares pairwise all combinations of group means (Field 2005) and investigates whether these means significantly differ.

Before the post hoc test, first, the most and the least favorable results of the middle manager’s age and the middle manager’s functional area regarding individual characteristics have been combined. Based upon these combinations, four groups have been formed within the social competences connected with communication skills. The mean value of each group is presented in Fig. 7.

The group with the most favorable result has consisted of middle managers older than 35 and working in “soft” fields. The group with the least favorable result has included middle managers younger than 35 and working in “hard” fields.

Table 4 The most and the least favorable classes within the social competences connected with communication skills

		Social competences connected with communication skills
Functional area	Least favorable	“hard” (manufacturing, production, maintenance, logistics, quality management, finance, accountancy, controlling)
	Most favorable	“soft” (HR, R&D, project management, commerce, purchasing, sales, marketing)
Active working years	Least favorable	-
	Most favorable	-
Age	Least favorable	Younger than 35
	Most favorable	Older than 35

To reveal whether the mean value of the group with the most favorable result has significantly differed from the mean value of the group with the least favorable result, a post hoc test has been needed. Regarding the post hoc test, first, Levene’s test has been applied. With Levene’s test, it has been possible to determine whether the variance within the investigated groups has been homogeneous (Sajtos and Mitev 2007) and to decide whether Tamhane or LSD tests should be used during the post hoc analysis. When variances have been assumed to be equal (homogeneous) as the result of Levene’s test, the LSD test has been used, and when variances have not been assumed to be equal (not homogeneous), the Tamhane test had been applied (Table 5).

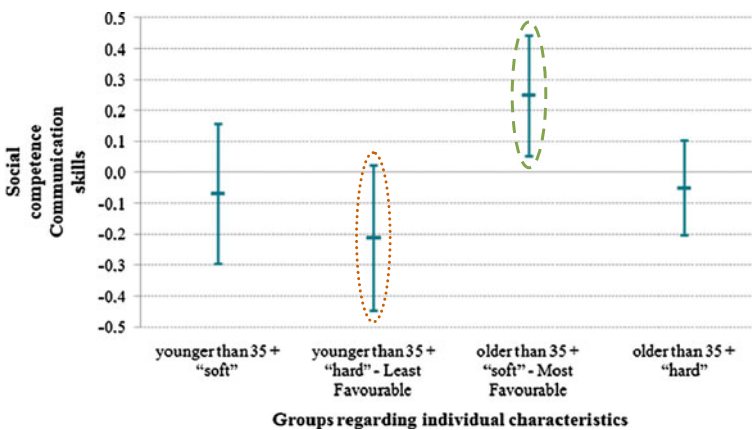


Fig. 7 The group means of social competences connected with communication skills (Csepregi 2012)

Table 5 The result of the test of homogeneity of variance

Test of homogeneity of variances			
<i>Social competences connected with communication skills</i>			
Levene statistic	df1	df2	Sig.
1.979	3	396	0.117

(Csepregi 2012)

The significance level of 0.117 in Levene's test of homogeneity of variance has been above the accepted limit of 0.05, thus the variances of the investigated groups have been homogeneous. As a result, the LSD test should be used during the post hoc test to account for whether the investigated two groups have been significantly different.

Table 6 presents the results obtained with LSD test and shows that there has been a significant difference between the mean values of the groups with the most and the least favorable results regarding social competences connected with communication skills. Based upon these results, the following statements could be made:

Those middle managers who primarily are older than 35 and who secondly have worked in "soft" fields as in the fields of HR, R&D, project management, commerce, purchasing, sales, and marketing find social competences connected with communication skills more important for knowledge sharing. On the other hand, those middle managers who primarily are younger than 35 and who secondly have worked in "hard" fields as in the fields of manufacturing, production, maintenance, logistics, quality management, finance, accountancy, and controlling find social competences connected with communication skills less important for knowledge sharing.

Among younger middle managers, the ability of summarizing, being plain during communication or having the adequate experience to explain something are missing especially when they are working in the "hard" fields since the terms used in these fields are thought by them to be accepted and they think that they do not need additional explanation (Csepregi 2012).

Mainly middle managers who are older than 35 because of the wisdom of their age realize the importance of social competences connected with communication skills. Furthermore, in fields where middle managers have to communicate with customers or other employees, who are not familiar with the terms accepted within that given field, the ability of summarizing or explaining those terms in plain language that are not understood by others is indispensable. Since without having these abilities, it is hard to buy, advertise or sell something or work together in situations where employees are working for a given time on a given task as in the field of project management or R&D (Csepregi 2012).

Table 6 The result of the LSD test

Multiple comparisons						
<i>Dependent variable: social competences connected with communication skills</i>						
(I)	(J)	Mean difference (I-J)	Standard error	Sig.	95 % confidence interval	
					Lower bound	Upper bound
(I) Social communication—age, function		(J) Social communication—age, function				
LSD	Least favorable: younger than 35—“hard”	Most favorable: older than 35—“soft”				
	0.7570477	-0.1643582	0.15073697	0.002	-	-

^a The mean difference is significant at the 0.05 level (Gaal et al. 2011)

3.3.3 Results of Individual Characteristic's Impact on Competence Groups

Based on the above-mentioned results, the following theses can be determined.

T1.1: Difference is found in the methodological competences needed for thinking that contribute to national competitiveness on the basis of individual characteristics by the middle manager's functional area.

T1.2: Difference is found in the social competences connected with communication skills that contribute to national competitiveness on the basis of individual characteristics primarily by the middle manager's age and secondly by the middle manager's functional area, while difference is not found in the methodological competences used for work method and style on the basis of the individual characteristics of middle managers.

4 Conclusion

Culture considerably influences global economy, and it also explains differences of competitiveness. On the basis of the analysis of Trompenaars' database with regard to national culture and that of the competitiveness data of the IMD WCY of 2005, it has justified that there is a close connection between the competitiveness of a country and its cultural characteristics. Those cultural dimensions, which mostly influence competitiveness, are the orientation of achieved/ascribed status, neutral/affective character. From among these cultural features, achieved status and neutral character are those which favorably influence competitiveness, that is, the more achievement defined, neutral oriented the country, the more competitive it will be. As a continuation of the study, the Strategic Management Research Group at the University of Pannonia, Hungary, has revealed the type of knowledge sharing generated at the dominant dimensions of the national culture profile related to competitiveness. It could be stated that knowledge sharing in countries with high level of neutral orientation is based on facts without subjective explanation and codification knowledge management strategy is applied. For this knowledge sharing, the methodological competences needed for thinking are needed. While conscious knowledge sharing is based on what to share and what to ask for, it is generated by achievement orientation. For this kind of knowledge sharing, methodological competences used for work method and style, and social competences connected with communication skills are required. Based on these results, the Strategic Management Research Group has been interested if differences can be revealed on the level of individual within these competence groups, thus an empirical research has been conducted among middle managers working at medium- and large-sized enterprises in Hungary. Findings of this survey indicate that three competence groups show differences regarding middle managers' individual characteristics. They are methodological competences needed for thinking, methodological competences used for work method and style, and social

competences connected with communication skills. From these, methodological competences needed for thinking, which because of the high level of neutral orientation is used to share knowledge based on facts, have shown significant difference by the middle manager's functional area. On the other hand, significant difference has occurred within social competences connected with communication skills, which requires conscious knowledge sharing, generated by achievement orientation, primarily by the middle manager's age and secondly by the middle manager's functional area. On the other hand, no difference has been revealed based on individual characteristics within methodological competences used for work method and style what is based on conscious knowledge sharing.

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Development of an Organic Food Mentality in Romania

Nicolae Al. Pop and Dan-Cristian Dabija

Abstract In recent years, consumers, producers as well as retailers have exhibited a growing tendency toward healthy, highly nutritious, functional, and, obviously, organic foods. Given that many European states have provided government grants for organic foods, these have become more easily accessible to consumers, both financially and in terms of the place where they can be procured. A field research conducted through the observational method reveals that an increasing number of Romanian retailers have included organic food in their assortment, both under the producer and their own brand. The research as a whole identified 15 different ranges of organic food distributed to hyper- and supermarkets as well as to specialty and convenience stores. The retail chains carry a wide range of organic articles and the customers are sometimes willing to pay an extra price of 50 up to 100 % higher than that of the conventional products. Supplemented by a semi-structured interview applied to various experts of Romanian environmental movements (academicians, representatives of producers, processors, specialty associations, control and certification bodies, and authorities empowered to enforce and verify compliance with quality standards, customers), the observation attempted to determine the degree to which organic products are known and the implications of their being consumed by the customers. Although some respondents are not fully aware of how relevant it is to consume mainly organic products, the conducted interviews revealed the respondent's increased interest in the issues related to promoting health and a lifestyle in accordance with the principles of a balanced diet. It is advisable that the conclusions of the present study should be

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turned to good account by means of an active marketing policy so that an “organic diet mentality” may be developed among the Romanian customers.

1 Introduction

The social and economic dynamics in Romania during the last two decades has generated a growing concern for sustainable development in the society. According to the definition proposed by the Bruntland Report (2012), sustainable development of a society represents the means of satisfying the needs of the current society without prejudicing the future generations. The concept of sustainable development integrates three important levels of the social evolution: *economic*, *social*, and *ecological*. Developing an ecological concept for approaching the economic and social processes does not pertain only to the long-term environment protection and the preservation of its resources but entails ample and responsible activities to train and develop ecological thinking/mentality. The achievement of this desideratum requires significant changes in people’s *mentality*, their line of thought and course of action.

Departing from the widely accepted meaning of mentality, viewed as “an individual’s or a group of individual’s mindset but also the frame of mind and the behaviour” (DEX 2012) toward a social phenomenon or process, the authors attempt, based on some marketing studies, to capture the attitude of all Romanian stakeholders toward organic diet. The integration of a sustainable development mentality into the objectives and strategies of a company implies the reorganization of marketing and management systems, practices, and procedures which would eventually have a direct impact on organizational changes (Pop et al. 2012).

Being influenced by the strategic thinking, relational marketing ensures the most favorable environment for approaching the changes in mentality and attitude to organic diet displayed by producers, consumers, distributors, and other stakeholder (Pop 2008). At the same time, relational marketing provides the operational framework for flexible decision making when it comes to the understanding of and orientation toward the requirements of consumers who become increasingly aware of the import of healthy physical and mental development. This comprehensive vision has been developed by the *holistic* manner in which the market phenomena and processes have been understood and dealt with and into which the value exploration, value creation, and value delivery activities have been integrated in a long-term approach and to the benefit of all stakeholders (Kotler et al. 2002). According to the holistic approach, *man* and *nature* are not viewed as distinct entities but the former is reckoned as integral part of the former. The approach is extended to natural and social and human sciences as well. The concern of medical sciences with ensuring human health (Ivan 1993) has become deeper and deeper. In fact, society considers that preventing disease is more advantageous than “repairing” the damage caused by diseases. That is why modern man needs a

healthy, balanced, rational, and scientifically controlled diet. This type of diet can contribute much better to the society's sustainable development and to the identification of the *basics of consumer welfare* (Martin and Schouten 2012).

2 Organic Food

A definition universally accepted by the European as well as by the national legislation, and particularly by consumers stipulates that organic food represents products that should be healthy, free of any disease or pests, should be the result of organic production, processing and marketing technology, with no chemical residues and manufactured through techniques meant to safeguard the agricultural ecosystem (Dabija 2005, pp. 115–123).

As consumers displayed a stronger preference toward organic products and particularly due to the increase in their price, there was also an increase in the number of fake suppliers who “took advantage” of the “biological/ecological wave” (Löbert 2001). In order to intensify the fair competition among the players of the environmental movements, the European Council adopted the “EU-Eco-regulation.” In addition to providing a definition for the organic product, the regulation also defines “ecological” as a similar term to “biological,” “organic,” “alternative,” or “environmentally friendly” (EO 2092/1991, EO 2804/1999). The difference lies particularly in the origin of the country or the language in which the terms are being used: “ecological” in Germany, Austria, Denmark, and Romania; “biological” in Switzerland; “organic” in English-speaking countries; and “alternative” to differentiate the organic products from the conventional products category. Likewise, “environmentally friendly” is used to differentiate the organic products from the ones obtained by means of synthetic, chemical, or genetic engineering. Foodstuff organicness must be subject to transparent inspection of each stage in the logistical process (production, treatment, packaging, transportation, marketing, etc.), conducted by an empowered body.

In order to sell the organic products to consumers, not only should they be termed “natural” or “from the countryside” but they should also be properly labelled with their name (GO 34/2000, Chap. 4, Article 6), the unit where they have been manufactured or processed, the used organic production method or principles, the storage conditions, and the expiry date. The package of the organic product must have the name and the acronym of the certification and/or inspection body.

Obedying quality standards is not the only requirement for organic products to be successful on the market. They also have to meet the customer's requirements. Purchasing and repurchasing the products, recommendation of products for consumption, trust in the products, asking for products within the distribution channel, obtaining accurate information on their pros and cons, and expressing interest in them are only a few aspects to be considered by any customer when assessing the quality of organic products (Plăiaş 1997).

The studies conducted by the Romanian researchers (Nediță et al. 2003) on the potential of the home market to promote Romanian agro-foodstuff products reveal that an overwhelming percentage (91 %) of the prospective or current consumers of organic bread, regardless of their occupation, gender, or income, are interested in other organic products as well: milk products, vegetables, fruits, and beverages. The percentage of those who expressed no interest is very low (only 2 %) whereas the other interviewees were unsure of their opinion.

The scandals over the agro-foodstuff products, such as those created by the “mad cow” and the bird flu crises or by the articles on the mass production and usage of hormones and medicines, explain the consumer’s positive perception of organic products, especially when the products are associated with a range of concepts such as health, lack of chemical products, untreated, natural, or non-polluting products, in a word, the low risk incurred by their consumption. The extra money necessary to buy organic products is due to the combined action of direct as well as indirect factors. The production costs are considerable for two reasons: first, the use of some treatments is highly limited and, secondly, the quality of the products must be attested by an empowered body. That is why it is necessary to set the threshold below which consumers are willing to pay a higher price for organic products. One can notice a decreasing tendency in consumer’s availability to pay an extra price, a fact which falls short of the producer’s expectations since it is expected that, in times of crisis, consumers should normally be motivated by their health problems to pay a higher price. It has been noticed, however, that since consumer’s purchasing power has been decreasing, they choose to buy cheaper foodstuff and only on rare occasions they buy organic products (special events, hedonistic motivations, etc.). Sometimes consumers give up purchasing organic products again because they see no usefulness and benefits being derived from these products.

3 Romania: A Country with Potential for Organic Foodstuff

As an emerging country, Romania shares the characteristics of developed economies and some characteristics peculiar to developing countries. Its natural and human potential has brought Romania in the foreground of dynamic development in the field of organic foodstuff. Owing over 36.07 million acres of farmland (the fifth in Europe), 65 % of which is arable land, Romania holds the first place among the European Union countries in terms of farmland per capita (1.58 acres/inhabitant). This is almost double the EU average (0.86 acres/inhabitant). In addition to these areas, Romania also owns over 0.51 million acres of vineyard, 0.49 million acres of orchards, and 11.8 million acres of pastures (Romanian Statistical Yearbook 2011).

Paradoxically, Romania continues to be ranked first among the European countries in terms of expenses for food consumption, despite the unfavorable conditions brought about by the economic and financial world crisis. Thus, the data provided by EUROSTAT confirm that in 2010, Romania held the first position among EU countries concerning the weight of food and soft drinks in the overall consumption expenses per capita, namely, 43 % (of the overall expenses) as against Germany (10.4 %), Hungary (17.3 %), Poland (19 %), and the EU average (14.2 %) (www.businessday.ro 2012). Although the data themselves do not provide an optimistic picture of the general evolution of the Romanian's living standard, they confirm that food has priority over all other categories of consumption expenses. Moreover, adding the fact that in Romania bread and cereals amount to 7.6 % of the overall consumption expenses (as compared to the EU average of only 2.6 %), one can state that Romanians are the biggest consumers of bread products in Europe (Eurostat 2012).

Since Romania has committed itself to going through the ongoing process of integration into the European Union, it has to make major efforts to come closer to the average of the main indicators that show the economic and social development and the European standard of living. One of the main courses of action to follow toward this end is changing the structure of consumption expenditure to the effect that food expenditure is reduced. Starting from the Latin dictum "non multa sed multum," Romanians should focus their attention on healthier food consumption (in terms of content and quantity). Given its multiple dietary advantages, organic diet represents an effective solution in this regard. Organic diet is based, particularly in the rural areas, on the tradition of natural food consumption and the large share (over 50 % in rural areas) of their own consumption.

In Romania, organic farming is aided by a series of factors such as soil fertility, limited level of chemical exposure by comparison to that in the developed countries (the consumption of pesticides per arable acre is about 10 times smaller than the European average) and the high level of parceling of farmland property which allows an easier delimitation of some *organic/ecological areas*. Specialists estimate that the area that could easily be converted into ecological farmland represents more than 15 % of the overall farmland (Proiectul ecologic romanesc 2012). According to the data provided by the association Bio-Romania (Radu 2011), in 2011, there were 1,025 registered organic operators which cultivated over 0.74 million acres of ecologically certified land (3.3 % of Romania's farmland). Both the number of farmers and the cultivated area have tripled in the last five years due to the increasing interest in this type of farming and to the stimulants offered. As regards the share of organic farmland in the overall farmland area, in 2010, Romania was surpassed by Austria (11 %), Italy (8.4 %), The Czech Republic (7.2 %), and Greece (7.2 %) (Radu 2011).

The market of organic products in Romania can no longer be neglected. According to the data provided by the association Bio-Romania (Radu 2011), the sales on the domestic market amounted to Euro 150 million in 2010. In 2011, total exports of organic products were valued at Euro 250 million. 90 % of these products, however, consist of raw materials (wine, honey, forest fruit, cereals, etc.)

only to be processed in the Western countries (Gandul 2011). A change in the structure of exports of organic products is thus deemed absolutely necessary in the sense of increasing the share of domestically processed products until they become finished products. This can only be done through notable investments in this field. While the interest in organic products has a long tradition abroad, Romania has only started to create the market, perform an effective marketing of products, and attract customers.

4 Assortment Policy in Retailing: Strategies and Tactics

In retailing, the assortment policy and the retailer's own-brand policy is derived from the basic service and the *product policy* peculiar to the marketing of consumption goods (Florescu et al. 2003). Retailers must decide upon the articles which will constitute the dimensions of the assortment (its length and width) and also consider the effects brought about by the inclusion of new articles or the exclusion of those which are no longer in demand (Vasquez et al. 2001). Moreover, they will have to decide about the methods to be used to optimize and plan the assortment depending on the target segments approached. (Homburg et al. 2002). Thus, the retailer's assortment policy encompasses all quality- and quantity-related decisions about the products and services offered for sale (Müller-Hagedorn and Natter 2011).

Through assortment, the retailer has the possibility of properly differentiating itself from its competitors and positioning itself on the market. The assortment also contributes to creating a proper image of the retailer in the mind of consumers, thus influencing their perception. From the customer's perspective, assortment represents the means whereby s/he may perceive retailers, feels attracted to them, and develops a particular attitude/opinion toward the preferred store (Liebmann et al. 2008; Dabija 2011).

When organizing the assortment, the retail brand will focus on the key articles that attract consumers, the range of articles sold by its competitors, its relationship with suppliers, the possibility to include its own brands, the identification of potential synergies concerning funding/refunding current activities, or the effect of legislative regulations on its activity (package and waste management, legal operation period of the store, etc.) (Müller-Hagedorn and Natter 2011).

The retailer will also have to keep account of the various dimensions that facilitate an effective organization of the selling process. Consequently, the retailer may offer unique, original, and innovative assortments, articles complementary to competitor's offer; may become the exclusive distributor of a producer; and may attempt to maximize the product utility felt by consumers or convey the feeling of comfort, pleasure, the sense of adventure, or good mood during shopping. Assortment management may also include the producer's location or the social trend evinced by the exhibited brand (organic, functional food from the fair trade for balanced nutrition, etc.) (Liebmann et al. 2008; Theis 2007; Haller 2009).

All these aspects of the assortment policy in retailing must be coherently analyzed and put into practice. Additionally, the inclusion of the organic food in a retailer's assortments should be a natural process, without aggressive promotional overtones. As food is no longer the sole goal for which to strive to ensure survival, the modern man becomes increasingly selective in his/her choice of food. Man's concern for healthcare and disease prevention prompts him/her to avoid foods with high-calorie content or with synthetic ingredients (colors, preservatives, etc.). The preventive medicine and the healthy man-oriented medicine join dietetics in an attempt to stimulate the consumption of organic food.

5 Research Objectives and Methodology

The development of a mentality favoring the consumption of organic foodstuff involves the active participation therein of producers, processors, and distributors as well as of consumerist and public rights protection associations. The display of a positive and proactive attitude to the purchase and consumption of organic products can be fostered by means of proper education, a sufficient motivation, and skillful influence of Romanian's perception.

Starting from the assumption that Romania has a considerable potential for organic foodstuff, the authors have investigated the volume of organic foodstuff put up for sale (through observation) and how it is perceived by different stakeholders by highlighting some useful criteria for a proper penetration of the market (exploratory research). The hypotheses formulated in relation to the performed observation and exploratory research confirm the existence of this market niche which has drawn the attention of producers, processors, and particularly the European and domestic retail chains operating in Romania under different retail brands.

In compliance with the scientific research methodology, the authors attempt, by means of the conducted observation, to highlight the extent to which organic foodstuff has penetrated the Romanian market. Viewed as a "Cinderella" of the marketing research for a long time, observation can better highlight its multifaceted nature, being supported by the new electronic recording technology (Wilson 2012). In this way, one can probe deeper into the hidden universe of the consumer behavior as well as of the corporate behavior. To this effect, observation reveals some aspects that cannot be detected by face-to-face communication with an interviewer (Kuß 2012).

Twenty-five operators coordinated by the authors of the research have carried out about 10,000 observations in stores located in the second most populated city of the country. They identified a total of about 1,500 organic items falling into 15 item categories. Observation was carried out in both big units (hyper and super-markets) and small stores (proximity, specialty or discount stores). In order to ensure the truthfulness of the data, three stores were randomly selected following the research and a second team of operators were entrusted with the task of resuming observations. Operators were instructed to write down on paper and in

electronic format some relevant characteristics of the observed organic foodstuff. Some of these characteristics are the name of the article, brand, weight, price per unit, warranty, the name of producer and of the organic certification body, etc. The obtained data were subsequently centralized and subject to a descriptive interpretation that took into account the formulated hypotheses.

According to the integrated approach and the holistic concept promoted by Kotler (2002, pp. 50–53), the conducted exploratory research attempts to capture the means whereby decision-making factors in the field (producers, processors, distributors, and representatives of consumerist associations) define their vectors for positioning organic foodstuff on the market. When they do this, the decision-making factors must take into account the environment protection requirements and bring the efforts to promote organic food and the long-term harmonious development of society on common ground. The exploratory research was conducted by means of an in-depth interview and a conversation guide applied to the main factors involved in the production, marketing, certification, and consumption of organic foodstuff.

Two sets of hypotheses have been defined, namely, OH (observation hypotheses) and ERH (exploratory research hypotheses). These were as follows:

- **OH₁**—Large-area units (super- and hypermarkets) market, a greater number of organic foodstuff items than the small-area units (discount and proximity stores), with the exception of stores strictly specialized on organic products.
- **OH₂**—Domestic producers have “foreseen” the potential of the market and channeled their production accordingly.
- **OH₃**—In the Romanian retail stores, there is a wide and deep assortment of organic foodstuff.
- **OH₄**—The price of organic foodstuff is higher than that of ordinary foodstuff.
- **OH₅**—The items are displayed on the shelves with the purpose of drawing the customer’s attention and generating on-the-spot purchases accompanied by significant turnover.
- **ERH₁**—The cluster of positioning vectors (potential criteria for motivating demand for organic foodstuff) *is different* in content from one category of stakeholders to another.
- **ERH₂**—The hierarchy of vectors for positioning organic foodstuff *is different* from one category of stakeholders to another.

The courses of action to be followed allow the development of some strategies at the level of Romanian organizations operating in the field of organic products. When harmoniously integrated into a systemic approach, peculiar to sustainable development, these strategies favor the promotion of a rational, healthy diet.

6 Research Findings

The number of distributed organic articles varies from one retail brand to another. Quantitatively, the units with the largest amounts of organic food are the specialty stores, followed by hypermarkets. The share of organic items in the overall assortment is between 60 and 95 % in the case of specialty stores and below 0.5 % in the case of hypermarkets, despite their seemingly large amount. However, gondolas layouts and the proper display of organic products prove that hypermarkets exhibit a strong orientation toward the inclusion of organic items into their range of products.

While hypermarkets carry up to 30,000 active items, 60–70 % of which are food items, supermarkets distribute on a much smaller area between 4,000 and 9,000 items, most of which are food items. Likewise, about 50 organic products could be noticed in the big supermarkets and only up to 20 such products in the small supermarkets. The small number of organic products on the shelves of supermarkets leads to the conclusion that they only include in their range of products the organic items that generate significant turnover.

Since the small proximity stores (under 250 m², between 500 and 2,000 items) carry between one and ten organic products, the hypothesis according to which Romanian consumers go for a rational and organic diet to enhance their health is confirmed. Given the high procurement costs and the increased perishability of these products as they are free from additives and synthetic substances, organic products are completely missing from the shelves of the observed discount stores.

The second result of the observation reveals that supermarkets and hypermarkets in particular market the organic products under their own brands (“Auchan Bio,” “Mieux Vivre Bio,” “Agir Carrefour,” “Bio Nature,” or “Real Bio”). The percentage of the organic products marketed under their own brands differs from one store to another. For instance, it amounts to only 10.6 % with the French retail chain Auchan but up to 65.88 % with its French competitor Carrefour (the European retail leader in 2010) to 61.1 % with the Belgian group Cora and 62.06 % with the Real chain belonging to the German group Metro.

The third result of the observation revealed that most organic food products distributed under retailer’s own brands come from countries of the European Union, being inspected and certified by empowered organizations in France (Ecocerct), Italy (Suolo e Salute), Germany (BCS-Ökogarantie), Hungary (Bio-kontroll), Switzerland (Bioinspecta), and Romania (Ecoinspect).

The observation also revealed that the Western retail chains (Auchan, Carrefour, Cora, etc.) carry, in their specialized departments, organic products produced mainly in EU countries while the specialized and proximity stores carry almost exclusively organic products inspected and certified in Romania. This confirms the hypothesis concerning the Romanian producer’s and/or processor’s increased interest in organic foodstuff. Unfortunately, however, these have failed as yet to provide the quantity of domestic products demanded by the market. It is very likely that a strong lobby organized by domestic producers might enable the

increase in the percentage of Romanian organic products in supermarkets and hypermarkets. As regards the type of distributed organic products, Romanian merchandise includes products such as eggs, cereals and various types of flour, bread, jams and jellies, chocolate, honey, cheeses, oil, fruits and vegetables, wines while the “exotic” food products such as coffee, cocoa, sweets, suckling, and baby food, snacks are produced abroad, being inspected and certified by different empowered bodies.

The hypothesis according to which the organic food assortment carried by the Romanian stores is not only wide but also deep has also been confirmed. The observation revealed the existence of no less than 15 different organic food assortments. In the case of food with late expiry date, the assortment is quite deep. For instance, the assortment of coffee and cocoa, made up of 22 items produced by the German company “Gepa The Fair Trade Company” and the Romanian and Polish companies “Sonnentor” and “Bioorganik,” respectively, contains instant coffee (1 item), decaffeinated (3 items), espresso (4 items), filter coffee (5 items), cappuccino (2 items), cocoa (2 items), hot chocolate (3 items), and coffee substitutes (2 items). The current research also confirmed the hypothesis regarding the higher price that the Romanian consumer is willing to pay for organic products. The price comparison drawn between organic assortments and their conventional counterparts revealed an extra price for organic products ranging from 50 to 140 % in the case of coffee and cocoa and from 70 to 100 % in the case of chocolate. The extra revenue contributes to covering the processing and distribution expenses as well as the promotion expenses. It is very likely that the final price paid by the Romanian consumer would be reduced and/or producers would show higher profits if these products were manufactured in Romania.

The last but not one aspect dealt with the display of items on the shelf. Although differing from one store to another, display has been found to be attractive. Food items are displayed in groups, according to their utility or functional characteristics. For instance, biscuits and cookies are displayed in baskets; fresh fruits and vegetables are displayed in wooden crates; and milk products, juices, alcoholic drinks, and eggs are obviously stored in refrigerators. As regards the best-before of organic food stuff, the items marketed in the stores under observation have an expiry date ranging from 24 h to 30 months. The food items for which no expiry date is required are honey and vinegar because, if properly stored, they preserve their properties almost perpetually. The earliest expiry date is ascribed to fresh fruits and vegetables, cheeses, and milk products (one week up to ten days). Organic coffee and cans as well as jellies and jams can be stored about one year. Snacks foods and organic chocolate expire after 18 months, and seeds, nuts, and pasta products may be stored up to two years.

The qualitative exploratory research allowed the validation of the formulated hypotheses. The conducted interviews enabled the identification of a set of vectors (criteria) relevant for each stakeholder category. The number of vectors and the importance attached to each of them differ from one category of experts to another. Producers and processors attached great importance to technological vectors.

According to the importance attached to vectors by the representatives of the two groups, the following are the most significant criteria revealed by the interview:

- the necessity to ensure optimal technical conditions for producing organic foodstuff;
- the existence of separate processing lines;
- enforcing higher quality standards;
- commanding reasonable prices for selling products;
- existence of a minimum production capacity;
- ensuring a constant flow of supply with raw materials (seeds and fodder, etc. to producers; and milk, cereals, eggs, etc. to processors);
- elimination of any interference in the production flow of the organic system versus the conventional system;
- consistency in inspecting the quality of the finite product;
- ensuring the production of package units that sell well.

By contrast, the representative vectors according to which distributors position their products must:

- become highly flexible in the *correlation between the purchased quantity and the selling price per unit*;
- show the *capacity* to use the package as a means to *communicate expressively* the organic status of the foodstuff (proper signaling, drawing attention, specifying the inspection body, information on the organic method used in production, etc.);
- ensure the access to the marketed foodstuff of a relatively great number of consumers by adopting a balanced and accessible price level;
- provide promotional support on the part of producers and/or processors in the selling process (samples, the possibility to try or test the products, leaflets, sampling, layout of special gondolas, etc.);
- ensure flexibility in the manufacture of the distribution package (tertiary packaging).

The relevant vectors for the inspection and certification bodies are the following:

- ensuring that the quality standards are met by producers, processors, and distributors and, at the same time, that the effect of their technology on the environment is diminished;
- designing “informative packages” providing information on the advantages of the organic system, the tariffs charged by the certification bodies, subsidies received, the exact procedure for inspection and certification or the terms under which the conformity certificate is issued;
- obtaining accreditation to carry out inspections in compliance with all existing standards (EU 2092/91, USDA/NOP, JAS Organic/MAFF, IOAS/IFOAM, bio.suisse, Demeter, EurepGap, Bioland, etc.);
- developing an online database with information about customers.

Finally, in the case of the consumerist organizations and those committed to protecting the consumer's rights, the most representative vectors for achieving a proper positioning organic foodstuff in Romania are the following:

- proper training of the Romanian public so that they might accept the payment of an extra price for organic foodstuff;
- encouraging Romanians to choose domestic organic products, thus contributing to the survival and strengthening of Romanian businesses;
- informing Romanians about the long-term effect of a rational and balanced diet and the latter's contribution to one's good mood;
- turning to good account, the interpersonal communication with minimum financial costs by means of social media tools (blogs, discussion groups, social networks—Facebook, LinkedIn, Twitter, uploading on YouTube, etc., short films or presentations) with a view to winning over supporters of ecological movements and enhancing the “word of mouth” phenomenon.

The exploratory research has confirmed the hypothesis concerning a divergent hierarchy of the vectors for positioning organic products by different stakeholder groups. Therefore, price holds leading positions as positioning vector among all stakeholder categories. While it is ranked first with distributors, it is only ranked third with consumer associations, which proves that this stakeholder category is aware of the relevance and significance of organic products in ensuring a rational feeding of the public.

The “environment protection” vector is ranked first with the producer inspection and certification bodies, while distributors and processors are less sensitive to this motivational factor.

The value (generating) chain beginning with producer, through processor, distributor, certifier and ending with the customer, does not operate fluently enough. That is because it features a range of obstacles related to the following:

- the constancy of raw material production varies considerably from one season to another;
- limitations that prevent technological production and/or processing capacity from being ensured;
- the irregular and uncertain provision of annual subsidies for the conversion to, or further stay in organic farming, correlated with major delays in the actual payment of the said subsidies to those entitled to receive them;
- huge bureaucracy in the implementation of inspection and certification tools;
- the low extent to which representatives of consumer protection associations are sensitized in respect of a consistent evaluation of the system flaws.

In addition to the main issues tackled by the exploratory research, it also revealed a weak involvement of the state bodies in supporting organic diet and in making consumers aware of the intrinsic advantages generated by the consumption of these products. The state's involvement was only limited to statements while very few actions could be identified in this respect (promotion through specialized

fairs, organization of symposia, specialized broadcasts, presence in the audio-visual or print media, etc.).

7 Research Limits and Prospects

Naturally, the two pieces of research feature some limits and future prospects for improvement. Thus, the first limitation lies in the fact that, on account of the big number of small-area (proximity) stores, not all of them could be encompassed in the observation. The second limitation is the fact that not all retailers group the organic products and display them on gondolas or in special departments. Some of them place organic products among items of conventional assortments. Third, there was the unwillingness on the part of the staff of the surveyed stores to offer information on the marketed organic products. In some cases, the employees forbade the observers from doing their work, inviting them out of the store.

On the other hand, the limits of the exploratory research lie also in the fact that only some stakeholders, particularly those known by the authors of the study, were included in the research. Although more than 30 representatives of producers, processors, certifiers, or consumer associations were required to respond to the current endeavor, only 11 interviews could be obtained and validated in the end.

The interviews with stakeholders revealed the necessity of organizing some focus groups whose participants are consumer representatives. These are supposed to bring forward the ways by which customers may be educated in respect of the consumption of organic products.

8 Conclusions

The decision-making factors of all observed stores understand not only the importance of organic products but also their market potential. Consequently, they put up for sale a wide and complete range of such products, not only under the producer's brand, but also under their own brand. Retail brands thus attempt to draw the consumers who can afford to pay an extra price and those who live by the principles of a healthy diet. Through the organic assortment, retailers manage to draw customers, bring them to the store and persuade them to think about purchasing other products.

The success of marketing organic foodstuff depends mainly on establishing effective communication with consumers. Significant in this regard is the "price" vector as it can tilt the purchase decision toward one side or the other. That is why consumers must be made aware of other vectors which support the consumption of organic products: prevention of disease, creating good mood, environment protection, etc. Sometimes, consumers of organic products do not know the actual prices of similar conventional items and do not ask themselves questions like Who

produced them, where and under what conditions? What effort was required to bring them in this marketing unit? What additional costs are involved in the packaging and ensuring of a long storage life? (Dabija 2005).

The consumer's awareness of these aspects and of the agro-food economy cannot be enhanced except through the development of a "buying culture" among consumers so that they may be instilled values such as *organic quality*, *responsible consumption*, *regional variety*, or *reduction of additional expenses*.

The task of training consumers, of educating them in the spirit of respect toward environment and of promoting a lifestyle as natural as possible fall on associations, private or public educational or research establishments, and the media, through scientifically accurate specialist articles. The concern for "sensitizing" the potential customers to the consumption of organic foodstuff will come as a welcome boost for the market of this merchandise. However, of paramount importance in this process is *a change of mentality* among the producers and distributors of these products. This can only be achieved through *a new "green marketing"-oriented management attitude*. This, in turn, requires the development of an integrated management based on the trio *quality—environment—social responsibility*.

In addition to economic calculations concerning the effectiveness of each link in the value chain and of the products and services of each stakeholder involved in providing organic products, some levers are required to stir up the interest of all stakeholders in the promotion of these products. In order to stimulate them, the following requirements need to be accomplished:

- (a) contribute to expanding the organically cultivated lands (which is currently ensured by the EU regulations);
- (b) provide financial support in the future for the shift from conventional farming to organic farming through conversion subsidies as well as subsidies for repairing the possible damage caused by natural calamities (drought, excessive rain or floods, pests or other harmful organisms, etc.);
- (c) stir up, through investment levers, the joint interest of economic operators in retrofitting their own processing units to make them more competitive, in compliance with the quality standards enforced within the organic inspection and certification system;
- (d) ensuring the streamlining of the bureaucratic mechanisms for certification of organic products;
- (e) sustainable efforts should be made by processors, distributors, organic associations, inspection and certification bodies, the academic environment, and the civil society *to reposition organic foodstuff on the market as premium products* of high functional quality and able to contribute to the prevention of diseases and to ensuring man's general health;
- (f) make customers aware of the advantages of organic foodstuff, by highlighting that this merchandise maximizes the *quality—price—level of satisfaction* ratio of the need for a rational diet by comparison to similar conventional food or genetically engineered food;

- (g) take steps to intensely promote organic products and their benefits for health, both through state authorities (national and local agencies and authorities) and through relevant organizations and associations in the country.

It is advisable that the conclusions of the study on the market of organic products should be turned to good account by means of an active organic marketing policy so that an *organic diet mentality* may be developed among Romanian customers. Organic marketing stands as an interface between *economic marketing* and *societal marketing* [the latter was coined by Kotler more than two decades ago (Kotler et al. 1993)] so that all organic food stakeholders might know that they are part of a long-term commitment to protecting the environment and not involved solely in conducting alternative profitable businesses.

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Euro Adoption in Romania

Ionuț Dumitru

Abstract This chapter assesses the degree of readiness of Romania to adopt euro mainly based on the optimal currency area (OCA) criteria. Our findings suggest that the correlation of the business cycle in the case of Romania is one of the lowest among the new member states (NMS), although it has increased in the last few years. Also, using a structural VAR approach, we estimated the similarity between demand and supply shocks between NMS and the eurozone, showing that the demand shocks are still negatively correlated with eurozone for some NMS, including Romania. The main conclusion of our chapter is that Romania, as well as some other NMS countries, still needs time to progress on the real convergence criteria in order to adopt euro without major costs.

1 Introduction

Ten countries¹ joined the European Union (EU) on May 1, 2004, and another two (Romania and Bulgaria) on January 1, 2007. None of these countries has been allowed to opt out for the third stage of economic and monetary union (EMU) like Denmark and United Kingdom. This implies that they are expected to adopt the euro sooner or later after their EU accession. Five of the new member states (NMS) have already adopted euro: Slovenia in 2007, Cyprus and Malta in 2008, Slovakia in 2009, and Estonia in 2011.

¹ Poland, Czech Republic, Slovakia, Hungary, Slovenia, Estonia, Latvia, Lithuania, Cyprus, Malta.

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The accession of the NMS to the European Union has stimulated a growing academic and policy debate about when should the euro area be extended to the new EU members based on the achievements in the convergence process.

Before the global crisis that started in 2007–2008, a rapid expansion of the eurozone to Central and eastern Europe was expected. However, euro adoption plans are now being postponed currently across the CEE region, even though adopting the euro is still a legally binding requirement for all EU members from CEE. The main reasons why the CEE countries revisited their euro adoption strategy are related to:

- The persistent crisis in the eurozone periphery which triggered a change in the cost/benefit analysis of joining the euro.
- The deterioration of the Maastricht convergence criteria partly due to the effects of the crisis.
- The existing eurozone members would be reluctant to accept new members which are not very well prepared to survive in the currency area.

1.1 The Current Status of the Euro Adoption Targets

Country	Euro adoption target	ERM entry target
Bulgaria	Not set	Not set
Poland	Not set	Not set
Lithuania	Not before 2014	2004
Romania	2015, but to be postponed	2013-2014, but to be postponed
Latvia	Not before 2014	2005
Czech republic	Not set	Not set
Hungary	Not set	Not set
Denmark	Possibility of a future referendum	1999
Sweden	Not under consideration	Not under consideration
United Kingdom	Not under consideration	Not under consideration

Among the CEE member countries which are still outside the eurozone, only Romania has a specific target for euro adoption. Currently, the euro adoption has become a rather long-term project for CEE countries—the convergence process continues to function as an important “disciplinary device” for the governments.

The euro adoption is still constrained by the fulfillment of the convergence criteria. The only formal conditions regarding the eurozone entry are related to the fulfillment of the nominal convergence indicators, specifically the fulfillment of the Maastricht convergence criteria: public finance criteria referring to the general government deficit and public debt, as well as monetary criteria, related to price stability, the level of long-term interest rates and exchange rate stability.

According to the consensus in the academic studies of the literature, both theoretical and empirical ones, meeting the Maastricht convergence criteria is also a basis for a sound macroeconomic stance, creating conditions contributing to a long-term sustainable economic growth. Thus, meeting the nominal convergence criteria opens the way to the euro and is also beneficial to growth.

According to the fiscal convergence criteria, in order to adopt euro, a country cannot have a planned or actual general government deficit in excess of 3 % of GDP. Moreover, its public debt should not be higher than 60 % of GDP. The inflation criterion is fulfilled when inflation in the applicant country does not exceed 1.5 % points the average inflation of the three best EU performers in terms of price stability. The interest rate criterion is fulfilled when the long-term interest rate does not exceed 2 % points the average interest rate in the three best EU performers in terms of price stability. Moreover, an accession country is obliged to participate for a minimum period of two years in the Exchange Rate Mechanism II (ERM II). Over this period, the exchange rate of the domestic currency against the euro should be maintained within fluctuation bands not wider than $\pm 15\%$ around a central parity. Moreover, during ERM II participation, no severe tensions in the foreign exchange market, and in particular no devaluations of the central parity, should occur.

The current nominal convergence indicators of the NMS are presented in Table 1. Among the NMS which already adopted euro, only Estonia continues to meet the nominal convergence criteria, and none of the NMS outside eurozone meets all the criteria.

In the case of Romania, currently just the public debt criterion is fulfilled. Romania still has problems with inflation and will continue probably to post higher inflation than in the eurozone in the next years, as the price-level convergence is expected to continue (which includes also the Balassa–Samuelson effect) and the general price level in Romania is still much lower than in eurozone (Fig. 1). Moreover, the budget deficit has exploded in 2008 and is expected to remain very high in the next years.

From the real convergence point of view, there is no formal condition in the euro adoption process. Just in the Maastricht treaty, there is a general provision mentioning the necessity of social and economic cohesion in order to reduce the development gap between countries. In a broader view, the real convergence means the adjustment process of the social, political, and economic structures toward the ones from the eurozone. In a narrow view, the real convergence means a reduction in the level of economic development gap, the reference being indicators like GDP per capita, productivity, and the living standard.

The GDP per capita is quite low in Romania compared with the eurozone average (Fig. 2). All the NMS which adopted euro at some point in time had a considerably higher GDP per capita at the eurozone entry moment (Table 2).

A special approach in terms of real convergence assessment is related to the optimal currency area (OCA) theory, introduced in the seminal papers of Mundell (1961, 1973).

Table 1 Nominal convergence indicators in NMS

HICP	Long-term interest rate	Budget deficit	Public debt	Exchange rate
Average annual inflation rate in the last 12 months (June 2011)	June 2011	2010	2010	July 21, 2009–July 22, 2011
<i>Average of three best performing countries</i>	1.7	3.3		
	<i>Average of three best performing countries in terms of inflation</i>			<i>Variation against central parity^a in the last 2 years</i>
<i>Reference value</i>	<i>Reference value</i>	<i>Reference value</i>	<i>Reference value</i>	<i>Reference value</i>
Czech Republic	Czech Republic	Estonia	Estonia	Eurozone
Slovenia	Slovakia	Bulgaria	Bulgaria	Slovakia
Eurozone	Slovenia	Malta	Romania	Cyprus
Latvia	Malta	Hungary	Slovenia	Slovenia
Slovakia	Lithuania	Czech Republic	Lithuania	Malta
Malta	Bulgaria	Cyprus	Czech Republic	Lithuania ^b
Poland	Eurozone	Slovenia	Slovakia	Bulgaria
Cyprus	Cyprus	Eurozone	Latvia	Estonia
Lithuania	Poland	Romania	Poland	Latvia ^b
Bulgaria	Latvia	Lithuania	Cyprus	Latvia
Hungary	Romania	Latvia	Malta	Czech Republic
Estonia	Hungary	Slovakia	Hungary	Romania
Romania	Estonia	Poland	Eurozone	Hungary
				Poland

Note ^a for non-ERM2 countries, the variation is calculated against the average of the period; ^b countries already in ERM2
Source Eurostat, BIS

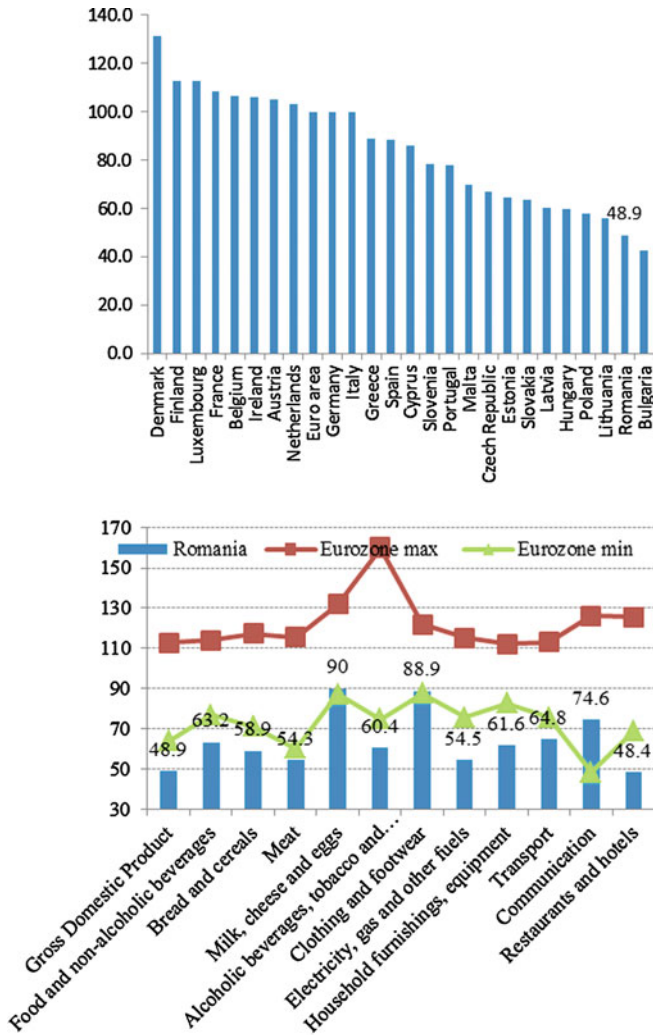


Fig. 1 Price level in Romania, 2011 (eurozone=100) Source Eurostat

From the OCA theory point of view, when a country wants to join in a monetary union, there should be taken into consideration criteria like the convergence of economic structures, business cycle synchronization, demand and supply shocks correlation, labor market and market flexibility in general, degree of financial intermediation, level of economic openness. In our chapter, we studied mainly two of these criteria: business cycle synchronization and demand and supply shocks correlation. Regarding the criterion of demand and supply shocks correlation, the theory said that costs of losing independent monetary policy are lower the higher the association of shocks between the potential member and the common currency

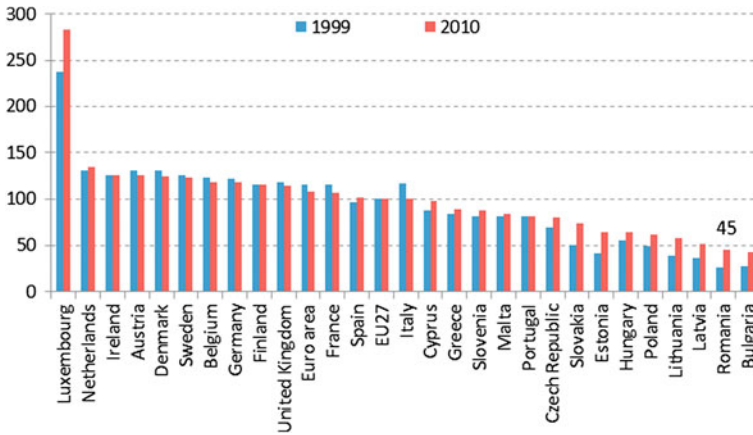


Fig. 2 GDP per capita at PPS (EU27 = 100). Source Eurostat

Table 2 GDP per capita (EU27 = 100) at the ERM and eurozone entry

Country	One year before ERM entry	One year before euro adoption
Greece	1997–85 %	2000–84 %
Portugal	NA	1998–79 %
Spain	NA	1998–98 %
Slovenia	2003–84 %	2006–88 %
Malta	2004–77 %	2007–77 %
Cyprus	2004–90 %	2007–93 %
Slovakia	2004–57 %	2008–72 %
Estonia	2003–55 %	2010–65 %

Source ECB

area. Regarding the business cycle synchronization criterion, if the countries forming a common currency area have synchronized business cycle, then the cost of losing the monetary policy independence and the exchange rate as an adjustment mechanism is not significant.

The Romanian economy has a different structure by economic sectors compared with eurozone, with a much higher share of agriculture in the value added and employment. Also, Romania has a less open economy compared with the other NMS (Figs. 3, 4, 5).

The current chapter has two main goals. Firstly, we investigate business cycles of the NMS economy and their symmetry to the euro area economy using the *correlation of business cycle approach*. Secondly, we identify the demand and supply shocks using the *structural vector autoregression (SVAR)* approach as developed by Blanchard and Quah (1989) and extended by Bayoumi and Eichengreen (1992), and we find whether there is symmetry between shocks of the NMS and euro area.

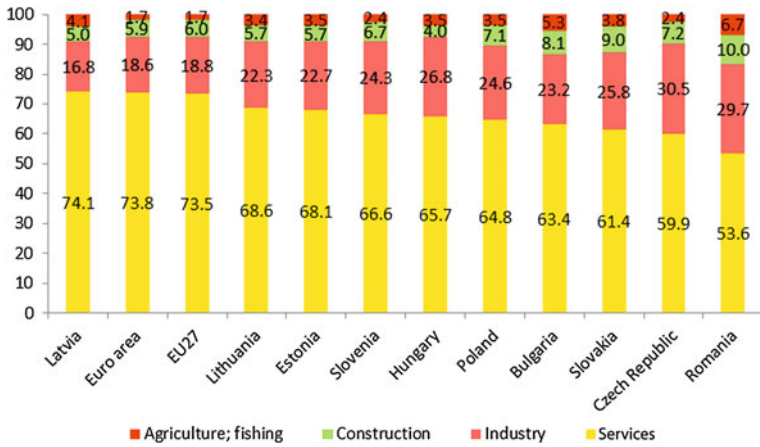


Fig. 3 Structure of value added by economic sector, 2010

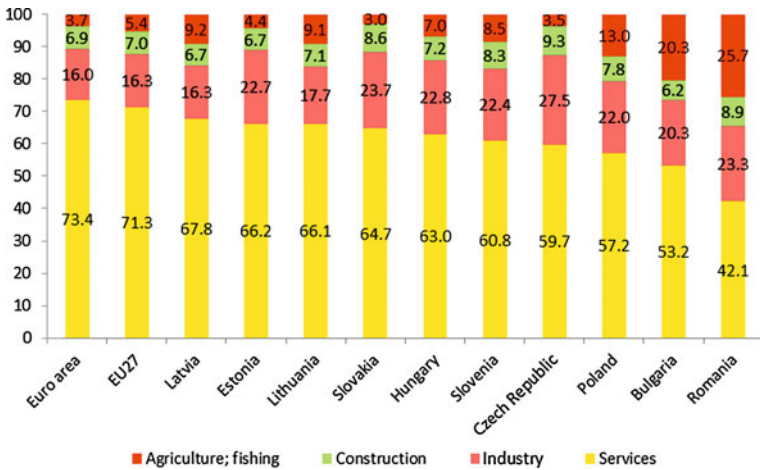


Fig. 4 Structure of employment by economic sector, 2010 Source: Eurostat

2 Optimal Currency Area: Literature Review

The **optimal currency area** (OCA) theory is based on the idea that the advantages of being a member of a monetary union depend on the degree of optimality of this union, meaning that it would maximize economic efficiency to have the entire area sharing a single currency. The theory of OCA was pioneered by Mundell (1961), with important contributions and extensions by McKinnon (1963) and Kenen (1969).

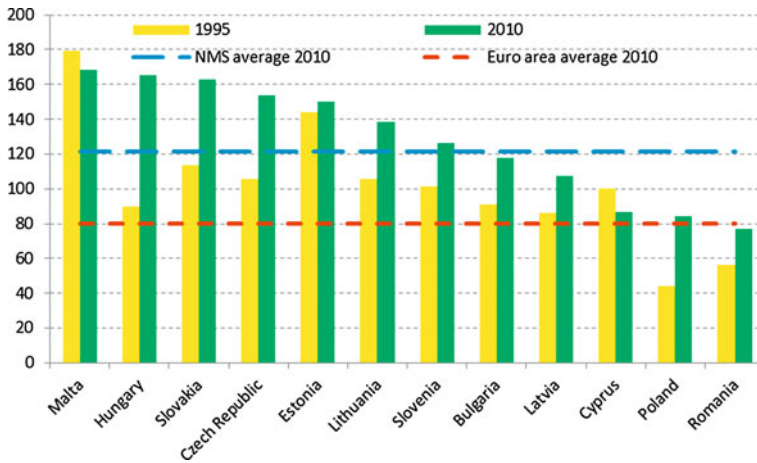


Fig. 5 Level of economic openness ($(\text{exports} + \text{imports})/\text{GDP}$, 2010) *Source*: Eurostat

After many amendments, the OCA has become a complex theory associating and mixing various aspects of international macroeconomic processes. Within OCA theory, various authors emphasize various criteria:

- (a) *Production factors mobility*, especially labor force (Mundell 1961). High factor market integration and sufficient factor mobility within a group of partner countries can reduce the need to adjust real factor prices, and the nominal exchange rate, between countries in response to disturbances. If one country suffers from depression due to a negative shock, factors of production may move from this country to another which is hit by a positive shock. Hence, prices of these factors do not need to fall so sharply in the depressed country and rise in the booming country. The factor mobility is then able to compensate for the exchange rate changes.
- (b) The *level of economic openness* (McKinnon 1963; Alesina and Barro 2002). The higher the degree of openness, the more the changes in international prices of tradables are likely to be transmitted to the domestic cost of living. Also, devaluation would be more rapidly transmitted to the price of tradables and the cost of living, negating its intended effects. Hence, the nominal exchange rate would be less useful as an adjustment instrument for small and open economies.
- (c) *Production and consumption diversification* (Kenen 1969; Tavlas 1994). A high diversification in production and consumption diminishes the possible impact of shocks specific to any particular sector. Therefore, diversification reduces the need for changes in terms of trade via the nominal exchange rate and provides “insulation” against a variety of disturbances. More diversified partner countries are more likely to endure small costs from forsaking nominal exchange rate changes among them and find a common currency beneficial.

- (d) *Wage and price flexibility* (Friedman 1953). When nominal prices and wages are flexible between and within countries contemplating a common currency, the transition toward adjustment following a shock is less likely to be associated with sustained unemployment in one country and/or inflation in another.
- (e) *Business cycle synchronization and demand and supply shocks symmetry* (Cohen and Wyplosz 1989; Weber 1990; European Commission 1990). Very important criterion is the similarity between supply and demand shocks and business cycles in countries using a common currency (or having their exchange rates fixed). Monetary and exchange rate policy cannot be used as a stabilization tool if a member country is, for example, hit by an asymmetric shock. Hence, business cycles of countries considering creation of a currency area must be correlated with a maximum extent.
- (f) *Fiscal policy integration* (Kenen 1969) and *political integration* (Mintz 1970). Fiscal transfers are a part of a non-market-based adjustment process. The aim is the redistribution of financial transfers from relatively richer to relatively poorer countries or from countries hit by a positive shock to countries hit by a negative shock. However, these two aims could be inconsistent: A country hit by a positive shock could be at the same time a relatively poorer country. Moreover, the system of fiscal transfers requires a certain degree of political integration.
- (g) *Financial markets integration* (Ingram 1962). Financial market integration can reduce the need for exchange rate adjustment. It permits, among others, to cushion temporary adverse disturbances through capital inflows (by borrowing from surplus areas or decumulating net foreign assets that can be reverted when the shock is over).
- (h) *Inflation differential* (Fleming 1971). Similarities of inflation rates are also needed to create an OCA. External imbalances can arise from persistent differences in national inflation rates resulting, inter alia, from the following: disparities in structural developments, diversities in labor market institutions, differences in economic policies, and diverse social preferences. When inflation rates between countries are similar over time, terms of trade will also remain fairly stable. That will foster better-balanced current account transactions and trade, and reduce the need for nominal exchange rate adjustment.

The degree of fulfillment of the OCA criteria is an essential factor when judging the advantages and disadvantages of euro adoption.

3 Business Cycle Correlation

In empirical studies focused on the euro adoption, the OCA theory is tested in many papers assessing the correlations between the eurozone (or German) business cycle and those of potential member countries. Boone and Maurel (1998) calculated the correlation coefficients between the cyclical components of industrial

production and unemployment rates for the CEECs against Germany and the EU. Their results show a relatively high degree of business cycle correlation for the CEECs with Germany, even higher than for Portugal and Greece. However, correlations with the whole EU are not so high.

Jarko Fidrmuc (2001) tests the endogeneity hypothesis of OCA criteria on five advanced CEECs (the Czech Republic, Hungary, Poland, Slovakia, and Slovenia).

Fidrmuc measures the similarity between business cycles by the correlation of detrended indicator with industrial production. He found that trade between transition countries and EU member countries started to increase and this led to a greater integration between these countries and more correlated business cycles between 1993 and 1999. The highest levels of correlation between business cycles are measured in Slovenia and Hungary (even above the EU average), while the lowest level is in Slovakia.

Darvas and Vadas (2005) proposed a procedure for combining univariate detrending techniques, which is based on revisions of the estimated output gaps adjusted by the variance and the correlation between business cycles. They combined quadratic trend, Hodrick–Prescott filter, band-pass filter, Beveridge–Nelson decomposition, and Wavelet transformation. The weighting method was used for business cycle analysis, to study the correlation between business cycles. The results affirmed that Hungary, Slovenia followed by Poland had the highest correlation coefficients with the eurozone.

The study of Darvas and Szapary (2005) differs from most of other contributions in the area in that they investigate the behavior of several expenditure and sectorial components of GDP. Using Hodrick–Prescott filter and band-pass filter, Darvas and Szapary (2005) obtained that Hungary, Poland, and Slovenia have achieved high degree of synchronization for GDP, industry, and exports, but not for consumption and services with eurozone. The other CEECs countries have achieved less or no synchronization.

Fidrmuc and Korhonen (2006) in their meta-analysis of 35 identified publications find two major categories of papers on business cycle coordination between the euro and the CEECs. In the first category, papers look at correlations of detrended output where several authors apply various filters, and in the second category, the structural VAR model is used to recover underlying shocks with properties derived from the economic theory.

Afonso and Furceri (2007) analyze business cycle synchronization and sectoral business cycle synchronization in an enlarged EU using annual data, trying to identify which sector for each country is driving the aggregate output business cycle synchronization. Their conclusions were that industry sector, building and construction sector and agriculture, fishery and forestry sector show the most relevant contribution in contrast to services sector although the largest one in terms of valued-added share. They obtained by applying first differencing, two HP filters with different smoothing parameter and a band-pass filter that Hungary, Cyprus and Malta have the larger correlation between business cycle synchronization with eurozone.

3.1 Estimation Methodology

In order to compute the correlation between business cycles, we used the following two univariate methods to obtain the trend and the cycle from the GDP series:

1. *Hodrick–Prescott filter (HP)* is a two-sided linear filter that computes the smoothed series s of y by minimizing the variance of y around s , subject to a penalty that constrains the second difference in s . That is, the HP filter chooses s to minimize

$$\sum_{t=1}^T (y_t - s_t)^2 + \lambda \sum_{t=2}^{T-2} ((s_{t+1} - s_t) - (s_t - s_{t-1}))^2 \text{ where: } y_t = \text{GDP}; s_t = \text{trend};$$

The smoothness parameter λ takes the values of 100 for annual data, 1,600 for quarterly data, and 14,400 for monthly data. The HP filter has two main drawbacks: arbitrary choice of the parameter λ that becomes unstable at the end and at the beginning of the sample.

2. *Band-pass filter (BP)*—intends to remove both high frequency and low frequency of a series, leaving the business cycle frequencies. We define the lower and upper frequencies of the two low-pass filters as, respectively, 6 and 32 quarters for the cycle range to be passed through. The major weakness is that in finite samples, only various approximations could be used: Baxter-King (1999) and Christiano-Fitzgerald (2003). We used in our paper the approximation of Christiano-Fitzgerald.

3.2 Data

Our data cover the period of 1997Q1–2011Q1 for eleven countries that entered EU in 2004 and 2007, and the eurozone. We excluded Malta from the group of NMS and the rest of the countries from European Union because of the lack of data for the entire sample.

We used the GDP series in constant prices (2,000 = 100) available from Eurostat, and we seasonally adjusted the data using the Tramo/Seats procedure.

4 Empirical Results

Table 3 reports the results on the output-gap correlation coefficient between the various European countries and the EA, as aggregate. The average correlation for the core EA group of countries exceeds 90 % for both filters, with Germany and France having the highest coefficients. This is an expected result, as the two

Table 3 Correlations between business cycles

	Correlations between business cycle with Euro Area		Lag (in quarters) for maximum correlation
	BP filter	HP filter	BP filter
<i>EA core</i>			
Austria	0.97	0.93	0
Belgium	0.84	0.87	0
Finland	0.95	0.90	0
France	0.97	0.96	0
Germany	0.98	0.96	0
Ireland	0.91	0.85	0
Italy	0.96	0.95	0
Luxemburg	0.93	0.85	0
Netherlands	0.97	0.93	0
Spain	0.95	0.89	0
<i>Average</i>	<i>0.94</i>	<i>0.91</i>	–
<i>EU15 non-EA countries</i>			
Denmark	0.95	0.87	0
Sweden	0.91	0.86	0
UK	0.94	0.89	0
<i>Average</i>	<i>0.94</i>	<i>0.87</i>	–
<i>EA periphery</i>			
Cyprus	0.81	0.71	0
Greece ^a	–0.07	0.32	6
Malta	0.75	0.68	0
Portugal	0.90	0.81	0
Slovenia	0.84	0.85	1
<i>Average</i>	<i>0.65</i>	<i>0.67</i>	–
excluding Greece	0.83	0.76	–
<i>New EU member states</i>			
Bulgaria	0.67	0.57	1
Croatia	0.66	0.58	1
Czech Republic	0.90	0.81	1
Estonia	0.84	0.75	0
Hungary	0.92	0.83	0
Latvia	0.82	0.78	0
Lithuania	0.71	0.63	1
Poland	0.61	0.63	0
Romania	0.36	0.27	2
Slovakia	0.35	0.45	1
<i>Average</i>	<i>0.68</i>	<i>0.63</i>	–

^a data starting with 2000

countries account together for almost half of the aggregate EA GDP (in nominal terms). Although they are not members of the monetary union, Denmark, Sweden, and UK have also a high degree of business cycle correlation with EA, slightly below the one of the EA core countries. Without sharing the common currency, these three economies are much more similar to the core EA members than those of the countries situated at EA periphery.

Average correlation computed for peripheral economies lies between 60 and 70 %, with Greece distinguishing as the least correlated. Average correlation for EA periphery excluding Greece is about 80 %. These findings provide, once again, empirical evidence suggesting that euro adoption by Greece was premature, leading eventually to the problems EA faces nowadays. In terms of the lag at which maximum correlation occurs, Greece displays also a distinct picture. The results indicate that Greece is one and a half years out of phase when compared to the business cycle in the EA. Greece's correlation with the EA is even lower than that of the new EU member states.

The average correlation coefficient for the new EU members is between 60 and 70 %, with Romania being the least correlated. If we analyze the timing of the business cycle, we observe that unlike the EA countries, where excepting Greece, the maximum correlation occurred contemporaneously, for some of the new EU members, there is a gap of one quarter. Business cycle in Romania is two quarters behind that of the EA countries.

An interesting case is that of Slovakia, which adopted euro in January 2009, but whose correlation with the EA countries is similar in magnitude to that of Romania. There is also a one-quarter lag between the phase of business cycle in Slovakia and the same phase in EA. Probably, deciding on euro adoption, the policy makers in Slovakia relied more on nominal convergence criteria. In terms of real convergence with EA, Slovakia is not ahead of its CEE peers.

5 Supply and Demand Shocks Correlation

Several studies have been devoted in the literature to the analysis of the similarities in the shocks affecting EU countries. An important contribution came from Bayoumi and Eichengreen (1992) when they used data from 11 European Union member countries to extract information on underlying aggregate supply and demand disturbances using VAR decomposition. The two authors recover the underlying demand and supply disturbances using the technique developed by Blanchard and Quah (1989). The basic idea is that an economy can be hit by two types of shocks: demand and supply shocks. Shocks are identified with the help of the restriction that their long-term impact of demand shocks on output is zero. Only supply shocks can have a permanent effect on output. Bayoumi and Eichengreen (1992) estimate two-variable vector autoregression (VAR) models for real GDP and GDP deflator. Demand and supply shocks are then recovered from the residuals of the VARs with the help of the aforementioned restriction.

Correlation coefficients of different shocks between countries are used to assess the degree of similarity between the business cycles.

Bayoumi and Eichengreen (1992) find that underlying shocks are significantly more idiosyncratic across EU countries than across US regions, result which may indicate that the EU will find it more difficult to operate a monetary union. However, a core of European Union countries made up of Germany and her immediate neighbors experience shocks of similar magnitude and cohesion as the US regions. EU countries also exhibit a slower response to aggregate shocks than US regions, presumably reflecting lower factor mobility.

Using data from mid-1990s to 2000 for ten CEE countries, Fidrmuc and Korhonen (2001) found that Hungary has the most correlated demand and supply shocks with the euro area as a whole, while at the same time, the correlation between shocks varies considerably between eurozone and accession countries. When taken individually, Hungary has the highest correlation in supply shocks, while Poland has the maximum correlation between the investigated countries for demand shocks. The least correlated are the Baltic countries, namely Lithuania and Latvia for demand shocks and Lithuania for supply ones.

Frenkel and Nickel (2002) conclude their study that “there are still differences in the shocks and in the adjustments process to shocks between the euro area and the CEECs. However, several individual CEECs exhibit shocks and shock adjustment processes that are fairly similar to some euro area countries.”

Horvath and Ratfai (2004) using quarterly data for the 1993–2000 period show that the degree of correlation between the eight new members of EU is significant, but there is a low correlation between these economies’ shocks with the eurozone’s core economies. Based on these, they argue that the integration of these countries into eurozone will be costly.

5.1 Models Used and Estimation Methodology

In order to identify the supply and demand shocks, we used in our analysis a methodology similar to Blanchard and Quah (1989) and Bayoumi and Eichengreen (1992).

The theoretical aggregate demand and supply model provides two distinct features of the original shocks affecting the economy. First, only supply shocks have permanent effect on output, property that will be used for the definition of structural models (VARs). Second, positive demand shocks raise prices, while positive supply shocks reduce the price level, property that is called by Bayoumi and Eichengreen (1992) as an over indentifying condition.

The method used to recover supply and demand shocks is presented below for a structural vector autoregressive (VAR) model with two variables (GDP growth rate and GDP deflator).

As we described above, supply shocks have a permanent effect on the output, whereas demand shocks have only transitory effects on output. On the other hand,

both supply and demand shocks have permanent effects on the price level. A supply shock decreases the price level, whereas a demand shock increases it.

As we previously mentioned, the method used to separate supply and demand shocks is similar to Blanchard and Quah (1989). They estimated a two-variable VAR with GNP and unemployment and proceed to identify the two aforementioned shocks. Similar to our analysis, Bayoumi and Eichengreen (1993) estimated a VAR with the differences in GDP and the price level (in logs) as variables. The joint process of the two variables (GDP and prices) can also be written as an infinite moving average representation of supply and demand shocks,

$$X_t = A_0 \epsilon_t + A_1 \epsilon_{t-1} + A_2 \epsilon_{t-2} + A_3 \epsilon_{t-3} + \dots = \sum_{i=0}^{\infty} L^i A_i \epsilon_{t-i}, \quad (1)$$

where X_t is a vector of differences in logs of output and prices $[\Delta y_t, \Delta p_t]$, ϵ is a vector of demand and supply disturbances $[\epsilon_{dt}, \epsilon_{st}]$, A_i are the 2×2 matrices which transmit the effects of the shocks to the variables, and L^i is the lag operator. The long-run restriction that demand shocks do not affect the level of output is the same as saying that the cumulative effect of demand shocks on the change in output is zero, i.e. $\sum_{i=0}^{\infty} a_{11i} = 0$. It is also assumed that supply and demand shocks are uncorrelated and their variance is normalized to unity, i.e. $\text{Var}(\epsilon) = I$. A finite version of the model represented by Eq. (2) can then be used to recover the original supply and demand disturbances. Because the vector X_t is stationary, the VAR representation can be inverted to obtain the Wold moving average representation. Here, e_t is the vector of residuals from the two estimated equations,

$$X_t = e_t + C_1 e_{t-1} + C_2 e_{t-2} + C_3 e_{t-3} + \dots = \sum_{i=0}^{\infty} C_i e_{t-i}. \quad (2)$$

The variance–covariance matrix of residuals is $\text{Var}(e) = \Omega$. Equations (1) and (2) directly yield the relationship between the estimated residuals (e) and the original (ϵ): $e_t = A_0 \epsilon_t$. Therefore, we need to know the elements in A_0 to calculate the underlying supply and demand shocks. The matrices C_i are known from estimation. Knowing that $A_i = C_i A_0$ and $\sum_{i=0}^{\infty} A_i = \sum_{i=0}^{\infty} C_i A_0$ helps to identify A_0 , but to recover the four elements of A_0 , we need four restrictions. Two restrictions are simply normalizations which define the variance of the shocks ϵ_{dt} and ϵ_{st} . The third restriction is the assumption that demand and supply shocks are orthogonal, which with our notation means that $A_0 A_0^{\top} = \Omega$. The fourth restriction has already been mentioned, that is, the long-run response of output to demand shocks is zero. The aforementioned restrictions uniquely determine the elements of A_0 , which allows us to recover supply and demand shocks from the residual of an estimated VAR.

5.2 Data and Results

Our data cover the period of 1997Q1–2011Q1, and we used eleven countries from the twelve countries that entered in EU in 2004 and 2007,² nine countries from the eurozone (Belgium, Germany, Ireland, Spain, France, Italy, the Netherlands, Austria, and Portugal), and four non-eurozone countries.

We used real GDP data and the GDP deflator. The data are from Eurostat. For Romania, the GDP data on Eurostat are available since 1998. For 1997, the GDP data for Romania are provided by the National Institute of Statistics.

For the structural VAR decomposition, we used the real GDP growth series obtained by first difference in logarithm of real GDP indices with base year 2000 (the indices were previously seasonally adjusted with Tramo/Seats) and inflation rate. For inflation, we used the first difference in the GDP deflator (seasonality-adjusted with Tramo/Seats).

In the structural VAR, we imposed the structural restriction suggested by Bayoumi and Eichengreen (1992), namely that GDP growth rate (aggregate supply curve) is in the long-term horizon independent of inflation rate, but inflation rate may in the long-term horizon depend on GDP growth rate (Philips curve, aggregate demand curve). After we derived the residuals (shocks) for each country, we studied the similarity between shocks computing the correlation between demand shocks of an NMS and eurozone and afterward the correlation between supply shocks (Table 4).

The results of the supply and demand shocks analysis confirm those obtained in the business cycle correlation analysis, as economic theory predicts a positive relationship between the transmission of external shocks and the degree of business cycle synchronization. As a general conclusion, irrespective of the country group, the supply shocks are more correlated than the demand shocks. This can be explained by the way each type of shock can be interpreted. It is more probable for supply shocks, reflecting unsystematic developments in the production capacity of the European economies, to occur as the result of a common source, than for demand shocks, which reflect the specific characteristics of each economy, such as changes in consumer preferences. Movements of output are dominated by demand shocks in the short run and by supply shocks in the long run.

Core EA countries and the three EU15 non-EA member states have a similar degree of correlation between supply shocks, of about 60 %. Also, peripheral EA countries and new EU members have close values for the correlation between their supply shocks and the same type of shocks in the EA, of about 40 %. It is worth mentioning that the demand shocks in most of the new EU countries are negatively correlated with EA, implying that these economies would react to common European monetary policy measures differently than core EA countries.

² Poland, Czech Republic, Slovakia, Hungary, Slovenia, Estonia, Latvia, Lithuania, Cyprus, Malta in 2004, and Bulgaria and Romania in 2007.

6 Conclusion

This chapter assesses the degree of readiness of NMS, including Romania, to adopt euro, mainly based on OCA criteria.

In the case of Romania, in terms of nominal convergence, a lot of efforts need to be spent to bring inflation and budget deficit within the Maastricht criteria. However, from real convergence point of view, Romania seems to be one of the least prepared countries among CEE countries to adopt euro, at least in medium term, high efforts being needed in terms of structural reforms.

Summing up, our empirical analysis suggests that at least some of the new EU members still have a long way before fulfilling the real convergence criteria and be prepared for euro adoption. This is especially true for Romania, which is the least correlated with the EA, regardless of the method employed to determine the output gap. Possible explanations could consist in differences in the structure of the economy or in insufficient commercial and financial integration between Romania and EA.

Annex 1: Advantages and Costs of Euro Adoption

Benefits of Euro Adoption are as follows:

- *The elimination of transaction costs* incurred by enterprises and households in relation to the exchange rate. These costs may be divided into two groups. The first group comprises financial costs like the bid-ask spreads, fees accompanying foreign exchange operations, and costs of hedging against exchange rate risk. The second one includes administrative costs (in-house costs) incurred by companies as a result of committing resources to activities related to foreign exchange operations. These are the costs of exchange rate risk management, additional expenses for financial reporting, the opportunity costs due to the lower efficiency of managing cash distributed between various bank accounts, and the longer duration of foreign currency transfers.
- *Elimination of exchange rate risk and decline in interest rates:* Elimination of exchange rate risk improves business conditions, triggering adjustment processes in trade and foreign domestic investment. Firstly, the elimination of exchange rate volatility results in reduced uncertainty on the part of exporters and importers as to the future level of costs and revenue, which supports foreign trade expansion. Secondly, a stable exchange rate will reduce the investment risk of a specific country, encouraging foreign direct investment inflow. Thirdly, relinquishing the domestic currency will contribute to a decline in domestic interest rates due to the elimination of the currency risk premium. Thus, the cost of capital decreases, which leads to increasing domestic investment. A stable exchange rate additionally plays an important role in stabilizing the overall price level, making investment decisions more accurate and capital

Table 4 Correlations between supply and demand shocks

	Correlation between supply shocks	Correlation between demand shocks		Correlation between supply shocks	Correlation between demand shocks
<i>EA core</i>			<i>EU15 non-EA countries</i>		
Austria	0.50	0.14	Denmark	0.54	0.27
Belgium	0.73	0.11	Sweden	0.68	0.09
Finland	0.66	0.03	UK	0.57	-0.02
France	0.77	0.23	<i>Average</i>	<i>0.60</i>	<i>0.11</i>
Germany	0.91	0.46			
Ireland	0.36	0.32			
Italy	0.82	0.52			
Luxemburg	0.40	-0.08	<i>New EU member states</i>		
Netherland	0.81	0.24	Bulgaria	0.33	0.08
Spain	0.46	0.30	Croatia	0.37	0.03
<i>Average</i>	<i>0.64</i>	<i>0.23</i>	Czech Republic	0.50	-0.13
			Estonia	0.55	-0.23
<i>EA periphery</i>			Hungary	0.56	0.05
Cyprus	-0.06	-0.04	Latvia	0.63	-0.11
Greece ^a	0.38	0.12	Lithuania	0.46	-0.24
Malta	0.28	-0.02	Poland	0.23	-0.05
Portugal	0.46	0.20	Romania	0.35	-0.29
Slovenia	0.73	0.25	Slovakia	0.13	-0.08
<i>Average</i>	<i>0.36</i>	<i>0.10</i>	<i>Average</i>	<i>0.41</i>	<i>-0.10</i>

^a data starting with 2000

allocation more efficient. The latter argument is particularly relevant for small open economies (McKinnon 1963).

- *Benefits that will become visible over a long period of time:* expansion in international trade, increased investment, greater macroeconomic stability of the country, development of financial markets and increasing competition in the goods and services market and further something that include all this is economic growth and improvement in living standards.

Costs of introducing the euro:

- *One-off costs of euro adoption* on the part of banks, businesses, but also on the part of the state administration. The most important tasks to be performed by businesses will involve, in particular, adaptation to information systems, changes in relationships with employees, contractors, customers, and their own bank. Enterprises will also have to get prepared for legislative changes which will concern them, in particular, in the area of taxes and accounting. The scope of all such tasks will directly affect the level of costs arising from euro adoption.
- Specific costs of banking sector and decrease in revenues of banks lead to a decline in revenues of banks from currency exchange activities and foreign exchange trades which will affect also banks' profits.

- *Effects of asymmetric shocks*

Unless the shocks affecting the NMS economy are identical with the shocks affecting the whole euro area, the loss of independent monetary policy will increase macroeconomic volatility.

Economic theory defines economic shocks as unexpected and typically abrupt events originating in the economic or political sphere, which have a significant impact on key macroeconomic variables.

Applying different classification criteria, the following types of shocks can be identified:

- depending on their source, there are demand and supply shocks,
- in terms of durability of effect, there are temporary and permanent shocks; depending on a geographical source of origin, there are internal and external shocks,
- in terms of the economic sphere creating the shocks, they can be divided into shocks from the goods and services market (real shocks) and from the financial market (financial shocks),
- depending on whether they affect one country (sector, region) or a group of countries (in this case, the relative size of the shock is important), symmetric and asymmetric shocks can be distinguished. A symmetric shock affects economies of a monetary union in the same direction and with a similar magnitude, allowing their single monetary policy to be used to alleviate it. An asymmetric shock, by definition, has a different effect on the main real variables in individual countries in which case using instruments of common monetary policy to neutralize it is difficult. In this case, the burden of adjustment process falls on the country hit by the shock and the economy returns to equilibrium by adjustment in the labor market or domestic fiscal policy.

Loss of independent monetary policy that may be used to reduce fluctuations in output and employment;

We will take a simple example to illustrate the importance of monetary policy. Let us assume that a negative demand shock affects the one of the NMS economy (e.g., consumers decide to buy less goods and services). In the short and medium run, this brings about a reduction in output and higher unemployment. As long as the country has its own currency, it can use both monetary and fiscal policies to stimulate demand and reduce the impact of the shock on output and employment. Moreover, the exchange rate might adjust (depreciate) and thus make our exports more price competitive. Once in the eurozone, two of these channels are closed. First, there is no independent domestic monetary policy which could lower interest rates, and one should not expect the ECB to react to a local shock. Second, after joining the eurozone, the exchange rate disappears, so there can be no exchange rate adjustments.

Accordingly, the only policy tool left after euro area accession is fiscal policy. For this reason, it is of crucial importance to run a balanced budget in the medium run, so that in case of negative shocks, there is a room for increasing the deficit and

thus buffer the shock. Additionally, there are also economic forces which can bring the economy back to equilibrium. The most prominent is wage adjustment—after a negative shock, falling wages can help reduce the cost of production and as a consequence prices. This will increase demand and help the economy return to equilibrium. A crucial prerequisite for this channel to operate smoothly is a flexible labor market—only if wages adjust immediately can increasing unemployment and an economic slowdown be avoided. We know, however, that this downward wage flexibility is rarely seen in real life.

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Is Networking of People, Attitudes and Ideas Exploitable for Marketing of New Energy Solutions?

Klaus Bruno Schebesch

Abstract Strategic decisions regarding future energy production and the resulting energy consumption patterns at the general societal level, also selecting the respective regional or national patterns, are both essential and highly controversial. Alternative technological paths which may be taken into account are surprisingly diverse and sometimes interrelated. However, the spectrum of alternatives ranges from “predominantly conceptual” to “well grounded in practical terms”, and hence, they are associated with many types of uncertainties stemming from technological to societal risks including for instance acceptance barriers. Perceptual, psychological and the socio-economic factors which may not be universal across different economic regions are involved in a stable adoption processes of new energy solutions: think, for example, of a country like Germany which “owns access” to virtually all energy alternatives and may consider abandoning the most controversial technologies like nuclear. An emerging country like Romania, however, which is not actively pursuing but a few of the available energy technologies may consider diversifying its future energy portfolio. The present contribution argues in favour of positively considering marketing-type recommendation as a complementary factor to “purely political” decision finding in the complex domain of future energy production and consumption, in that these marketing-related mechanisms must not “just manipulate” but can genuinely aid the adaptation processes of “ubiquitous social computation” which is unfolding anyway in modern present-day societies. Such adoption processes are based on collective information-processing mechanisms like those involved in the functioning of markets and by using networking of persons, attitudes and ideas. We also discuss whether such processes may be used in order to “predict” mutually acceptable new regional energy solutions. The objective is to propose a problem-oriented recommendation mechanism but not that of naming the most preferable future energy solutions.

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1 Uncertainties Concerning New Energy Solutions

Finding new energy solutions for a growing world population with ever-increasing energy consumption per capita is one of the major challenges of present times and of the decades to come. Or so sound at least very influential political campaigns repeatedly exercised at the global level, and also at many regional and at still many more local occasions. Except for some general awareness about potential scarcity of some widely used energy resources and about rising or volatile energy prices, not very much on the prospects of energy consumption topic seems to be very clear or at least not beset by various contradictions. In addition to all that, the “desirable” patterns of energy consumption do also have strong ideological connotations which seem to be unavoidable even in “neutral” information materials (for different points of view see www.zeri.org, Westra and Kuyvenhoven 2002), making persons think and behave in ways which can hinder the acceptance of rational but non-ideological arguments. This may be especially true in situations where energy consumption is related to sustainability issues. As an observation-based “soft” proposition, we may state that (1) we do *not* know whether energy resources are going to be truly scarce within a medium-term time period of, say, the following 20 years from now, with the addendum that, most probably and on the average, there will be diminishing returns to the “unit effort” of locating and exploiting further energy resources and (2) the price processes for valuing future energy resource will be probably *less predictable* still, even in more qualitative terms, for example, in asserting trend or volatility dominance. This will increase the risk of betting on alternative short-term solutions and may obscure the view regarding any long-term solutions. Hence, in the near to medium term, we are most probably faced with an *increased uncertainty* concerning the prospects of future (old and new) energy solutions.

1.1 Dual Nature of Innovative Energy Solutions

Innovation is an important engine of development for the energy sector, but it also entails a dual nature (Schebesch 2011). The requirement to stick to “sustainable solutions” in technical, economic and social terms means informally to find collectively acceptable and commercially viable ways of using energy leading to “expected medium-term stability” of societal development, which also means attempting to assess and to minimize possible future drawdowns. There are certainly many alternatives for such induced development paths, which may all earn a positive reward in different historical and cultural contexts of development. Examples of the dual nature of innovation abound and can be illustrated for very disparate domains, not restricted to but including many of new energy solutions: a more general example is satellite telecommunication, which is revolutionizing entertainment, many types of highly useful monitoring tasks and even parts of

business. However, space debris as an inevitable consequence is generating serious future threats and costs. As energy related example think of deep sea drilling, which taps formidable new oil and gas reserves, but it is also producing expensive and hard to handle catastrophic spills. In the event of tapping the much hailed arctic gas and oil deposits and methane hydrates (gas trapped in sea bottom ice), important amounts of methane, a potent greenhouse gas, are involuntarily freed into the atmosphere (Bidder et al. 2012). Potential benefits and drawdowns of the nuclear energy options seem to be even more frightening: ultra-high energy densities with fuels lasting for millions of years for some variants contrasted to imminent dangers of reactor meltdowns, lasting contaminations, many other unsolved technological problems regarding re-processing and post-processing of nuclear fuels and, finally, the notoriously high initial investment levels as well as the long-term structure of such programmes. For detailed information on different aspects and in-depth material on present and future nuclear energy solutions, consult for instance the websites www.iaea.org, <http://fire.pppl.gov>, www.ga.com and www.terrapower.com of pertinent and important international organizations and of university-lead or industrial associations.

1.2 Abundance of Alternative Concepts

In general, there are a bewildering number of old and new energy solutions and alternative “solution concepts”, to be read off from material that is quite easily collected over a more recent period (of 1–3 years, say), the Internet sources thereof being some of the more trustworthy technology news organizations like www.sciendaily.com or www.technologyreview.com (the latter being published by the MIT). These alternative solutions range from manifold variants of long-term nuclear projects to highly distributed societal, often extremely short-term actions with low specific costs and sometimes restricted to promoting behavioural or perceptual changes within groups of persons. The latter may also contain a new mix of proven technologies, for example, like coal-fired generators, adjacent greenhouses and photovoltaics—all synergetically used within a confined area. Others consider the locally immediate conversion of, for example, wind-generated electricity into another energy carrier like hydrogen, thus avoiding the use of electricity grids. Still others consider extracting electricity produced by bacteria, which are cleaning wastewater, or growing “energetic” plants on a large scale, which use up carbon produced by combustion engines, thus reducing carbon footprint. However, sustainability of all energy solutions may be questionable when used on larger scales; even the seemingly environmentally “benign” solution variants (often distributed over many small-scale projects, etc.) carry hard to anticipate future risks as they may produce some major changes, for example, by requiring huge landscape interventions and new logistic processes or by being economically wasteful (low energy density, low levels of reliability, etc.) as compared to more traditional energy solutions. Next, we highlight some important

future energy solution alternatives. They may assume different positions in the semi-ordered priority lists of different economic regions or countries.

A list of energy alternatives can be sorted with regard to many features. Additionally, not all features may be applied to all alternatives. Finding, for example, a Pareto front of the alternatives would imply stating several competing goals, which may then be formulated by some selection or by some combination of such features. Some important features of energy alternatives are as follows:

- time horizon to expected availability or maturity (*short term* ST, *long term* LT, *highly dependent on complementary events* (CE); may occur also in mixed form)
- expected detrimental direct effects on environment or quality of life (locally–globally, direct–indirect, retarded)
- expected cost of abandoning the energy alternative (low–high, individual–collective)
- many other “isolated” features...
- complementarity effects between installed solutions (affinity matrix)
- many other features based on pairwise, triplewise, etc., effects...

A priori one can distinguish groups of alternatives (level zero clustering), which entail energy solutions (old and new) starting from proven technologies with long usage histories (Table 1) and subsequently listing the presently still more speculative solutions (Table 2).

In general, the energy solutions F1–F6 depicted in Table 2 are based on less well-proven technologies, which might come with many surprises for large-scale applications. Among these, there might be much lower efficiencies in practice than expected, owing to intermittencies, process instabilities or viability problems with respective technologies. While technologies concerning F6 (advanced nuclear) are a famous case in point for more fundamental technological uncertainty, other energy solutions (F1–F5) may also be rather immature and highly uncertain as far as efficiency and long-term ecology are concerned. Many of these potential solutions are maintained by hype (exaggerated positive prospects thereof) which is propagated within groups of networked people and which may be eventually amplified in the wider public, however, without there being enough reasonable results pointing towards a trustworthy technological assessment. Many awaited technological solutions (from energy and non-energy domains) are proven to be stubbornly hard: jokes of respected domain experts sound like “...a practical quantum computers is decades away (non-energy)”, “...technical scale artificial photosynthesis is decades away (energy)” or “...large scale electricity generation from nuclear fusion is decades away (energy)” and “...will always be so...” (Westra and Kuyvenhoven 2002; Fusion–fission hybrid systems 2009). This deep pessimism might be overstated, but uncertainty is at truly high levels and may be eventually reduced by unforeseeable technological breakthroughs in the future.

While no country and even no much smaller community would be well advised to bet on a single or on a too narrow selection of energy solutions from Tables 1 and 2 (and their possible extensions), the degree of usefully blending or combining solutions of single-energy solutions is not obvious a priori. Attempting to state a

Table 1 Features of the most important energy solutions now in existence for considerable time

Group of proven technologies	Features	Produces/implies
G1 hydropotential, dams	- Short-term availability - Accumulation lake leads to environmental changes	- Mechanical force (ancient) - Electricity (modern) - May imply massive land use - Frees greenhouse gases from accumulation lakes
G2 burning wood	- Immediate availability - Burning wood is usually dirty and inefficient - Depletion of forests	- Heat - Enjoys some “modern reincarnations”, for example, by means of waste-wood pellets
G3 burning coal	- Short-term availability and favourable event dependent - Heavy multiple pollution - Easy to abandon	- All traditional uses except significant use in vehicles - Heavily opposed by environmentalists
G4 burning petrol-derived fuels	- Short-term availability - Polluting, toxic - Versatile, costly to replace	All traditional uses - Heavily opposed by environmentalists
G5 burning gas	- Short-term availability and favourable event dependent - Comparatively clean and easy to maintain - Cheap to abandon	All traditional uses except significant use in vehicles - Moderately opposed by environmentalists
G6 nuclear fission, PWR (pressurized water reactor technology)	- Medium-term availability - High initial costs - Very clean in normal mode, dangerous and costly if malfunctioning - Long-term nuclear waste - Expensive to abandon	- Electricity, heat, radioactive waste - Partially transformable into more nuclear fuel - Has lead to dangerous reactor meltdown accidents

matrix of pairwise energy solution affinities may produce many indeterminacies, even when using as much domain expertise as is available. Some examples will explain this and other concerns:

- Combining G2 (wood) and G3 (coal) would not serve as an attractive future solution taking detrimental effects into account (although is presently massively practiced in India and China), making it a candidate for a negative affinity pair.
- Combining G5 (gas) and G6 (nuclear, PWR) would potentially serve as an attractive future solution as the two are quite clean under normal conditions, but their technological base is very different (both are event dependent owing to gas price evolution and uranium availability and, in turn, owing to the eventual global popularity of G5 + G6). Being opposed in terms of initial capital requirements, short-term availability and cost of abandonment make them candidates for a positive affinity pair.

Table 2 Features of some important but more speculative energy solutions for future use

Group of speculative solutions		
F1 solar thermic, shallow geothermal	- Short- to medium-term availability - Clean, comparatively low tech - Easy to abandon	Heating soils and buildings
F2 wind, ocean wave, deep geothermal	- Short- to medium-term availability - Clean, can be developed in modules (e.g. so called farms) - More expensive to abandon	Electricity, heating soils and buildings (deep geothermal)
F3 biodegradables: plants	- Short-term availability - Massive land use - Easy to abandon	- Biogas; fuels for vehicles - Often competes for edible plants soils
F4 biodegradables: waste	- Medium to long term - Uses genetically engineered microorganisms, for example bacteria - Easy to abandon	- Waste clean-up and neutralization - Electricity
F5 solar photovoltaic	- Short term - Future photovoltaic cells are expected to be more efficient/cost-effective - Needs energy storage - More expensive to abandon	- Using smart grids for exporting surplus electricity and for importing electricity - Direct fuel production converting locally produced electricity into fuels by using water, carbon dioxide, etc.
F6 exotic and advanced nuclear fission, nuclear fusion	- Long term, highly uncertain - Uses unproven and critical technology/exotic materials - Many competing concepts and hybrid concepts - Expensive to abandon	- Electricity - Fuel production

- Forcing a combination of G3 (coal) and F2 (wind) seems contradictory and possibly inferior on ecological grounds (coal pollution + extensive land usage) and drives it towards being a candidate for negative affinity.
- Highly advanced options like combining F5 (photovoltaic) with F6 (exotic nuclear) are way far off present viable use and therefore would appear highly negative in pairwise affinity. However, if bigger portfolios are considered (e.g. G4 & F4 and F5 & F6), they may well have a good chance of being included owing to their features of being highly extensive (F5 land use, large-area servicing) and highly intensive (extremely high energy densities, F6) and also being in contrast to both G4 and F4 which are more easy to abandon.

Table 3 illustrates the energy combined options discussed above. Upon trying to translate the information available from Tables 1 and 2 into affinities in the partial matrix of Table 3, it will become clear soon that for most pairs (and also for most triple and higher-order combinations), there hardly are well-grounded details to be found in order to assign clear affinity values. Such a situation may not be atypical for similar valuation problems appearing at the interface of the social sciences and technology. A way out may be to formulate the effects of energy solution combination as a real options problem (for real options see Hull 2009; Amran and Kulatilaka 1999). However, owing to the high dimensionality of the underlying evolution of state variables, such an approach would eventually run into a similar problem, namely that of providing very many transition probabilities between possible states.

Characterizing uncertainty is, hence, complicated by the occurrence of CE and by the limits on providing well-grounded affinity relations between two or more energy solutions. Many of these affinities are thus undetermined and may be assumed to be neutral, assuming for instance a value of zero. Much like coalitions in game theory models of multi-agent emerging behaviour, here too, owing for instance to pressure exerted by the affinity relations discussed above, some grouping or coalitions of energy solutions (combining solutions from both groups G* and F* of Tables 1 and 2, say) may emerge. Implicit coalition formation leading to “setting of standards” by basically non-cooperative procedures can be found in the management literature as early as (Axelrod et al. 1995). In our context, such procedures based on *social computation* (a presently more fashionable terminology) would amount to formation of *stable, mutually acceptable* energy solutions portfolios or *stable, networked attitudes* towards future energy solutions. However, there is also an important difference: contrary to the case of standard-setting alliances, the new energy portfolios must not contain mutually distinctive options, and hence, they may overlap in general.

1.3 New Energy Solutions for Economic Regions: A Case in South–East Europe

In addition to the universal approach to new energy solutions as outlined in the previous Sects. 1.1–1.2, there are still a series of more specific, regional aspects

Table 3 Partial affinity matrix: pairs and more options (denoted by asterisks, see main text)

	G2	G3	G4	G5	G6	F2	F4	F5	F6
G2	–	neg							
G3		–				neg			
G4			–				****	****	****
G5				–	pos				
G6					–				
F2						–			
F4			****				–	****	****
F5			****				****	–	neg

and characteristics worth considering. In order to describe an empirically relevant mechanism for recommending and predicting new energy solutions for a region, one would at first consider some “political factors” in the sense of opinion formation and voting by considering various subsets of the region’s population. As our regional economic example, we choose that of former Eastern Block socialist Romania, presently traversing a period of more than 20 years into a partially modern capitalist and partially into a retro-traditionalist society, which, for our purpose of analysis, will be succinctly described by the following features:

- a medium-sized country and economy related to its geographical neighbours,
- with still untapped economic potential (resulting in a broad cone of possible development and energy solution adoption paths),
- with moderate quantities of own natural resources (resulting in increased risk concerning the patterns of use of own versus imported resources),
- a blend of “laissez-faire” capitalism and clan-oriented power structures unwilling or unable to enforce a stringent national development strategy (resulting in still increased uncertainty concerning any long-term adaptation process or technology commitment),
- an educated but declining population (resulting in an ageing population with structural problems very similar to some of the most developed economies)

In addition, there is a tendency towards increasing social stratification resulting in widely diverging views on how to best use and combine energetic resources, for example, the use of forest wood and the prospect of solar and nuclear energy options including the “advantageous” positioning of the country’s energy policy within the range of acceptable (sustainable) solutions variants agreed upon by the European Community.

How do then people and ideas “network” in order to advance future energy solutions in different countries, such as Germany (heavily industrialized, export oriented, quality of life discussion is pro-eminent) or Romania (economically emerging, role model seeking, traditionalist)?

Rich Germany gives in to political and ideological pressure in a post-Fukushima disaster mood in order to abandon nuclear energy altogether (the state of affairs as of summer 2012) and is prepared afford pursuing (heavily subventioned) long-term programmes on extensive alternative energies like solar, wind, waste wood and also of different regional portfolios which combine these energy technologies (the intensity and the level of detail with which such programmes are defended publicly can be seen, for example, in “Die Strompreislüge” 2012 and “Packing some power” 2012, for the more general views in the developed countries).

Much less strategically oriented Romania agrees upon a general necessity of replacing energy options with poor environmental and efficiency record (wood fires, etc.). Other energy options are subject to high economic uncertainty (natural gas imported from Russia, etc.), making a strategic decision difficult. Limited resources may also constrain the number of alternative options the country can pursue in parallel or in suitable combination. Compared to the big European player

Germany, Romania is hardly engaging into any public discussion regarding national and regional energy solution choices.

The present contribution argues that determining the energy future of a country by heavy political pressure (or manipulative forces) of some very active minority groups alone, a situation which seems to coincide by and large with the German case, and, equally, leaving the energy future to (hopefully) advantageous adaptations to essentially random events, a situation which may characterize the case of Romania, are both inferior choices for not being truly desirable and, presumably, not truly sustainable as well. In order to counter the two extreme but nonetheless quite typical cases, a more principled procedure, based on recommender technology derived from marketing-oriented thinking, may be the adequate guide. For illustrative purposes, let us turn again to the above-mentioned two countries, Germany and Romania. We note that they have

- different ways of *networking* the interested communities and attracting new community members,
- different ways of managing (reinforcing, changing) *attitudes* concerning energy production and energy consumption patterns and
- different intensity and depth levels of promoting (identifying, presenting, comparing) new and old *technological and organizational ideas* concerning energy solutions.

Stability and resilience of (multiple) networking may depend positively on the levels of national wealth, which in the German case translates into the much more notorious societal concern with energy topics. A similar situation is valid for the US case. While the principal German motivation may be found in ecology, the principal US motivation might well be the goal of national energetic self-sufficiency. The Romanian motivation might well be a mixture of these goals: improving ecology, improving energetic self-sufficiency, but, to a large degree, also improving efficiency of inherited, by now outdated energy technology. Another characteristic of the Romanian case is the far lower intensity of public or other group debate on energy issues in general. Concerning the energy solution lists of Tables 1 and 2, almost all energy technologies are available, at least in principle. Curiously, G6 (nuclear PWR) is not available, but some F6 (exotic nuclear, natural uranium fission reactors) is being pursued at slow pace for more than 30 years.

2 Socio-Economic Context of New Energy Solutions

Proposing a new energy solution by means of scientific intelligence based on laboratory feasibility or “proof-of-principle” experiments does in general *not* mean that a marketable solution is also at hand. A marketable solution requires a sufficient level of *trust* and *stable mutual acceptance* thereof in society. An all too often neglected slogan from marketing applies here too, insisting that: *A new*

solution is not yet a product. Especially in the context of accepting and adopting new energy solutions, *considering long and complex cycles* of societal interests may be decisive for their long-term success. In a similar context (Brondizio et al. 2009; Ostrom 2009) claim that polycentric systems (implying multi-party involvement) hold the key to sustainable solutions of complex problems involving environmental, social and a series of commercial and economic interests. For new energy solutions, *long and complex cycles* of societal interests may not directly refer to concrete energy options but may refer, for instance, to a consensual wish of cultivating nuclear engineering, of cultivating certain technologies in conjunction with others, exploiting local resources like wave or geothermal and aiding the different energy production technologies by local industries. Eventually, all such societal interests contribute to (re-)arrange the partially ordered preference lists of old and new energy options over time. Being long term as well, these cycles do not have much in common with market-like structures, at least not in the sense of favouring solutions which minimize transaction costs (i.e. those which are short term, self-financing, with many small-scale distributed units, requiring the least amount of formal approvals or regulations). Hence, here we propose *not* to confound marketing with the search for and the implementation of transaction cost, minimizing market-like structures in the above sense. Marketing is used here for the purpose of searching for *winning* stable, mutually acceptable new energy solutions (portfolios) by using ordered preference lists and technological complementarity.

2.1 Dynamic Opinion Formation

Given a list of potential energy solutions, dynamic opinion formation may act by means of neighbourhood information exchange (Baronchelli et al. 2007; Blondel et al. 2008; Krause 2000; Schebesch 2011) in social and technical networks (on networks, see Newman et al. 2006). Such opinion formation selects several more trustworthy solutions which consumers, or alternatively, consumers and producers, could more easily agree upon (for opinion and trust formation, see Schebesch 2011).

Attitude formation about more abstract, future-oriented products and services, which may not cover self-explanatory basic needs of people, can in part be traced back to opinion formation processes within social networks. Opinion formation evolves alongside trust formation. Trust between clients is an important factor for building recommender systems based on past client scores (Schebesch et al. 2010; Bolton et al. 2004) and can contribute to changing client behaviour. A similar process of trust building and recommendation is stipulated to function also in the case of more complex attitudes as are those concerning the adoption of new energy solutions.

Assume that the only observable for modelling this process may be the network structure and whether the group of people using the network—starting out with

different opinions about or rankings of potential energy solutions—have reached a consensus. Then, a rather simple dynamic opinion formation model may be used, which can also be considered as a basic ingredient for modelling the formation of conventions and of standards, by using a procedure of message exchange between agents in social (client community, etc.) environments. Such dynamic opinion formation can also be related to the modelling of negotiation processes, see (Baronchelli et al. 2007).

Models for dynamic opinion formation typically use *bounded confidence*, in order to restrict direct interaction within groups of *culturally similar partners*—a neighbourhood concept used to describe the emergence of communication in networks. Very likely, there is no closed mathematical solution for opinion formation models (Blondel et al. 2008), but extensive numerical experiments with simple variants of such dynamic models using a few obvious parameters concerning the action of neighbourhoods do have the following generic features:

- For a broad range of parameter settings and for many initial opinions, *consensus* eventually emerges (one single opinion is finally reached).
- For other parameter ranges, the dynamics typically exhibit *opinion polarization*, that is, convergence towards two or many final opinions.
- For slight parameter variations (e.g. as can be attributed to the influence of chance), *phase transitions* occur: a minor variation in critical parameter values leads to abrupt changes in behavioural type, for instance, the sudden transition from consensus to opinion polarization.

The basic dynamics of opinion formation are well described by Krause's consensus formation model (Krause 2000; Blondel et al. 2008), which simply states: First assume that $n > 0$ agents $i = 1, \dots, n$ are connected via a topology which is inducing a neighbourhood. These agents are evolving their respective opinion $X(i, t) > 0$ over discrete time $t = 0, 1, \dots, T$ by updating for every agent $i = 1, \dots, n$ the following (purely deterministic) difference equation:

$$X(i, t + 1) = \sum_{\{k(i)\}} \frac{X(k, t)}{|\{k(i)\}|}, \text{ with random } X(i, 0) > 0$$

where the index $k(i)$ is running over the neighbourhood of every agent i and where “ $|\cdot|$ ” denotes the number of respective neighbours. The index set $\{k(i)\}$ is computed by finding all the

$$\{k : \|X(k, t) - X(i, t)\| < w\}, \text{ for a given } w > 0.$$

Here, $\|\cdot\|$ stands for a *distance function*, which simply measures the absolute difference between opinions and opinion values of agents k and i . By convention, the n starting opinions are sorted, that is, with $X(n, 0) > X(n - 1, 0) > \dots > X(1, 0) > 0$. Owing to the agent-dependent dynamic index set $\{k(i)\}$, the dynamic process $\{X(\cdot, t)\}$ is adaptable to every interconnection topology *evolving over time* in the agent's relational network. Adaptation is steered by setting $w > 0$

for the size of the neighbourhood. Simulations show that the overall dynamical properties of opinion formation are more complicated than perhaps guessed from their simple equations.

2.2 Trust-Based Cascaded Opinion Formation

Using the general features of opinion formations outlined in Sect. 5, a very robust producer–consumer opinion formation process is presented (Schebesch 2011), which polarizes opinions from a potentially large list of starting options. As time evolves, we assume that trust increases between agents, albeit with different rates in different contexts. For simplicity, dynamic effects of forgetting and unlearning are neglected. As in Sect. 2.1, we start out with an opinion formation process $X(i,t) > 0$ over discrete time $t = 0, 1, \dots, T$, now called *opinion formation of consumers*. Next, we adjoin a second process $Y(i,t) > 0$, called *opinion formation of producers*, which functions according to the same dynamic equations as process X . For simplicity, we assume a unidirectional dependence $X(Y)$, which reflects a trust increase with those consumers which form opinions in the vicinity of those evolved by the producers. The difference in the basic process described in Sect. 2.1 resides in the dynamic neighbourhood of every agent. The index set $\{k(i)\}$ of every consumer $i = 1, 2, \dots, N_X$ is now computed using a *trust-based* radius $W(i,t) > 0$ (instead of constant radius $w > 0$), which partially depends on the match with the opinions evolved by the producers $j = 1, 2, \dots, N_Y$ and which evolves over time according to

$$W(i, t + 1) = W(i, t) + W_X + W_{XY} \sum_{j=1}^{N_Y} u(\|X(i, t) - Y(j, t)\| < W_{XY}), \quad \text{with} \\ 1 \gg W(i, 0) > 0,$$

with $u(\cdot)$ the unit function, which returns 1 if the argument is true and 0 otherwise, and with the parameters selected to be $W_X = 0.5$ and $W_{XY} = 0.075$. The index set $\{h(j)\}$ of every producer j is updated by a trust-based radius $V(j, t) > 0$, which simply increases with time, namely

$$V(j, t + 1) = V(j, t) + V_Y, \quad \text{with } 1 \gg V(j, 0) > 0,$$

for parameter value $V_Y = 1.5$.

If $N_X > N_Y$ as assumed in the sequel, the starting opinions of the producers $\{Y(j, 0)\}$ are a true subset of the starting opinions of the consumers $\{X(i, 0)\}$, reflecting more focused information of the producers. Figure 1 depicts an example of a cascaded opinion formation process, where the outcome of the consumer opinions (right plot) depends on the outcome of the faster opinion formation process of the producers. Nine opinions converge to an opinion representing a product solution with lower creativity, say, and six to, say, a high-creativity solution (left plot). On the consumer side (rhs plot), all opinions tend towards nearby located high-creativity solutions.

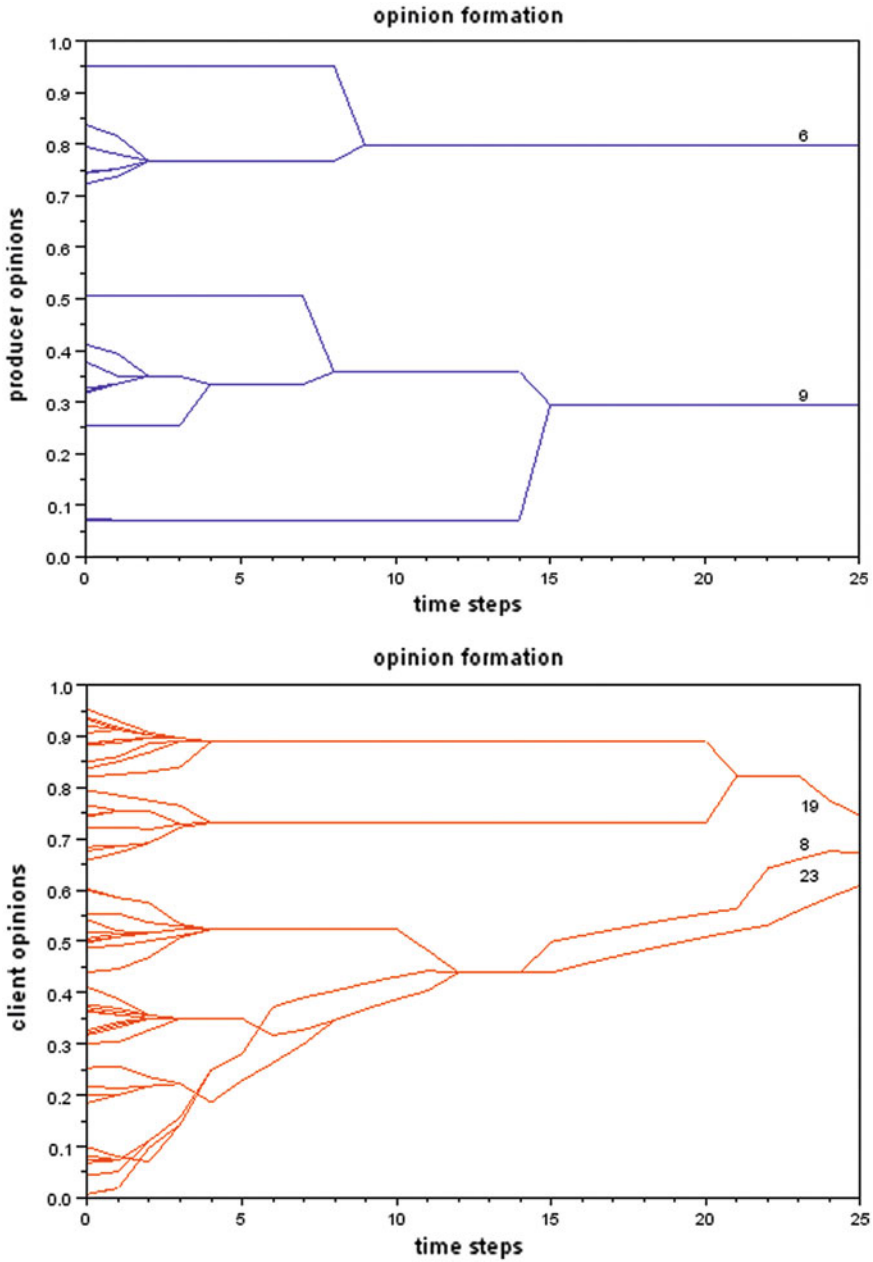


Fig. 1 An opinion formation process with a starting number of producer opinions of $N_Y = 15$ (lhs) and a starting number $N_X = 50$ (rhs) of consumer opinions, respectively

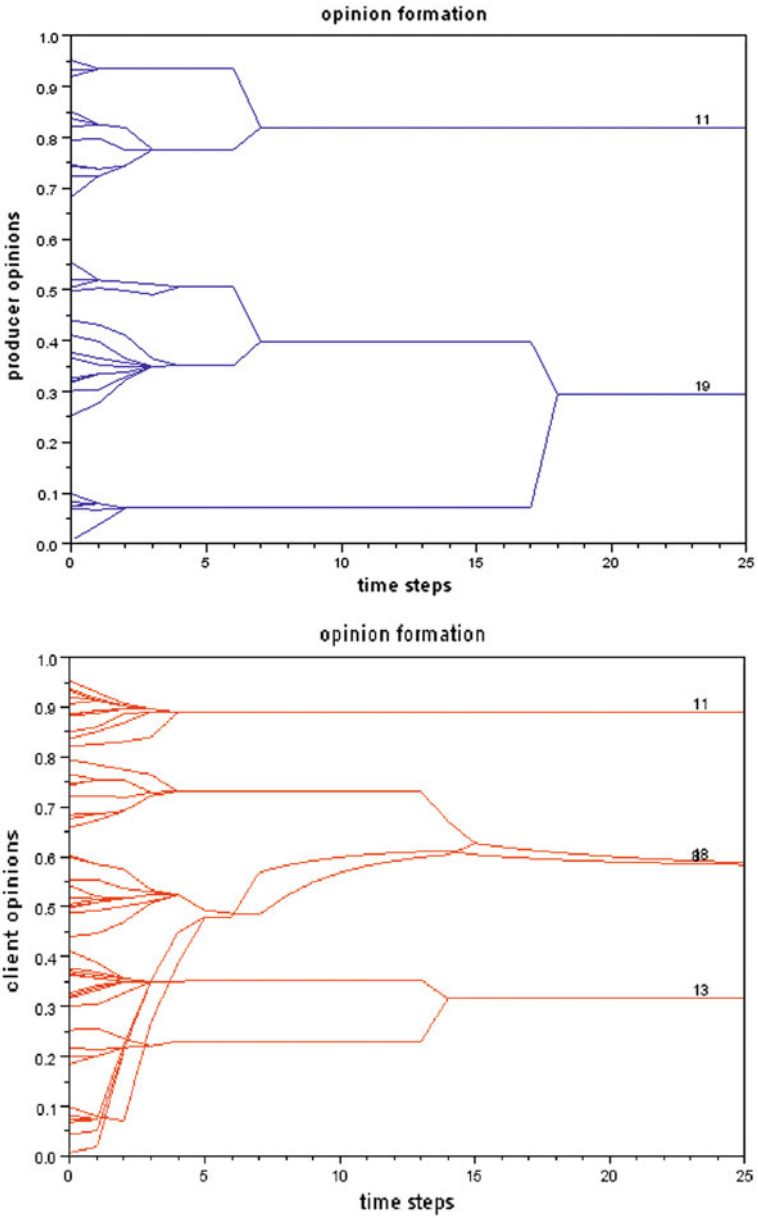


Fig. 2 Same opinion formation process as that of Fig. 1 except bigger $N_Y = 30$

Figure 2 depicts a process with the same consumer starting opinions and the same parameters for both processes, but with more producer starting opinions. Two converging producer opinions occur with slightly less original opinions

(11 out of 30, or 36 %), now representing the more creative solution. The consumers retain two distant extreme opinions (originating from 11 and 13 starting opinions, respectively), while a slight majority of different initial opinions tend towards opinions representing medium creativity.

Generically, the qualitative properties of this cascaded opinion formation process are very stable with regard to changes in the parameters and also with regard to smaller changes in initial opinion distribution of both processes.

Obviously, in the context of opinion formation regarding future energy solutions, more complex object representations leading to opinions are used. The stylized opinion formation processes from Figs. 1 and 2 may assume that there simply are different opinions about a single object (a fashion trend, say). Alternatively, starting opinions may be identified with different objects (products, say). Still, they can all be “sorted on the line”, that is, they are trivially ordered by some composite scalar index like *date of appearance* or *originality*. A first question then is about what exactly do we have opinions in the context of energy solutions? Are they about single components of an energy solution (i.e. about component valuation)? Or, are they about the energy solution as a whole or even about solution combinations (i.e. about higher-level impressions)? Posed in another way, the question reads: do we need to evolve opinions in the object space? Such object representations generate sets of elements from more structured spaces (vector spaces with constraints, appropriate subspaces of trees, graphs, etc.) capable of mapping relevant relations between components and features of the single-energy solution.

The opinion dynamics alone can, in principle, be mapped to the line (as in the computed examples from Figs. 1 and 2) reflecting in their starting opinions, by means of a suitable projection mapping, the relations between the objects in their more complex original representations. An alternative approach would be to dynamically value or colour the space of objects reflecting thereby *opinion concentration* on certain energy solutions, possibly by taking into account the preference for new solutions (e.g. inspired by Hoeffler 2003). However, note that emerging opinions from the opinion dynamics depicted in Figs. 1 and 2 need not coincide with any starting opinions. In an appropriate object space, this feature would favour representing both energy solution combinations and energy solutions, about which there is no initial opinion expression by a set of relevant agents. Insisting on object space representations has also another desirable consequence as it enables designing of energy solutions in an appropriately restricted and focused ways. Restrictions and focus refer to handling certain feasible design operations (for process design complexity consult e.g. McNerney et al. 2009) such as combining energy solutions and finding additional (complementary) uses of energy and industrial (agricultural) processes. All these design operations build on trustworthy scientific results and technological components (and cannot substitute them).

However, being in a position to operate on designs of energy solutions in the above-restricted sense opens up a wealth of possibilities to pose extremely focused questions or even formulate sufficiently narrow problems, which can then be handed out to a large community of persons inclined and able to contribute to

pertinent innovations by using the quite productive methods of *citizen-science*, namely by organizing *innovation contests* and *crowd-sourcing* (for the dynamics of heterogeneous, preference-based decision finding consult e.g. Wang et al. 2009, and for opinion and innovation dynamics consult e.g. Martins and Pereira 2008).

2.3 Using Innovation Contests and Crowd-Sourcing

An important aspect in providing new and *mutually acceptable* energy solutions is the use of specific collective innovation processes such as those organized by *innovation contests*, which may lead both to technological and to complementary social innovations. Two premises lead to the growing relevance of this type of innovation procedures:

- In many domains, including that of new energy solutions for a region, it becomes increasingly difficult to *forecast by expert opinion* what consumers can agree upon. As stated in the previous section, this is not meant to interfere with basic energy research, for which any whatsoever educated public other than the domain expert is often hopelessly underqualified.
- Transaction costs of *inventing* decrease dramatically with the spread of Internet-related platforms. As long as to subject of inventive design is comprehensible for the informed and interested public, the subject matter can nevertheless be highly complex in the sense of many possible variants and subvariants or many possible evolution paths. Here, different people may develop very different intuitions about the subject (in analogy to the ability, they have interesting intuitions about business ideas or about art valuation), which can be very beneficial for the collective innovation process.

While such approaches are in general clearly useful for automated marketing and forecasting procedures as described in (Schebesch et al. 2010), there is mounting evidence that they can be applied (with adaptations) to genuine innovations as well (Terwiesch and Xu 2008; Tödting et al. 2009; Natter and Mild 2003; Urban et al. 1996). An innovation contest for new (regional) energy solutions requires designing a mechanism for efficiently collecting and evaluating (i.e. filtering) proposals received from a large number of participants originating from a broader societal context. By providing sufficient comprehensible information (and diverging historical opinions) about important energy alternatives, it may be possible to counteract strong emotions (threat perceptions, fear of hidden dangers, etc.) often present in regional or national public opinion, acquiring in some cases the intensity comparable with moral or cultural traits (Pfister and Böhm 2012). Moderating the reach of such sentiments can aid in finding truly sustainable regional energy options and also bring to the fore the hidden potential of the societal innovative forces.

3 Predictive Approach for Recommending New Energy Solutions

Many innovative businesses formed around modern energy– or bio-related activities are the result of collective action of organizations involved in many-sided markets, which can be found in and around focusing environments such as business incubators, technology centres or, as in our case, are part of a long and complex societal cycle. Within such environments, group interests beyond those of single producers and their immediate clients exist and interfere (Schebesch 2011). In the sequel, we attempt to find a stylized approach which accounts for such interdependence (for a contrasting macroview on neutral innovation dynamics consult e.g. Andergassen et al. 2006).

3.1 Coding of Energy Solution Alternatives

We assume in the sequel that a coding or representation of the different energy solutions is chosen in order to make them comparable. Such a coding entails at least unambiguous naming of the alternatives (the simplest variant) and some structural information thereof (more complex variants). Concerning choices between such coded energy solutions, and, respectively, solution portfolios, ranking and weighting procedures are in demand. At first, there should be determined whether in the energy context, choices from a reduced set of solutions (some nuclear and photovoltaic variants, say) are different from choices considering all alternatives. Such choice situations are discussed in the marketing- and microeconomics-related discrete choice theory (Tversky 1972, for elimination of alternatives; Simonson and Tversky 1992, for *context-dependent choice*). However, owing to the dynamic nature of creating extreme (more speculative) and intermediate (more pragmatic) energy solution alternatives, it is hard to decide whether a given set of alternatives is *complete* or *near complete*. Another important point is about finding out about *preference for diversity* (Anderson et al. 1992, p. 80ff) in the context of energy solution choice. A further issue to resolve relates to the preference for *really new products* (Hoeffler 2003), transposed to the present context of energy alternatives. Risk propensity, perceived risk and especially strategic risk of alternatives can be usefully connected to permutations of sorted lists over time (Collins and Ruefli 1996).

However, in the context of energy solutions, it may be insufficient to treat the selection process as one of opinion formation from a static list of initially ordered opinions as described in Sect. 2.1. As huge amounts of structural information about energy options are (or become) available, graphs of relations between the energy options can be drawn up.

Between pairs or sets of such options, one may compute similarities or distances. Such similarities computed on technological grounds and also based on the

associated risks are sketched by the bottom network of Fig. 3. In order to achieve this, one may collect information about the feasibility, the costs and risks, as well as possible hybrid or combined energy solutions, for example, of many exotic nuclear options from reports like DOE’s (“Fusion–fission hybrid system” 2009). The top network from Fig. 3 sketches a complementary graph by which people relate by way energy attitudes as indicated in Sect. 2.3.

A candidate object for representing the choice problem would then be the set of permutations of the available options at a given point in time (for predicting combinatorial structures consult e.g. Vembu 2009). Such a representation is ranking or a priority list of energy options. For a number of energy options $m(t) > 1$, there is no natural a priori ranking of their members or of groups of members. Additionally, there is also no point in considering all $m(t)!$ option list permutations (rankings) as acceptable solution candidates, as some of the rankings will obviously be widely preferred and many others will be indistinguishable with regard to preference (see also Sects. 1.2 and 1.3).

3.2 Predicting Energy Solution with Multi-Label Classifiers

A similar problem appears in the context of learning to classify and to predict combinatorial structures using methods of statistical learning (multi-label versus multi-class problems, e.g. Tsochantaridis et al. 2005), which can be solved

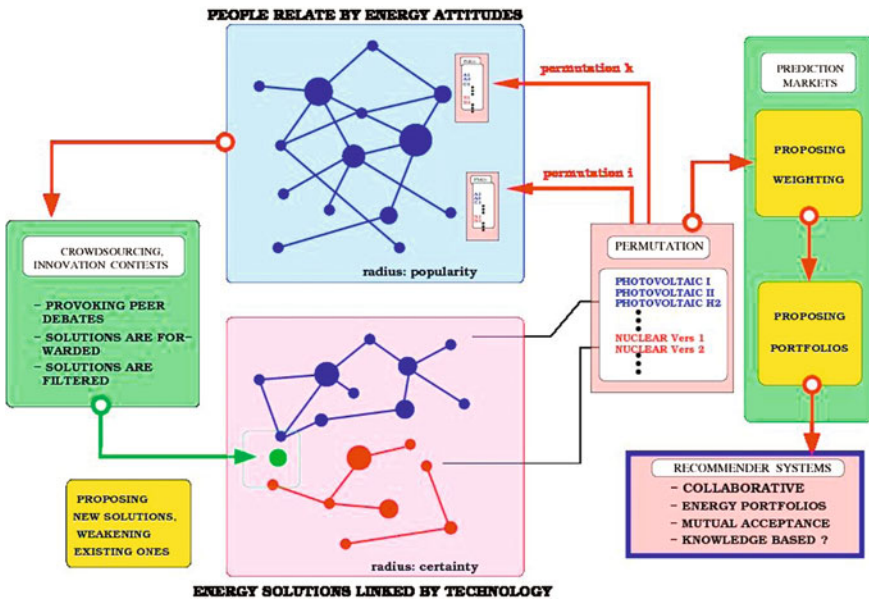


Fig. 3 Recommending energy solutions by predicting acceptance of weighted permutations

technically by considering associations between the combinatorial structures (e.g. permutations). Such *preferred* permutations, that is, viable or at least debatable energy option lists, are then mapped to the network of energy option attitudes (the upper network sketched in Fig. 3). In this figure, the number of persons (consumers, produces), which stick to the different options, is depicted by the radius of the respective network node. Most influential relations between people—or groups of people, as is more often the case in the energy choice debate—are indicated by edges.

3.3 The Recommendation Process

A feature which tends to distinguish regional energy option choice from more mundane consumer choices is the intensity and insistence of proposing new solutions (and often trying to weaken established ones) by a heterogeneous community of innovators. As described in Sect. 2.3, such actions can be modelled and organized by means of *innovation contests* or *open innovation* (Terwiesch and Xu 2008) or by means of *crowd-sourcing* (Gassmann 2010), which do provide useful input data for competitively ranking energy options. The most important data they provide are new energy solution proposals. A neutral crowd-sourcing process can also lead to more critique (or weakening) of established solutions. In the wake of such inputs, changes to the lower, technology-based network from Fig. 3 may occur, for instance, by linking hitherto separated solutions by a new proposal (depicted by the framed isolated vertex) or reducing the degree of certainty of solutions (depicted by the radius of the respective vertices).

Information from the lower network leads to the proposal of a potentially acceptable energy solution ranking (a permutation). A refined action is then to weigh the rankings and to henceforth produce potentially acceptable portfolios of energy solutions (depicted by the box named *prediction markets*). This process can be aided by real-world input stemming from experimentally organized prediction markets (Barbu and Lay 2011, diverse software solutions for implementing prediction market mechanisms can be found at www.midasoracle.org/predictions/software/).

Finally, recommender systems (as depicted in Fig. 3) operating in the sense of collaborative filtering (Abernethy et al. 2009; Candes and Recht 2009; Ahn et al. 2009; Xia and Benbasat 2007) are used to forward mutually acceptable and hence stable energy solutions. The main loop of this stylized energy option selection mechanism is related to learning and forgetting in agent networks, which are obeying specific patterns (Wu and Hubermann 2007) and which may be accounted for in any experimental realization of this process. Other aspects which have to be accounted for are the fact that most natural persons are members of multiple parallel networks, which may interact only very weakly. Neighbourhoods in such multiple networks must hence be detected. Finally, closing the cycle with dynamic opinion formation (of Sects. 2.1 and 2.2), one may note that a very efficient transmission of attitudes (and ideas) between people is a well-functioning trust and

reputation mechanism. Trust evolution can be closely related to recommendation, for instance, via the evolution of trustworthy tasks, which then leads to products which finally can be recommended to agents (see Schebesch 2012, for a trust–reputation–production–recommendation cycle model).

4 Conclusions and Outlook

After pointing to the rich technological and societal background and implications of new energy solutions and to the even more demanding regional energy option choice problem, one may ask whether it is possible and, indeed, useful to consider describing an experimental mechanism, which can support the search for truly sustainable and mutually acceptable solutions. Upon positively answering this question, the mechanism is projected to be based on adapted variants of *social computation* entailing such processes as innovation contests, crowd-sourcing, prediction markets and recommender systems. The connection of energy option search to (application neutral) opinion formation dynamics is discussed, which leads to considering important representational problems of single and combined energy options. After describing the possible role of innovation contests in forwarding new energy solutions, a framework for predicting mutually acceptable energy solutions is presented.

Predicting a weighted permutation of adequately coded energy solutions may solve the task of stable mutual acceptance of a solution by energy consumers and energy industry alike. The conceptual approach and first step towards a real-world computational mechanism are outlined. The approach is strongly inspired by relational aspects between people and technologies. An additional application would be the use of structured output classification in order to determine the probable type of game prevailing between people, attitudes and ideas with regard to opinion and trust formation, which may lead to effective relational marketing of future energy solutions.

The quality of the resulting predictions will depend on the ability to identify and chart emerging complementarities of different energy development paths as they co-evolve over time. Regional characteristics of groups of people and their attitudes would have many entry points into the proposed experimental mechanism. A more simple multi-agent dynamic model with appropriate learning and forgetting rates, which enables extensive simulation and stability analysis, may complement the experimental approach.

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A Multi-Agent System for Acquiring Transport Services

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Abstract The economic crisis and the increased business environment uncertainty have led to shrinking the business figures and adopting cost-cutting programs in many industries, which had affected the service acquisition procedures. Companies asking for transport services and, also, the service providers have been improving the planning and decision making processes, asking for software systems adapted to the new business models. The multi-agent systems (MAS) represent an adequate approach in addressing these rapidly changing business needs. The chapter presents a multi-agent system, named TranServ for transport services acquisition, developed by the authors, in line with several FIPA compliant standards. In order to justify the development solution, the authors analyze several MAS standards and methodologies. For designing the system, the MASA methodology is applied. The analytic hierarchy process (AHP) tree algorithm is used to model the agents' behavior. The implementation is done on JADE Platform. The authors will continue the development of the system, improving the auction algorithm and refining the criteria for choosing the best service offers.

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1 Introduction

In recent years, the transport volume of passengers and freight in Romania has decreased. In terms of volume, the road transport of goods carried by the licensed transport operators has dropped in 2010 by 40.3 % compared with 2009 and by 51.0 % compared to 2007 (INS 2011). In 2009, the volume of the road transport decreased by 19.5 % and the goods transport performance decreased by 39.2 % compared with 2008 (UN 2010). A re-orientation of goods flow towards road transport took place. In 2009, the share of road transport in the freight market structure was 83.95 % at goods transported and respectively 60.91 % at freight transport performance in domestic traffic (UN 2010). In the absence of any re-orientation towards other transport modes, the increase of the share of road transport with over 10 % until 2013 is expected.

The economic recession and the increased uncertainty in the supply chain have led to shrinking the business figures and adopting cost-cutting programs in many industries. This economic situation inevitably calls for changes in the distribution setup, while still maintaining focus on the customer needs (Capgemini Consulting 2011). Many shippers and logistic service providers have learned that they have to improve their planning and decision making processes. One possibility of doing that is to use more productive software systems. A major trend in the transport management software market is the usage of web based and the supply chain integration solutions. In recent years, the wide range access to the Internet changed the traditional way of doing business. The companies and their customers are making the transactions easier thanks to the Internet technologies, available on the market. In electronic commerce, the most important types of transactions are business-to-business (B2B), business-to-customer (B2C), customer-to-customer (C2C) and customer-to-business (C2B). The IT infrastructure of the companies includes more and more Internet-based technologies. The enterprise architecture is constantly changing, to integrate new business models. Connectivity and visibility enable the supply chain integration, through the multi-party collaboration of shippers, carriers, clients and authorities. The enterprise architecture is constantly changing, not only to integrate new technologies and business models, but also to face the high volatility of the emerging economy. The service market is one of the most dynamic components of the economy.

The multi-agent system (MAS) represents a complex system, as part of a dynamic IT enterprise architecture. The usage of the MASs in the framework of an enterprise architecture is presented in several papers (Erl 2005; Kishore et al. 2006; Hurwitz et al. 2007; Fingar 2010; Godinez et al. 2010; Mogoş 2010). Based on these examples, we can consider that the software agent properties, like: autonomy, degree of cooperation and communication, responsiveness, mental concepts, persistence, stamina, mobility, social ability, pro-business, and trust provide a good basis for assuring the IT architecture dynamics.

2 Interactions in Multi-Agent Systems

MASs assure a distributed and concurrent perspective on problem solving. This perspective heavily relies on complex interactions which should take place during the problem solving process. MAS can be seen as a weakly connected network of entities that collaborate in order to solve a problem.

The main types of interaction in MAS are the communication and the coordination, which are described below:

2.1 The Communication Between the Software Agents

The ability to communicate is an essential characteristic of any software agent. During the recent years significant efforts have been made for improving the agent communication, defining specific languages for information exchange, such as: agents communication languages (ACL) and knowledge query and manipulation language (KQML). In order to exchange messages, MASs use the conventional communication between computers, such as: sockets, remote calling methods and procedures.

For the *local communications*, MASs are using “meeting abstracts”, initially proposed by Telescript (White 1996), advertisements for group communication or, more recently, “tuple spaces”. A communication mechanism is needed for exchanging messages, regardless of the communication type. The main problem in sending messages is that after message is sent, the receiver agent could change its location, and the message can be easily lost. Two solutions were defined, the translation (forwarding) and distribution.

MASs use different communication strategies. The object management group—mobile agent system interoperability facility (OMG MASIF) standard deals only with the interface for agent calling and locating on different platforms. AGLETS and VOYAGER are using translation, associating the “House” role to a proxy object. EMERALD (Kravari et al. 2010) is using translation and casting for dealing with the situations where the agent which should receive the message is not found. There are also systems, like AGENT TCL which provide mechanisms based on a common call procedure, leaving the failure of the message sending to the application developer. Some of the most important communication languages are presented below:

- **FIPA.** It ensures a maximum interoperability between agent-based systems, providing also different solutions for developing communication and interoperability between agents. FIPA assigns tasks to technical committees (TC), responsible for the performance and maintenance of these tasks. Once assigned a task to a TC, it must return a detailed task description in ACL. The FIPA-ACL considers messages as actions or communicative acts. The syntax is similar to that of KQML, the only difference being the primitives’ names.

- **KQML**. It is a high-level communication language which can be seen as a protocol used to exchange information with syntax, content and independent ontology. Therefore, it is independent of the exchange mechanisms, as TCP, STMP, etc. The content language (for example, KIF, SQL, etc.) and KQLM ontology consists of the following three levels: content, message, and message service set.
- **ORB** (Object Request Broker) and **CORBA** (Common Object Request Broker Architecture). ORB is the communication structure based on distributed objects. ORB is essentially useful for messages interchanging. OMG defines a common architecture for the ORB agents, thus enabling the creation of specific CORBA platform.
- **KIF** (Knowledge Interchange Format). It is one of the first languages that was proposed in the KSE as a standard to describe databases, software agents, etc. KIF has been specially developed to produce an “inter-language”, meaning a language able to translate information from one language to another.
- **RMI** (Remote Method Invocation). It is a set of APIs that allows an easy and powerful distributed network application development. RMI has its own ORB which does not match with CORBA. This means that the RMI ORB objects can communicate only with objects that use the same type. ORB RMI protocol is named JRMP (Java Remote Method Protocol).
- **ADLMAS** (Architecture Description Language for Multi-Agent Systems). It is a language for describing the architecture of a MAS. ADLMAS includes essential features for describing system architecture.

2.2 The Coordination Between the Software Agents

In recent years, the research has focused on the communication and coordination between agents.

Inside the enterprise architecture, the multi agent systems are used in order to make intelligent and effective coordination of multiple autonomous agents endowed with various properties specific to the tasks they have to do. Through coordination, the agents complete their tasks correlating their actions and pooling the knowledge and capabilities. The most common coordination techniques are described below:

- **Negotiation process**. It is a communication process that takes place between groups of agents in order to reach an agreement acceptable to all participants (Bussmann and Muller 1992). During negotiation, agents communicate original proposals first and then attempt to arrive at agreement by seeking alternatives. To do negotiate, they must be able to interpret features Belief (Conviction)—Desire (Desire)—Intention (Intention) of other agents. Negotiation techniques are grouped into three categories: negotiation based on game theory-based, planned negotiation and negotiation modeled on human behavior. In the negotiation based on game theory, the agents are rational in economic terms,

trying to maximize their utility functions. Negotiation is a process that is planned in two stages: first an agent creates an action plan, considered optimal for task execution. On the second stage, the agent coordinates its actions with respect to other agents to resolve any arising conflicts. Negotiation emulates the human behavior in which the negotiators use their experience and expertise in the field. In (Bodea and Mogos 2012) a negotiation made by software agents is described for university resource allocation.

- **Multi-agent planning.** The agent-based planning aims to avoid the inconsistencies and distribute conflicts found in the actions of agents. The plan defines tasks priorities and also a specific sequence of them for each agent. Multi-agent plans cover a relatively small period of time due to the dynamic environment of the MAS. Specific to this technique is that agents' actions need to be agreed upon with all the cooperating agents.
- **Contract net.** It is one of the most effective and popular techniques for task allocation and resource coordination among agents. "Contract Net" is built on the contracting mechanism used in business to manage the exchange of goods and services. In the contract net protocol, if an agent can not solve the problem itself, he turns the problem to another agent in the proximity. In this approach, the agent can hold two roles, as manager and contractor. The limitation of this technique is the intense communication between agents, which leads to the infrastructure overload in real-world applications.
- **Market-based rules.** Dynamic MAS containing a large number of participants could be developed. The market mechanism contains: a voting process, bidding, and processes related to the electronic economy. In the voting process, the agents choose a set of alternatives, and finally select the alternative that received the most votes. (Huhns and Stephens 1999). Auction mechanism has been adopted in many applications based on MAS, such as resource allocation in operating systems (Waldspurger et al. 1992), the bandwidth allocation for computer networks, allocation of tasks. Regarding the electronic economy, the calculation processes are becoming increasingly complex as agents have a greater degree of autonomy. In the electronic market, they must behave rationally and optimally use their resources. In (Mullen and Breese 2000), an electronic market allocation is described in a distributed operating system resources environment.

3 Agent-Oriented Methodologies for Developing Multi-Agent Systems

Defining the architecture of a MAS and implementing such systems represent complex processes. The role of agent-oriented methodologies is to support the development of MAS. Several research (Brinkkemper 1996; IEEE Standards Board 1990; Sturm and Shehory 2003) reveal that methodologies are even more important in developing MAS than in another software engineering projects. In the early stage

of the agent-base technology, the research teams developed their own methodology. Today, the agent-oriented methodologies are themselves a research topic.

In (Akbari and Faraahi 2008), the software engineering methodology is defined as an economic process of software development, equipped with dedicated modeling concepts and tools. Given the above definition and the fact that the agent is the main element of an agent-based system (Wooldridge 1997), an agent-oriented methodology (ABM) can be defined as an economic process of software development, equipped with dedicated agent modeling concepts and tools. Another definition of ABM is provided in (Morandini et al. 2008), considering ABM as the methodology that uses software agent in all stages of implementation.

ABMs consider the enterprise as divided into sub-organizations where agents play one or more roles, interacting with each other. Concepts as “role”, “social dependence” and “organizational rules” are used not only to model the system environment, but also to model the system itself. One of the most important aspects addressed by an ABM is the description of interactions between agents, simulating the dependencies between agents and their roles in the system. Each methodology must have a high enough degree of abstraction in agent modeling. That is why the object-oriented methodologies are not suitable for developing MAS. An ABM should be focused on agents, the roles they have made in systems and interaction protocols.

There are many elements connecting the agent-oriented methodologies with object-oriented ones. Many ABMs are direct descendants of the object-oriented methodologies. One example is MaSE—Multiagent Systems Engineering (DeLoach 1999; Wood and DeLoach 2000; Kendall et al. 1996). Another example is Australian artificial intelligence institute (AII) methodology (Kinny et al. 1996). The AII was strongly influenced by object modeling technique (OMT), developed by Rumbaugh et al. 1991). Similarly, the FUSION methodology, as mentioned in (Coleman et al. 1994) had a great influence in the development and implementation of GAIA methodology (Wooldridge et al. 1999; Zambonelli et al. 2003). Two other object-oriented methodologies have been used in agent-oriented extensions, RUP (Kruchten 1999) that is the basis for ADELFE (Bernon et al. 2002) and MESSAGE (Caire et al. 2002). MESSAGE is the starting point for the INGENIAS methodology (Pavón et al. 2005). RUP has also been used with agent object relationship (AOR) to achieve radical agent-oriented process (RAP) (Taveter and Wagner 2005). Object-oriented software development has been significantly extended to support agents, being sometimes referred to as Agent OPEN (Debenham and Henderson-Sellers 2003). Two other methodologies that have made an important contribution to object-oriented methodologies are PROMETHEUS and PASSI. Although PROMETHEUS is not coming directly from an object-oriented methodology, it is possible to adapt it when diagrams and object oriented-concepts are applied (Padgham and Winikoff 2002a, b). Similarly, PASSI methodology uses diagrams and object oriented-concepts using the basic UML notation, together with specific multiagent systems elements (Henderson-Sellers et al. 2006).

GAIA is one of the first ABMs, using analogies from real organizations, and trying to provide both a friendly approach for a lesser developer and a technical one,

for the skilled developers. GAIA promotes the sequential approach in software development, containing stages for requirements gathering, analysis, design and implementation. In (Zhao et al. 2007) the semantic agreement (SMART) allowing an automatic agreement using ontology and agent technology is presented.

TROPOS provides guidance for the four most important stages of a MAS development. A framework for modeling agent objectives starting with actors, activities and system resources is included in TROPOS. This methodology is the starting point for *i** (*i* star) modeling language (Yu 1995) and pays special attention to the initial requirements modeling. The usage of *i** language, especially during the analysis and design provides a high degree of flexibility especially for those who use the Agent UML notation (Huget et al. 2004). In (Hadar et al 2010; Bryl et al. 2009; Bresciani et al. 2004) the methodology advantages are presented.

MAS-Common KADS is derived from Common KADS methodology and several object oriented-methodologies. In (Iglesias and Garijo 2008), the basic concepts of this methodology are presented. *MAS-Common KADS* defines a set of models, such as: the model agent, model work, the expertise model, coordination model, communication model, organization model and design model, in order to model a real-life problem. The methodology has the following distinct phases: conceptualization, analysis, design, development and testing.

PROMETHEUS provides a special approach, based on goals for planning agencies (BDI). It is currently used mainly to develop MAS with business planning agents, such as JACK and Agentis. In (Padgham and Winikoff 2002a, b) basic features are highlighted of this methodology and in (Padgham et al. 2008) a design tool is proposed.

RAP methodology was primarily defined for developing large-scale distributed information systems, such as enterprise architecture, ERP's and supply management systems. *RAP* applies the model driven architecture paradigm. *RAP* is basically an agent-oriented extension of the RUP and UML.

MESSAGE extended the object-oriented methodologies for agent-oriented systems. *MESSAGE* integrates the concepts of organization, role, goal, and task. Also, the methodology extends the UML language concepts with agents, providing graphical notations for their visualization (Caire et al. 2006).

INGENIAS methodology is based on model-driven development paradigm (Schmidt 2006). This methodology supports a notation based on five metamodels. The metamodel usage allows high flexibility and adaptability. In (Gutierrez and Garcia-Magariño 2010) several metrics in designing MAS are proposed, considering the communication protocols, agent negotiator selection policy, the number of agents, etc.

MaSE methodology was originally used for integration applications from heterogeneous databases. The methodology can be successfully applied for developing MAS because it provides a consistent framework for distributed planning. In (DeLoach 1999; DeLoach 2005) the advantages of this methodology are discussed.

4 TranServ System Design Using the MaSE Methodology

TranServ MAS has a specific purpose to allow the clients (Client 1, Client 2, ..., Client n) to get the optimal transport services from a specified group of providers (Transport service provider 1, Transport service provider 2, ..., m), according to several criteria imposed by the company mediating the demand—offer negotiation. The following premises are considered: each client and supplier is represented by a software agent, and the communication between them is facilitated by other two software agents, the initiator and negotiator agents. Figure 1 presents the application environment which can satisfy the mentioned purpose.

The development of the TranServ system follows the MaSE methodology phases (Table 1).

4.1 The Analysis Phase

4.1.1 Capturing the System Goals

The system goals are structured into a hierarchy, as shown in Fig. 2. On the top of the hierarchy, there is the most important goal to be accomplished, named *Provide transport services*, which is decomposed into the following four sub goals: *Obtain client information*, *Obtain Transporter information*, *Realize negotiation process*, and *Inform participant*.

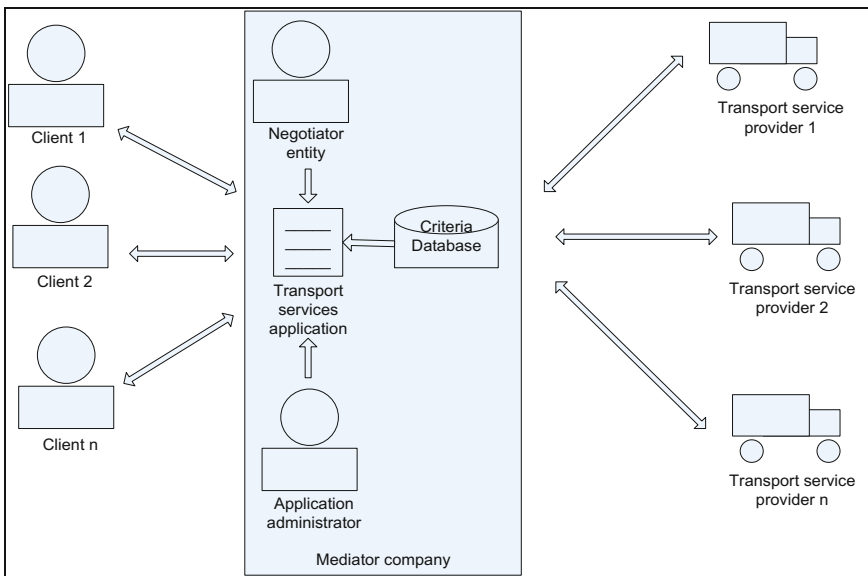


Fig. 1 The environment diagram

Table 1 MaSE methodology phases

Phases	Models
1. Analysis phase	
a. Capturing the system goals	Goal hierarchy
b. Applying use-cases	Organization diagram, sequence diagrams
c. Refining roles	Role model
2. Design phase	
a. System architecture design, by creating the agent classes	Agent class diagrams
b. Conversations design	Conversation diagrams
c. Agent classes architecture	Agent architecture diagrams
d. System deployment design	Deployment diagrams

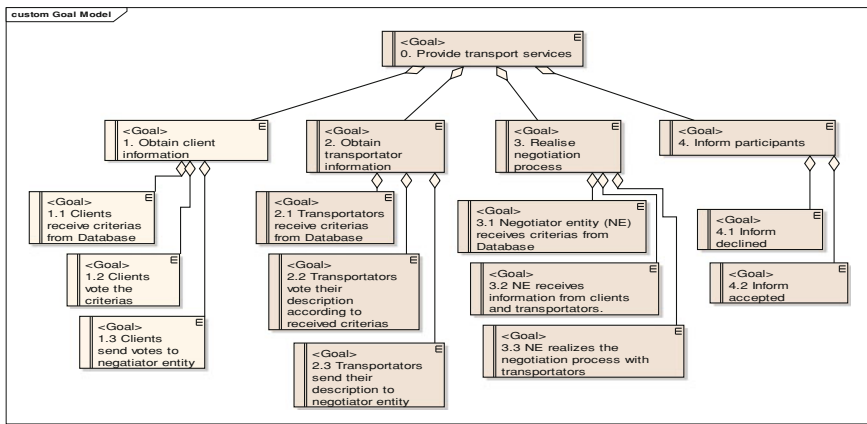


Fig. 2 Goal hierarchy diagram

In order to obtain client information, the clients receive criteria established by the application administrator. Then the clients vote each of the criteria according to the perceived importance and send criteria evaluation to the entity having the role to negotiate with companies proving transport services. Transport services companies receive criteria established by application administrator. According to these criteria, each company performs a self-evaluation, assigning a score to each of criteria, showing the degree of fulfillment. Then, the providers send information to the negotiator entity.

The negotiator entity receives the negotiation criteria and the clients' votes. All offers are compared, searching for the best match with the clients' needs. A classification of the provider companies is made. All companies, except the first one, are invited to improve their offers by improving process one or more criteria to increase their chances on the negotiation. All participants receive a note which contains the name of the winner, which is the transport company sending the best offer in relation with the clients' requirements.

4.1.2 Applying the Use-Cases

The *Organization model* diagram describes the main application goal and actors involved in the communication process (Fig. 3). There are three types of actors: **Client**, **Transport Company (transporter)** and **negotiator entity (negotiator)**. The diagram reveals the main activities to be accomplished, as follows:

- the client actor is sending the evaluation of criteria to the negotiator actor, waiting for an answer;
- the negotiator actor is involved into communication with other two actors (client and transporter) through sending and receiving information, and coordinates the negotiation process with the transporter actor (Negotiation process I);
- the transporter actor is sending its description to the negotiator actor and the optimized offers (Negotiation process II).

In addition to *Organization model* diagram, the *Sequence* diagram (Fig. 4) shows how the votes and the offers are sending and how the negotiator process is running. The diagram contains the initiator actor, who has the trigger role for the entire process of communication between agents, spreading the criteria to all other actors (*submit Criterias*). The Client and Transporter actors send votes and offers to the Negotiator. The Negotiator actor builds the AHP tree to identify the importance of each criterion in line with all the clients' opinions. It also develops a classification of the transport companies, runs the negotiation process, and informs the winner about the negotiation result.

4.1.3 Refining Roles

The *Roles* diagram (Fig. 5) describes how the application goals are mapped into the system goals and how the actors interact with the roles. In the TranServ system eight roles have been identified, each of them achieving one or more goals.

These roles and their corresponding goals are the following: Table 2.

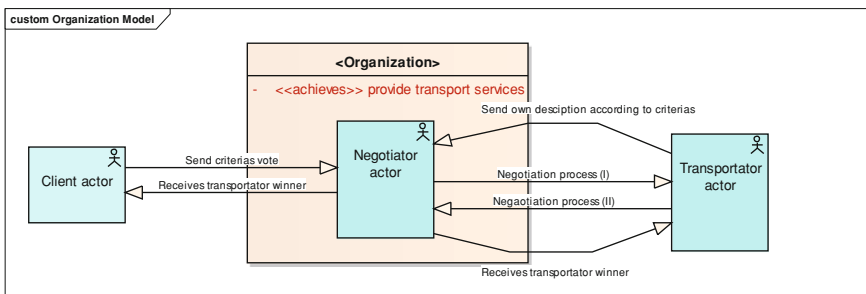


Fig. 3 The organization model diagram

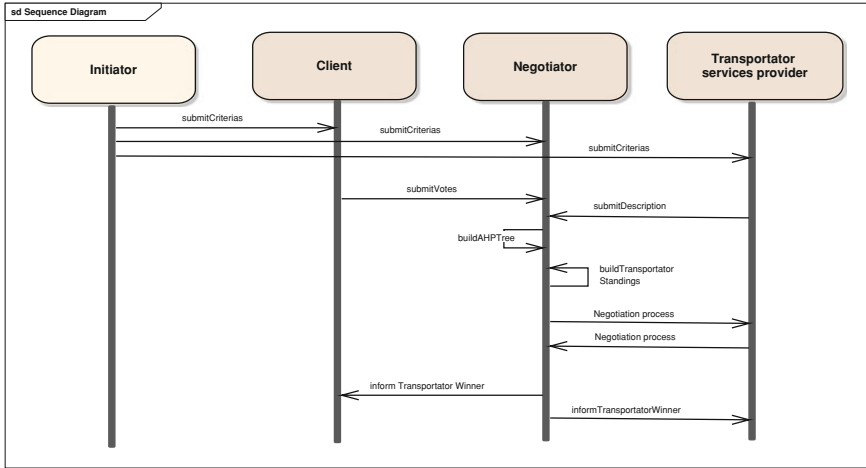


Fig. 4 The sequence diagram

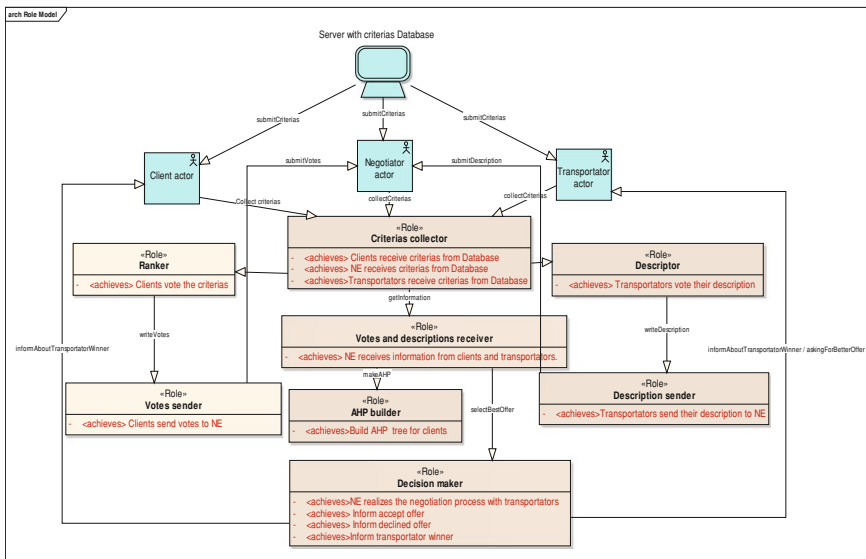


Fig. 5 The roles diagram

The component *Server with criteria Database* represents a collection of software and hardware elements required for the application execution and information distribution across the network.

Table 2 Roles and goals in TranServ system

Roles	Goals
Criteria collector	Clients receive criteria from database Transporters receive criteria from database Negotiator entity (NE) receives criteria from database
Ranker	Clients vote the criteria
Votes sender	Clients send votes to negotiator entity
Votes and descriptions receiver	NE receives information from clients and transporters
AHP builder	Builds AHP Tree for clients
Decision maker	NE realizes the negotiation process with transporters Inform accept offer Inform declined offer Inform transporter winner
Descriptor	Transporters vote their description
Description (offer) sender	Transporters send their description to NE

4.2 The Design Phase

4.2.1 Designing the System Architecture

During the design phase the system architecture is defined using *Agent Class* diagram. The diagram contains not only the agent classes, describing agents' functionalities but also the packages. There are the following six packages: four packages for the agent types [client agent (CA), transporter agent, negotiator agent and initiator agent (IA)], one package, named *Commons package* containing common elements of all agents types, such as: *Agent Util Operations* (the utility methods for agents interaction); *DB Connection* (abstracting a database connection to MySQL), *Status Panel* (encapsulating a panel with a waiting message and decreasing timer), *Summary Display Behaviour* (graphical interface for checking the counter and status message), *Transport Broker Constants*, and one package, named *Data*, for specific functionalities regarding client vote and offer description for transporter actor, such as: *AC Criteria Comparison Vote Data* (the model class for agent vote and two criteria of the same level comparison), *Criteria Element* (the model class for offer regarding a specific criterion), *Provider Offer* (the model class for making offers), *System Startup Data* (the model class allowing the IA to notify CA) regarding the system parameters). Figure 6 shows the communication between packages, as lines.

4.2.2 Designing the Agent Conversations

Two *Conversation class* diagrams are used, to design the agent conversations, one for initiator and one for responder. These diagrams describe the states and transitions in the inter-agent communication, similar to the concurrent tasks modeling.

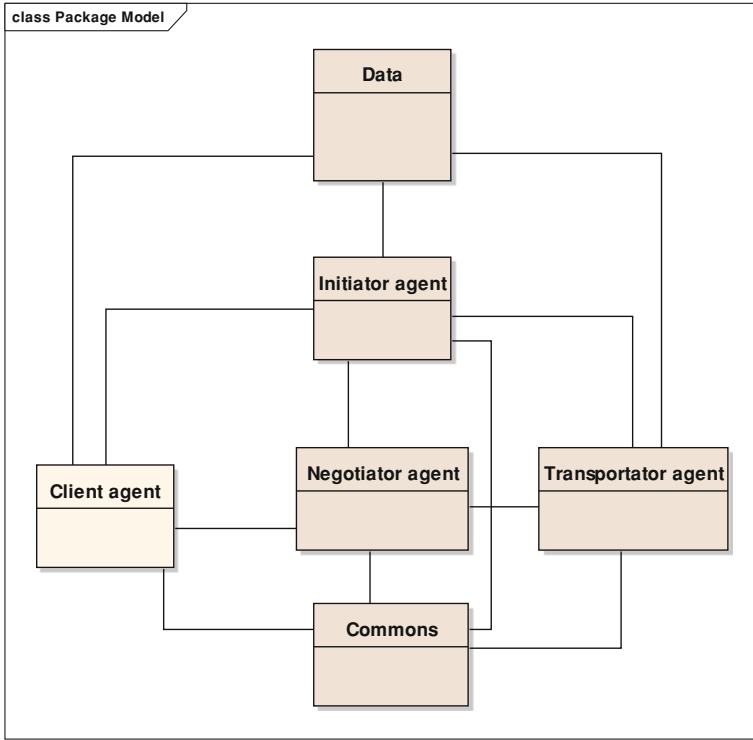


Fig. 6 The packages diagram

4.2.3 Designing the Agent Classes Architecture

For each agent type, a diagram describing the agent architecture, named *Agent Architecture* diagram is developed. There are specific classes for each type of the agents included in the TransServ system.

The *CA type* includes the following classes, as shown in Fig. 7: *ClientAgent* (the main class for this agent type), *MainFrame* (the main component for the agent graphical interface), *ACMessageReceiverBehaviour* (the agent receiving and treating the messages), *StartupFrame* (the login form), *CriteriaSelectionPanel* (the visual panel showing the criteria list and sending the vote results to the Negotiator agent, grouped by criteria) and *CriteriaTableModel* (the table for showing the comparison between two criteria of the same parent).

The *Negotiator agent type* includes the following classes, as shown in Fig. 8: *AgentStandings* (the class that models position of the transporter agents in the AHP tree according to their offers), *AHPCriteriaNodeData* (class corresponding to a criterion node in the AHP tree), *AHPTree* (the class modeling the options AHP tree), *ANAgent* (the main class of the negotiator Agent), *MainFrame*,

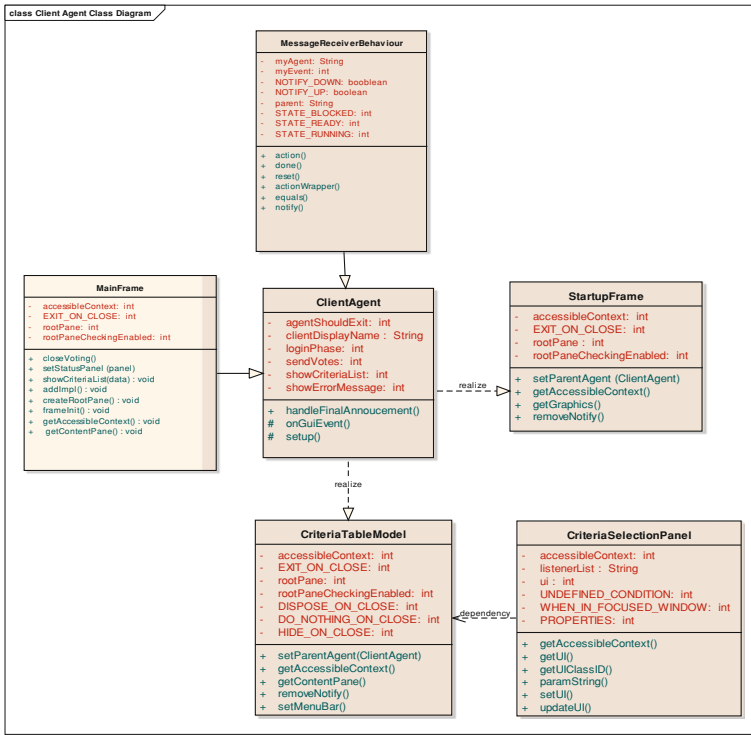


Fig. 7 Class diagram for the CA

ANMessageReceiverBehaviour and *ATAgentInstance* (the class modeling a transporter agent profile).

The *Transporter agent type* includes the following classes: *TransporterAgent* (the main class for this agent type), *MainFrame*, *ATMessageReceiverBehaviour*, *StartupFrame*, *OfferSubmissionPanel* (the panel with transporter agent options), *OfferTableModel* (the table for posting the offers).

The *Initiator Agent type* includes the following classes: **Initiator Agent** (the main class for this agent type) and *Behavior* (the behavior class for the initiator agent).

Analytic hierarchy process (AHP) tree algorithm

The negotiation agent, using the information sent by the Inquirer agents create a AHP tree, which will be used for the calculation of scores, for each offer issued by the resource agents. The algorithm for AHP tree generation is the following:

1. A tree representation is created, based on the objective which should be achieved, a set of criteria and decision alternatives. The tree root is represented by the objective, the second level if the tree is represented by the criteria, the next levels include sub-criteria and the leaves are represented by alternatives.

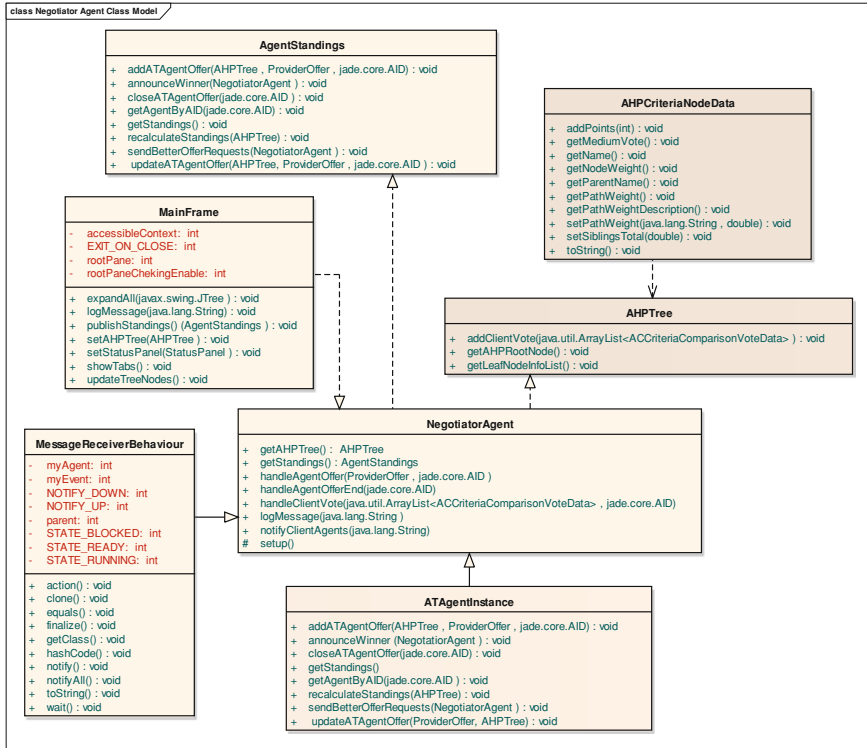


Fig. 8 Class diagram for the negotiator agent

The objective and the criteria form a sub-tree, allowing the evaluation of the alternatives according to a sub-set of criteria.

2. Pair-wise Comparison (PCM) matrix and B matrix are created. The elements of B matrix, b_{ij} , with $i, j = 1, \dots, n$, where n is the number of criteria are calculated according to the following formula:

$$b_{ij} = 1/b_{ji}, \text{ for } i \neq j, \text{ and } b_{ii} = 1 \quad (1)$$

3. The principal eigenvector, M is calculated:

$$M_i = \sum_j^n b_{ij} (i = 1, 2, \dots, n) \quad (2)$$

M is used for setting the importance of each decision element in connection with the upper level of the APH tree.

4. The criteria weights, W_{ci} are calculated:

$$W_{ci} = M_i / \sum_i^n M_i \tag{3}$$

5. The consistency index, *CI* of the B matrix and the random consistency ratio (*CR*) are calculated.

$$CI = \frac{\lambda_{max} - n}{n - 1} \quad \text{and} \quad CR = \frac{CI}{RI} \tag{4}$$

where: λ_{max} represents the maxim eigenvalue from B and *RI* represents the Random Index, with a value that is depending on the number of criteria. If *CR* has the value less than 0.1, the consistence of the PCM based analysis is accepted, otherwise the B should be redefined.

6. The alternative weights, $W_{A_i,j}$, for alternative *j* ($j = 1, 2, \dots, m$) in connection with criteria *i* are calculated, then the total weight for each alternatives are set according with the formula:

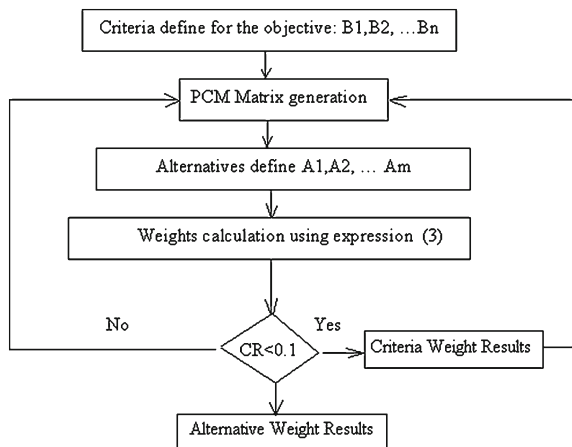
$$w_{Aj} = \sum_{i=1}^n w_{A_i,j} * w_{ci} \tag{5}$$

The Fig. 9 presents this algorithm in a graphical form.

4.2.4 Designing the system deployment

The Deployment diagram, as shown in Fig. 10 is developed in order to create the environment framework for the TranServ multiagent system implementation.

Fig. 9 AHP tree algorithm



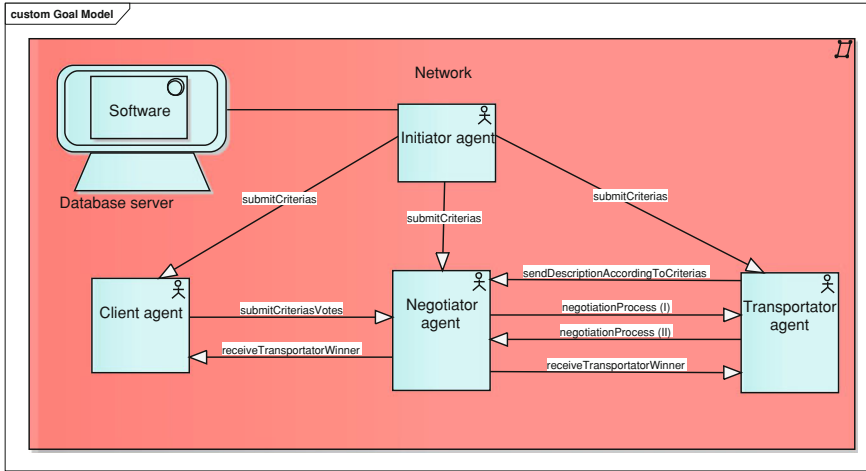


Fig. 10 TranServ application—deployment diagram

5 The Implementation of TranServ Multi-Agent System

5.1 JADE Platform

The implementation of the TranServ system was made on the JADE Platform, version 3.7. JADE represents a framework for creating multiagent systems. The development of this platform starts in 2001 and now it fully implements the FIPA agent coordination standard. The platform allows several containers for agents, running on the same computer or in a network of computers. The main container represents the main location of the agents and contains two dedicated agents named agent management system (AMS) and directory facilitator (DF). The existence of a distributed system for agents, supporting the agent mobility is associated with a simple AMS, including an efficient asynchronous message delivery system, interaction protocols library, and servlets, applets and Web services for web technologies integration, as javaserver pages (JSP). JADE Platform provides “Sniffer”, as an important facility for monitoring the communication via Sequence diagramme.

5.2 A Scenario for Acquiring Transport Service Using TranServ

Three agents, named clients want to acquire a transport service. The process of getting the best offer is described below. The client agents impose several criteria to be fulfilled by the transporter supplier (demand-offer criteria). Each criterion has

Table 3 Demand-offer criteria

Service supplier	Attributes	Criterion
Transporter agent	Driver	Number of accidents in the last year Foreign languages knowledge Experience (number of years or km driven)
	Provided services	Cost/km Number of rates
	Company information	Average age of the vehicles Medium speed Average number of incidents in the last year

Fig. 11 Criteria form filled by CA (the client demand)

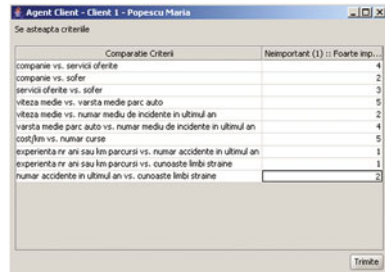
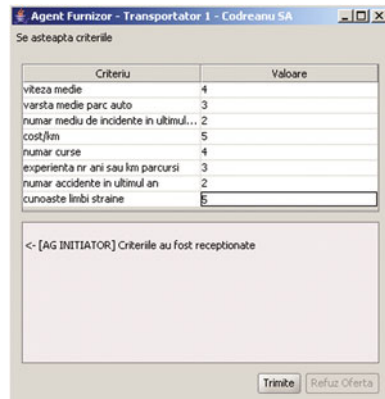


Fig. 12 Criteria form filled by transporter agent (the transporter offer)



a different importance rate, according to the client preference. A client can vote a criterion from 1 to 5 (1—not important, 5—very important). There are the following three attributes (Table 3), related to the transporter covered by the criteria: driver, services and general characteristic of the company. Clients and suppliers receive criteria through the Initiator Agent, from a database.

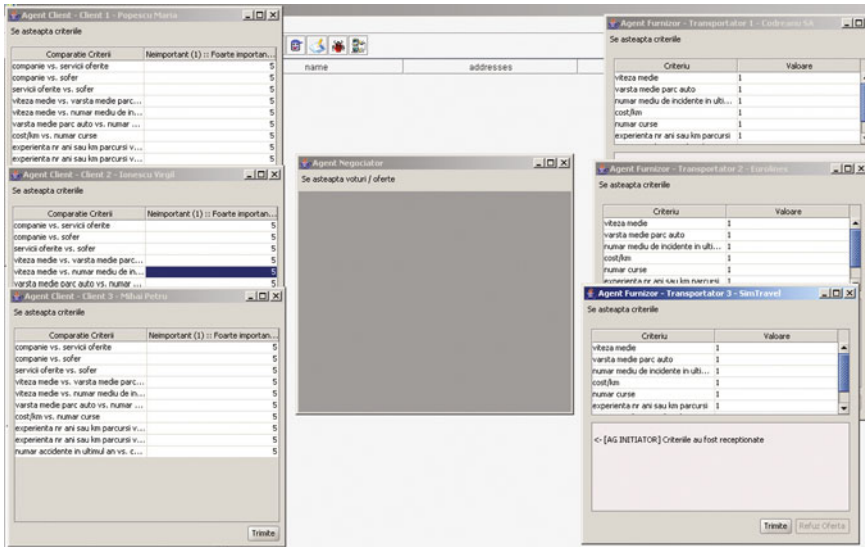


Fig. 13 Client and transporter agents receiving criteria from the initiator agent

While customers’ scores express the importance given to these criteria, the scores given by suppliers express the degree to which they meet them (Figs. 11, 12).

The information about the criteria provided by the client and transporter clients are sent to the negotiator agent, for ranking the offers. The negotiator agent can ask transporters for improving their offers. New offers can be submitted. After sending these new offers, a new ranking is done. The negotiator agent will finally announce the participants about the winner (the transporter owning the first place in the classement). Figure 13 presents both client agents and transporter agents receiving the criteria from the initiator agent and filling their demands, respectively their offers. Once the first demand is sent, the development of the AHP tree is started. Once another offer is received by the negotiation agent, the CA is informed that criteria and votes were received and decisional tree is updated.

In Fig. 14, the CA receives a confirmation message from the Negotiator agent. The Negotiator agent develop the AHP tree with the following structure: (*total points, medium vote, [p: total points per level], [for: global proportion]*). After each client demand, a comparison between two criteria on the same level takes place. For example: the criterion “Company versus Offered services” =4 means that the attribute “Company information” has 4, as importance score and attribute “Services” are less important, because it will receive the score 1 = 5–4. At the negotiation agent side, the result: *company* (6, 2.83, *p*: 0.19) means: 6 is the number of votes for the *Company information* criteria; 2.83 is the medium score and 0.19 is the proportion between the criterion neighbors, in this case: “Driver” and “Provided services”. This proportion is, in fact, the geometric average

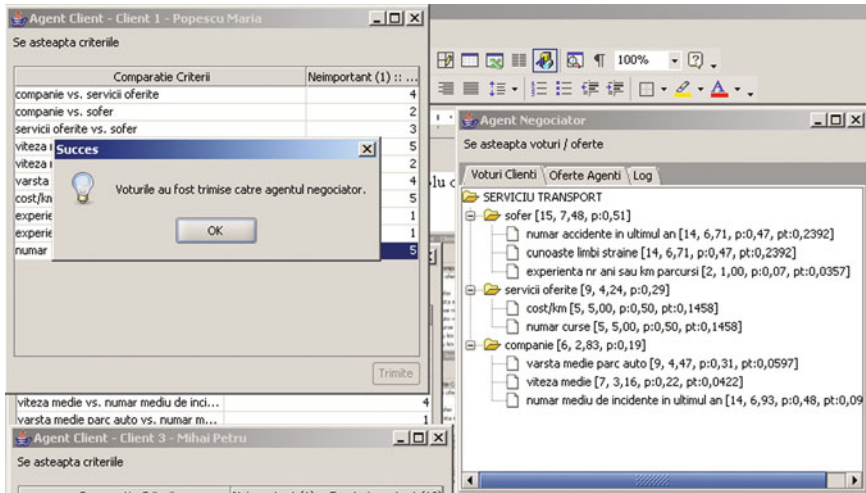
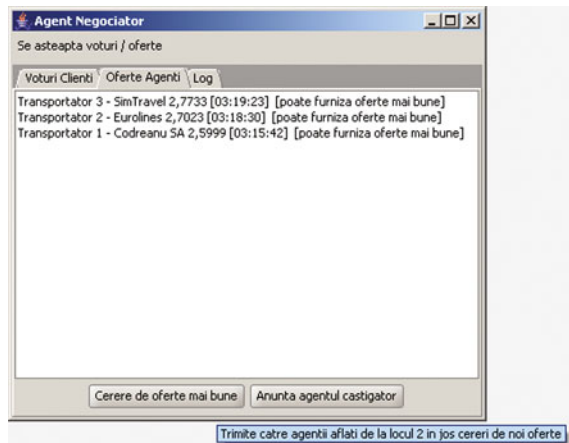


Fig. 14 Negotiation agent confirms to the CA that its demand was received

Fig. 15 Generated ranking



between scores obtained by a criteria/attribute and it is used in generating offers by the Transporter agent. This information is continuously updated until the last CA will send its demand.

When the last Transporter agent sent its offer, the Negotiation agent generates the ranking (Fig. 15). The offers are shown hierarchically, starting from a leaf node (for example, the medium speed) having proportion p_1 , his parent having proportion 2, etc. Considering the vector $(p_1, p_2 \dots p_n)$, an offer from a transporter agent is described as the vector $(v_1, v_2 \dots v_n)$, where v_j represents the fulfillment

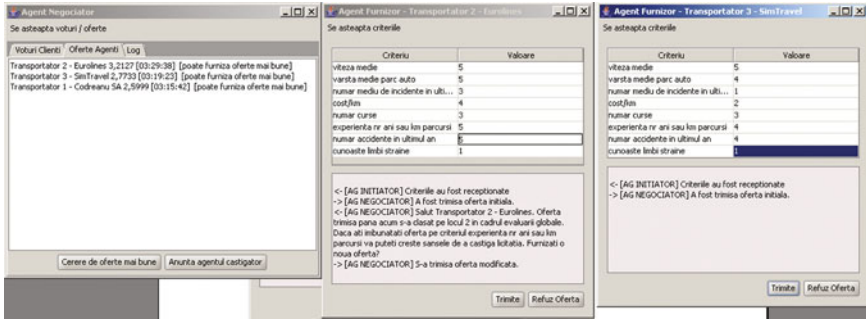


Fig. 16 The second transporter agent improved its offer and moved to the top

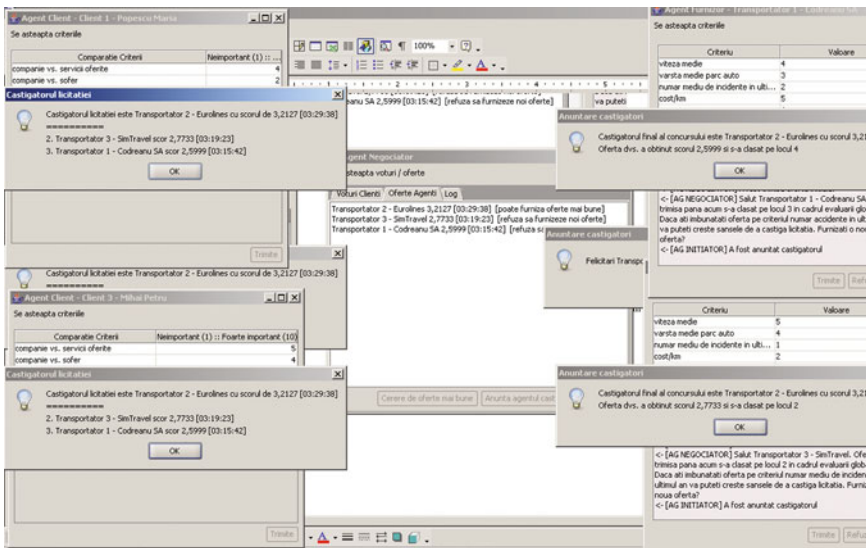


Fig. 17 Negotiation agent sends the message with the winner

degree of the criterion j . The offer score is calculated according to the following formula: $SO = p1*v1 + p2*v2 + \dots + pn*vn$.

If a Transporter agent decides to improve its offer, its ranking position could be changed, as it is shown in Fig. 16.

When the negotiation process is completed (no transporter agent does not want to improve its offer), the negotiation agent will the winner (Fig. 17). The winner Agent will receive a specific message from the Negotiator agent (Fig. 18).

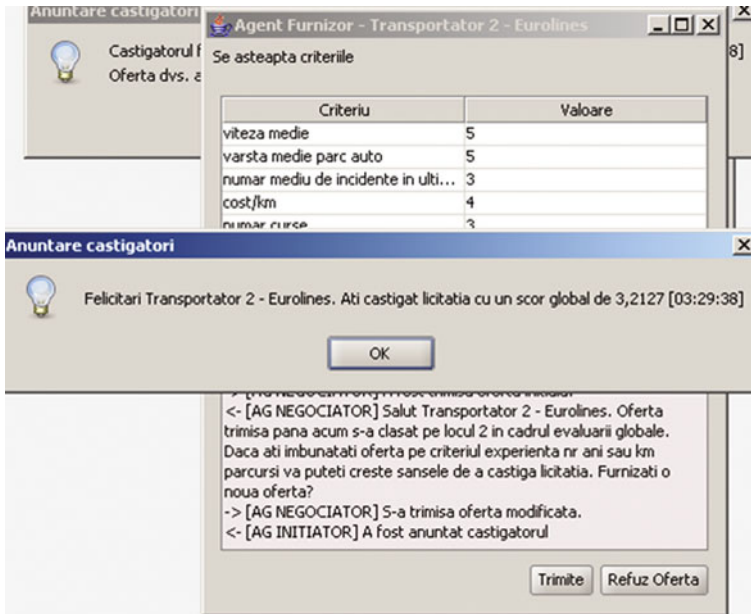


Fig. 18 The specific message sent to the winner agent by the negotiator agent

6 Conclusions

The main purpose of the research was to develop a MAS for transport services acquisition. The TranServ system was developed using the MaSE methodology, with FIPA compliant standards and implemented on JADE Platform. The system has four types of agents: IA, Transporter Agent, Negotiator Agent and CA. This chapter presents the main analysis, design and implementation results. A specific scenario with three clients and three transport service providers was presented. The negotiation process is based on AHP tree algorithm.

As further research, the authors will extend the negotiation algorithm by refining the criteria applied for defining the eService demands and offers. Also, as long as directions of research in recent years have focused on communication and coordination between agents, there are enough places to find better negotiator strategies for the Negotiator agent.

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Twenty Years After: Management and Performance Measurement in Romanian State-Owned Enterprises

Bogdan Băcanu

Abstract In 2011, the economic crisis generated public discussions related to the performance measurement and poor management of state-owned enterprises (SOE) in Romania. The debate revealed the fact that the existence of present SOE, including their creation and strategies, is undermined by an unclear conceptual frame. The study analyzes the theoretical roots of some critical demarcations in the public sector in order to explain the dilemmas or some controversial approaches in the policies regarding the SOEs management. The map of discussions for building the theoretical background of the study takes as main milestones some references related to the issue of public sector demarcations, to the privatization of SOEs and to the organization and management performance appraisals of the SOEs in the specific Romanian context. The methodology of study is tailored to the Romanian context. A collection of case studies and disparate but relevant facts are preferred to statistical tools. They are used to explain a very strange behavior of organizations in this dynamic and theoretically unclear environment. The state of the Romanian public sector is explained first as a result of the national legal context. But the new public sector is also the result of the economic reform, including the privatization after 1990. All these elements triggered some local characteristics of the SOEs management. A representative case for the process of restructuration can be found in the energy sector, with a special significance for the national economy as a “model”. The problems of organizational performance and management appraisal in Romanian SOE are present in discussions using the so-called anti-management concept. Some facts are brought forth to illustrate the concept.

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1 The Initial Trigger for a Discussion About Some Concepts of the “Public Management Theory Jungle”

In the end of the year 2011, in relation to the local manifestations of the economic crisis, the performance and management related to the SOEs became topics prone to cause controversy. The discussion was triggered by the comments expressed by the president of the country, which reflected both a general concern of the state and specific concerns and interests expressed by the representatives of IMF and of other international financial organisms.

The discussion is associated with the central pillar supporting the reorganization of the Eastern economies, namely the privatization. After 1990, the privatization topic has been frequently approached in multiple manners by the Romanian economic environment. At this stage, the privatization comes into being by proposing the support of two components, the sale of SOEs or of certain participations and the initiation of a SOE private management.

The second component mentioned is associated with the performance measurement in the public sector, and especially to SOEs. Moreover, this component is associated in Romania to some specific issues involving the style of SOE managers, as a part of the domestic aspects of agency theory.

The lack of clarity in approaching the performance of the organization and in assessing the management performance seems to represent only “the tip of the iceberg.” The remaining part is represented by a set of concepts and delimitations associated with the public sector. Both the named ambiguity and the ones related to economic policies which include the public sector generate the assumption that they have a more profound source, consisting—in other words—in the definition of basic concepts of the public sector. They lead to immediate pragmatic and theoretical consequences as the “proximal concept” is being defined. This label, associated with a relative positioning, refers to a theoretical element relying on the previous one.

In the case of the present study, the management is referred to an organizational entity named SOE referred to a manner of segmenting the public sector, to the so-called problem of its demarcation, and also to the process of privatization. The privatization seems to be the process having the fastest impact on the alteration of the dividing line between the public and the private sectors within the economic field. Finally, the demarcation of the public sector relies on a set of basic options defining a publicness model. Obviously, the debate on management will begin with discussing the publicness concept and then will be developed in several steps in order to focus on particular aspects of a specific type of organization.

Even a “soft” review of the named concepts and of the reasons underlying the relation between them shows a wide array of points of view that warrants the Koontz (1961) paraphrasing label “public management theory jungle.”

If the deductive component of the study is to be taken into account, the theoretical ambiguities and their pragmatic consequences noticed in mature economies are likely to generate a larger and more difficult to manage database, which is

prone to call in question the solutions that have represented the trigger of discussion and to determine the development of an approach that must be supported more convincingly from the theoretical point of view.

This local and temporary context determines the necessity of a more focused theoretical approach, influenced by the existence of general theoretical reference frames which have guided ample pragmatic approaches abroad, but also by a previous national experience. However, both categories of reference marks must be considered from a critical point of view, due to manifold controversies which have accompanied them.

In a more concrete manner, the discussion about SOE on the “route” publicness and public organization, new public management and privatization, management and performance measurement will be related to American and Western basic references, for a further search for practice-oriented references associated with the category of emergent economies, and mostly to specific Eastern economies.

The review of the named concepts allows the discussion of certain particularities specific to the Romanian environment. They provide both a theoretical component—and thus a comparative approach related to the Western model is to be developed—and also an applicative component which emphasizes a state of facts representing the consequence of a specific context. This context determines the inductive approach of the study and an atypical research methodology involving the Romanian SOE state of facts.

2 Theoretical References Related to the Concept “State-Owned Enterprise”

2.1 Publicness and the Problem of Demarcation of Public Sector

The main distinction between public and private organizations is based on ownership (Rayney et al. 1976). In order to use a simple and steadfast definition, a public organization is an organization owned collectively by members of political communities, municipalities, regions, or of the state. Later on, Bozeman (1987) developed a model of publicness that included other two variables, namely the categories of funding and control related to the organization. Using these three dimensions of publicness, Bozeman postulated an idea which was represented by the title of his book: “all organizations are public.” However, in order to build a conceptual ground for this study, it is relevant to emphasize that the political system and not the economic one has the upper hand when some organizations, labeled as public, are taken into account (Dahl and Lindblom 1953).

If the three-dimensional model of Bozeman and the idea developed by his book are considered, the consequence of publicness is that some differences could be observed not only between private and public organizations, but also between

public agencies and public companies. Once again, if the idea of Bozeman is taken into account, the valid conclusion would be that the dimensions of publicness represent a continuum for public organizations. The “medium” agency is more public than a “medium” public company, due to the funding and control dimensions. A public company is controlled predominantly by political forces, being, however, more “market oriented” than an agency, even in the case of a monopolistic structure.

The main theoretical approach related to publicness could be identified in leading journals from UK and the USA. The data rely on empirical evidence provided by comparisons between private and public organizations within countries such as UK, Australia, Canada, and the USA. However, these countries, and especially USA, seem to express a more favorable opinion toward the private than toward the public activity. This fact generates a rather “unbalanced” interest on the management of private organizations and on the public sector agencies.

Even if there are many empirical studies on management differences between public agencies and private organizations within the USA related to this context, a weak interest on public companies management is reflected by studies. If one takes into account the fact that most of these studies developed in the USA represent the results of a small amount of researchers’ efforts, the most renowned names being Bozeman and Rayney (Boyne 2002), the area of theoretical references on publicness and public companies relevant for the Romanian context should be expanded by consulting the theory developed in European and Asian states in order to counterbalance the American bias.

The publicness seems to become in a more obvious manner the result of a political culture different in Europe from that of the USA, as a result of the experience of strongly centralized European states. The first theoretical issue is to define the public interest and to find a clear demarcation for the public sector, as discussed in Lane (1993). The demarcation problem was a central theme for the so-called Austrian school, including Friedrich Hayek and Ludwig von Mises. Schumpeter (1965) discussed the organization of the society on the basis of public control and private ownership of the means of production, in fact the Mises’ market-bureaucracy distinction. Demsetz (1982), an important scholar of the so-called Chicago school, argued that the distinction between private and public ownership should not be identified with the distinction between competition and hierarchy.

Many other writers are involved in this conceptual discussion involving the demarcation of both sectors, using various interaction concepts related to ownership, allocation mechanisms, forms of control or the production–consumption balance. As these concepts are used to cross-tabulate the distinction in order to build a more analytical approach, the number of solutions that involved the ideal forms of social interaction have increased. It may be argued consequently that the theoretical border between the private and public sectors is indeed vague and dynamic. The pragmatic consequences are that each state presents a specific solution for demarcation and that the European states probably present the most

various social and political visions related to the field, obviously without the involvement of a clear, strategic, or rational plan.

From a managerial point of view, both the demarcation problem and the distinction between related fundamental concepts represent in fact the choice made by society or state between “bureaucratic management” and “profit management” (Mises 1962).

2.2 The Privatization and the State-Owned Company

The empirical evidence involving the state of facts in the European countries, especially in the Eastern European and former Soviet ones, is expected to provide data that would seem “unbelievable” for the American theoretical framework. These states have experienced for more than 40 years a strong form of communism, involving planned economy, state ownership, and total control of organizations. After 1990, the basic choice has changed and thus the private sector has developed sharply as a result of the privatization process. The specificity of the public sector of each Eastern European state before 1990 and the specific national formula developed for the transition to capitalism and privatization redefined the demarcation border and this has led to different outcomes. The results involved specific configurations of the public sector, taking into account the amount and size of the public companies. Each East European state has developed a specific model for each industry and also for each significant public company. As a logical consequence, the study of these public organizations has focused on the current diversity of the management variables that have increased from West to East.

The discussion on demarcation has added to the one concerning publicness and definition of public organizations. In fact, for this stage of the study, it is important to shed light on the differences between public companies and public agencies in order to develop the theoretical framework for analyzing the management in a specific context, place, and time, of the former category. However, the result of this addition is the enlargement of the referential system used to conceptualize the management of public companies and also to design the list of characteristics reflecting the expected performance.

The current economic crisis has brought about a number of new reasons to discuss the problem of demarcation and the pragmatic approaches related to the management of public companies.

Considering that this study will further analyze the public sector and the economic transition in Europe, the implementation of new labels for the organizations in discussion could provide a better account on references on the local legal context. On the other hand, these labels allow the distinction of fine differences between the cultural approaches involved in public sector organizations in the USA and Europe.

In order to clarify the definitions and the new labels, the works of Bös (1986) must be taken into account. Bös discussed about public enterprise instead of the

public company and described it using three different sets of characteristics. These sets refer to the enterprise itself, to the relevant government agencies which control public enterprises and to the strategies developed by government in order to influence the enterprise.

The first main characteristic of the public enterprise is the use of a price which may or may not cover costs. The second possibility, price under cost, will be a sensible aspect of the Romanian management.

The legal forms of public enterprises could be agency (departmental), public corporation, or state company. The first form does not have a legal personality and the link with the government is straightforward. The others have a distinctive legal personality, the public corporation being an institution of public law and the state company being an institution of private law.

The public corporation is usually financed by the state using an allotment of capital or a loan. This form is frequently used in order to manage the so-called “nationalized industries” in UK, France, Italy, and the USA, but not in Germany. Within the Eastern European states, the current public corporation is a former large organization created in the communist era or a nationalized firm developed after World War II with the aid of significant state investments. In Romania, this category of public enterprises was deemed as “strategic” by a specific law (Law 15/1990) and labeled in Romanian “regie autonoma” RA (in fact a public corporation), according to the French “style,” with legal characteristics inspired by the French legislation.

The government controls the state company wholly or partially as the owner of shares, and thus, the label used in economic literature is SOE. Each state defines a specific level for the minimum amount of shares allowing the control of the government. In Europe, controlling more than 50 % of the shares is considered as “normal” in order to control the respective organization. In Romania, the label usually used for a number of SOE is “national company,” even if several SOEs were established and have operated under ordinary commercial law used for private companies.

The privatization, having an important impact on the border of demarcation, namely the privatization, was developed within the Western economies during the 1980s. Details on these privatizations are provided by Hawkins (1991) for the Western Germany, Beesley (1992) for UK and Morin (1998) for France, but also by many other studies and works. Several studies focus on specific industries, as railway transport, financial services, or electricity.

The comparative perspective on privatization in Western Europe is also very well represented in studies. This perspective is significant because it offers a realistic image on the dimensions of privatization. Compared with the “Big Bang” of Eastern nationalizations, the dimensions of Western privatizations were rather modest. The “tough” privatization, labeled as “large privatization,” was to be experienced in the UK, where accumulated proceeds in GDP during 1979–1991 were under 12 % (Stevens 1992).

The comparative approach has been extended after 1990. Usually, a group of Western European states were compared to Eastern ones, involving a usual

“pattern.” Due to the fact that the characteristics of ex-communist states were different and also the interest of Western investors and politicians for the these countries, the comparative studies discuss about Central European states, as Austria and Czechoslovakia, and Eastern European states, as Poland and Hungary. The image about the process of privatization of the states from the “Eastern first line,” depicted by comparative West–East studies (i.e., Bös 1993), is detailed from a national perspective only for an “internal” use.

All the studies about privatization in former communist states from Europe and Soviet Union reflect the existence of very different models of privatization. Adopted as plans to be developed in a few years, their implementation was difficult and the mixed results determined the decision makers to operate several changes. Finally, an important dispersion of facts could be observed, different from the theoretical framework developed in the US or in the Western European states. Neither the process of privatization, nor the processes of dispersion are complete. The logical consequence is that the dispersion in management follows the mentioned trend.

Despite the theoretical framework and the references related to the “success model” involved in the implementation of privatization plans in a number of Eastern European economies, the economic and management realities in Romania are poorly discussed and mapped in the international literature. A reason for this situation could be that Romania represents an “atypical” case, involving communist nationalization, the style of economic planning from 1970 to 1989 and the further chaotic privatization.

After 1995, for several political reasons, the Romanian government has transformed the legal character of public enterprises during the privatization, changing the public ownership into the state–private ownership. Several corporations have become SOE, and the government has gradually diminished its share.

2.3 The Organizational Performance Appraisal in the Public Sector

After providing a critical review of problems involved in the conceptual demarcation in the public sector, the discussion on management and performance measurement in SOE could be more focused. Further on, the focalization process consists in the distinction of appropriate references that are relevant for Romanian SOE.

The topic of organizational performance measurement has generated an impressive list of references in many disciplines. The initial interest has focused on performance measurement in the private sector (Johnson and Kaplan 1987), due to the fact that the expected results were “profit-oriented.” After ‘90, it has been accepted that companies compete using information based not only on cost and price, the two being key-elements in the model of Porter (1985), but also on the

non-financial information. As a consequence, several multidimensional models for organizational performance measurement have been developed (Fitzgerald et al. 1991; Lynch and Cross 1991; Kaplan and Norton 1992).

After '80, the transfer of managerial knowledge from the private sector to the public sector has included the performance measurement. Countries like Australia, the USA, Canada, the UK, and some other OECD states have tried out the theories involved in the field. The resulted approach for the public organizations was labeled as "new public management" (Hood 1991).

The focalization on the public sector and nonprofit organizations became a common sign of the interest for efficiency manifested by the society. This interest promoted by government and academics in the USA and the UK was reflected in empirical studies diffused in the influential American and English journals. The studies were focused on the domestic public sectors, administration, education, and health services being the most investigated fields.

After more than a decade of theoretical debates and empirical studies, several works of research have tried to use taxonomies in order to systemize the domain of performance measurement. Micheli et al. (2005) identified five broad topics that deal specifically with performance measurement in the public sector. Three topics were focused on more technical aspects, such as characteristics and use of systems, benchmarking, or balance between internal and external measures. Other two topics dealt with human aspects. They also identified three organization theories, agency, institutional and resource dependence theory, which have been more frequently used as a frame for this kind of research. Vickers and Yarrow (1991) also examined the implications of different ownership types in terms of managerial incentive structures and enterprise performance and they argued that "ownership matters."

Following this trend, during the next years, other national experiences have been revealed. Brignall and Modell (2000) discussed the topic referring to the UK and Scandinavia (Sweden).

Paradoxically, during the next decade, this transfer of private company management concepts was directed to improve the management of public service organizations and the public enterprise was neglected. In fact, the implicit assumption was that the SOE is very similar with the private firm and the transfer is "natural." On the other hand, it seems that the American researchers and scholars are not very interested in the management of SOE, as a consequence of their national practice on this segment of the public sector.

However, the level of interest in the SOE management is different in the countries where the tradition of state ownership is strong, that is, France or Germany, or in the countries where the sociopolitical contexts involve a more intense state control of public enterprises, that is, Canada or Greece. In what these countries are concerned, there are several studies describing the general situation or specific management problems of SOEs and also the specific industries and specific types of SOE.

For instance, Canada, despite the American models or the English NPM experiences, has an important number of SOEs. The Canadian state was involved

in the standard activities of electricity generation and distribution, telecommunications, postal services, water and sewage, ports, and airports, etc. Furthermore, Canada has owned at various times an airline (Air Canada), a railroad (Canadian National), an oil company (Petro-Canada), and numerous mining operations, but has also been involved in shipbuilding, aerospace, forestry, oil and gas exploration, nuclear reactor building, agricultural land ownership, interurban bus service, and automobile insurance. Taking into account the list above, Heath and Norman (2004, p. 255) state that “The standard ‘public goods’ rationale for state involvement is absent in these cases.” The heterogeneity of the industries on the list and the comments on rationality of state involvement raise immediately some dilemmas in measuring performance of Canadian SOEs. In the American cultural context, some studies, that is, Boardman and Vining (1989, 1992), explain the characteristics and behavior of these organizations regarding performance and underline the idea that “ownership matters” in determining the efficiency.

Within the same geographic regions such as Romania, Greece has had the same basic problems in what SOE management is concerned. Illustrating the origin of current problems 20 years before the economic crisis, Lioukas et al. (1993) discussed the managerial autonomy in SOE, including the scale of the state involvement. Implicit dilemmas on performance management were presented in this study and the current situation has “validated” the related concerns.

In fact, during the last century, the history of SOE in every state has showed a very “irrational” list of industries where the state has had a “special” interest.

2.4 References on the Organizational Performance Appraisal in the Romanian Context

For the current Romanian SOE context, the experiences of the European Mediterranean states or of the Asian emergent economies, the Asian “tigers” included, could offer a more appropriate perspective. Italy, Spain, and Greece feature some common characteristics of the sociocultural environment that could induce a similar managerial behavior regarding the performance and its measurement. On the other hand, South Korea and China offer an interesting experience concerning the performance measurement of SOE, before and after corporatization or before privatization.

For instance, Menozzi (2009) analyzed the influence of political environment, namely the nomination of representatives of political groups on the board of Italian SOE operating public utilities, a topic which is very interesting for the Romanian perspective on SOE performance measurement. In Greece, as early as 20 years ago, Lioukas and Kouremenos (1989) were interested in identifying certain models for SOE, labeled as “typical,” as a base for an implicit discussion about performance measurement. In Greece, and also in Italy, as it can be observed in these

studies, the concern for economic performance is counterbalanced by the concern for social issues.

In the Asian emergent economies, an increased interest for measuring performance of SOE can be identified as a step toward obtaining a more effective public sector. A special position, not necessarily as an emergent economy, but as a challenging area for research on SOE, is that of the Popular Republic of China. All the issues of interest above are discussed in several studies written by Chinese and also by Western researchers. Xu and Wang (1997) have studied the correlation between ownership structure of organizations and their performance. The mentioned research, *inter alia*, reflects the government concern and could be seen as a theoretical preparation for a new design of the public sector. The demarcation has been made gradually, utilizing “soft” tools, as the corporatization of SOEs, or with “hard” tools, as the privatization. In the first case, Aivazian et al. (2005) discussed the possibility of the SOEs performance improvement, the state keeping a stake in order to obtain some social results on long term. For the newly privatized Chinese firms, Wei et al. (2003) argued that the performance and the financial measures were essential.

The research results of these studies are consistent with several Western studies and theories, but the China case is quite different because the statistical base for empirical studies is very large and primary data are collected by Chinese public agencies. A very shrewd political command could be referred to in order to support the present public policy regarding the SOE, a policy tailored in Chinese style on long term and with a strategic perspective.

The public policies in South Korea have always been to take into account the concern regarding the performance of SOE and generally of the public organizations. The accounts on Korean efforts to improve the performance are more available in studies and research reports published in Korean rather than in English. However, it is obvious that the Korean government has tried to reform the public sector using a classical Western approach, involving corporatization of SOE and privatization as an extreme measure against the 1998 economic crisis (Ahn and Kim 2000). In this context, the performance measurement will focus mainly on profitability, operating performance (reflected in sales and net income), and leverage level, but also on employment. Features to be taken into account by this study are the “demarcation” of the public sector and the list of Korean SOEs that were privatized during the last decade (see the Canada case discussed above). Among the companies inscribed on this list, one can take into account large SOEs from the fields of telecommunication, steel and heavy industries, tobacco and ginseng, a specific Asian product involving a higher public concern. A matter with a significant impact is the Korean manner to relate the experiences of Eastern European transition economies and their theoretical explanations. An example could be the explanations offered by the Hungarian Kornai (1992), regarding the poor performance of SOE within Eastern European region due to the use the “soft budget constraint.”

Finally, it can be assumed that the SOE performance measurement will consist nowadays of a mixture of Western methodologies, mostly represented by profit-

oriented tools developed in the American style within a sociopolitical framework set by NPM that has been strongly influenced by historical and cultural matters. These studies use statistic tools in order to obtain “predictable” results that support certain public policies related to SOEs in emerging or transition economies, with a strong emphasis on privatization.

As far as the Romanian economy is concerned, invoking the public interest—ambiguously labeled as “strategic”—has generated not only a highly “original” configuration of SOE, but also the dilution of performance assessment orientation toward financial results. Even the dynamics of the privatization process has been affected, the “slow” stages of the process being interspersed with stages characterized by sudden transformations. The latter are questionable as far as their procedures and goals are concerned, a fact that leads to a significant amount of dissimilar management problems. The balance between the profit-oriented and the social-oriented strategies in measuring performance has followed the dynamics of privatization. The orientation coherence in pursuing performance does not match either the market-oriented approach belonging to the Anglo-Saxon type, or the state management approach practiced by Western economies such as France or by emerging Asian economies.

2.5 The Management Performance Appraisal

If the initial “trigger” of this study is taken into account, an implicit assumption would be the existence of a correlation between the quality of management of SOEs and the level of their organizational performance.

The managerial performance appraisal is another Western concept that has received a special attention from the specialized literature, with the pragmatic consequence of top management compensations. The topic has been discussed for 80 years in hundreds of studies, as the empirical research has focused on Anglo-Saxon countries, with a strong emphasis on the USA.

If the topic is translated into the public sector, the problem of variable compensation is under control due to the fact that the salaries are limited within these organizations. The problem of managerial appraisal still remains in discussion, augmented in this peculiar case by the fuzziness of the aforementioned connected topics.

The appraisal of top management performance within private companies relies mostly on two factors: individual goal achievement and organization performance. The most frequently used organization performance is the profit accounting. However, the appraisal can be ineffective even in this case because of unclear performance criteria (Longenecker 1997). In general, the appraisal could be analyzed as a part of agency theory (Fama 1980), with the significant impact of the information asymmetry between the principal, the board or the owner on the one hand, and the agent, namely the executive on the other.

The first dilemma specific to the top management appraisal in SOE is related to the balance between the economic performance and the social results, considered as long-term objectives. The difficulties involved by the other problems discussed are amplified by the structure of the ownership and stakeholders.

3 A “Puzzle Methodology” to Study Romanian SOEs

This study involves an inductive research and consists of two main components. The first attempts to map a “jungle theory” which refers to public organizations and, more specifically, to SOE. This map is useful in order to identify the problems involved in the demarcation of SOEs domain.

A minimal framework of basic concepts is established in order to define a number of characteristics describing the process involved in assessing performance measurement and the management of public organizations. An extended list of concepts and theories would cause a divergent effect, impeding on defining a realistic and precise image of the “jungle.”

The concepts are chosen in order to provide a shortcut from the theories related to private organizations to the domain of public organizations, a domain which is always open to debate and further clarification. The discussion relies on the concepts of “public ownership” and “publicness,” considered as tools involved in the “demarcation of the public sector” and in the differentiation between agencies, public companies, and SOE. The special emphasis laid on privatization will redefine the boundaries between the public and the private sector, with the renewal of the managerial and performance behavior of organizations. Performance measurement and managerial appraisal represent characteristics specific to SOE which were induced by the “design” of public sector.

The review refers to the Romanian environment, taking into account Anglo-Saxon theories and a number of referential empirical researches developed within the Western world, including examples from Asian, Mediterranean, and former communist East European states. The extension was made in order to describe the relation to a similar context, involving the enlargement of the “jungle.”

The wide array of concepts has interfered with some geographic examples and references, the framework of the study involving an exploratory character. Several secondary characteristics are explanatory in an obvious manner, even if the explanations did not attempt to achieve a comprehensive status. As a matter of fact, if the realities of the public sector of the Western world are hard to be explained in a “rational” manner, the same concern is involved for the emergent economies.

As a deductive approach and the use of statistical tools for a quantitative analysis are concerned, the main difficulties related to small or medium countries are the heterogeneity of organizational populations to be studied and the extreme diversity of legal contexts determining the operation of public organizations. As an

amount of doubt is related to the official figures provided by national statistics offices, there is some concern on the adequacy of a “technical” approach used when researching the SOE in the unknown environment of small or medium countries. A collection of case studies could have been a more appropriate method to utilize when doing research on countries of this size.

Referring back to the inductive approach, the data have been collected by using various and sometimes unusual tools, due to the attempt to develop reliability by triangulation. The secondary data were collected from various Romanian studies or researches, and the “very hot” data were collected from newspapers reflecting the last managerial development of SOE. These newspapers have utilized several specific investigation methods, accessing a significant amount of data labeled as “confidential,” despite the fact that this category of data has to be made available for the public.

The primary data were collected by observation, unstructured or informal interviews. The facts and people taken into account as sources of primary data are either involved in SOE in a straightforward manner or have developed a significant relationship to this environment. The exploratory phase concerning a specific type of SOE has been planned in order to define their operation according to the political context of Romania and also of the European Union. Eventually, the collection of data has become more focused.

Finally, it has to be stressed that a novel approach on a reliable “decryption” of formal data collected in Eastern ex-communist countries is related to the choice of this methodology. The result of this decryption has influenced the selection of concepts referring to the public sector and to SOE.

The most recent data utilized in this study were collected in May 2012, after the Romanian government had changed.

4 Facts, Figures, and Emergent Strategies in Romanian SOEs Sector

4.1 The Legal Context and the Demarcation Process After Privatization

At the end of 1980s, the Romanian public sector included all the enterprises belonging to the exploration field, the manufacturing industries, the public utilities, and the financial and insurance services. The state owned the industry and transport infrastructure, the oil, gas and mining resources, and significant areas of forest and agricultural land. The private sector was limited to a small number of family-owned enterprises and the so-called co-operative enterprises, which in fact were controlled by the state. Twenty years after, at the beginning of the year 2012, the Romanian public sector counts 760 SOEs representing 11 % of the GDP (figures available in Romanian newspapers). The state also holds an amount of minority participations in former SOEs, now private companies.

In order to define the economic behavior of these SOE, their present ownership, and the last changes, the influences in their status should be described. The large SOEs are owned by the government, which is represented either by a ministry or a central agency. Several medium SOEs operating in public utilities belong to the municipality or county ownership. The property rights for specific organizations were transferred from the government to local authorities, as a consequence of a new public policy developed for this category of organizations. For instance, as the domestic heating services are concerned, the supply companies owned by the government (and also their significant debts!) were transferred, in 2008, to municipality ownership. As the water and sewage services are concerned, the owner usually is the county council. There are, however, several public partnerships between municipalities, counties, and the government.

Going back to 1990, the first post-communist government launched a program of economic reforms relying on a new vision related to ownership. This program started with the Law 15/1990 that separated the state-owned entities in two distinct categories: the so-called “commercial companies,” as state companies (the label SOE fits to the category) which were to be privatized, and the so-called “regii autonome,” RAs, in fact public corporations which were to belong, as a whole, to state ownership. The RAs were considered as “strategically significant” (a label which is still difficult to define!), and this category included fuel and mining utilities, defense enterprises, and also a huge amount of other enterprises considered as “peculiar” due to their operations, market structure, and ownership (represented by both municipality and county). In fact, this law seems to be issued in order to draw boundaries of public sector for the next decade.

After few years, the first demarcation between the private and the public sector proved to be ineffective. The main issue involved was that several RAs were very attractive for foreign investors, as many SOE were not. The solution was to redefine the boundary, by importing entities belonging to the second category into the first one, a RA becoming a SOE with the opportunity of being privatized. The creation of a SOE in order to attract investors was to be the result of the division of a RA. Eventually, a small part of it held the original label and the legal statute.

The dynamics involved by the demarcation have proved a lack in the development of coherent plans, as the privatization process has proved the same degree of incoherence. The results of objective analyses have been frequently supported by opinions, explanations, and facts provided by decision makers involved in privatization. Any figure regarding the SOE performance has represented a bone of contention with important social consequences.

4.2 The Case of Energy Sector

A more coherent process of privatization has been developed within the electrical energy sector. After 1997, due to the interest on EU membership, Romania launched an energy sector reform focused mostly on electricity. The managers

assumed the secondary role assigned by the Romanian political decision makers, and as a consequence, the performance measurement was replaced by political considerations which attempted at meeting the EU objectives. Foreign advisors were employed in order to provide technical assistance for drafting legislation, regulatory frameworks, and industry structures.

In a few years, after a gradual transformation, technically labeled as “deregulation,” “open market,” and “internationalization,” a national vertically integrated company was divided into many dozens of regional and process- or product-oriented SOE. A number of new regional SOEs were sold to SOE or public companies from Germany, Italy, and Czech Republic. This is the way in which Romania has developed the EU directives on the energy market, without taking into account the dominance of powerful national companies which are vertically integrated not only in the Western Europe, but also in Central and Eastern European states, and overlooking the poor local experience in deregulation and privatization of the natural monopolies.

Haar and Marinescu (2011) refer to the process of liberalization and privatization involving the energy sector in Romania as a lesson learned on strategies involving European utilities. Even if this lesson seems to be positive in an economic perspective, it does not explain the perseverance of France and Germany in keeping gigantic national companies or the “California lesson,” namely the electricity crisis of 2000 and 2001, caused by a supply gap created by energy companies such as Enron, in order to create an artificial shortage (Weare 2003).

This study emphasizes the gradual adaptation of the Romanian legislation related to the energy sector and explains the consequences for the ownership of SOE sector. In the final stage of the EU alignment determined by GD 638/2007, the electricity sector was completely open. The energy SOE population is defined by Diaconu et al. (2008), cited by Haar and Marinescu (2011), as consisting of 63 thermo-producers (former parts of “Termoelectrica”) owned by municipalities, one transmission system operator completely unbundled and regulated as a public corporation mainly state-owned (“Transelectrica”), 8 fully regulated distribution network operators and implicit suppliers of which 5 have been privatized with Enel (Italy), E-on (Germany), and Cez (Czech Republic), 104 suppliers, and 8.6 million consumers, of whom 8 million are residential and 0.6 million industrial.

In order to complete this image, it should be mentioned that the electricity production is still concentrated (about 70 % of the market) in three SOE, namely “Hidroelectrica,” “Nuclearelectrica,” and “Thermal Station Turceni.” The European investors have pursued a vertical diversification in distribution, supply, sales, and trading segments of the domestic energy market. The project involving the creation of one or two Romanian-integrated energy utilities created by sharing electricity producers, namely SOE such as “Hidroelectrica,” “Nuclearelectrica,” and “Termoelectrica” and a gas producer “Romgaz,” and distribution units, integrating them with transmission operator “Transelectrica” and expected to foster regional competitors has been postponed.

Referred only to the 10 years, the performance measurement is questionable due to frequent asset distribution between new and old enterprises. Each step in the

creation of new organizational structures and of new entities was attempted by new managers. However, the movement of managers was more frequently caused by the changes of the political components of the government.

Today, the main public problem refers to the huge profit gained by private traders, the so-called by newspapers “smart guys” who use long-term contractual arrangements with energy producing SOE, and to the threat this fact involves for the domestic price of electricity. A secondary problem is the assumption that the manipulation of economic results supports the sales of government’s shares to some public corporations operating as natural monopolies (i.e., “Transelectrica”). The incompetence of top managers, employed mainly taking into account political criteria, and their secretiveness regarding the “smart guys” remains an exotic topic for the Romanian TV shows.

In what gas is concerned, the business is represented by two large SOE, “Romgaz” for production, and “Transgaz,” for transport. Due to the fact that the price of Russian gas is very high in comparison with the cost of the Romanian gas, the theoretical margin is also high and can be shaped in order to obtain a certain social impact. This opportunity offers a significant level of power to managers which gives them the possibility to bargain with the decision makers at regional and national level. Even if the world of top managers is not open for public inquiry, the newspapers criticize the exotic acquisitions of these SOE, including an expensive “toy”—a professional football team in the first league representing a rather small community. The explanation of team’s financial support is emblematic for the top management: the source consists of the SOE “private money.”

The gas distribution has been privatized, after splitting the national monopolistic SOE in two enterprises. The new private companies preserved for South and for the North of the country the monopolistic position on market.

Considering these facts it could be concluded that the entire Romanian energy sector has developed an emergent strategy and not a deliberate one, the development of events identifying the strategy, using the words of Lindblom (1959), as the “science of «muddling through».” Even if it is difficult to distinguish social objectives specific to the public sector, the overall liberalization related to the price of utilities seems to endanger the Romanian standard of life with no improvement in the competitiveness of national firms.

4.3 The Organizational Performance and the “Antimanagement”

In the last 20 years, the organizational performance appraisal remains with a strong political distortion. For instance, the government considered the performances achieved by the coal mining sector after 1997 as unacceptable, considering the financial performances, and eventually implemented a policy of reorganization, which included the liquidation of unprofitable exploitations. During the fall of

1998, thousands of mine workers from Valea Jiului (the main Romanian pit coal area) were on strike and started a protest march, which became a march for Bucharest. After a number of negotiations and conflicts with the police forces, the strike ended and the “reform process” continued. Nevertheless, after 15 years, the main SOE operating in coal mining, “Compania Nationala a Huilei” CNH (“The Pit Coal National Company”), the origin of the aforementioned strike, and “Societatea Nationala a Lignitului Oltenia” SNLO (“The Oltenia Lignite National Society”) are classified between the public entities with the most significant debts to the state. In 2011, CNH was the “king debtor” with a debt of almost 2 billion RON (around 500 million euro). The performance measurement of operations or the financial performances could be discussed by taking into account the “social” or “strategic” role of these SOE, as the newspapers frequently report on the “exotic acquisitions” of the SOE top managers and other facts which are difficult to explain. For example, the top managers cannot explain their private fortune. Eventually, in the case of coal mining, the SOEs are entities playing a significant useful social and political role. The consequence of this public policy is the decline of the economic performance of this category of SOE, as the role of managers is mostly political.

The environment of SOEs operating in transport is similar to the one discussed above. The Ministry of Transport has in its portfolio a number of railway enterprises, an airliner, a subway, and a number of airports, ports, and national roads. The regional roads and the local companies for public transport belong to the municipality or county ownership. All the transporters have to confront a significant amount of debts. For instance, “CFR Calatori” (railway passenger transport) confronts debts of more than 600 million lei (140 million euro) after the first semester of 2011, with an increase in operational loss for each month.

A specific issue is related to the SOEs resulted after the split of the national railroad company, labeled as CFR. Despite the personal cuts and other cost reductions, the debts and losses have increased during the last 5 years.

As in the cases of South Korea or of Canada, the list of Romanian SOEs includes many organizations operating on competitive markets. “CEC Bank,” “Antibiotice Iasi” (pharmaceutical industry), “Oltchim” (chemicals), “Televiziunea Romana” (TV), and “Radio Romania” (broadcasting), “Posta Romana” (postal services) are the most significant examples. The reasons to maintain the total or partial state ownership vary according to each case, and their publicness could become a topic involved in academic debates. For a number of cases, the only reason of concern is the poor economic performances or eventually the state of bankruptcy. Consequently, the performance measurement takes into account various criteria and the financial support provided by the state can come under a specific form, as in case of TVR.

Regarding the appraisal of top managers of SOEs, the problem of unclear criteria is augmented by the demarcation of the public sector, all other issues being referred to as changes involving the legal form of ownership. The same effect has been caused by the strategy of privatization. On the other hand, if the organization

performances, social objectives included, are prone to doubt, the achievement of personal objectives can be considered as an appraisal reference.

These “personal objectives” have been a feature of the bureaucratic system with strong connections to Romanian political groups with a strong representation in all the significant parties which ruled the state during the last 20 years. The evidence is provided by the fact that 99 % of the top managers have represented a party involved in the government and their hiring has been determined exclusively by political criteria, namely direct connections with significant names of certain parties. This is a clear representation of the so-called in Romania “antimanagement” (Bratianu 2003) and the Russian term “apparatchik” (which has been also adopted by the French media in order to categorize certain managers, as Bernard Attaly at Air France) describes this relation in the most appropriate manner. Consequently, each change at the government level is immediately reflected into the change of SOEs managers. According to findings available to the public, the replacement of managers was accomplished 3 years after the 1996 general elections, 3 months after the 2000 elections, and 3 days after the 2004 elections or after the last government change in 2010.

Each top manager and each SOE can represent a consistent and spectacular topic for an academic case study. However, the “color” is influenced by peculiar facts and figures which go beyond the formal statements.

5 Conclusions

Both the definition and the demarcation of the Romanian public sector have had to assume the great number of field-related problems and ambiguities existing in the Western countries. The multiple modifications of the privatization public policies which have eventually influenced the SOE list prove there is not such a thing as a coherent strategy of the public sector. No significant components have been transferred from the experience specific to the Western steadfastness, to culturally similar Mediterranean states, or to the transition developed in East European or Asian states.

Due to the widespread conceptual ambiguity, a distinctive feature of the public sector, and public organization management—an ambiguity reflected also in the privatization policy—the decision makers are guided by indefinite political reasons and not by measurable references, reasonable according to social and economic criteria. This fact is emphasized by the new public management in general, and by the incoherence of the national strategy in particular. The management peculiarities are illustrated by economic reasons involved in such instances where the social ones should prevail, as in the case of natural monopolies existing in the sector of public utilities, and, on the other way round, by social reasons involved in instances where the economic ones should prevail, as in the case of SOEs operating on competitive markets.

The performance measurement of the Romanian SOE presents principle-based difficulties associated to the current theory, amplified by the exacerbation of the influence exerted by political factors. A probable consequence would be the interpretation of each performance with an attempt at justifying a future public policy, an approach pointed out by studies developed in states which are interested in promoting both NPM and the privatization. Such an approach, even if substantiated by empirical studies, discredits any reasonable attempt at translating into practice the performance-oriented management developed in textbook manner.

The SOE managers have become the pawns involved in the political environment display of power. The actual manifestations provided by case studies illustrate this fact by taking into account each and any SOE. In a similar manner, when SOE groups of certain specificity are discussed, the actual manifestation is characterized by a perpetual reorganization which involves their transfer from public–state ownership to the private–state ownership, implying—in other words—their transformation into SOE.

Therefore, the multitude of SOE evolves in Brownian motion with no influence from a managerial plan providing economic or social objectives associated with the usual theoretical approaches belonging to the Western type. The environment is characterized by cases which are peculiar due to the evolution of results and incomes specific to an exotic management for which the political level makes the difference.

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Factorial Analysis of the Correlation Between Competitive Strategy and Company's Characteristics: The Case of Romanian Business Environment

Alina Mihaela Dima

Abstract The cutthroat market competition for gaining competitive advantage and, implicitly, extra profits often makes companies intervene in competition mechanisms by closing deals or initiating anticompetitive practices. In order to avoid falling under the incidence of competition law, companies should apply a competition strategy and a competition audit. Our paper sets as a general objective the analysis of how companies on the Romanian market know, understand, and apply the coordinates of a competition strategy. Specific objectives target the factorial analysis of the influencers of the business strategy of the considered companies. For the factorial analysis, we have performed nonparametric tests of the answers given by 425 managers of companies on the Romanian market to certain questions in the questionnaire, in order to assess the importance of specific factors (company size, experience in the market, etc.) on the tested aspects regarding the business and, respectively, competition strategy and the risk of getting involved in anticompetitive behaviors.

1 Introduction

Competition and the characteristics of competitive environment remain a field of study for numerous research endeavors. Recent studies (Hunt and Duhan 2002) outline two orientations regarding competition. One view is the neoclassic orientation, in whose acceptance a company seeks to become efficient, the purpose of perfect competition being to maximize consumer welfare. The second view approaches the business idea from a conventional side, claiming that a company seeks to be effective. Competition on the market leads to a level of effectiveness

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through profit, based on which companies can innovate and, thus, add value. From this point of view, of producing (more) value, businessmen regard effectiveness as being pro-social, which is disapproved by the neoclassic, for whom a higher level of effectiveness leads to monopolistic competition, which decreases social welfare. Despite these views, whose conclusions are more or less valid or scientifically proven, a new orientation comes to front: Competition, starting from the realities of the present business environment, may be defined through efficiency, as well as through effectiveness, the later having a pro-social effect. Hunt and Duhan (2002) support this idea by using the resource-advantage theory. In order to prove the pro-social character generated by the effectiveness reached by a company, several premises have to be accomplished (Hunt and Duhan 2002):

- The heterogeneous character of the supply–demand relationship within the same economic sector—a diversified supply is necessary for diverse market segments within the same economic sector because of the diversified customer demands.
- The heterogeneous and relatively immobile character of resources.
- The imperfect character of consumer information and of competitor information, respectively. Human motivation is oriented toward satisfying one’s own interests.
- The objective of the competitor to maximize its financial performance. In this context, the managerial behavior is mainly based on adopting, implementing, and adapting strategies.
- The dynamic character of competition, meaning, on the one hand, that competitive processes have a negative potential by leading to disequilibria generated, mainly, by the desire of companies to obtain financial performance, and, on the other hand, that innovation and organizational learning have an endogenous character.

All these premises are met by the resources-advantages theory. Being interdisciplinary, the resources-advantages theory approaches companies, as well as resources, as durable entities, as a result of evolutionary selection, where the competition on resources is the base of the selection process.¹ The continuous strive for gaining competitive advantage makes those companies which succeed in obtaining such advantages to be better situated in the market, having better financial results than their competitors. The functioning mechanism of the competitive process depends on several factors (Hunt and Duhan 2002):

¹ “RA theory is an evolutionary process theory of competition. It views firms and resources as the heritable, durable units of evolutionary selection, with competition for comparative advantages in resources constituting the selection process. Because the selection process focuses on firms and resources that are locally fitter, rather than maximally fittest, RA theory is non-consummatory (i.e., there is no predetermined endpoint for the process of competition). Therefore, the theory accommodates path dependencies. Thus, though RA competition is a process that is moving, it is not moving toward some ideal point (such as a Pareto-optimal, general equilibrium)” (Hunt and Duhan 2002, p. 99).

- the resources the company attracts and uses;
- the institutions responsible for organizing economic activity;
- the actions taken by competitors and suppliers;
- consumer behavior;
- public policies.

From the resources companies use, we should mention (information) technology and competitors' competencies and abilities. These can be regarded also as sources of competitive advantage.

Information technology may lead to an increase in a company's efficiency by cutting costs and differentiating products and services. An aspect not to be left apart is the way in which technology is managed and used (exploited) in the company. Although, at first, information technology was regarded as a source of competitive advantage, the changes in the economic and business environment turn it into a competitive necessity (Booth and Philip 1998).

The competencies and the abilities of the competitors, coming from an accumulation, rather implicit than explicit, of knowledge and experience are a premise of organizational learning. That which enables companies to obtain competitive advantage is more of a linkage, a synergy of distinct traits and abilities of the company, than the application of generic strategies, as formulated by Porter (Booth and Philip 1998). The synergic approach to capabilities implies (Kay 1993, in Booth and Philip 1998)

- setting the price and formulating positioning initiatives;
- initiating and formulating marketing strategies targeting, mainly, promotion of products and services, building, and consolidating a brand;
- interacting with other market actors through business relations in the value chain.

The formulation and implementation of flexible strategies, which adapt rapidly to market changes, open a new perspective in approaching competitive advantage. This is not a mere application of generic strategies, but represents the exploitation of many factors (resources, most of the times) in a unitary framework.

Through market competition and access to resources, as well as through the ways of using these resources, companies obtain competitive advantages specific to an efficient behavior (minimizing costs), or to an effective behavior (maximizing profits), or to both. Innovation and organizational learning play an important role, as they contribute to the development of company process and to the improving of their performance, to the development of economic sector they are part of, to the increase in productivity leading to economic growth and, thus, to social welfare. As a conclusion, competition incorporates two key activities for the present economic environment: effectiveness and efficiency.

Frequently, cutthroat competition for gaining competitive advantage and, implicitly, for gaining extra profits pushes companies to act in an anticompetitive manner, using multiple practices, as horizontal agreements, vertical agreements, abuse of dominant position. In order to avoid falling under the incidence of

competition law, companies should apply a competition strategy and go through a competition audit.

Our paper sets as a general objective the analysis of the way in which companies on the Romanian market come to know, understand, and apply the steps of a competition strategy. Specific objectives refer to testing the influence of certain factors on business strategies, by interpreting statistic correlations.

2 Literature Review

A conventional wisdom in economics posits that more intense market competition, measured in almost any way, reduces firm profit. Consequently, it should be in the best interest of profit-maximizing firms to reduce the degree of market competition, especially if it can be done through some legal means (Ishida et al. 2008). There are several means to achieve this end, either to gain some market power through product differentiation or to reduce the number of competitors in a market through means such as collusion, entry deterrence, predation and horizontal merger. The main goal is to earn higher profits if they can place themselves in less competitive environments. Mergers and acquisitions can affect competition on the market since they concentrate market shares in the hands of few competitors that can control the market.

Markups can provide valuable information on competitive pressures in various sectors of the economy, reflecting pressures stemming from rules of conduct imposed by regulators as well as those arising from such factors as trade and FDI or increasing consumer demands in terms of price and quality (Molnár 2010).

A lot of papers related to competition offer evidence of concerns in the field and the need to implement competitive strategy at the company level. The relationship between competition and productivity or competition and economic growth is underlined.

In the paper “Do Competition and Ownership Matter? Evidence from Local Public Transport in Europe,” Boitani et al. (2010) investigate how the ownership and the procedure for the selection of firms operating in the local public transport sector affect their productivity. We find that when firms are totally or partially in public hands, their productivity is lower. Moreover, firms selected through competitive tendering display higher total factor productivity (Boitani et al. 2010).

The article “Competition and Trust: Evidence from German Car Manufacturers” explores the determinants and effects of trust relationships between upstream suppliers and downstream producers. Using unique survey data on individual supplier–buyer relationships in the German automotive industry, the article shows that by means of different measures of supplier–buyer trust that higher levels of trust mitigate relationship-specific underinvestment in a classical hold-up situation. Moreover, the article states that higher levels of supplier’s trust are reflected in the buyer’s choice of a more competitive procurement strategy among potential suppliers (Felli et al. 2011).

Koster and Stel (2011) investigate the impact of start-up rates on regional economic development. Interactions between new and incumbent firms play an important role in the process of economic growth, and more knowledge on these interactions is required. Thus, the paper fits in a recent strand of empirical research which suggests that competition among incumbent firms is caused by (lagged) start-up rates (Koster and Stel 2011).

Advances in competition economics as well as in computational and empirical methods have offered the scope for the employment of merger simulation models in merger control procedures during the past almost 15 years. The article “Merger Simulation in Competition Policy” provides a classification of state-of-the-art merger simulation models and reviews their previous employment in merger cases as well as the problems and limitations currently associated with their use in merger control (Budzinski and Ruhmer 2009).

The paper “Competition and Economic Growth” examines the relationship between competition and economic growth, in the theoretical framework described by endogenous growth models, but with a specific interest in the policy implications. In particular, specific attention is paid to the most recent models of Schumpeterian growth, which show the existence of a nonlinear relationship between competition and growth, by considering either the initial degree of competition or the distance from the technological frontier (Scopelliti 2010).

Another relevant paper titled “Competition and Firm Productivity” presents empirical evidence on the impact of competition on firm productivity. Using firm-level observations from the World Bank’s Enterprise Survey Database, it is found out that implemented product market reforms had a more pronounced increase in competition and correspondingly, in productivity: the contribution to productivity growth due to competition spurred by product market reforms is around 12–15 percent (Ospina and Schiffbauer 2010).

In the paper “From transition to competition,” the hypothesis being tested is that the economic transition toward a market economy increases the efficiency of firms. The findings of the article are the fact that the technical efficiency of the companies has indeed increased during the transition, while allocative efficiency has deteriorated. It is also found out that significantly increasing returns to scale, suggests that the regulatory authority should allow companies to merge into larger units (Cullmann and Hirschhausen 2008).

Wagner (2011) contributes to the literature on international firm activities and firm performance by providing the first evidence on the link of productivity and both exports and foreign direct investment (FDI) in services firms from a highly developed country.

In the paper “Firm productivity and export markets: a non-parametric approach,” Delgado et al. (2002) examine total factor productivity differences between exporting and non-exporting firms. The paper also examines two complementary explanations for the greater productivity of exporting firms: the market selection hypothesis and the learning hypothesis. Results indicate clearly higher levels of productivity for exporting firms than for non-exporting firms (Delgado et al. 2002).

3 Methodology

This paper uses nonparametric statistics in order to test the research hypotheses, in order for the analysis not to be conditioned by the skewness of the considered population distribution. In case of our sample, which deviates from the normal distribution, to an extent to which it cannot be properly approximated by parametric tests, our choice of nonparametric methods is motivated. Nevertheless, we retain the classical parametric t test, as a point of departure in comparing the results obtained by applying its nonparametric counterpart, the Mann–Whitney test, as well as the nonparametric equivalent of ANOVA, the Kruskal–Wallis test.

For the factorial analysis, we performed different nonparametric tests, in order to compare the importance of different factors (experience of the company, dimension of the company, etc.) on the tested aspects regarding competitive strategy and anticompetitive risk practices.²

Independent group T test: Tests the null hypothesis stating that the means of two normally distributed populations are equal. The formula of this test divides the difference between the means (the signal) to the measure of variability (the noise) that may make it harder to see the difference between the two groups:

$$t \text{ value} = \frac{\text{signal}}{\text{noise}} = \frac{X_T - X_C}{\sqrt{\frac{\text{Var}_T}{n_T} - \frac{\text{Var}_C}{n_C}}}$$

where: n_T and n_C are the number of respondents associated with each group.

This test divides the group of respondents into maximum two groups (for instance big companies vs. small companies, global vs. local companies).

As an alternative to the t test, in case of a violation of the assumption of normality of the sample, we use the *Mann–Whitney nonparametric test*. The test divides a random sample from a population in two equal subsamples, based on a certain criterion (experience on the market, for instance). To each subsample (experienced and non-experienced companies), a set of questions is addressed, and the means of the answers are then compared, in order to see whether the perceived differences are statistically significant, or random. The test is based on the formula:

$$U = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - \sum_{i=n_1+1}^{n_2} R_i$$

where:

- U Mann–Whitney test
- n_1, n_2 sample size (number of respondents)
- R_i rank of the sample

² Nonparametric tests are recommended to test whether or not the values of a particular variable differ between two or more groups (top and middle management position in the company for those persons that answered to the questionnaire).

Another test we use is the *Kruskal–Wallis nonparametric test*, as a nonparametric alternative to the one-way ANOVA. The Kruskal–Wallis test uses an independent (grouping) variable which splits the cases in two or more groups and a dependent variable, based on which cases are ranked. The test is based on the formula:

$$H = \frac{12}{n(n+1)} \sum_{i=1}^k R_i^2 - 3(n+1)$$

where:

H Kruskal–Wallis test

N total number of observations in all samples

R_i rank of the sample

The null hypothesis is accepted when the value of the Kruskal–Wallis test is less than the value of the tabular chi-square, while it is rejected when the value is greater than table chi-square, when it indicates that the chosen subsamples are not part of the same population, in other words, the splitting criterion introduces a significant difference between subsamples.

In comparison with the Mann–Whitney test, which accepts only two values of the nominal variable, the Kruskal–Wallis test uses multi-level variables, which assures a better accuracy in describing the sample. Strictly statistically speaking, the p value is the same for the two tests.

4 Empirical Results

In the questionnaire applied to the managers from 425 Romanian companies, we used mostly closed questions for assessing practices in the field of competition strategies:

- Identifying the main barriers on the market (Q1);
- Determining the mechanisms of price settlement on the company's market (Q3);
- Identifying the business objectives of the company (Q4);
- Identifying the main customers (Q5);
- Identifying the main competitors (Q6);
- Determining the company's importance on the market measured through market share (Q8);
- Determining the intensity of the competition in the company's field (Q9);
- Determining the knowledge level on the activity of competitors (Q10);
- Identifying the main tools used to acquire information about the competitors' activity (Q11);
- Identifying the relevant information about the competitors' activity (Q12);

- Identifying techniques companies use to create competitive advantages on the market (Q13);
- Identifying collaboration ways with customers (vertical agreements) that present an increased sensitivity from the point of view of the competition legislation (Q14);
- Identifying collaboration ways with competitors (horizontal agreements) that present an increased sensitivity from the point of view of the competition legislation (Q15);
- Identifying types of marketing strategies used by companies in order to obtain a competitive position on the relevant market (Q16);
- Identifying selling techniques (used within the marketing strategy) that present an increased sensitivity from the point of view of the competition policy and their anticompetitive effects on the market (Q17);
- Identifying the mere existence of a competitive market strategy at company level and the knowledge of its components (Q18);
- Determining the degree to which the competitive strategy exists and it is correlated with the marketing strategy of companies (Q19);
- Identifying the degree to which companies run competition audits and determining their main components (Q20);
- Understanding top management's perceptions on the relationship between business ethics and fair competition (Q21);

and each impact factor

- The experience of the company on the market (no. of years) (D1);
- The field of the activity of the company (D2);
- The turnover of the company in the previous year (of the research) (D3);
- The company size measured through the number of employees (D4);
- The ownership type of the company (D5).

4.1 Factor 1: The Experience of the Company on the Market (No. of Years) (D1)

A. Independent group *T* test

The *t* test performed on the answers provided and the first factor—the experience of the company (D1) indicates that market experience is a relevant factor to explain different aspects (answers provided to the following questions)

- Identifying the business objectives of the company (Sig. = 0.03);
- Identifying the main competitors (Sig. = 0.06);
- Determining the company's importance on the market measured through market share (Sig. = 0.10);
- Identifying techniques companies use to create competitive advantages on the market (Sig. = 0.00);

Table 1 Independent group *T* test based on the experience of the company

Item	F	Levene's test for equality of variances	Sig.	<i>t</i>	df	Sig. (two-tailed)	
Q4	Equal variances assumed	4.86	0.03	-3.17	314.00	0.00	
	Equal variances not assumed			-3.15			299.00
Q6	Equal variances assumed	3.60	0.06	-1.82	314.00	0.07	
	Equal variances not assumed			-1.83			314.00
Q8	Equal variances assumed	2.66	0.10	5.69	314.00	0.00	
	Equal variances not assumed			5.71			313.96
Q13	Equal variances assumed	18.17	0.00	-2.12	314.00	0.03	
	Equal variances not assumed			-2.09			255.99
Q14	Equal variances assumed	11.15	0.00	1.17	314.00	0.24	
	Equal variances not assumed			1.18			312.29
	Equal variances assumed			-0.61			309.87
Q18	Equal variances not assumed	14.96	0.00	2.05	314.00	0.04	
	Equal variances assumed			2.06			313.69

Sig. lower than 0.05 means that the correlation has statistical relevance

- Identifying the mere existence of a competitive market strategy at company level and the knowledge of its components (Sig. = 0.00);
- And partially identifying collaboration ways with customers (vertical agreements) that present an increased sensitivity from the point of view of the competition legislation (Sig. = 0.00).

This might explain that companies with higher experience on the market have better knowledge and perspective in identifying their objectives, identifying the competitors on the market, in determining their position on the market (determine and estimate their market share), identifying their competitive strategy and its elements, and partially to identify their collaborative agreements with the customers/distributors. In other words, more experienced companies have a better knowledge to assess the business external environment (position, competitors, strategy, collaborative agreements with customers) (Table 1).

As a conclusion, the company age (an indicator of the company's market experience) is relevant factor for questions Q4, Q6, Q8, Q13, Q18 and partially for Q14.

B. Mann–Whitney nonparametric test

Another test performed was Kruskal–Wallis test. According to this nonparametric test, the differences between groups are significant only in some cases: between experience of the company and identifying business objectives of the company (Q4), between experience of the company and identifying the main competitors (Q6), between experience of the company and identifying market share (Q8), and between experience of the company and identifying the existence of a competitive market strategy at company level and the knowledge of its components (Q18). The experience on the market is significant factor in case of market position and defining objectives and business strategy.

Table 2 Mann–Whitney nonparametric test based on the experience of the company

Indicator	Q4/D0	Q6/D0	Q8/D0	Q18/D0
Mann–Whitney U	10,173	11,118.5	8,056.5	11,064
Wilcoxon W	23,868	24,813.5	19,532.5	22,540
Z	−3.019	−1.918	−5.777	−2.040
Asymp. Sig. (two-tailed)	0.003	0.055	0.000	0.041

Asymp. Sig. lower than 0.05 means that the correlation has statistical relevance

In other words, companies with higher experience on the market could better assess their position on the market (market share) and their competitors and have better knowledge on the existence and components of their business strategy (Table 2).

As a conclusion, the company age (an indicator of the company's market experience) is relevant factor for questions Q4, Q6, Q8, and Q18.

C. Kruskal–Wallis nonparametric test

The Kruskal–Wallis test (this test measures how much the group ranks differ from the average rank of all groups), performed on the correlation between answers and the factor D1, indicates that there *is a significant difference* (asymptotic significance is less than 0.05) among the groups (the experience of the company and the following aspects (answers to the questions):

- Determining the mechanisms of price settlement on the company's market (Q3);
- Identifying the business objectives of the company (Q4);
- Identifying the main competitors (Q6);
- Determining the company's importance on the market measured through market share (Q8).

Analysis of the correlations measured by the Kruskal–Wallis test indicates that the most important difference is between the factor experience of the company and the market share (0.0000), followed by identification of business objectives (0.0365) and identification of main competitors (0.365) and mechanisms of price settlement (0.0492). So, companies with high experience on the market will be able to identify more easily their position on the market, their business objectives and main competitors or the price settlement mechanism. All these aspects have an impact on decision making and business strategy within the company, setting up the long and medium term objectives, and finally the success of the company on the market (Table 3).

The overall test analysis (three tests) shows that factor represented by the experience of the company is relevant for the following questions:

- Identifying the business objectives of the company (Q4);
- Identifying the main competitors (Q6);
- Determining the company's importance on the market measured through market share (Q8).

Table 3 Kruskal–Wallis nonparametric test based on the experience of the company

Indicator	Q3/D0	Q4/D0	Q6/D0	Q8/D0
Chi-square	9.5253	10.2416	10.2287	54.0397
df	4	4	4	4
Asymp. Sig.	0.0492	0.0365	0.0367	0.0000

Asymp. Sig. lower than 0.05 means that the correlation has statistical relevance

4.2 Factor 2: The Main Object of Activity (D2)

Using the three statistical tests, the *T* test, the Mann–Whitney and Kruskal–Wallis nonparametric tests, we analyze the way a company’s main object of activity reflects in its practices and organizational aspects. The results of each test are interpreted below.

A. *T* test of independent groups

According to this test, the main object of activity influences only in part the clients’ structure (Sig. = 0.82)—the clients being either companies, organizations, or the public (individual consumers). The results obtained show that other components analyzed depend, in some respect, on the company’s main activity (questions Q5, Q8, Q15, Q16, Q17). We may exemplify

- The market share of the companies (Sig. = 0.01);
- The collaboration relationships between competitors (Sig. = 0.01);
- The types of marketing strategies adopted (Sig. = 0.03), as well as the techniques used in these strategies (Table 4).

B. The nonparametric Mann–Whitney test

According to this test, we conclude that between the main activity of the company and the share registered by the companies in the market there is a total interdependence (question Q8) (Table 5).

C. The nonparametric Kruskal–Wallis test

By interpreting this test, we see that the main activity of companies is a relevant factor only for their types of clients (Sig. = 0.001), the number of competitors in the branch (Sig. = 0.013) and the acquired market share (Sig. = 0/003) (questions Q5, Q6, and Q8) (Table 6).

4.2.1 Conclusions

We may notice certain similarities between the results of the three tests. A result confirmed by all three tests is that the company’s activity is a determinant factor for the size of the market share of that company. As a result of two of the three

Table 4 *T* test for independent groups applied to the main object of activity

Item	F	Levene's test for equality of variances	Sig.	<i>t</i>	df	Sig. (two-tailed)
Q5	Equal variances assumed	6.31	0.01	1.12	326.00	0.26
	Equal variances not assumed			1.14	159.06	0.26
Q8	Equal variances assumed	0.05	0.82	-3.00	326.00	0.00
	Equal variances not assumed			-2.97	151.53	0.00
Q15	Equal variances assumed	7.53	0.01	0.72	326.00	0.47
	Equal variances not assumed			0.69	141.16	0.49
Q16	Equal variances assumed	4.96	0.03	1.08	326.00	0.28
	Equal variances not assumed			1.17	181.52	0.24
Q17	Equal variances assumed	5.03	0.03	-1.58	326.00	0.12
	Equal variances not assumed			-1.50	140.93	0.14

Note If Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 5 Mann–Whitney nonparametric test applied to the main activity of the company

Indicator	Q8/D0
Mann–Whitney U	8,311
Wilcoxon W	37,231
Z	-3.159
Asymp. Sig. (two-tailed)	0.002

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 6 Nonparametric Kruskal–Wallis test applied to the main activity of the company

Indicator	Q5/D0	Q6/D0	Q8/D0
Chi-square	16.3336	10.7668	14.0202
df	3	3	3
Asymp. Sig.	0.001	0.013	0.003

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

tests we have used, the *T* test and the nonparametric Kruskal–Wallis test, the object of activity influences the types (structure) of clients of the companies.

In the literature on the topic, the influence of the object of activity on the organizational and competitive environment is very little addressed to. It has been identified, though, related to the activity of a company, a thematic area less studied, that of emerging business fields, such as IT or telecommunications. Their in-depth research becomes, in the context of a dynamic business environment,

more and more necessary. The rise of these fields is determined by factors such as innovation, the cyclical pattern of technological development and of its mechanism (Möller and Svahn 2009).

According to the same authors, innovation seems to be the determinant factor in the emergence of such fields: the more innovation is found in the current infrastructure and the more the new infrastructure becomes necessary for marketing the innovations, the more innovative companies will intensify and develop relationships with the actors coming from the political and social domains.

There are certain steps that are the prerequisites of these emerging business fields (Möller and Svahn 2009). You start from an innovative idea, exploring the ways of developing it and the business field it belongs to. Then, you develop networks (means of cooperation) with other companies, in order to marketize the products/services that are based on that innovation. The last phase is the coordination of a network whose components, production, logistic and marketing, will function efficiently, while the managerial device will ensure a rapid growth and a competitive behavior that will ensure a significant market share for the company.

The environment in which such businesses emerge is characterized by several factors:

- The degree of complexity: this is defined by the type of resources used, abilities, and other stakeholders;
- The degree of novelty: this factor shows the capacity of using, together with other competitors, the resources and capabilities toward developing new products/services;
- The capacity of integration (incorporation): this is described by the interconnection degree reached through relations and diverse forms of cooperation with competitors, but also by the number of networks the company is a part of;
- The dynamic character: this is given by the change rhythm and by the number of modified or newly created activities.

We conclude that the structure of the client pool plays a decisive role in the design and development of new objects of activity for companies (see the emerging businesses field as an example). The more diversified the type of clients and the way of interaction with them, the more you need to take into consideration a suitable use of some adequate resources and capabilities, and also the formulation of the strategy (marketing strategy) and its permanent adaptation. The number of competitors in the branch can also influence the development or the emergence of new objects of activity through diverse forms of cooperation.

4.3 Factor 3: The Turnover of a Company (D3)

The turnover is one of the means of assessing a company's performance. Its influence on some organizational and competition aspects is tested, in the present

research, using the three statistical tests, the T test, the nonparametric Mann–Whitney and Kruskal–Wallis tests. The results are further analyzed.

A. Independent group T test

According to the results of this test, the turnover, that reflects the dimension of the company, is in interdependence with the size of the market share of the company (Sig. = 0.05), the owned information regarding competitors (Sig. = 0.00), the types of adopted marketing strategies (Sig. = 0.00), the existence of a competitive strategy (Sig. = 0.00), and the existence of a competition audit in the company (Sig. = 0.00), (questions Q8, Q11, Q16, Q18, and Q20) (Table 7).

B. The nonparametric Mann–Whitney

The turnover influences, according to the results of this test, the number of competitors on the market (Sig. = 0.012), the size of the market share (Sig. = 0.000), the types of marketing strategies adopted by the companies (Sig. = 0.000), the existence of a competitive strategy at the level of the company (Sig. = 0.000), the correlation between the competitive strategy and the marketing strategy of the company (Sig. = 0.000) and the competitive strategy in the company (Sig. = 0.003), and the relationship between fair competition and business ethics (Sig. = 0.032), (question Q6, Q8, Q16, Q18, Q19, Q20, and Q21) (Table 8).

C. The nonparametric Kruskal–Wallis test

According to the results of this test, the turnover influences the types of market barrier (Sig. = 0.031), the structure of the company's clients (Sig. = 0.002), the size of the market share (Sig. = 0.000), the types of horizontal agreements between competitors (Sig. = 0.046), the type of marketing strategy adopted by the company (Sig. = 0.001), adopting a competitive strategy at company level (Sig. = 0.000), the correlation between the competitive strategy and the marketing strategy of a company (Sig. = 0.000), the choice to make a competition audit in

Table 7 Independent group T test applied to the turnover

Item	F	Levene's test for equality of variances	Sig.	t	df	Sig. (two-tailed)
Q8	Equal variances assumed	3.99	0.05	-9.40	330.00	0.00
	Equal variances not assumed			-9.15	232.46	0.00
Q11	Equal variances assumed	15.12	0.00	1.96	330.00	0.05
	Equal variances not assumed			2.14	317.13	0.03
Q16	Equal variances assumed	77.27	0.00	3.99	330.00	0.00
	Equal variances not assumed			4.59	329.49	0.00
Q18	Equal variances assumed	22.41	0.00	-5.60	330.00	0.00
	Equal variances not assumed			-5.45	232.48	0.00
Q20	Equal variances assumed	36.95	0.00	-2.99	330.00	0.00
	Equal variances not assumed			-2.66	177.25	0.01

Note If Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 8 Nonparametric Mann–Whitney test applied to the turnover

Indicator	Q6/D0	Q8/D0	Q16/D0	Q18/D0	Q19/D0	Q20/D0	Q21/D0
Mann–Whitney U	11,004	5,994	10,585	8,998	7,216.5	11,591	11,086
Wilcoxon W	18,507	28,149	18,088	31,153	14,719.5	33,746	18,589
Z	-2.510	-8.640	-3.997	-5.363	-6.852	-2.956	-2.148
Asymp. Sig. (two-tailed)	0.012	0.000	0.000	0.000	0.000	0.003	0.032

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 9 Nonparametric Kruskal–Wallis test applied to the turnover

Indicator	Q1/D0	Q5/D0	Q8/D0	Q15/D0	Q16/D0
Chi-square	8.886	14.779	78.803	7.993	16.231
df	3	3	3	3	3
Asymp. Sig.	0.031	0.002	0.000	0.046	0.001

Indicator	Q18/D0	Q19/D0	Q20/D0	Q21/D0
Chi-square	32.964	48.853	10.632	8.746
df	3	3	3	3
Asymp. Sig.	0.000	0.000	0.014	0.033

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

the company (Sig. = 0.014), and the link between fair competition and business ethics (Sig. = 0.033), (questions Q1, Q5, Q8, Q15, Q16, Q18, Q19, Q20, and Q21) (Table 9).

4.3.1 Conclusions

The results obtained in the three tests show that the factor represented by the turnover of the company is mainly relevant for the following questions:

- Assessment of the importance of the company in the market, measured by the market share (Q8);
- Identifying the marketing strategies used by the companies in order to obtain a relevant competitive position in the market (Q16);
- Identifying the existence of a competitive market strategy at company level and knowing its components (Q18);
- Identifying the making of a competition audit at the level of the company and the determination of its main elements (Q20).

According to studies from the specialty literature, organizational performance can be reflected, in most of the cases, in the role the training of the employees and the development of their competencies and abilities plays, by determining the relationship between personnel turnover in a company and the investment in the training of the personnel (Forrier and Sels 2003) or the organizational commitment (Appelbaum et al. 2009).

Together with the practices related to the management of the human resources (Khilji and Wang 2007), or the personnel policies (Bingley and Westergaard-Nielsen 2004) that can influence organizational performance, there also are other determining factors.

For example, literature mentions a few managerial practices, common in companies with high performances (Grønholdt and Martensen 2009):

Organizational strategy;

Organizational culture;

Organizational structure;

Cultivating employee talent at every organizational level;

Leadership;

Innovation and the relationships between competitors (mergers or partnerships).

At the same time, studies show that those companies which are oriented toward adopting and applying marketing concepts, as well as concentrating on the sales volume, achieve better organizational performance than those companies that treat these aspects separately (Helgesen et al. 2009).

The present study completes the results already discussed in the specialty literature, proving that the dimension of the turnover is a relevant factor influencing the size of the market share, the type of marketing strategy adopted by the company, the competition strategy = at the level of the company and the decision to have a competition audit in the company.

Moreover, the turnover is reflected in the correlation between the competition strategy and the marketing strategy of the company, as well as in the relationship between fair competition and business ethics, result confirmed by the two non-parametric tests used, the Mann–Whitney and Kruskal–Wallis tests. This proves that the companies with a bigger turnover have a more coherent vision on the business strategy and coordinate their decisions (marketing techniques, market extension strategies) integrating them in the overall strategy of the company.

4.4 Factor 4: The Number of Employees of the Company (D4)

The main interest of policies in the competition field is oriented toward companies which affect the competitive mechanism of the economy. As a consequence, companies that do not have market shares that would allow them to have a significant impact in the relevant market they are operating in are not in the attention of the competition authorities. Even more, they can get involved in anticompetitive practices which are illegal for companies with a significant market share. Legal systems, globally, have adopted rules that divert the attention of the authorities in the competition field from the small and medium businesses. In the case of the European Union, this rule is called “*minimis*” and ignores, starting with 2001, the companies that have a market share of less than 10 % (for agreements between

competitors) or 15 % (for the other types of agreements). Still, it has to be mentioned that this rule can be also a “trap,” as far as the essential element that makes the difference is the way the relevant market is defined. If the relevant market is defined at a regional/local level smaller than the national one, a business that does not exceed 10 % at national level can have the fake comfort of not being in the attention of the authorities of the competition field. However, if the company has a market share at regional or local level of over 10 %, it will automatically attract the attention of authorities in the competition field.

A. Independent group *T* test

The independent groups *T* test, which can be qualified as the most discriminant of the tests used, identifies a significant impact of the number of employees of the company—as proxy for the size of the company—on the answers to questions:

- Q6 (identifying the main competitors, Sig. = 0.039);
- Q16 (identifying the marketing strategies used by companies to obtain a competitive position on the relevant market, Sig. = 0.000);
- Q11 (identifying the main instruments used in order to obtain information about competitors, Sig. = 0.000);
- Q18 (identifying the existence of a competitive market strategy at the level of the company and knowing its components, Sig. = 0.000);
- Q20 (identifying the making a competitive audit at the level of the company and determining its main elements, Sig. = 0.000) and
- Q21 (identifying the perceptions of the managers related to the relationship between business ethics and fair competition, Sig. = 0.005).

It is obvious that companies with a significant turnover are not only professional from a marketing function standpoint, but their management is also sensitive to questions related to ethics and competition (Table 10).

B. The nonparametric Mann–Whitney test

The nonparametric Mann–Whitney test offers, in addition, a significant impact of this factor on

- Q4 (identifying the business objective of the company, Sig. = 0.007);
- Q8 (determining the importance of a company in the market, measured through market share, Sig. = 0.000);
- Q10 (determining the level of know-how regarding the activity of the competition, Sig. = 0.001);
- Q12 (identifying the relevant information regarding the activity of the competition, Sig. = 0.013);
- Q15 (identifying some ways to cooperate with the competition, horizontal agreements, having high sensibility from a competition legislation standpoint, Sig. = 0.043) and
- Q19 (determining the level of the competition strategy of a company and its correlation with its marketing strategy Sig. = 0.000) (Table 11).

Table 10 Independent groups *T* test applied to the number of employees of a company

Item	F	Levene's test for equality of variances	Sig.	<i>t</i>	df	Sig. (two-tailed)
Q6	Equal variances assumed	4.285	0.039	2.914	337.000	0.004
	Equal variances not assumed			2.851	237.445	0.005
Q11	Equal variances assumed	23.010	0.000	2.338	337.000	0.020
	Equal variances not assumed			2.673	336.564	0.008
Q16	Equal variances assumed	91.751	0.000	4.334	337.000	0.000
	Equal variances not assumed			5.050	336.052	0.000
Q18	Equal variances assumed	24.486	0.000	-5.628	337.000	0.000
	Equal variances not assumed			-5.464	232.054	0.000
Q20	Equal variances assumed	73.761	0.000	-4.110	337.000	0.000
	Equal variances not assumed			-3.518	161.822	0.001
Q21	Equal variances assumed	8.072	0.005	2.436	337.000	0.015
	Equal variances not assumed			2.554	290.683	0.011

Note If Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 11 Nonparametric Mann–Whitney test applied to the company's number of employees

Indicator	Q4/D0	Q6/D0	Q8/D0	Q10a/D0	Q10b/D0	Q11/D0	Q12/D0
Mann–Whitney U	11,097.5	10,856	6,501	10,536	10,617	12,186.5	11,423
Wilcoxon W	18,723.5	18,482	29,937	33,972	34,053	19,812.5	19,049
Z	-2.703	-3.275	-8.337	-3.448	-3.255	-2.338	-2.496
Asymp. Sig. (two-tailed)	0.007	0.001	0.000	0.001	0.001	0.019	0.013
Indicator	Q15/D0	Q16/D0	Q18/D0	Q19/D0	Q20/D0	Q21/D0	
Mann–Whitney U	11,614	10,700	9,352.5	8,565.5	11,569.5	11,455.5	
Wilcoxon W	35,050	18,326	32,788.5	16,191.5	35,005.5	19,081.5	
Z	-2.024	-4.517	-5.388	-5.616	-4.017	-2.212	
Asymp. Sig. (two-tailed)	0.043	0.000	0.000	0.000	0.000	0.027	

Note: If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

C. The nonparametric Kruskal–Wallis test

The nonparametric Kruskal–Wallis test shows also how relevant this factor is for question Q13—“the identification of the main techniques used by a company in order to create competitive advantages in the market” (Table 12).

4.4.1 Conclusions

Comparing the results obtained through the three tests, we see that the factor represented by the number of employees of the company is relevant for the following questions:

Table 12 Nonparametric Kruskal–Wallis test applied to the company’s employees number (public versus private)

Indicator	Q1/D0	Q4/D0	Q6/D0	Q8/D0	Q10a/D0	Q10b/D0	Q12/D0
Chi-square	10.958	10.353	17.122	86.053	14.135	14.237	15.687
df	4	4	4	4	4	4	4
Asymp. Sig.	0.027	0.035	0.002	0.000	0.007	0.007	0.003
Indicator	Q13/D0	Q14/D0	Q16/D0	Q18/D0	Q19/D0	Q20/D0	Q21/D0
Chi-square	10.007	13.323	20.814	37.500	46.807	18.895	11.821
df	4	4	4	4	4	4	4
Asymp. Sig.	0.040	0.010	0.000	0.000	0.000	0.001	0.019

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

- Identifying the main competitors (Q6);
- Identifying the marketing strategies used by companies in order to obtain a competitive position in the relevant market (Q16);
- Identifying the existence of a competitive market strategy at the level of the company and knowing its components (Q18);
- Identifying the making of a competition audit at the level of the company and determining its main elements (Q20);
- Identifying the management perceptions regarding the relationship between business ethics and fair competition (Q21).

Factor 4, “the number of employees of the company,” is almost similar from a competition field politics standpoint, to dimension of the company (turnover). There are few relevant companies from a competition point of view that have a small number of employees, as well as few companies with a significant number of employees that are relevant from a market share point of view. As a result, between the two attributes there can be identified a strong correlation from a competition field politics point of view.

As expected, the larger the dimension of a company, the more its management starts to ask questions regarding the impact on the company’s competitive decisions. So, the bigger a company is, the more its management acts more professionally, its employees are specialized more and more toward the different functions of the company, beyond the production department. The management of the company advances more and more, as the company gets bigger, toward a strategic perspective.

4.5 Factor 5: Ownership (D5)

This factor can lead to some very interesting analyses on the attitude that companies have toward the competition problem. The analysis of this factor has been done on two independent groups: public capital versus private capital and local capital versus foreign capital.

Table 13 Independent group *T* test applied to the company's capital source (public versus private)

Item	F	Levene's test for equality of variances	Sig.	<i>T</i>	df	Sig. (two-tailed)
Q11	Equal variances assumed	7.456	0.007	-1.243	338.000	0.215
	Equal variances not assumed			-6.006	325.000	0.000
Q12	Equal variances assumed	6.961	0.009	-1.590	338.000	0.113
	Equal variances not assumed			-4.476	29.388	0.000
Q15	Equal variances assumed	23.224	0.000	2.095	338.000	0.037
	Equal variances not assumed			2.961	15.487	0.009
Q20	Equal variances assumed	8.605	0.004	1.700	338.000	0.090
	Equal variances not assumed			1.145	13.473	0.272

Note If Sig. is smaller than 0.05, then the correlation is statistically relevant

A1. The independent group *T* test

As it can be seen, the most relevant answer has been in the case of Q15 (Sig. = 0.000), regarding the horizontal agreements (identifying some method of cooperation with the competitors—horizontal agreements, having a high sensitivity from a competition legislation standpoint), where some public companies (that are most of the times in a monopolistic position or have been in one) do not have a significant experience in cooperating with the competitors. On the other side, companies with private capital are, at least theoretically, more open toward these types of cooperations, especially when they enter a new market, dominated by a state monopol (Table 13).

B1. The nonparametric Mann–Whitney test

The nonparametric Mann–Whitney test offered a significance also for questions Q6 (identifying the main competitors, Sig. = 0.031), Q8 (determining the importance of the company on the market, measured by the market share, Sig. = 0.022), and Q10 (determining the level of competitors' activity know-how, Sig. = 0.001) (Table 14).

C1. The nonparametric Kruskal–Wallis test

In addition, the result of the Kruskal–Wallis test has proven to be relevant as well for the question Q4 (identifying some methods of cooperation with the competition—horizontal agreements, having a high sensitivity from a field competition legislation point of view, Sig. = 0.025) (Table 15).

4.5.1 Conclusions

Companies with public capital are less sensitive to the competition and antitrust issues. Traditionally, the state interventions in economy were made through means and mechanisms that would frown significantly upon the market and competition

Table 14 Nonparametric Mann–Whitney test applied to the capital source of the company (public versus private)

Indicator	Q6/D0	Q8/D0	Q10 a/D0	Q15/D0
Mann–Whitney U	1616	1511	1183.5	1587.5
Wilcoxon W	1721	54812	54484.5	54888.5
Z	−2.162	−2.282	−3.322	−2.027
Asymp. Sig. (two-tailed)	0.031	0.022	0.001	0.043

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 15 Nonparametric Kruskal–Wallis test applied to the capital source of the company (public versus private)

Indicator	Q6/D0	Q8/D0	Q10 a/D0	Q10 b/D0	Q14/D0
Asymp. Sig.	0.011	0.000	0.000	0.008	0.025

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

economy rules. From this point of view, public monopol did not think of the risk that its business practices would qualify as dominance abuse. Public companies operated until the middle of the 1990s on the basis of a licence *ex ante* of not following the anticompetitional practices.

Starting with the mid-1990s, this protection stopped, at least in the European Union. Public companies had to play by the same rules as the private ones and it is just a matter of time until the management of the state companies, not yet realizing this, will get to stand the rigor of the legislation in the field. In the situation of our analysis, ownership (public vs private) was relevant for questions Q6, Q8, Q10a, Q11, Q12, Q14, Q15, and Q20.

A2. Independent group *T* test

According to the first test (the independent groups *T* test), the questions for which capital source played the most important role were Q11 (identifying the main instruments used in order to obtain information about competitors, Sig. = 0.000), Q16 (identifying the marketing strategies used by the companies in order to obtain a relevant market position, Sig. = 0.000), and Q18 (identifying the existence of a competitive market strategy at company level and knowing its components, Sig. = 0.003) (Table 16).

B2. The nonparametric Mann–Whitney test

According to the results of this test, the capital source of a company (local or foreign) renders significant differences in the case of the questions: Q6 (Sig. = 0,047), Q8 (Sig. = 0,000), Q10a (Sig. = 0,044), Q10b (Sig. = 0,004), Q11 (Sig. = 0,006), Q15 (Sig. = 0,001), Q16 (Sig. = 0,002), Q18 (Sig. = 0,000), Q19 (Sig. = 0,000), Q21 (Sig. = 0,002) (Table 17).

Table 16 Independent group T test applied to the capital source of the company (foreign versus local)

Item	F	Levene's test for equality of variances	Sig.	<i>t</i>	df	Sig. (two-tailed)
Q11	Equal variances assumed	37.466	0.000	2.825	338.000	0.005
	Equal variances not assumed			4.111	337.784	0.000
Q16	Equal variances assumed	36.675	0.000	2.837	338.000	0.005
	Equal variances not assumed			3.427	239.392	0.001
Q18	Equal variances assumed	8.782	0.003	-4.848	338.000	0.000
	Equal variances not assumed			-4.697	148.566	0.000

Note If Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 17 Nonparametric Mann–Whitney test applied to the capital source of the company (foreign versus local)

Indicator	Q6/D0	Q8/D0	Q10 a/D0	Q10 b/D0	Q11/D0
Mann–Whitney U	9,890.5	7,511	9,773.5	9,078	10,072.5
Wilcoxon W	13,985.5	38,886	41,148.5	40,453	14,167.5
Z	-1.988	-4.985	-2.011	-2.877	-2.725
Asymp. Sig. (two-tailed)	0.047	0.000	0.044	0.004	0.006
Indicator	Q15/D0	Q16/D0	Q18/D0	Q19/D0	Q21/D0
Mann–Whitney U	8,658.5	9,642.5	8,090	7,210	8,843
Wilcoxon W	40,033.5	13,737.5	39,465	11,305	12,938
Z	-3.406	-3.053	-4.695	-5.219	-3.159
Asymp. Sig. (two-tailed)	0.001	0.002	0.000	0.000	0.002

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

Table 18 Nonparametric Kruskal–Wallis test applied to the capital source of the company (foreign versus local)

Indicator	Q15/D0	Q16/D0	Q18/D0	Q19/D0	Q21/D0
Chi-square	19.984	11.780	29.574	31.641	17.398
Df	5	5	5	5	5
Asymp. Sig.	0.001	0.038	0.000	0.000	0.004

Note If Asymp. Sig. is smaller than 0.05, then the correlation is statistically relevant

C2. The nonparametric Kruskal–Wallis test

The Kruskal–Wallis test has retained as relevant also the answers to questions Q6, Q8, Q15, Q19, and Q20 (Table 18).

5 Conclusions

The similar results of the two tests confirm that the capital source of the company (foreign versus local) leads to significant differences in the case of the following answers:

Identifying the marketing strategies used by the companies in order to obtain a competitive position on the relevant market (Q16);
 Identifying the existence of a competitive market strategy at company level and knowing its components (Q18).

As a general rule, the companies with Romanian capital are presently small and medium companies, while the big companies in Romania (in terms of their market shares) are subsidiaries of foreign companies. This way, it can be anticipated that the answers to the questions follow the same distinction. Moreover, foreign companies originating in developed countries (as it is the case of the companies on the Romanian market) come from markets that are familiarized with the competition legislation. As a result, they can play a beneficial role in the learning process of their Romanian branch.

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Changes in the Romanian Consumer Behavior

Nicolae Istudor and Corina Pelau

Abstract The consumer behavior is an important aspect for the way marketing departments develop their strategies. One of the biggest challenges in consumer behavior analysis is to determine its dynamic. On one hand, there are changes at the level of each individual when passing from one stage of his life to another, but on the other hand, there are also changes determined by the society such as changes in values and norms, trends, technological developments. For this reason, in consumer behavior it is important to analyze this dynamic and try to find the reasons for these changes, because only by this forecasts can be made. In this article, there are presented several aspects of the Romanian consumer behavior and its dynamic. There are analyzed the amount spent depending on age, the frequency of buying, the time spend in the store and other aspects regarding the emotional aspects. By analyzing these changes, there can be observed the changes in the consumer behavior from one generation to another.

1 Introduction

In the following paper, the behavior of the Romanian consumers is analyzed and to what extend the planned economy of the period before 1989 has influenced that behavior. For this reason, the Romanian consumer behavior was analyzed for different age groups, to determine whether the different generations have other

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typologies of behavior. Obviously, in analyzing the different segments of consumer, there might be age-specific changes of the behavior (Kotler and Bliemel 2001: 55), but in Romania there is also an influence based on the different economies in which the population has grown.

2 The Influence of Consumer Behavior on the Performance of Companies

Some of the main factors which influence the consumer behavior of different age segments are the stage of life in which the consumer is situated, the society in which the consumers live, and moreover, the globalization that has a great role on the behavior of the consumer.

The globalization has also an important role in changing consumer behavior in Romania. Theorists of globalization show that there are three main beliefs regarding globalization of consumer trends. One states a strong influence of globalization on consumption, the second one goes in the direction of opposition to all globalization influences, and the last one suggests a mixture of the two. The research of Alden et al. (2006) states that there is a “hybridization” of the local culture with the global consumer trends (Alden et al. 2006: 227–239). According to Alden, the influence of the globalization has a “U” shape starting with a “honeymoon” phase, continuing with a rejection phase and ending with a stable relation, probably explained by the mixture of the two (Alden et al. 2006: 227–239). Actually, the consumer passes through all the theories of globalization.

Still there is a strong influence of external cultures on the consumer behavior, especially in a country like Romania, where the market is dominated by foreign retailers. According to Alden et al. (2006), this influence is the stronger, the more the society is exposed to media and the more materialistic the culture is (Alden et al. 2006: 227–239). Djursaa and Kragh (1998) suggest that the acceptance of a global brand depends on the product category. So, the more cultural values are associated with a certain brand, the more difficult is the penetration of international products (Djursaa and Kragh 1998: 23–38). A research of Lee and Kacen (2008) shows that even impulse buying is determined by culture. So in opposition to individualistic cultures, collective cultures are more satisfied with impulse buying when they shop with companions. (Lee and Kacen 2008: 265–272).

Based on our own observations, we would describe the Romanian consumer culture as an enthusiastic one toward external influences, but still having moments of “awakening” when local products are cherished.

3 General Buying Behavior Depending on Age

The objective of the research was to determine the cognitive and emotional reactions of the consumer behavior and the rationality of this behavior. The research was done in the period November 2011–December 2011. For the sample, an equal number of men and women were chosen and there was also a homogeneous distribution among five age groups. The respondents within every segment were chosen on a random basis; 711 answers were received. This survey was the second about the consumer behavior, and the results were confirmed (Pelau 2011a: 101–114).

As it can be observed in Fig. 1, the segment of the population which spends least in the store is the segment of people older than 60 years; 53.8 % of the people older than 60 years spend between 51 and 100 lei (15–30 US \$), while 20.8 % of this segment spend less than 50 lei (15 US \$). The second segment which spends least in the store is the people between 20 and 30 years; 43.7 % of this segment spend between 51 and 100 lei (15–30 US \$), while 12 % spend less than 50 lei (15 US \$) on a shopping visit. An explanation for this situation is the lower income for these segments of population. On the one hand, the young people are at the beginning of their career (being students or on entry levels), while many of the people over 60 years are already retired. Another explanation for this situation is the fact that both segments go more frequently to the store compared to the middle age population (see Fig. 2), and for this reason, they do not buy that much at a single visit at the store. Another common characteristic of the two segments of population is the fact that they are either single or couple without children. In the case of the young people, they are at the beginning of founding a family, while in the case of the older population, usually at this age, the children have their own families and do not live with their parents any longer.

The segments of population between 31 and 60 years have a similar spending behavior in stores. So, most of them spend between 101 and 300 lei (30–90 US \$) in the store (49.7 % for the age group 31–40 years, 47.5 % for the age group

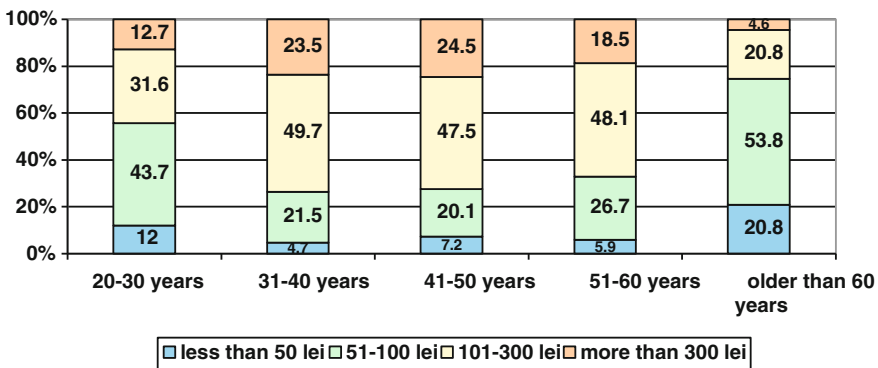


Fig. 1 Spendings depending on age (Source Results of own research)

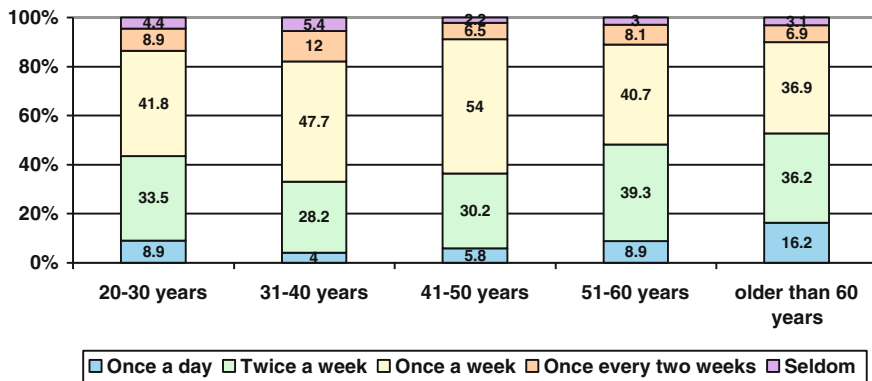


Fig. 2 Frequency of buying depending on age (Source Results of own research)

41–50 years, and 48.1 % for the age group between 51 and 60 years. In the age segments between 31 and 40 years and 41 and 50 years, approximately 24 % of the population spend more than 300 lei, while approximately 21 % of the population spend between 51 and 100 lei. This percentage is with 26.7 % higher for the age group of 51–60 years. The explanation for this situation is the fact that most of the persons in this category have families and they do the shopping for the whole family.

Most of the people in Romania go shopping once or twice a week. The segment of people which go shopping once a week is preponderantly the people of ages between 41 and 50 years (54 %). Another group which frequently goes shopping once a week is the people between 31 and 40 years (47.7 %). For the other segments, the percentage of people going shopping once a week vary between 36.9 % (for the people older than 60 years) and 41.8 % (for the people younger than 30 years).

The second important behavior is going shopping twice a week. This behavior is most frequent with the older people and is probably complementary to going shopping once a week. The group where this behavior is also well represented is the people younger than 30 years. These are the groups of people, which do not have small children in their care and probably this is the reason why they go shopping more often. The same segments of people go shopping everyday. So, 16.2 % of the people older than 60 years go shopping everyday as well as 8.9 % of the people between 20 and 30 years and between 51 and 60 years. The people who go shopping most seldom are the people between 31 and 40 years; 12 % of them go shopping once every 2 weeks and 5.4 % seldom go shopping.

Regarding the time spent in the stores, most of the consumers stay between 31 and 60 min in the store. The segment for which this behavior is preponderant is the people with ages between 41 and 50 years (42.4 %). For all the other segments, the percentages of people who stay between 31 and 60 min in the store vary between 33.5 and 35.4 %. The second most frequent behavior differs from one segment to another. For the segments of people older than 60 years and the people

younger than 30 years, the most frequent behavior is staying in the store less than 30 min. So, 31.6 % of the people younger than 30 years and 30.8 % of the people older than 60 years stay less than 30 min in the store. For the age segments 31–60 years, the second most represented time is between 31 and 90 min. So people, who are more likely to have a family, stay for a longer time in the store, Thus, 31.5 % of the people with ages between 31 and 40 years and 25.2 % of the people between 41 and 60 years stay between 61 and 90 min in the store. In the same segments, more people stay between 91 and 120 min. The highest percentage of people who stays more than 2 h in the store is the people between 31 and 40 years (5.4 %) (Fig. 3).

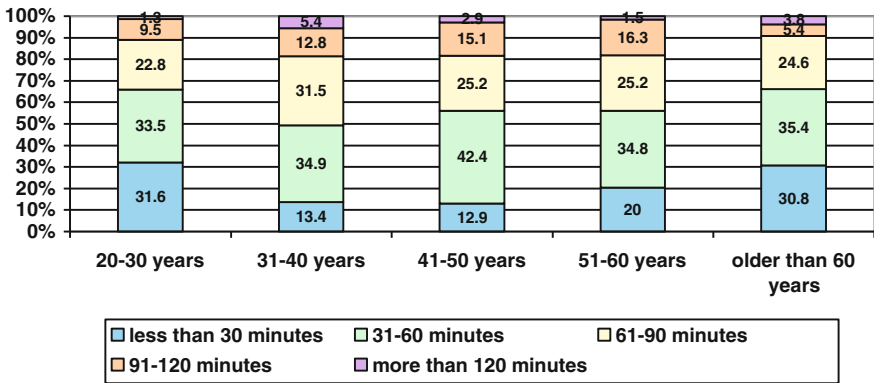


Fig. 3 Time spent in the store (depending on age) (Source Results of own research)

4 Emotional-Impulsive Buying Behavior Depending on Age

Most of the strategies of the retailers seek to convince the consumer to buy as much as possible. For this reason, most of the retailers use different instruments of the marketing mix to convince the customer to buy more than he initially planned, as for instance special offers, discounts, the portfolio of products, appealing positions, store layout, promotions, and others (Diller et al. 2005). In order to analyze the efficiency of these instruments, it is interesting to analyze the behavior of the consumer, with the purpose of determining whether he buys more or not. The research shows that the Romanian population answers to these incentives, as most of the consumers buy more than initially planned. From this point of view, the most rational segment of population is the older ones, 37 % of the segment with ages higher than 60 years. For all the other ages, the percentage of people, who buy only what was planned range between 17.3 % and 19.3 %. Most of the population with ages between 20 and 60 years buy some extra products, with values between 54.7 and 66.7 %. In this case too, the people older than 60 years have a more rational behavior, as only 45.4 % buy some extra products. This result

can be, on the one hand, explained by the more experienced and more rational consumer behavior, but on the other hand, this group of people have lower incomes. As it was seen in Fig. 1, this group of people together with the young people spend least in the store. As Kotler and Bliemel (2001) mention, the young people are more easily influenced by advertising and promotions (Kotler and Bliemel 2001: 325), so for this reason they might be more easily influenced by the marketing instruments used in the store. A significant amount of the population buys many extra products. Thus, more than 20 % of the age segments between 31 and 40 years (22.1 %) and 41 and 50 years (26.6 %) admit that they buy many extra products. This percentage is lower for the age groups 20–30 years (19.6 %), people older than 60 years (16.9 %), and the age group 51–60 years (14.1 %).

This can be used for the marketing departments of the companies in the sense that they should address many of the instruments to these segments of population, as it is known that they are more easily influenced. Different campaigns such as promotions at the shelf, a better positioning of the products, discount, or direct marketing in the store can convince the consumer to buy even products they did not have initially the intention to purchase.

The results confirm a previous research done by Pelau (2011a, b, c), where 62 % of the consumer bought more extra products, 17 % bought some extra products, and only 21 % bought only what was initially planned (Pelau 2011a).

Regarding the frequency of buying extra products, as it can be seen in Fig. 5, it decreases with the age. The youngest people (ages between 20 and 30 years) often buy more extra products (43.7 %), while 24.1 % buy extra products. The percentage of people who buy extra products remain constant (70.4 %) for the age group 31–40 years, with the difference that there are less people who buy more extra products (only 34.2 %). This percentage decreases for the age group 41–50 years, where 57.5 % buy extra products, from which 33.8 % buy more extra products. This percentage is even lower for the age groups 51–60 years (54.1 %) and older than 60 years (40.8 %). The amount of more extra bought products decreases too, so for the people with ages between 51 and 60 years, it is 28.9 %, while it is 17.7 % for the people older than 60 years. The percentage of people who seldom buy extra products vary from 15.2 % (for the people between 20 and 30 years) to 25.2 % (for the people between 41 and 50 years).

Regarding the rational people, who do not buy extra products, they are the people older than 60 years (39.2 %). The next segments are the ones with ages between 51 and 60 years (21.5 %) and the people with ages between 41 and 50 years (17.3 %). The young people seldom buy only what was initially planned (16.5 % for the people between 20 and 30 years and 12.8 % for the people between 31 and 40 years). This confirms the statement of Kotler and Bliemel (2001: 325) that young people are more easily influenced by advertising and other marketing instruments.

The fact that there is a difference in the results of Figs. 4 and 5 can be explained by the fact that the results of Fig. 4 are related to the shopping in the day of the questioning, while Fig. 5 refers to the general buying behavior. As it is known, a consumer has a certain type of consumer behavior, which can vary depending on



Fig. 4 Amount of extra bought products depending on age (Source Results of own research)

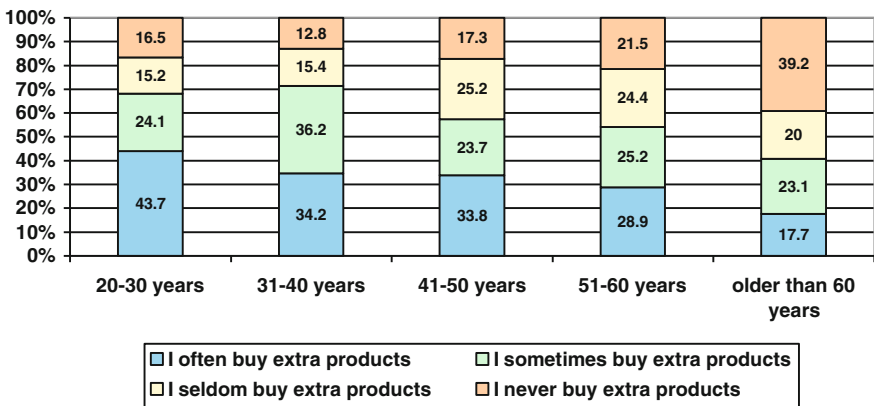


Fig. 5 Frequency of extra bought products (depending on age) (Source Results of own research)

the situation. That does not change the typology of behavior, but only the characteristics of the shopping visit. For instance when a consumer has guest or goes on holiday, he has another type of behavior then the usual one. Another reason for the difference in the responses can be the fact that a consumer admits that he once bought some extra products, but he does not want to generalize it. Besides that, even the fact that for Fig. 5 there are four possible answers and for Fig. 4 there are only three answer possibilities can influence the result.

The good planning of the spending at shopping is also correlated with the age. As it can be observed in Fig 6, older people have a more rational behavior, being able to spend approximately as planned. In opposition to the segments of people younger than 60 years, where less than 5 % of the people spend less than planned, for the people older than 60 years, 17.7 % of the people older than 60 years have the same behavior. The amount of people spending as planned increases with the

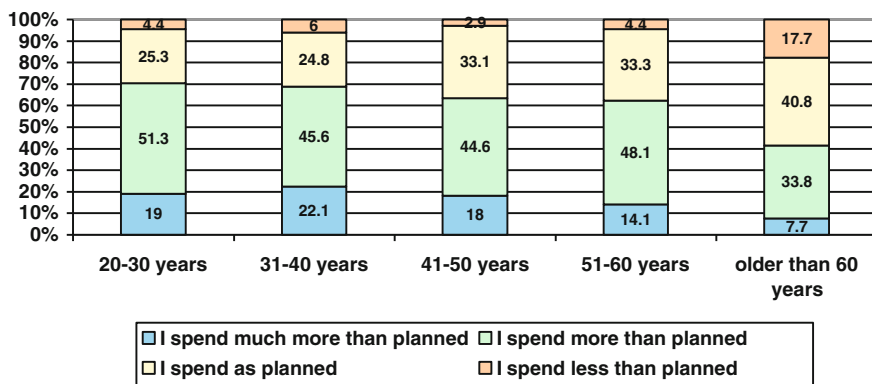


Fig. 6 Extra spending in the store (depending on age) (Source Results of own research)

age. So, approximately 25 % of the people between 20 and 40 years spend as much as planned. This percentage increases to 33.2 % for the people with ages between 41 and 60 years and to 40.8 % for the people older than 60 years. This is also the main shopping behavior for the people older than 60 years. Regarding the percentages of people, who bought more than planned, it can be observed that this percentage decreases with the age. Besides this, it is the preponderant consumer behavior for all age groups, younger than 60 years. The highest percentage of people buying more extra products are for the young people, with ages between 20 and 30 years. For the people with ages between 31 and 60 years, this percentage varies between 44.6 and 48.1 %. As mentioned before, the percentage decreases to 33.8 % for the people older than 60 years. This can be explained by the fact that younger people are more easily influenced by advertising and promotions in the store. As people grow older, they get used to all these instruments and for this reason they do not take them so much in consideration. As the people who spend much more than planned, this percentage varies between 18 and 22.1 % for the people with ages between 20 and 50 years. This percentage decreases to 14.1 % for the people with ages between 51 and 60 years and to 7.7 % for the people older than 60 years.

The research has confirmed that the Romanian consumers have an emotional-impulsive behavior and that they buy more and spend more that they have initially planned. In Fig. 7, we analyzed the opinion of the consumer by the fact that they buy more. Most of the people got used to the idea that they spend more and they do not get annoyed about it. So, for the people with ages between 20 and 60 years, the percentage of the people having this opinion ranges between 47 and 50.6 %. Only 36.9 % of the people older than 60 years got used to it. This is compensated by the fact that for these people, it does not happen to buy extra products. So for people older than 60 years, for 36.2 % of the people, it does not happen to buy extra products, while for the younger segments of people, these percentages are lower.

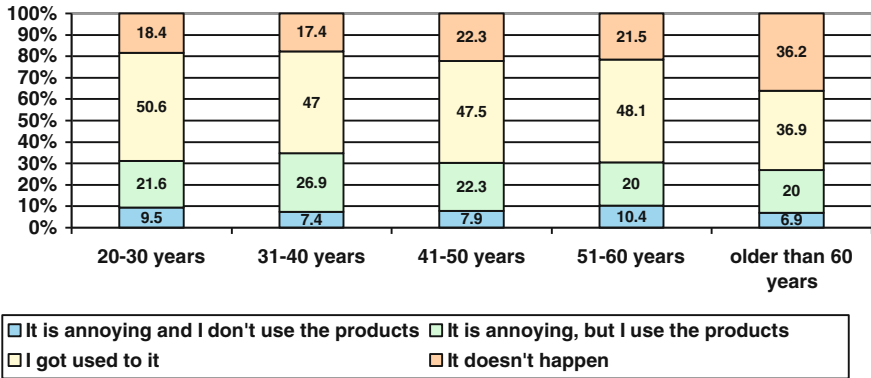


Fig. 7 Opinion on extra bought products (Source Results of own research)

So, for the people between 41 and 60 years, these percentages range between 21.5 and 22.3 %, while for the people younger than 40 years, this percentage ranges from 17.4 to 18.4 %. The percentage of people who get annoyed about the fact that they buy extra products ranges from 26.9 % (for people older than 60 years) and 34.3 % (for people with ages between 31 and 40 years). Most of the people who get annoyed about the fact that they buy extra products usually use them. So, the percentage of people who does not get annoyed ranges between 20 and 26.9 %. The people who get annoyed about the fact that they buy extra products and they do not even know them, ranges between 6.9 % for people older than 60 years and 10.4 % for the people with ages between 51 and 60 years. Another group, for which this percentage is high, is the people younger than 30 years.

5 Conclusions

One of the limitations of the research is the fact that it is based on the verbal responses of the consumer and not on observations. For this reason, many consumers might have given the answer depending on how they want to see themselves and not necessarily how they really are. A research of Istudor and Pelau (2012) shows the fact that there are differences in the way a consumer perceives himself and the way in which he is perceived by a third party.

The results of the research confirm the fact that there are differences in the way people of different ages behave. On the one hand, the fact that people who do not have the responsibility of a family has similar behavior. Another aspect is the fact that the age group over 60 years is more price sensitive than the other segments.

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Green Clusters as New Cooperation Strategy for Cleantech Companies

Adrian D. Tanțău and Alexandra Chinie

Abstract This chapter discusses green clusters, a new form of economic network in the domain of environmental-friendly businesses, as a cooperation strategy for companies. Cleantech companies, also referred to as green companies or environmental businesses, are companies offering products and services that have a sustainable positive impact on the environment. As technological innovation leads to the development of such businesses, and as green activities often require high expenses, companies became interested in establishing green clusters. By being part of the cluster, cleantech companies could achieve technological synergy, attract financial support, and collaborate with the governmental sector in order to support their activities. This article analyzes the trends in green clusters' characteristics and how they can represent a successful cooperation strategy for the green business sector. The methodology used is composed of previous case studies, regarding cleantech businesses and green clusters, as well as a survey performed by the authors. This was conducted on 11 green cluster administrators and individual cluster members. Also, public information of another 70 green clusters, related to cluster members, cluster activities, and other characteristics has been studied. The results of this analysis helped us identify main trends in the green clusters' field and how they would form a successful corporate strategy.

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1 Introduction

The ever-growing interest in environmental protection, and also in achieving a sustainable economic performance, has attracted government strategic plans, followed by a supportive legal framework, as well as growing investments in environmental-friendly technologies and products.

Strategic actions for innovation have been proposed in the **Green Paper (2006)**—A European Strategy for Sustainable, Competitive and Secure Energy: a strategic plan for technological innovation, revising the energetic policy of the European Union and a treaty of the European Energetic Community. The European Parliament and Council have adopted these measures in March 2007. Another green European strategy is based on the legal package energy—climatic changes—and was adopted by the European Council on the 6th of April 2009. This comprises measures for challenging the climatic changes and for promoting the resources of renewable energy.

Sustainable ecological measures are also supported through directives such as **Directive 2009/28/EC** of the European Parliament and of the Council of the 23rd of April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing **Directives 2001/77/EC** and **2003/30/EC**. The European objective of increasing energy that comes from renewable sources is expressed in the Europe 2020 strategy. Its goal is to have a minimum of 20 % of the energy originating from a renewable source by 2020. In 2008, The European Commission (EC) approved the law meant to encourage renewable energy investments by granting incentives in the form of green certificates, a piece of legislation initiated by the Romanian authorities. Green certificates will be granted to electric power producers for every MW obtained by wind power, hydropower, solar power, biomass, landfill gas, or gas fermentation sludge from wastewater treatment plants.

The technology pillar of the EU energy and climate policy, the **SET-Plan**, defined a long-term energy research, demonstration, and innovation agenda for Europe, including concrete strategic milestones to be achieved in the coming years. The industrial initiatives within the SET-Plan refer to wind (the European Wind Initiative), solar (the Solar Europe Initiative—photovoltaic and concentrated solar power), electricity grids (the European Electricity Grid Initiative), carbon capture and storage (the European CO₂ Capture, Transport and Storage Initiative), nuclear fission (the Sustainable Nuclear Initiative), bioenergy (the European Industrial Bioenergy Initiative), smart cities (energy efficiency—the Smart Cities Initiative), fuel cells and hydrogen (Joint Technology Initiative), nuclear fusion (International + Community Program—ITER) (ec.europa.eu 2010).

The importance of green growth can also be found in “The impact of renewable energy policy on economic growth and employment in the European Union,” a report recently published by the EC that concludes that the employment and the creation of added value will be achieved in the field of renewable energy on a different level through the installation and implementation of new policies than what was achieved in previous industries (Yoon-Jun 2001).

In order to meet new challenges related to the environment, the legal framework, and market dynamic, companies have been growingly interested in clean technologies and becoming a cleantech business. “The cleantech industry encompasses a broad range of products and services, from alternative energy generation to wastewater treatment to more resource-efficient industrial processes” (Burtis et al. 2006).

Green businesses are represented both by very small companies and by very big ones, ranging from small family companies to big corporations and international players. Reaching competitive advantage in the environmental business requires a successful innovative strategy. In this respect, one of the strategies that have gained interest in the last few years is the entrepreneurial cooperation through the form of an environmental cluster.

2 Cleantech Sector

The term “cleantech” became popular due to the work of Nick Parker and Keith Raab, founders of the Cleantech Venture Network, recently known as the Cleantech Group. The term is different from the 1970 and 1980 environmental technology or “green tech,” when “the green revolution had been used by the popular press to describe the spectacular increase in cereal-grain production” (Borlaug 1970).

Dikeman (2008), in his article on the cleantech field, also attributes the term to the principals of the Clean Edge consultancy company, Joel Makower—green business journalist, Ron Pernick and Clint Wilder—authors of the book “Cleantech Revolution.”

Cleantech is new technology and related business models that offer competitive returns for investors and customers while providing solutions to global challenges (www.Cleantech.com 2011).

The cleantech categories, defined by the Cleantech Venture Network, are as follows (Burtis et al. 2006, p. 7): agriculture and nutrition, air quality, enabling technologies (such as manufacturing process technologies), energytech (clean energy generation, storage, efficiency, and infrastructure), environmental information technology, materials and nanotechnology, materials recovery and recycling, manufacturing/industrial, transportation and logistics, and water purification and management. The main characteristic of cleantech activities is that they use innovative technology in order to develop environmental-friendly products or services. Green activities also comprise those economic domains where corporate innovation does not only rely on technology, but also rely on innovative strategies that lead to a positive ecological perspective.

Clean energy generation, the most developed green sector today, comprises all activities in the renewable energy sector. There are three different origins for the creation of renewable energy: geothermal energy, which is stored in heat that is released by earth, solar energy, and tidal energy, which is generated by gravitation

and movements of planets (Kaltschmitt et al. 2007, p. 7). The natural sources of renewable energy are as follows: continental solar radiation, wind, biomass, geothermal energy, and tidal/water energy.

As the graphic representation of the Cleantech Group shows in Fig. 1, the cleantech sector with most investments is the “wind energy” sector, followed by the “water and wastewater management” sector. Agriculture is the cleantech domain with the smallest amount of capital invested, followed by the “air and environment” sector and “biofuels and biomaterials”. Venture capital investments in the cleantech sectors have had a rapid growth from the year 2007 to 2008. After the shock of the economic crisis in 2008, the entire cleantech market regressed, but started to recuperate in 2009.

Innovation is an important driver for the development of the cleantech market. In an effort to measure cleantech innovation, the Global Cleantech Innovation Index has been built up from a set of 15 indicators. These are distributed in four main categories: general innovation drivers, cleantech-focused innovation drivers, evidence of emerging cleantech innovation, and evidence of commercialized cleantech innovation.

In order to sustain innovation within their sector, cleantech companies acknowledged the need to cooperate and formed cleantech networks. Nixon of the Urban Sustainability Associates states that typically, a **cleantech network** would include (Nixon 2009, p. 16) the following members:

- Entrepreneurs, management, and workforce of cleantech companies;
- Investors, including banks, venture funds, angel networks, and finance intermediaries;
- Energy and water utilities;
- Business services providers serving the cleantech sector, including legal firms, accountants, management and business strategy consulting firms, public relations and marketing firms, and others;
- Academic institutions, including research institutes, green MBA programs, and tech transfer program;

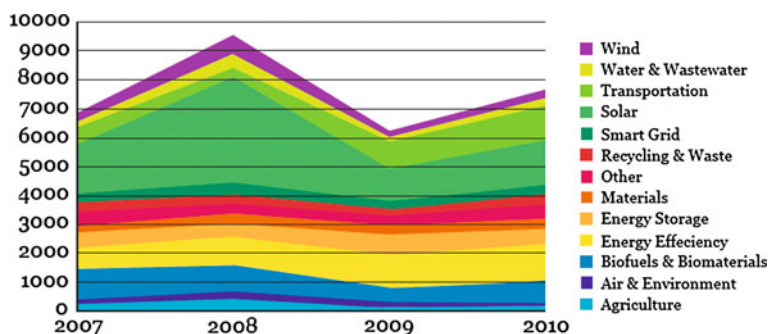


Fig. 1 Global cleantech VC investment by technology (Cleantech Group 2012)

- Government agencies interested in encouraging cleantech businesses in their jurisdictions, including economic development, business development, and workforce development agencies.

Thus, cleantech networks are based on the concept proposed by Porter in 1990, the business cluster, and set out a new type, the green cluster.

3 Green Clusters. Definition

Clusters represent the economic structure that best defends the interests of businesses and fosters innovation, economic growth, and competitiveness. The simplest definition of clusters is based on the description of the client–provider relationships and of the value chain. The term became famous with Porter’s “The Competitive Advantage of Nations” article in 1990. He wrote that *a cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities* (Porter 1998a, b, p. 199). “Many clusters include Governmental and other institutions—such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations—that provide specialized training, education, information, research, and technical support” (Porter 1998a, b, p. 78). There are two central elements in Porter’s definition. The accent is placed on the interconnectivity between actors and the resulting positive externalities (for example, qualified workforce locally available, lower transportation costs, external economies of scale, know-how transfer, etc.). Connections are vertical (buyer and seller chain), as well as horizontal (complementary products and services) (Tantau 2011, p. 7). United Nations Industrial Development Organization (Ceglie, UNIDO 2003, p. 6) defines clusters as *a sector and geographical concentration of enterprises that produce and sell a range of related or complementary products and thus face common challenges and opportunities*. Clusters can be established at the initiative of a governmental institution, with the aid of governmental funding, or spontaneously, based on the cooperation of several companies (the founders of the cluster).

The concept of business clusters has been differently adopted in France. In 2005, the government adopted a strategy based on **competitiveness poles** (pôles de compétitivité), in order to respond to the need for vitalizing growth based on the empowerment of R&D and innovation. Competitiveness poles have supported the development of clusters of competitiveness, thus being the premise for their creation: *the combination, within a given geographic area, of businesses, training centers and public or private research facilities working in partnership to generate synergies in connection with innovative joint projects having the requisite critical mass for international visibility* (Potter and Miranda 2009, p. 44).

Thus, through the term “cluster,” we understand *a regional network of enterprises, suppliers, research institutes, universities, professional training centres in a specific domain, that find themselves on competing positions and have an*

innovative orientation, and are at the same time connected between each other through synergic advantages of cooperation relations and new models of knowledge dissemination (Tantau 2011, p. 7).

Potter and Miranda defined strong cooperation, critical human capital mass, skill enhancement, strong commitment of the public sector, strong partnership and leadership, high quality of life, and social capital defined as **key success factors for clusters** (Potter and Miranda 2009, pp. 14–16). Silicon Valley, located in the United States, is the most renowned industrial cluster, active in the domain of hardware, software, and venture capital companies. Other successful clusters, as reviewed by OECD (Potter and Miranda 2009), are as follows: the Micro-nanotechnology Cluster of Grenoble (France), the High-tech Cluster of Oxfordshire (United Kingdom), the Biotechnology Cluster of Vienna (Austria), the Life Science Cluster of Medicon Valley (Scandinavia), the Engineering Cluster of Dunedin (New Zealand), the University-centric High-tech Cluster of Madison (United States), and the ICT Cluster of Waterloo (Canada).

Developing Porter's cluster concept, a superior form of clusters emerged in literature and practice: the innovative cluster, which aims at creating sustainable development through business innovation. The "Community Framework for State Aid for Research and Development and Innovation" (2006/C323/01, p. 10) defines **innovation clusters** as *groupings of independent undertakings - innovative start-ups, small, medium and large undertakings as well as research organizations - operating in a particular sector and region and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination among the undertakings in the cluster.*

Innovation clusters are a superior form of clusters because they assure regional economic development by promoting innovation (Engel and del Palacio 2009, p. 495). Innovative clusters are no longer defined solely by agglomeration, which contributes to the specialization of the industry, but by its development state and business innovation (Tantau 2011, p. 8). The origin of innovation lies in social networks, knowledge transfer, and R&D cooperation. Also, innovation occurs more easily when geographical concentration and proximity are present, and therefore, the regional cluster takes a crucial dimension in such processes (Doloreux 2004, p. 6).

A major distinction is sometimes made between **two generic types of clusters**: *industry-focused clusters* that evolve from the industry's life cycle and *technology-based clusters* where new technologies enable new products or even industries to develop (St. John and Poudet 2006). With international efforts to build a sustainable economical system with positive effects on the environment, a new type of cluster has gained importance: the **green clusters**, also identified as environmental clusters.

Nidumolu et al. (2011) thought of sustainability as a touchstone for innovation. Because of the primary scope of green clusters, they can be considered a form of innovation clusters. Companies seeking a green growth strategy, innovation, and competitive advantage on the long run will be interested in cooperating by creating

local networks based on knowledge and value share, active in interconnected businesses, with a sustainable ecological strategy.

Although still an emerging concept, the term “green cluster” is used for some time now, to define all business clusters acting in an ecological field. Other terms associated with this concept are cleantech cluster, ecolcluster, or environmental cluster.

Green clusters can be created by two means:

- (a) collaboration between green businesses (companies which develop environmental-friendly products and services) on the private sector level,
- (b) collaboration between green businesses and non-green businesses on the private sector level, creating an environmental-friendly synergy effect.

The first model is the most common and easier to develop. The second is based on the natural ecosystem principle, meaning that the waste produced by a corporation within the cluster would be the production raw material for another enterprise. The concept of circular economy, in contrast with the linear, classic economy, supports a system that will not cause resource exhaustion or ecological damage, but can recycle various resources. The creation of the business network and ecological value chain would require more resources, but the synergy effect can lead to more economic efficiency (Jing and Yu 2007). This economic model forms a framework for business collaboration in order to reach sustainable development.

Most of the green clusters can be found in developed countries in America, Europe, and Asia. Successful cleantech clusters in 2010, as analyzed by Shawn Lesser of Sustainable World Capital, according to their revenue, are as follows: Eco World Styria, Graz, Austria; the New England Clean Energy Council, Cambridge, Massachusetts; Finnish Cleantech Cluster, Lahti, Finland; MaRS, Toronto, Canada; Copenhagen Cleantech Cluster, Copenhagen, Denmark; The CleanTech Center, Syracuse, New York; CleanTECH San Diego, San Diego, California; Environmental Business Cluster, San Jose, California; Stockholms Miljöteknik-center, Stockholm, Sweden; Ontario Clean Water Initiative, Toronto, Ontario (Cleantech Group 2010).

4 Current Trends in Green Clusters

As the scientific work on green clusters is still scarce, the authors have performed a research in order to identify their defining characteristics and current trends (Tantau and Chinie 2012). There were two methodologies used: an observatory analysis of information such as location, year of foundation, and sectors of activity of 70 green clusters worldwide, based on the online available data, mainly on their websites; interviews conducted with cluster administrators and cluster members, in order to identify further indicators of the clusters, but also their personal opinion on the cluster’s development.

One of the first points of interest was to perform a green clusters mapping. The European countries with most clusters identified in the ecological field are Denmark and France with 9 green clusters, Germany with 8 green clusters, and Belgium with 7 green clusters. There is an obvious difference between the number of clusters in western Europe and clusters in Central and eastern Europe.

Another important question was to find out which are the cleantech sectors (as listed by the Cleantech Group), in which companies and the clusters activate and invest.

Most of the analyzed clusters (61 %) are active in the field of **alternative energy**. Other relevant sectors are the **enabling technologies** sector (41 %) and the **waste management** sector (39 %). Sectors with fewer involved clusters are environmental IT (17 %) and biological products (16 %)—probably because the field of biological products converges with agriculture, making a separate domain with its own clusters. Other relevant cluster activities mentioned by the interviewed members are air quality, pollution prevention, and energy efficiency (Fig. 2).

When asked about the primary objectives of their clusters, the most mentioned aims were **regional development** (73 % of the interviewed have listed it as a primary objective) and **technology development** (64 % of the green clusters). Corporate entrepreneurship and supporting the industry were both listed by 55 % of the interviewed clusters. The importance given to regional development leads to the question: how much are public institutions involved in green clusters (Fig. 3)?

As expected, 88 % of the analyzed green clusters have **companies involved**. The second entity that is most encountered as a green cluster actor is represented by the **public institutions** (71 % of the green clusters), while 65 % have **universities** as cluster members. An interesting fact is that while one would expect clusters that are interested in regional development to have public institutions involved in the network, only 50 % of them do. Instead, an impressively high percentage of 87 % of the clusters involved in regional development have entrepreneurs as cluster members (Fig. 4).

Fig. 2 Fields of activity of green clusters

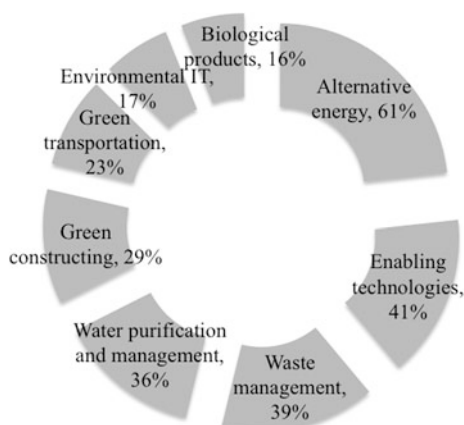
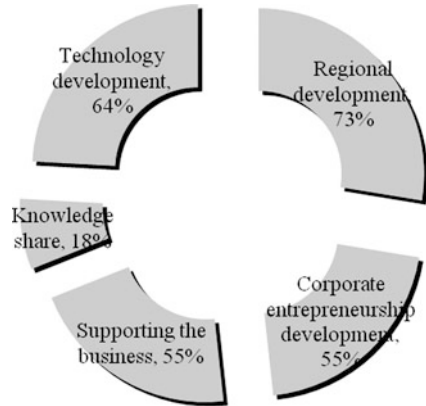


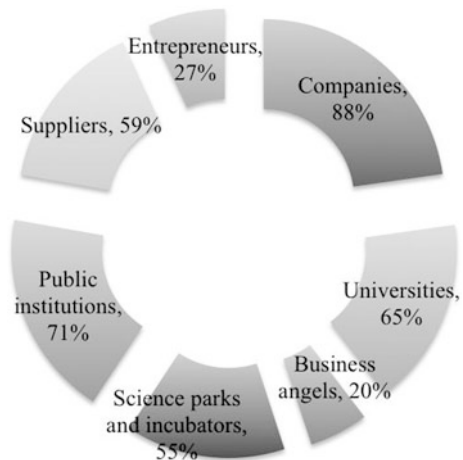
Fig. 3 Primary objectives of green clusters



This would lead to the hypotheses that smaller companies, represented by entrepreneurs, are more interested in achieving regional development than bigger companies. Indeed, 86 % of clusters that have any start-ups involved listed regional development as the primary objective, while 100 % of clusters with 60–80 % of the companies being start-ups affirmed that they were interested in regional development. So, what could make up for the clusters that are involved in regional development, but do not receive support from governmental institutions? Most of these clusters rely on the collaboration with universities, science parks, and business angels.

Science parks grant significant support to green clusters (55 % of the analyzed clusters have science parks involved). When asked whether technology development is one of their primary objectives, 33 % of the respondents that have scientific parks and incubators involved (however a smaller number than the total of analyzed clusters) answered nay.

Fig. 4 Green clusters' members



An interesting percentage corresponds to the suppliers (59 %), which indicates the possibility of a hub-and-spokes cluster model (Markusen 1996).

Only 20 % of the green clusters analyzed have the support of investors or business angels. Given the objective of 64 % of green clusters to support technology development, the small number of active investors would be insufficient. The rest of the technology development projects are probably supported with private capital, within science parks and incubators (55 % of the analyzed green clusters have a science park or an incubator).

The number of green cluster members varies from 15 to a reported number of 5,000. Most of the analyzed green clusters have between 15 and 50 cluster members (38.10 %). The number of members is influenced by the region of impact of the cluster. While most green clusters have impact on a 45–100 km range, some have taken up the French model of “pôles de compétitivité,” where regional proximity is not as important as in the case of the original cluster model presented by Porter, and transnational collaboration is supported.

The forms of establishment of green clusters are the **association** and the **network**. The average age of the promoter company that initiates the creation of a green cluster varies between two extremes: some are approximately 20 years old, or the experience of the cluster promoter in the cleantech industry is around 20 years old, but there are also green clusters which were initiated by companies with an average of only 3 years of experience. The youngest company that initiated a green cluster was barely 1 year old (Progetto Manifattura in Italy). This case shows that start-ups or small enterprises in the ecological domain can choose to enter the market by initiating collaboration within their branch.

In matters of organizations' size, 57 % of the companies within cleantech clusters are small and medium-sized enterprises, while start-ups represent 21 % of the cluster's companies. Although one would expect big players to be most interested in investing in green clusters, given their financial status and experience, only 13 % of the companies are large national companies, and 9 % are international players.

The main constraints for the creation of green clusters are **the lack of information** regarding the cluster concept, the **small number of involved entities**, the **bureaucracy**, and **lack of initiative**. The most relevant activities for the creation of green clusters are the **transfer of information**, **best practices**, and **know-how** with organizations and institutions (Fig. 5).

The most relevant drivers for the creation of green clusters are **R&D and innovation**, **governmental support**, and **qualified human capital**. These factors scored an average grade of 6 on a 1 to 7 level, 1 being “not important at all” and 7 meaning “imperative.”

Companies that became part of the clusters due to a corporate strategic decision are companies interested in *facilitating corporate entrepreneurship*, *knowledge share* within their business field, or innovation through *technology development*. In the following table, the main drivers for the creation of the clusters are correlated with the primary objectives of the cluster members. For companies interested in supporting corporate entrepreneurship, the main drivers for cluster creation are

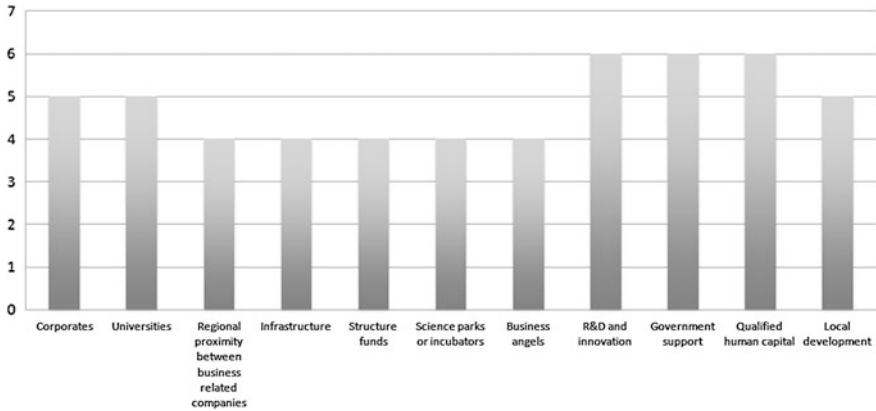


Fig. 5 Primary drivers for the creation of clusters

R&D and innovation and **qualified human capital**. For companies that list knowledge share among their primary objectives, the private and academic sector, governmental support, qualified human capital, and the development of the region are equally important. Companies that consider technological development as one of their primary objectives stated that the main drivers for the creation of the cluster are as follows: the **industry**, **R&D and innovation**, and **qualified human capital** (Table 1).

Thus, the strategic decision of creating or becoming involved in clusters is influenced by the qualified human capital and R&D centers that the company would have access to, as well as the possibility of attracting governmental support.

Green clusters can form a corporate strategy for companies that want to enter the cleantech sector through collaboration, or for existing cleantech companies that want access to technology, qualified human capital, or need governmental and legislative support. The last chapter studies the way green clusters can be integrated as a corporate strategy.

5 Measures for Developing Green Clusters as Cooperation Strategy for Cleantech Companies

The results of our research provide basis for a set of measures for the creation and development of green clusters. In this respect, we outlined a general action framework in order to develop green clusters. Promoting this type of cooperation strategy is influenced by the concept of green entrepreneurship, identified by Schaper (2002), who established a model of four types of entrepreneurship: classic entrepreneurship, intrapreneurship (entrepreneurship within an organization), social entrepreneurship (entrepreneurship with an impact on society, through collaboration with NGOs and public institutions), and the latest, emerging form of

Table 1 Drivers for the creation of the clusters

	Regional development	Corporate entrepreneurship development	Supporting the business	Knowledge share	Technology development
The industry	Important	Important	Quite		important
Important Universities	Very Important	important			
Important Regional proximity	Quite Important	important	Important	Quite	important
Quite important Infrastructure	Average	importance	Quite		important
Important Structural funds	Quite	important	Quite		important
Quite important Research parks and incubators	Quite	important	Important	Important	Quite important
Quite important Business angels	Quite	important	Quite		important
Average importance R&D and innovation	Important	Important	Quite		important
Very important Government's support	Important	Very important	Important	Quite	important
Important Qualified human capital	Very Important	important	Important	Very	important
Important Local development	Important	Very important	Important	Important	Important

entrepreneurship, environmental entrepreneurship (entrepreneurial activities with positive impact on the environment), also referred to as ecopreneurship or green entrepreneurship.

Krafft (2006) proposed a model for the development of a cluster, in order to achieve regional development. The first phase, predeliberation, refers to the analysis of the existence of premises for the creation of a cluster, if there is potential in this respect (latent cluster, industrial agglomeration).

The second phase, the baseline study, seeks for an answer regarding the position of the new cluster in relation with the existent industry in the region; an analysis in order to find out whether the cooperation strategy is efficient and the advantages

that may appear need to be carried out. Also, in order to evaluate these effects, the characteristics of the local industry need to be analyzed.

The third phase consists of the outline of a set of measures for the cooperation strategy, associated with green clusters.

The model of green clusters can be implemented by following a set of actions, which are the best practices for the creation of successful green clusters: (1) **Segmentation of the environmental business**; (2) **Identification of environmental innovations**—improving the company efficiency on the basis of company resources or extending the business activity; (3) **Development of an innovative business model**; (4) **Carrying out a context analysis and opportunity evaluations**; (5) **Deciding whether to cooperate within a green cluster or not**; (6) **Assembly and involvement of the major players** for the green cluster; (7) **Formulation of the vision and strategy** of the cluster; (8) **Designing the action plan and financing** the green cluster

1. In practice, the segmentation of the environmental business is based on the type of environmental businesses. One model developed by Hendrickson's and Tuttle's (1997) concluded that there are three types: environmental by environmental-friendly product inputs; environmental through the positive impact it has on transforming the products and services of others (such as consultancy on resources efficiency and waste reduction); environmental through the products or services it offers (enabling technologies that help manage waste, for example). Linnanen (2002) has another approach on the segmentation of environmental businesses. He has identified four types of green businesses: nature-oriented businesses, producers of environmental technology, providers of environmental management services, and producers of environmental-friendly products. Drivers for entering the green business sector are **achieving competitive advantage**, **improving the company's image**, or **government regulation compliance**. The segmentation of the environmental business allows a better establishment of the cluster's objectives, partners' selection, and a better development strategy for the company.
2. Environmental entrepreneurs are generally of two types: small ecopreneurs that acknowledge the opportunity of environmental business and big corporations that integrate the green strategy within their general strategy. **Green cooperation strategies** can be incorporated in two main categories: one way is by **improving the consumption efficiency** of the company's resources or using clean technology in the production process in order to make it more environmental friendly; the second way is by **extending their business activities** by becoming involved in the green business market. Most of the companies have taken the first approach, becoming involved in raising the resource usage efficiency or using clean technology. In their cases, the green strategy has been correlated with CSR strategies or cost-reducing strategies by benefitting from tax reductions.
3. Developing an innovative business model is a crucial factor for the success of the cooperation strategy. While the enabling technological system can be

achieved through a continual innovation strategy of the company, an innovative business model is probably the most important success factor for green businesses. Innovation, like market opportunities, can be differentiated according to its driving force. “Innovation may be induced by either a performance gap or by recognizing a promising new technology” (Zmud 1984). We refer to the first case with innovation push and to the second case, with innovation pull. While the beginning of the environmental revolution was based on innovation push, cleantech companies are now interested in improving clean technologies and discovering nascent technology which might bring a competitive advantage to the company. Encompassing an innovation pull strategy in the company can help the company discover and implement new technologies before the competition does. This can be achieved by developing a continual innovation process. Here, the awareness of key employees has risen toward the general, but especially on the cleantech-specific driving factors.

General innovation inputs and entrepreneurial culture are essential within the cleantech company, but specific innovation drivers for the cleantech sector also need to be taken into account: government policies, public R&D spending, access to private finance, infrastructure for clean technologies, as well as cleantech industry organizations. These drivers are taken into account when computing the Global Cleantech Innovation Index. Technological innovation is crucial for the cleantech sector, but not sufficient by itself. Companies, universities, and research centers, as well as governmental institutions need to have a holistic perspective when designing their green strategy. Johnson and Suskewicz (2009) found that a sustainably successful green strategy balances four components: an enabling technological system; an innovative, customized business model; a market-adoption strategy that assures a foothold; and a favorable governmental policy.

IBM is one of the big companies that have invested in becoming green by launching its project, “Project Big Green,” in order to reduce the energy consumption. IBM products and services that follow the steps deemed necessary for Project Big Green will cut energy usage by an estimated 42 %. The operational costs can be reduced by 50 % off; in other word, the IT capacity can be doubled without increasing costs, and most importantly, carbon emissions are decreased. “It is a win–win–win for all” (Molloy 2007). Other companies that adopted a similar strategy are Bank America who reduced paper use, Dupont with reduced gas emissions, Honda with carbon dioxide emissions, Continental Airlines, Alcan, Tesco, Citibank, and others. Companies that decided to transform one of their key processes (production, supply, distribution, or others) are Starbucks with the use of recycled paper, Dell and HP by recycling computers, Suncor who measures the environmental impact of each of its projects, PG&E, Johnson, and others. OMV Petrom chose to use clean technology instead of conventional energy, as part of their strategy to comply with European environmental standards and set themselves as a green enterprise. They chose to cover part of their energetic field with wind-generated power, from a wind park located in Dobrogea, Romania. In this case, the company changed the way they supplied energy for their refinery, by

using renewable energy. By extending the wind farm in Dobrogea and selling green certificates, they will have diversified their products and services portfolio by backward integration. Companies that also extended their business activities are CEZ, Toyota, Ikea, and others. There are, however, fewer companies that have extended their domain of activity by producing green products or services, in comparison with companies that change the way they utilize resources. The strategies that are widely used to enter the ecological business sector are backward integration and horizontal diversification. Companies engaging in reengineering their value chain are mostly entering the renewable energy field, in order to cover for their energetic need, while others are using their expertise in order to produce similar products for a different customer segment. Examples of horizontal development are as follows: developing biological agricultural products instead of conventional agricultural products; electrical engines instead of fuel-powered engine; renewable energy instead of gasoline. Following these examples, the business model sectors of the green business that receive high attention are as follows: resources and partners. These two key elements of the green business plan can also be correlated in terms of economies of scale and scope, achieved by cooperating with other companies.

4. The context analysis and opportunity evaluations are based on the SWOT analysis of the favorable regions for the cluster establishment, with major interest on the current development of the cleantech sector and taking into account all three pillars of sustainable development (economic, social, and environmental). This analysis should take into account which companies could collaborate within the cluster, the proximity of an important academic institution and research centers. Also, the regional legal framework (policies that would encourage businesses or even cluster formation) could be an important decision factor for the cluster establishment.
5. The strategic choice of entering a network structure and benefiting from it is influenced by advantages as well as by disadvantages. When discussing such a decision internally, management must take notice of the general strategy of the company (How will such a decision help me gain competitive advantage? Is there impact on the domain of activity coming from third parties with whom I might collaborate?), to the organizational hierarchy (To what extent does the company agree to share control?), its core competences and resources (Can the company support product innovation, or is it more advantageous to collaborate within the research activity?) and trends within the branch (Are other companies joining networks? If yes, can I be successful remaining independent?). De Man (2004) listed the following advantages of being part of a business network: access to new markets, increased efficiency (lower production costs, economies of scale, economies of scope), lower risk of R&D, access to specialized and complementary competences, serving individual customer needs by combining separate modules produced by different companies, benefiting from technological development, setting standards, obtaining subsidies or governmental grants.

6. Involving the major players of the cluster means in principle setting out the cooperation between the three categories of members, namely the triple helix of the cluster (Etzkowitz 2002): cleantech companies, the governmental institutions, and the academic sector. Financial institutions or banks can also act as intermediaries with potential for involvement. Establishing a framework for collaboration between the private sector, the academic sector, and the public sector is now essential in order to achieve market performance, as well as to assure a sustainable growth with positive impact on the external environment. Strategies used for forming network relationships have widely been strategic alliances, mergers and acquisition, or business networks based on alliances between firms. Freel and Harrison (2006) considered cooperational entrepreneurship to be fundamentally important for innovation, which is nowadays strongly correlated with the concept of sustainability.
7. The vision and strategy formulation of the cluster should be strongly tied to the results of the initial analysis and the individual strategies of the cluster actors. After formulating the vision of the cluster, cluster members can set out the general strategy and, consequently, the strategic plan. In their study for Economic Development and Employment Promotion Program, Scheer and von Zallinger (2007) put management by objectives (MBO) forward as a valuable strategy for clusters. The green cluster could focus on goals such as monitoring the business environment and business trends in order to discover opportunities or assess possible effects on the renewable energy industry; organizing conferences, forums, and workshops regarding the cleantech business; creating a cluster portal with information on the green cluster and common publications; establishing the requirements for the business suppliers; participating in European green networks or poles of competition.

De Man (2004) acknowledged knowledge share as a new trend of the network economy. “R&D networks focusing on the production of knowledge have no tangible component or only a small one.” Current network alliances are no longer based on a 50 % equity share. Instead, they are more aimed at sharing knowledge and benchmarking. How can green clusters support the environmental strategies of the company? Given the high costs of clean technology, as well as the drive for a social and ecological impact, cleantech companies have been interested in becoming active in green clusters. Strategic choices to become involved in green clusters could be achieving technological innovation and reaching economies of scope through resources synergy. In these cases, of companies improving their efficiency and transforming the impact they have on the environment, collaboration between corporations and suppliers is the most efficient model. The supplier would intervene in order to transform the impact that the partner company has on the environment. Such collaboration has been established between Sony and Waste Management, Inc. This case sets the premises for a wider collaborative network of companies and suppliers, based on the hub-and-spokes cluster model. The engagement of an R&D institution would also affect the technological value chain within the cluster and improve the efficiency of both companies, as would

academia and government support the initiatives of such partners. Another type of collaboration where a company extends its line of products or its services by offering new, environmental-friendly products can also be developed based on the hub-and-spokes cluster model. This time, however, a more extended network would be formed between companies using similar technologies and offering environmental-friendly products. While in the case of small or family companies, the collaboration of small entrepreneurs offering the same product is a common practice—such as the Welsh renewable energy clusters analyzed by Cato et al. (2008)—our study has also shown that big corporations do not engage in clusters that much. The risks of cooperation in clusters, as listed by the “Cluster Policy Whitepaper,” are as follows: (1) vulnerability of specialization; (2) lock-in effects; (3) creation of rigidities; (4) decrease in competitive pressures; (5) inherent decline; and (6) self-sufficiency syndrome. The choice of creating or becoming part of a cluster is also influenced by the companies’ reluctance to cooperate with the competition.

The strategic choice of becoming part of the cluster can be analyzed through the **game theory**, which is commonly used for cooperative versus non-cooperative games. Here, the company taking the strategic decision needs to analyze the decisions of the competition. This decision is also influenced by the companies’ general strategy (does the company want to reach competitive advantage by technological innovation or by cost leadership?), but also so-called general rules of the game theory, such as how many times should the game be played? Is there equilibrium or not? Are the players playing simultaneously or in a sequence? Do they want to cooperate or not (Charmichael 2005)?

Before taking the strategic decision of entering a green cluster or not, the context should be analyzed, in terms of macroenvironment (economic indicators, the legal framework and supporting policies, technology, demographic indicators, and the sociopolitical context), industry and competitive environment (Porter’s 5 forces—suppliers, substitute products, buyers, new entrants, competition) (Thompson et al. 2009), as well as the company’s internal context (strategic vision, objectives, investment costs, etc.). Each indicator of the macroeconomic, competitive, or organizational environment needs to be valued and weighted, in order to compute the payoffs of the three decisions a company could choose.

The game theory scheme for a company that wants to invest in cleantech by becoming part of a green cluster has the structure presented in Table 2:

Existent companies interested in investing in the cleantech industry as a cooperative entrepreneurship strategy must take a few points into account: the cleantech activity must be in accordance with the company’s general strategy; benchmarking and knowledge share would be very useful in order to gain information on the business; the organization must be rethought in order to incorporate the new strategy (companies engaging in cleantech corporative entrepreneurship activities have created new companies or new strategic business units for their new services).

Table 2 Game theory approach for making the decision to become part of a green cluster

Company/Competition (C1/C2)	Invest in the cleantech sector alone	Become part of a green cluster	Do not invest in the cleantech sector
Invest in the cleantech sector alone	Payoff1/Payoff2	P1/P2	P1/P2
Become part of a green cluster	P1/P2	P1/P2	P1/P2
Do not invest in the cleantech sector	P1/P2	P1/P2	P1/P2

8. Financial aid from the European Union or local governments, as well as private equity, should be granted to support cluster management activities, joint services, investments, and collaborative R&D activities comprised in the action plan of the cluster. As the present study on green clusters showed, the implication of the government or European institutions is one of the major success factors for such an initiative. The involvement of such institutions and agencies in attracting the financial grants may play a major role in the cluster's success. The green cluster can be financially supported through Economic Development Operational Programs or Regional Operational Programs, but also through corporate venture capital, business angels, controlled transactions, and private equity.

In order to implement the measures proposed in this approach, the companies have to take into account their relative position to the local stakeholders that influence direct or indirect each phase of the model.

6 Conclusion

While our study has proven that start-ups or small enterprises in the ecological domain choose to enter the market by initiating collaboration within clusters, this type of involvement can be chosen by companies as a cooperation strategy. Our research has showed that this strategy is more relevant for companies which are active in the field of alternative energy. Green clusters may also be a successful cooperation strategy for companies that wish to transform the utilization of resources, but especially for companies that want to diversify their products and services by entering the environmental market, through backward integration and lateral diversification. As corporate entrepreneurship is one of the top three objectives of green clusters, companies may be interested in developing innovative business models through cluster collaboration. When formulating the strategy, these companies also need to take into account the regional and technological development.

The decision to enter a green cluster needs to follow an analysis of the organizational issues, of the industry and competition, as well as an assessment of the

macroeconomic context. Important effects of the cooperation strategy through green clusters are the transfer of information, best practices, and knowledge between cluster members.

There is no general patented solution for the development of green clusters. The present research aimed at offering support for companies that activate in this field and wish to improve their competitive advantage through the formulation of a cooperation strategy within green clusters.

Measures for the development of green clusters as cooperation strategy for cleantech companies need to be reinforced by other indirect measures that would facilitate the implementation and monitoring of the cooperation strategy.

A further study can be carried out based on the methods that can be used in order to take the strategic decision of cooperating or not within a green cluster.

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The Integrated Marketing Communication—The Consumer Behaviour Impact: A Romanian Perspective

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Abstract The concept of integrated marketing communication (IMC) was born in mid-1990s and has been generating many controversies in the literature. The concept has constantly evolved from the simple coordination of promotional tools to a complex strategic process. Due to the modern marketing development, IMC has become an important and complex tool for achieving the goals of a company. Therefore, it is useful to investigate the opportunities to increase IMC impact on consumer behaviour. The purpose of this chapter is twofold: (1) to approach IMC as a complex system which has as communication drivers the four elements of the classical marketing mix (product, price, distribution and marketing communication) and (2) to develop a conceptual model that describes the impact on consumer behaviour. Such model can be used to research the IMC influence on consumer behaviour and, in the same time, could identify the ways to create an effective IMC strategy based on the consumer reactions and requirements.

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1 A Theoretical Framework of Integrated Marketing Communication

1.1 *Emergence and Evolution of IMC Concept*

In a competitive economic system, survival and development of the companies involve the existence of accurate and detailed information about consumers, so the concept of modern marketing highlights the need for consumer knowledge.

In the contemporary era, it is almost universally accepted the idea that the main purpose of marketing is not finding and persuading people to buy what a company produces, but satisfying the consumer needs by carrying out all the activities according to these needs, which is the essence of consumer orientation.

Developing effective ways by which consumers' needs could be satisfied is one of the main objectives of IMC. Identifying the communication pathways which influence consumer behaviour is an essential marketing communication activity, the ultimate goal being the creation of marketing messages to reach target audiences through the most appropriate channels.

Adopting the approach according to the integrated marketing communication is not part of the marketing mix, but a holistic concept using marketing mix elements to create and strengthen the relationship with consumers and to send a unified message; it involves analysing the elements and relationship that support this view.

Communication, one of the most representative human activities and basis for social interaction, is defined as the exchange of ideas, information and feelings.

In recent decades, the phenomenon has evolved faster and has seen dramatic changes due to the increasing need for communication in all areas and technological performance.

Communication effectiveness is determined both by understanding the message and by getting the desired reaction from the part of the receiver, in response to the message (Popescu 2002). Marketing communication occurred during the last decades of the twentieth century, as a result of the marketing outstanding development during that period. Although so far there is not unanimity of specialists' opinion in terms of concept content, we can talk about a consensus on the role and importance of marketing communication.

In a global market characterized by high dynamism and fierce competition, organizations try to find the most efficient way to get their word out, so that customers understand the benefits that can be obtained by consumption or use products or services (Clow 2010). Consequently, marketing communication has become a fundamental aspect of marketing, a business vision and an essential factor in successful marketing communication. Its importance increased dramatically in recent decades, considering that the marketing and communication are inseparable, all organization's business areas using various forms of marketing communication to make their offer and to meet financial or non-profit targets (Shimp 2003).

It can be concluded that marketing communication has a highly complex content, in terms of both scope and the objectives pursued and on methods and tools for action.

The main instruments of communication and marketing include classical and online advertising, sales promotion, personal selling, public relations, direct marketing and event communication. Although these instruments are traditionally called “promotion” (the fourth element to the mix of classic marketing), in the literature and in practice has been adopted to a large extent the term “marketing communication”, the term “promotion” is generally used to delineate the scope of sales promotion (Shimp 2003). In this context, one can say that between promotion and marketing communications, there is a ratio from part to whole (Popescu 2002), an idea justified by common elements found in many definitions of promotion.

Wider range of marketing communication can be highlighted through the following differences:

- (a) As a communication tool, *promotion* has clearly defined objectives, ensure communications with individuals or organizations, but is characterized by discontinuity, various promotional activities having a *temporary nature* (Popescu 2002);
- (b) *Promotion aims mainly at supporting sales* and it is *focused on influencing purchase behaviour* while marketing communication aims to build and strengthen a long-term relationship with all stakeholders is geared towards influencing consumer behaviour in general.

Considering that the primary purpose of marketing communication is to build and strengthen the brand, while the main market competitors have become brands, many opinions of experts converge in the idea that in the contemporary era, the marketing communication will be the only way to create and sustain competitive advantage.

Given that marketing communication is more strongly asserted as a major achievement of marketing objectives within an organization, the necessity arises to identify ways to increase its impact; that goal can be achieved by integrating all the specific components in an assembly unit. IMC is considered one of the most controversial areas of research, expert’s opinions being found in a diverse range whose amplitude includes very different approaches. There are points of view according to which this concept is the most important development of marketing communication in the last decade of the twentieth century (Kitchen and De Pelsmacker 2004) and views, which assume that IMC does not go beyond a collection of specific traditional marketing concepts, presented in a new form (Spotts et al. 1998).

Academic research in IMC area has covered a long way since the emergence of the concept and its shape as a field of study in the late 1980s and early 1990s, marking a gradual transition from the limited vision that is just the coordination of promotional tools, to the broad perspective of structuring a complex strategic process.

Although aspects of the definition, theoretical grounding, understanding and developing the concept of IMC have been a constant concern of specialists over time, so far they have not reached a concrete result in a universally accepted definition of IMC.

Integrated marketing communication definitions vary considerably, both in terms of complexity and issues they focus. The simplest definition (which reflects the approach of some scholars) have integrated marketing communication as a process of integrating all elements of the promotional mix, failing to highlight some specific features that give the concept a much wider horizon.

In contrast, other authors believe that the communication approach of integrated marketing communication perspective is one of the most significant changes throughout the history of advertising and promotion (Moriarty 1996; Belch and Belch 2008) and the most important step in the evolution of communication in the last decade of the twentieth century (Kitchen et al. 2004).

A significant contribution to the definition of IMC concept is the emphasis on its strategic aspects, regarding IMC as a business process, rather than its initial approach as a coordination of marketing communication tools (Schultz and Schultz 1998).

Specific to the research in IMC field is the evolution of the concept central idea from a simple combination of marketing communication tools to the integration of all messages and communication channels.

The review of IMC literature shows that definitional and conceptual underpinnings surrounding the IMC construct continue to be an important topic of academic research even in recent years (Kliatchko 2008). This development can be structured according to the new dimensions and additions at each stage of theoretical development of integrated marketing communication (Table 1).

Analysing the diversity of topics explored within the context of deepening study of integrated marketing communication, it could be useful to systematize them into the major issues highlighted (Table 2).

Based on the study of various approaches of integrated marketing communication, we can conclude that the common element is limiting their vision at integration of the communication tools. Contemporary perspective of practical use in integrated marketing communication is a transition from the approach “inside-out”, which was central coordinating tactical marketing communications, to plan a unified action (Cornelissen and Lock 2000), according to the approach “outside-in” that means an integrated marketing communication strategy based on the consumer. As a result, identified and transmitted information is regarded as essential and useful in terms of consumer, rather than in terms of organization.

1.2 Marketing Mix Components as IMC Drivers

There are authors who, taking into account the broadening of the frame of integrated marketing communication, consider that it has to include also the other components of the marketing mix (product, price and distribution), but this direction has been not clearly explained.

Thus, Clow (2010) believes that a complete plan of integrated marketing communication incorporates every element of the marketing mix, needed to design

Table 1 Evolution of integrated marketing communication concept

Contributions to theoretical foundations, development and understanding of IMC concept	Authors
Concept of marketing communications planning;	AAAA (1989), Nowak and Phelps (1994), Kotler (2000);
Coordination of messages and communication channels to ensure maximum communication impact	
Process of coordinating all information sources aimed at influencing customer behaviour	Schultz (1991), Duncan and Everett (1993), Belch and Belch (2001);
Coordination of messages and media channels to promote the concept of brand and brand influence	Keegan et al. (1992), Shimp (2000);
Influencing consumer behaviour	Schultz (1998), Gronstedt (2000), Schultz and
Business/management strategic process	
Evaluation and measurement	Schultz (2004), Duncan (2001, 2005);
Focus on long-term brand value	Madhavaram et al. (2005)
Philosophy involves strategic coordination of all brand messages	Duncan si Mulhern (2004), Kitchen, Joanne si Tao (2004)
New management paradigm that facilitates marketing communication	
The most important development in twenty-first century’s marketing communication	Kitchen and de Pelsmacker (2004);
Key competitive advantage	
Concept and strategic coordination process of brand communication programs	Kliatchko (2005, 2008)
Key elements: audience, channels, content and results	

Source authors’ research based on literature review

and send a unified message. In agreement to this view is the opinion of Duncan (2001), that integrated marketing communication process should be approached from a holistic perspective, requiring development of a comprehensive strategy of the company, which involves communication with customers throughout all marketing activities, not only the promotion. This may be reflected in the view presented by Pickton and Broderick (2005), which states that there are many dimensions of integration, one-dimensional approach that refers only to communications integration marketing being unnecessary and ineffective as a simplification of the problem. Other dimensions include the integration of all creative elements, the intra- and inter-organizational factors, the marketing communications mix with other elements of marketing, information systems and databases, integration-oriented communication internal and external audiences and geographical integration.

Therefore, taking into account the opinions above, we believe that each element of the marketing mix has strong communication connotations, so we can talk about integrating all four elements in integrated marketing communication strategy, which has to send a single consistent and coherent message.

Organizations can gain several benefits from the integration of marketing communication, which promotes better brand differentiation opportunities for the

Table 2 Main research topics regarding IMC

Research topics in the field of IMC	Authors
Definition, theoretical basis, explaining and developing the concept.	AAAA 1989, Schultz 1991, Duncan and Everett 1993, Nowak and Phelps 1994, Gould et al. 1999, Phelps and Johnson 1996, Schultz and Schultz 1998, Schultz and Kitchen 2000, Cornelissen and Lock (2000), Cornelissen 2001, Duncan si Mulhern 2004, Gould 2004, Kitchen and de Pelsmacker 2004, Pickton and Broderick 2005, Swain 2004, Kliatchko 2005, 2008, Madhavaram et al. (2005)
Measuring and evaluation IMC effectiveness in terms of synergy concept.	Schultz 1998, Low 2000, Reid 2003, Zahay et al. 2004, Schultz et al. 2006, Ratnatunga and Ewing 2005, Smith et al. 2006, Belch and Belch 2008, Ewing 2009
Management and implementation issues in organizations.	Nowak and Phelps 1994, Phelps and Johnson 1996, Gronstedt 1996, Eppes 1998, Cornelissen 2001, Maskulka et al. 2003, Beverland and Luxton 2005, Blakemen 2007, Caemmerer 2009
Relationship with internal marketing relationship marketing and corporate communication.	Hutton 1996, Duncan and Moriarty 1998, Schultz 2004, Beverland and Luxton 2005, Finne and Gronroos 2009
Influence on creating brand identity and brand equity.	Barnes 2001, Dewhirst and Davis 2005, Reid 2005, Madhavaram et al. 2005, Ratnatunga and Ewing 2005
Adaptation of IMC to new interactive media technologies and changes in consumer behaviour.	Peltier et al. 2003, Schultz 2003, Schultz et al. 2005, Court et al. 2005, Kessler 2004, Lee and Park 2007, Mulhern 2009, Kitchen and Schultz 2009

Source authors' research based on literature review

coordination and communication of activities and evaluating their effects (Shimp 2003). Although it is difficult to achieve synergies resulting from integration, it significantly increases the impact of marketing communication, the consistency and continuity of communication, with positive results on efficiency and effectiveness.

2 IMC: a Communication Approach from the Consumer-Centric Perspective

Clearly, product performance, price and distribution patterns influence the extent to which consumers buy a product and repeat purchase, but in many cases, these three elements of the marketing mix are not decisive criteria. Often, performance, price and distribution are similar so that to attract and keep consumers are

predominantly determined by several “behavioural” variables (Duncan 2005) namely:

- *Coherence*: It is transmitted through product uniformity as well as by uniformity in the way a company positions itself and responds to situations. Image of a mark must be unitary out all messages that reach consumers—this is one of the main objectives of integrated marketing communication;
- *Accessibility*: Consumers can quickly turn to a representative of the company in case of problems with the purchased product;
- *Reaction time*: Where consumers have some complaints about the product, solving them in short time may counteract any negative feelings due to any shortcomings of the product so that the brand can be given another chance;
- *Commitment*: In relation to an organization, it is very important for consumers to be convinced that their satisfaction comes first and that is the main focus of the organization.

In the contemporary era it is almost universally accepted that marketing is not aimed primarily at finding and convincing people to buy what a company produces, but the consumer needs stand first, by carrying out their activities according to these needs, which is the essence of consumer orientation (“customer-oriented”, “customer-focused” or “customer-centric”).

The role and importance of consumer orientation are reflected in the statement of Drucker (1985), so that the essence of marketing is the knowledge of all aspects of the consumer (utility of a product they purchase, which are its values, etc.); the effect of this approach materializing means the level of profit.

If there may be different opinions regarding the status of the consumer orientation, cause or consequence of marketing efficiency, there can be no doubt about the fact that a clear focus on the present and future consumer behaviour and willingness to act according to the main elements that characterize this behaviour is essential to the success of a business (Goldsmith and Clutterbuck 1985; Peters and Waterman 2004).

Although a successful strategy depends on the proper use of a wide range of skills and resources, none is so important that as the consumer orientation and the ability of firms to “feel” the market (Arnould et al. 2004). That involves the ability to empathize with and understand consumer decision intrinsic resorts and activities.

In this context, an important prerequisite for the survival of firms in a competitive environment is to provide consumers more value than its competitors. It is essential that the company appreciate the value from a consumer perspective, which involves an ongoing sustained anticipation of requirements and power response faster than competitors (Hawkins and Mothersbaugh 2010). Consumer reaction to a product can also be seen as a certain level of satisfaction, which for marketers with experience is more important on long terms than immediate sales growth. As a result, consumer analysis is a basic element for marketing strategy planning, while consumer reactions to the brand message (incorporating all marketing mix components) determine the success or failure of this strategy.

Consumer purchases are, in fact, the greater part of the economic system, thereby obtaining profits by companies, jobs and income for employees (Wilkie 1990). Changes in consumer spending have an effect on general economic situation, influencing the chances of success of business, growth prospects, prices, interest rates, etc.

Therefore, simply collecting information about consumers is not enough; the consumer orientation materializing as in-depth knowledge of all processes and mechanisms that form the behaviour.

Based on the multitude of definitions that try to describe the complex structure of consumer behaviour (Wilkie 1990; Solomon 2009; Schiffman and Kanuk 2007; Zaltman and Wallendorf 1979; Catoiu and Teodorescu 2004), we can select the following commonalities:

- *It is motivated*: It involves a specific purpose (meeting needs) and an end that requires a thorough search of the reasons behind a particular action;
- *Includes various activities*: Taking into account only the actual purchase is an error, leading to exclusion of important elements (thoughts, feelings, plans, decisions, experience). These activities can be divided into two categories, depending on the degree of intentionality (intentional and incidental), both with implications for marketing strategy;
- *It is influenced by internal and external factors*: There are many factors that exert various influences, having several key features (depth, time of action, number) and has to be known by marketers;
- *Can be defined as a set of elementary processes* (perception, information/learning, attitude, motivation and actual behaviour).
- *It is multidimensional*: It can be investigated by detailed knowledge of each elementary process analysis and evaluated using the key dimensions that characterize and provide perspective on consumer behaviour (reasons, preferences, intentions, habits and skills, attitudes, image).

For better understanding of the complex structure of consumer behaviour, it is necessary to know each elementary process and its specific dimensions.

Perception. It is a complex mental activity that is finding, understanding and judgment of stimuli using sensory receptors (Catoiu and Teodorescu 2004);

From the marketing point of view, perception is a process that starts with exposure of consumer attention to the stimuli and ends with the interpretation on those stimuli. Reality and perception of reality are often different, which means that to communicate a message effectively, marketers must understand the nature of perception and the many factors that influence it (Hawkins and Mothersbaugh 2010).

Learning/Information. That is a relatively permanent change in behaviour due to experience. From a marketing perspective, learning can be considered a process by which individuals acquire the purchase and consumption knowledge about and experience that will integrate into their future behaviour (Schiffman and Kanuk 2007).

The main reason behind the interest of marketers to learn how individuals act in the position of consumers is their vital interest to provide essential information about product attributes and their potential benefits.

Motivation. According to the general acceptance, motivation is the inner strength that leads individuals to act. This force is produced by tension, arising as a result of unmet needs. Uncovering consumer motives are one of the prime tasks of marketers, who then try to teach motivated consumer segments why and how their products will fulfil the consumer needs (Schiffman and Kanuk 2007).

Attitude. The concept of attitude occupies a central position both in studying social psychology and consumer behaviour. Attitude can be considered predisposition to respond in some way to a particular stimulus; a favourable or unfavourable inclination of an individual to a feature of an object (Hughes 1971). To get at the central point of what is driving consumers' behaviour, attitude research has been used to study a wide range of strategic marketing question (Kanuk and Schiffman 2007).

Although the literature has not reached an agreement on the way the structure of attitudes is identified, generally three main components are mentioned: cognitive (beliefs and knowledge), affective and cognitive (intention to act in a certain way).

Actual behaviour. It is the only one of the four elementary processes described above that can be observed directly and immediately and can be measured. Although it can be studied independently, this process is not autonomous, but a specific outcome resulted from the interdependent system composed of other elementary processes. (Catoiu and Teodorescu 2004). If the actual behaviour results in a purchase decision, studying this aspect can be achieved by two important dimensions: purchasing habits and consumer habits.

Action of the elementary processes, how each contributes to shaping consumer behaviour and their synergistic effect are shown in structuring the decision process, whose detailed knowledge is structure of the decision-making process most often used in studying consumer behaviour includes the following steps:

- Need recognition;
- Information search;
- Evaluation of alternatives;
- Decision;
- Post-purchase evaluation.

The whole consumer behaviour and decision-making process should be analysed in terms of influences exerted by various factors, whose knowledge is essential to substantiate effective marketing strategies.

3 Modelling the Research of IMC Influence on Consumer Behaviour

Although in terms of concept content the specialists have not reached a consensus, the main purpose of IMC can be considered as influencing or modifying the behaviour of the target audience (Shimp 2003). So, it can be stated that the essential premise of IMC is the consumer orientation. Influencing the behaviour of the target audience means more and deeper action than increasing awareness of a brand or strengthening consumer attitudes towards a particular brand. An IMC program must be structured following multiple directions, all processes influencing consumer behaviour (perception, information/learning, attitude, motivation), not only the actual behaviour.

In this context, based on Shimp's opinion (2003), several *key characteristics* can be identified integrated marketing communication, divided in two main categories:

(a) Related to IMC construct

Use any relevant contact forms: IMC uses all forms of communication and all sources of appropriate contacts as potential message delivery channels. The objective is to surround consumers with the brand message at every possible opportunity.

Achieve synergy: Coordination of messages and media is critical to achieving a strong and unified brand image. Communication elements must transmit the same message and convey that message consistently across diverse message channels or points of contact.

(b) Related to consumer behaviour

Focus on the consumer: The IMC process should start with the consumer and then work back to the communicator in order to determine the most appropriate messages and ways to convey it. The organization has to use those communication methods that best serve the consumer's information needs and motivate them to purchase a product.

Build a relationship with consumer: IMC success requires establishing and supporting a link between consumer and brand, which induces the idea that relationship is the key to modern marketing and integrated marketing communication is the key to building this relationship (Simonini and Ruth in Shimp 2003).

Affect consumer behaviour: The main feature and also the most important objective of IMC is to influence the behaviour of the target audience, which means more action and deeper than increasing awareness of a brand or strengthening consumer attitude towards a certain brand. An integrated marketing communications program must be structured as to influence all processes of consumer behaviour, not only actual behaviour.

Starting from the meaning of IMC concept adopted throughout this chapter, we consider that the development of scientific endeavour is possible, on purpose of modelling the research of its influence on consumer behaviour. Such conceptual and methodological approach has also important applications and experimental facets, because it can be a very useful tool for applications in the free market and for companies or corporations in all fields of activity (production, distribution, services). Furthermore, modelling the research of IMC influence on consumer behaviour is important for facilitating meaningful comparisons between different companies (in-depth analysis of competition), time, etc. To create such a research model (Fig. 1), we proceeded to test several variables, in terms of matching model components and its functional relationship with theoretical precepts accepted as defining IMC.

Modelling of research, the IMC influence on consumer behaviour, is important for facilitating meaningful comparisons between different companies (in-depth analysis of competition), time periods, etc.

To create the research model, we proceeded to test several variants, in terms of matching components of the model and its functional relations with theoretical precepts accepted as defining integrated marketing communication. The proposed version is shown in Fig. 1, which includes functional morphology and relationships of the model (system). When creating these functional blocks, some general properties of the social systems (which are open systems among others) have been taken into account, such as equifinality, stability, sensitivity to certain parameters and nonlinearity (feedback curves used as a control of system functions).

The five functional blocks which represent the morphological model developed will be described below.

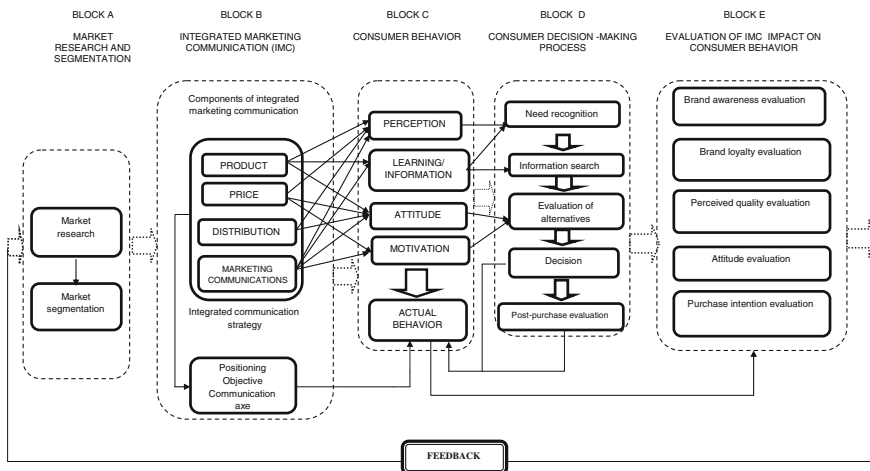


Fig. 1 Authors' model of research the integrated marketing communication impact on the consumer behaviour

Block A—Market Investigation and Segmentation—refers to the stage preceding the integrated marketing communication structure, the decisions on product, price, distribution and marketing communications. Due to the diversity market in which consumers can be found with interests, desires, aspirations and different values, designing an effective strategy, integrated marketing communication should be based primarily on knowledge of consumer needs. That involves dividing of consumers into potential market segments using relevant criteria and focusing on integrated communication actions to influence one or more segments of consumers. Market research and segmentation studies aimed primarily at knowledge, desires and needs of specific groups of consumers, so that products meet the utmost requirements of each group. Many new products were designed to “cover” market zones, discovered through market research and segmentation. For example, a named product designed to meet consumer needs can be developed and delivered to a clearly defined segment, the product is brought to market at a certain price, the appropriate distribution channels, target segment using specific marketing communications segment is also concerned.

The characteristics most commonly used for market segmentation are geographical, demographic, psychological, psychographic (lifestyle), sociocultural variables, characteristics related to the use of the product.

Block B—Integrated Marketing Communication—refers to the ways in which communication is found in all four components of marketing mix, namely product, price, distribution and marketing communications. Each element of the marketing mix is considered part of an integrated marketing communication because of its potential to send a consistent and uniform message. Communication vectors are structured and coordinated through integrated communication strategy, embodied in market positioning based on objectives of the company and core communication axis.

Positioning is defined as the art or science of associating the product of one or more market segments in order to be significantly different than the competition (Ayer’s Dictionary of Advertising Terms in Duncan 2004). Positioning a product is a key element in communicating the benefits it provides. Positioning differentiates the product from the competition and is based on one of the following main elements:

Product attributes and benefits;

- Price/quality;
- Use or applicability;
- User product;
- Competition;
- Cultural symbols.

Integrated communication strategy objectives are dependent upon the levels that have to be influenced by consumer behaviour: cognitive, affective and cognitive. The communication axis is particularly important because the message gives strength to influence consumer behaviour in the desired direction.

Block C—Consumer Behaviour—is composed of five dimensions through which experts define this process at the conceptual level. These elementary processes of consumer behaviour are also used to define operational variables (endogenous or exogenous). The five basic processes of the block, that perception, information/learning, attitude, motivation and actual behaviour, have a multidimensional structure, which is taken into account in the design and implementation of many forms of behavioural studies.

Block D—Decision-Making Process—consists of phases completed by consumers when deciding to purchase goods and services, generally accepted by experts within the field of marketing, namely need recognition, information search, evaluation of alternatives, decision and when buying, post-purchase evaluation. Obviously, these stages lead to a specific decision determined by the following:

- Nature of product or service;
- Target segment of consumers;
- Specificity of the processes that define behaviour.

Block E—Evaluation of Integrated Marketing Communication Influence on Consumer Behaviour—is meant by its components, to “close” what may be termed “consumer loop” for the purposes of measuring the communication influences on behavioural manifestations. In this regard, we propose consideration of variables that are related to both brand equity and the size of consumer behaviour, to assess the effects of integrated marketing communication on consumer behaviour, namely

- Brand awareness: It involves brand recall and recognition, its importance being given by the positive attitude that is the precursor of a favourable attitude to the brand;
- Brand loyalty: It can be evaluated from measuring satisfaction with the two sub-components: assessment and continuing favourable recommendation with fidelity measurement itself on re-purchase rate and the perception of advantages over competing brands;
- Perceived quality of the brand: A brand quality perception is not based necessarily on a detailed knowledge of the product, but it is something that will directly influence purchasing decisions and brand loyalty, especially when a buyer is motivated or not able to analyse product details;
- Attitude to the brand: Measuring attitudes in the context of consideration of its three-dimensionality can provide important information on the formation of specific intent to adopt a certain behaviour;
- Intention to purchase the brand: It is a probabilistic estimation of future behaviour that can support the evaluation of the influence of integrated marketing communication on consumer behaviour.

The results of such evaluations are meant to give a conclusive marketing effort materialized in integrated communication vectors, that is, a measurable degree integrated marketing communication influence on consumer behaviour.

Functional relations on the model are required by its class and the morphology described above. Ultimately, the functional relationships of the model developed are divided in three classes or categories, as follows:

- The main functional relations, highlighted by block arrows in the model with horizontal links describing the underlying blocks in graphical form;
- Secondary functional relations, highlighted by vertical lines and block arrows, describing, in graphic form, structural links between certain components of a building with other components of the same block or different blocks;
- Feedback curves.
- One that shows the influence decision and post-purchase evaluation (in Block D) to the actual behaviour (in Block B);
- Another linking Block E to the Block A, as a result of systemic vision of the model.

Overall, the functional relationship of this model describes its functionality, as follows:

- *Market Research and Segmentation (Block A)*: By dividing the market into identifiable groups of consumers with similar characteristics, determine the draft and structure of integrated marketing communication, that through the four main pillars (product, price, distribution, communications marketing) send a unified message, to appropriate segment or segments of consumers concerned.
- *Integrated Marketing Communication (Block B)*: Includes the marketing mix components addressed in terms of potential individual and overall communication, specific action of these components being operationalized through integrated communication strategy. This tool brings together all the influences of structural components of the marketing mix components on Block C components (Consumer Behaviour).
- Basic processes that describe *Consumer Behaviour (Block C)* are determined individually, in various proportions and combinations, by the marketing mix components from Block B and integrated communication strategy. Block C has two meaningful results:
 - A resultant of Block C which is embodied in influence of specific behaviour processes on the decision-making process stages (Block D);
 - *Block C, Consumer Behaviour*, influences and structure evaluations in Block E.
 - *Block D, Decision-Making Process*: It is determined by configuration and behavioural processes influences of Block C (Consumer Behaviour) and has two results:
 - On the one hand, retroactive curve on the actual behaviour of Block C (particularly through two of its components, namely the decision and post-purchase evaluation) and
 - On the other hand, consistent influence on the elements of Block E.
- Structural elements of *Block E, Evaluation of IMC Influence on Consumer Behaviour*, are determined by all elementary processes that define consumer

behaviour (in Block C) and stages of the decision-making process (in Block D). Resultant of Block E is not only a consistent basis to substantiate decisions on the organization's communication policy, but also a factor of structural reconfiguration of Blocks A and B.

The conceptual model was created starting from the relevant literature in the field of IMC and consumer behaviour and was tested sequentially based on two research types (qualitative and quantitative) conducted for this purpose. Because the model was intended for the Romanian consumer, the design research methodology took into account its specific characteristics.

The researches were focused on a particular segment: users of skin care products (females with age between 20–29 and 40–59, urban).

The qualitative research based on two focus groups (each one composed of twelve respondents) and twenty in-depth interviews has revealed important aspects regarding the individual influence of marketing mix components on the constitutive processes of consumer behaviour.

The results of quantitative research which was a survey based on questionnaires highlight also the effects of integrated marketing communications, through its four communicational drivers (product, price, distribution and marketing communications) on the consumer responses and behaviour. Since the sample was divided first into two segments (based on age criteria) and then, each group in two groups (exposed and unexposed) based on responses to the first twelve questions of the questionnaire, in order to analyse the effect of integrated marketing communication influence, it can be said that research has characteristics of an experiment design. Thus, the actual entering the experimental group are respondents who were included in the group of “exposed” (experimental factor being integrated marketing communication), and the actual control group, respondents included in the group of “unexposed”.

Main conclusions, limits and implications

Based on numerous and diversified approaches and opinions, it could be concluded that as regards IMC there is no unified view in literature, demonstrating the existence of many contradictions, both in terms of conceptual issues and in terms of practical elements. Also, the influence of IMC on consumer behaviour is generally addressed unilaterally, just as an impact of promotional activity.

Integrated marketing communication research influence on consumer behaviour is a complex process involving in-depth analysis of the relationship and instruments through which this influence is exercised. The IMC study gains a greater importance and utility if connected with the actual consumer behaviour, in order to obtain the desired response. Therefore, as described in the model, between IMC and consumer behaviour, there is a two-way relationship, highlighting a new approach according to the consumer behaviour research could represent a starting point for creating an effective and well-founded IMC strategy.

Considering the researches results, it could be stated that all the marketing mix elements affect the basic processes of consumer behaviour, showing their communicational abilities as integrated marketing communication drivers. So, the

assumptions made in the design research methodology are validated based on the differences in various proportions between the exposed and unexposed segments in the two age groups analysed.

As limits of the model testing can be mentioned the sequential research, namely analysing only the relations between two Blocks (B and C) of the model and lack of adequate instruments to measure the influence of each component of the marketing mix, as IMC tool, on each process of consumer behaviour.

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The Romanian Labor Market for Young People

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Abstract The study is based on four direct researches in the period July–December 2011 regarding the high school graduates, the university graduates, the teachers, and the employers from the Romanian market. In order to help young people to meet the labor market demands, there is a need of a joint effort from universities and companies by developing internship programs, centers for career guidance and by creating joint research programs. They were questioned 2,047 final-year students from 26 universities and 2,364 final-year high school students from 70 high schools. Both samples were obtained using the multistage random probability sampling method. Data were collected using a questionnaire with similar topics on both studies, so that data collected can be compared. The main objectives of this research focused on gathering information about students' opinions on the national education system, evaluation of existing counseling and guidance services, perception of labor market integration and educational/professional route. The main findings are further presented in this chapter.

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1 Introduction

There are different needs that affect the working environment, and work has a different purpose and meaning for people from different backgrounds. For most people, the basic meaning of work is related to economic necessity such as money for food, housing. The additional connotations of work are more subjective, pointing to what work provides other than money: achievement, honor, social contacts, and so on (Deresky 2006).

Another research was carried in eight countries by George England and a group of researchers. Their research sought to determine a person's feeling of the relative importance of work compared to that of leisure, community, religion, and family. This was defined as "the degree of general importance that working has in the life of an individual at any given point in time." The study showed visible differences between countries within each category. For example, there is a higher level of interest and satisfaction derived from work by the Israelis when compared with the Germans. Although income was the most important factor for all eight countries, it plays by far a greater importance in Japan. For Dutch people, the relative importance of different factors was more evenly distributed (Mintzberg 1973).

Another study conducted by Furnham showed visible economic differences between countries and explained variations in attitudes toward work. Over 12,000 young people from forty-one countries on all five continents were questioned. The researchers found that people in Far East and Middle Eastern countries reported the highest competitiveness and acquisitiveness for money, while North Americans and South Americans reported high work ethics. The studies show the complexity of the underlying reasons for cultural, economic, and other differences in attitudes toward work. These differences are to be taken into account when considering what needs and motivates people in their workplace. To conclude with, studies show a considerable cultural variability affecting the way work meets employees' needs.

According to the National Institute of Statistics of Romania in July 2012, the unemployment rate in seasonally adjusted form in Romania was estimated at 7.0 %, being down by 0.3 % points from the previous month and by 0.5 points percentage level recorded in July 2011. Number of unemployed (aged 15–74 years), estimated for July of this year is 694,000 persons, down from the previous month (727,000) and compared to the same month of the previous year (732,000) (Romanian National Institute of Statistics, Press Release no. 198, 2012).

In press release no. 90 of April 19, 2012, the National Institute of Statistics of Romania discloses some worrying information regarding employment and unemployment in 2011: 237,000 people employed part-time wanted and were available to work more hours than currently, being considered underemployed. This category of persons represented 2.4 % of the working population, 2.6 % of the population and almost one-quarter (24.8 %) of the total number of people working part-time. In the EU27, 3.6 % of active persons were underemployed in 2011 (Ireland 6.3 %, UK 5.6 %, Germany 4.7 %, Czech Republic 0.5 %, Belgium

and Bulgaria 0.8 % both). Out of the inactive population (11,516,000 people), 487,000 persons aged 15–74 years were available to start work but not seeking work, and other 7,000 people seeking work but not available to start working. These two categories of inactive persons together constitute additional potential labor force which in 2011 was 494,000 people, equivalent to 5.0 % of the active population (Romanian National Institute of Statistics, Press Release no. 90, 2012).

Factors currently influencing labor market in Romania are listed by Andrei Rădulescu in his chapter regarding the labor market in Romania (Rădulescu 2012): domestic macroeconomic difficulties, Eurozone recession, contraction of investment, human capital depreciation, reduced investment in human capital, low participation rate of the working population, which is below the European average and below the threshold of Europe for 2020 (75 %).

Romania's National Prognosis Commission, published its trend forecasts bleak in terms of the labor market in the medium term, one of the biggest problems listed being the decreased ability of Romanian economy to generate new jobs and the trend of passing many work places on the *black market* in the near future (RNPC 2012). Even if these predictions are not among the best, there are a number of market segments whose members are optimistic.

Regarding areas with the most optimistic hiring, on top is trade and manufacturing, where more than a quarter of the companies that participated in a survey by Manpower in 2011, stated that they intend to do employment. Still, estimates of mining are negative, due to the seasonal adjustment of employees (Pele 2012).

The study presented further is part of a complex paper regarding the present situation of the Romanian labor market, employment policy within the EU and the evolution of occupations on the Romanian labor market to 2020.

Besides studying the secondary sources of available information, two studies have been conducted in collaboration with (Multi Consulting Group 2011), regarding the real professional path of students from final year. These studies were based on two surveys, made on two distinct samples, one focusing on the final-year bachelor and master students' opinions and the second one on interviewing high school students from twelfth grade. Faculties and master programs differ in terms of number of studying years, master programs taking two years, while bachelor programs can take three (e.g., Economics), four (e.g., Engineering), five (e.g., Constructions), or six years (e.g., Medicine), therefore, we will refer to students who are about to graduate as "students in the final year."

The most important research topics taken into account were the opinions on the current education system, the accession at the labor market and the intentions regarding continuing studies. These vectors were taken into account because they are the most representative for the presented study and they are very common in these types of studies.

The students interviewed belong to various study programs/faculties, the sample being formed by 33 different specializations (economics, law, engineering, electronics, medicine, mathematics, wood industry, agriculture, architecture, etc.). A significant part of respondents (31 %) are studying economics, law, or engineering. The high school students interviewed belong to one of the following nine

specializations: technical, economics, humanities, sciences, services, pedagogical, artistic, sports, or vocational.

Therefore, we can conclude that the research is representative for the entire Romanian labor market. All the persons interviewed were asked for permission for information, data provided by the persons from the project's target group being considered confidential according to the Law nr. 677/2001 regarding the protection of persons for the processing of personal data and free movement of these data, with subsequent amendments.

The data were obtained using a survey with similar topic on both studies, so the collected information can be compared. The gathering of information was made with the help of an interviewer's team who went to educational institutions and identified and questioned the eligible persons for the study. The method of interviewing used was paper and pencil interviewing (PAPI).

2 Study Regarding the Educational Path of Last-Year University Students

The first survey was conducted from June 1 to 30, 2011 (effective collection of information from the field), and took into account direct interviews based on a questionnaire that included 32 direct questions and interviews of 2,047 last-year university students (the last two years of study, depending on the specialization). By applying the multistage random probability sampling method, a maximum error of $\pm 2.1\%$ has been ensured (Lefter 2004). This survey included 26 universities around the country. The chosen sampling method allowed that among these universities, technical and non-technical specializations to be selected, so that a heterogeneous picture on the researched topics could be obtained (Datculescu 2006).

The most important objectives of this research were based on the collection of information regarding students' opinions of the national education system, motivation of enrolling in universities, evaluation of counseling and professional orientation services, and perception on labor market integration and professional career.

The field collection of information required the use of twenty-five interviewers who were selected and trained for data collection.

Approximately 20 % of the interviews conducted have been checked by telephone in order to identify the possible errors or circumventions of the regulations received by each operator in the form of a specific guide. We want to point out that the database of the survey is at the company's headquarter, so there is total transparency on the activities performed from the beginning of the survey until the completion of the present report. After the field data were collected, it was entered using a statistical specialized program, which allowed preparation for analysis and interpretation. Also, we should not overlook the fact that for ensuring adequate

representation of the used sample and for eliminating possible sampling errors or contained by the questionnaire used (Lefter 2004), “a pilot study” was performed during the period of May 16–18, which involved random interviewing of 120 interview subjects (approximately 5 % of the final sample).

The main null hypothesis was that according to interviewees, the current educational system is not adapted to the realities of the labor market. It is very important that this null hypothesis was largely confirming the actual obtained results, 55.3 % of the respondents stating that we have tried to be extremely objective in the data analysis and interpretation, so all these results can be followed during the final report of the research. The questionnaires were applied to a sample of 2,047 subjects, out of which 56.2 % were female and 43.8 % were male. We mention that the national educational system is not adapted to the requirements of the labor market and surveys to define the demand for each segment of the labor market have not been made so far.

2.1 *The Results of the Survey Conducted Among Last-Year University Students*

The analysis of the processed data will be presented taking into account the most important objectives for this research.

2.1.1 *The Opinions of Students Regarding the National Education System*

One aspect of the research took into account the quantification of the confidence degree of last-year university students in the national education system. The overall picture at the sample level indicates the fact that the present education system offers an average degree of trust; average score calculated according to the answers being close to level 3 of the scale—no more, no less confidence. The results are presented in Table 1.

Table 1 The distribution of answers for the question *How much confidence do you have in the national education system?*—Standard question often used in such research

Confidence level	Absolute frequencies	Relative frequencies (%)
No more, no less	878	43.9
Much	530	26.5
Little	383	19.2
Very little	116	5.8
Very much	92	4.6
<i>Total</i>	<i>1999</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 6

Only 1,999 out of the 2,047 respondents offered an answer at this question, the rest 48 did not provide any answer. From these respondents, 43.9 % have mentioned that they have no more, no less confidence in the present education system. About one-quarter has mentioned that they have much confidence in the Romanian education system (26.5 %) and only 4.6 % have declared that they are very confident in the system.

Most of those who mentioned to have much confidence in the national education system are from urban area (74 %). The most significant percentage recorded among the persons coming from the rural area (42.9 %) is for the scale level “no more, no less,” while 26.7 % of the persons from the rural area have declared to have “much” confidence in the present education system. The persons who have little or very little confidence in the present education system are from the urban area (73 %).

One of the research hypotheses which was confirmed after obtaining the information from the students is that, in the opinion of last-year university students, the present education system is not adapted to the realities of labor market, 55.3 % saying this. The percentages are presented in Fig. 1.

From the 2,047 respondents, only 23.7 % consider that at the moment, the current education system is correlated with the labor market and offers people prepared for the requirements of the labor market.

In order to illustrate in a more elaborate way the image of the education system, the last-year university students interviewed were asked to express the degree of agreement or disagreement regarding several statements. The answers are measured on a five-level scale, and the calculated average scores for each statement are presented in Table 2.

In your opinion is the present education system adapted at the realities of the labor market?

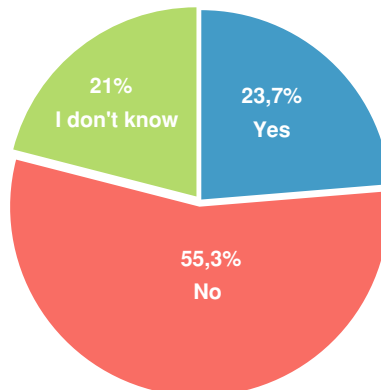


Fig. 1 The distribution of answers for the question “In your opinion is the present education system adapted at the realities of the labor market?”. *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 7, graph obtained using Excel

Table 2 Average scores for statements illustrating the image of the education system

Statements	Average scores
The education system represents the most important source for acquiring the necessary skills for professional life	3.62
School plays a decisive role in training a person	4.05
I will not face difficulties in finding a job, after graduation	2.58
I will find a job in the specialization field	3.08
I know what job I will practice after graduation	3.41

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 7

We can mention that most of the respondents agree with the statement “School plays a decisive role in training a person,” do not agree or disagree with the statement “I will find a job in the specialization field.” The last-year university students are aware that the labor market will not be totally accessible and they will face difficulties in finding a job, after graduation. A positive thing is the fact that many persons agreed with the following statements included in the questionnaire:

“I know what job I will practice after graduation” and “School plays a decisive role in training a person.” These statements were written by Multi Consulting Group.

For the statement “The education system represents the most important source for acquiring the necessary skills for professional life,” many positive answers were obtained: 912 answers of “agreement” and 381 of “total agreement.” Only 297 subjects have mentioned that they “totally disagree” or “disagree.” Results are presented in Fig. 2.

The options of the respondents for the statement "The education system represents the most important source for acquiring the necessary skills for professional life"

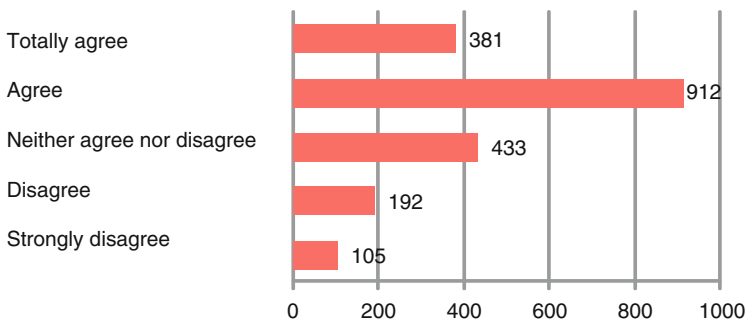


Fig. 2 The distribution of answers regarding the importance of the education system. Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 8, graph obtained using SPSS

For the statement “School plays a decisive role in training a person,” the results obtained are presented in Table 3.

From those who have answered this question, almost half have chosen the option “agree,” 45.8 % (925 options) of 2,019 respondents who answered this question out of the total of 2,047 respondents. A high percentage was obtained for the option “Totally agree”—34.7 %, 700 options. Only 3 % totally disagreed with this statement.

In order to quantify the opinions of last-year university students regarding the access on the labor market and for measuring with the five-level Likert scale, the statement “I will not face difficulties in finding a job, after graduation” was introduced. From a total of 2,049 respondents, only 2,012 answered this question.

The highest percentage was found in the undecided persons who have chosen the alternative “neither agree nor disagree”: 34.5 % of the total answers. The answers show the fact that last-year university students know the evolution of the Romanian labor market and are aware of the difficulties faced by those looking for a job. The options for the statement “I will find a job in the specialization field” are presented in Table 4.

Only 6 % of the students included in the sample are convinced that they will find a job in the field of specialization, choosing the alternative “totally agree”. 26.7 % of the respondents agree with this statement, most of the respondents being undecided and choosing the option “Neither agree nor disagree,” —43.5 %.

Table 3 The distribution of answers for the statement “School plays a decisive role in training a person”

Degree of agreement	Absolute frequencies	Relative frequencies (%)
Strongly disagree	60	3.0
Disagree	88	4.4
Neither agree nor disagree	246	12.2
Agree	925	45.8
Totally agree	700	34.7
<i>Total</i>	<i>2019</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 9

Table 4 The distribution of answers for the statement “I will find a job in the specialization field”

Degree of agreement	Absolute frequencies	Relative frequencies (%)
Strongly disagree	142	7.1
Disagree	335	16.7
Neither agree nor disagree	876	43.5
Agree	538	26.7
Totally agree	121	6.0
<i>Total</i>	<i>2012</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 10

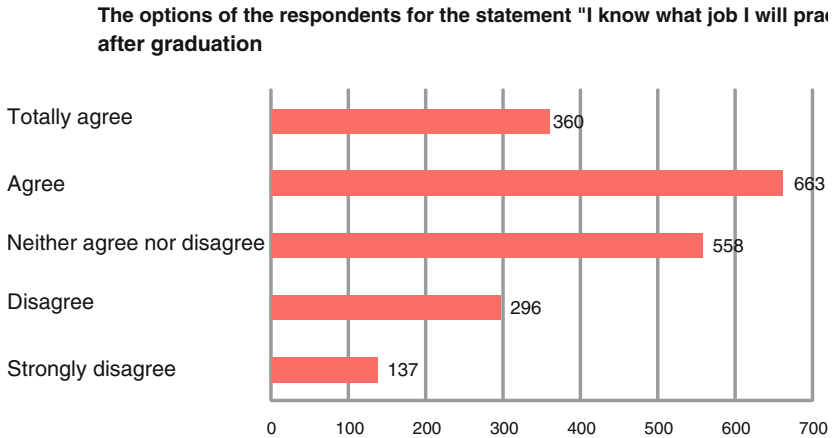


Fig. 3 The distribution of answers for the statement “I know what job I will practice after graduation.” *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 11, graph obtained using SPSS

The statement “I know what job I will practice after graduation” received the results presented in Fig. 3.

One-third of the interviewed persons know what kind of job they will practice at the end of university studies, 663 options, 32.9 %. For this statement, (27.7 %) 558 persons have chosen “Neither agree nor disagree,” while 360 students have chosen the alternative “totally agree”—taking a decision regarding the occupation they will pursue.

2.1.2 The Motivation of Enrollment at University Studies

The research has tried to quantify the reasons which determined the interviewed persons to choose the present school path, so that the respondents were asked to mention from a list of reasons the most important three aspects which determined them to choose the faculty they are currently attending. For reasons that are not dependent on them, such as strong competition between candidates for admission, a low average of years of study, or poor results at bachelor examination or university entrance examination, it is possible that some of the respondents to follow a different study program than originally desired.

The first and the most important issue which determined the interviewed persons to attend the courses where they are currently enrolled is linked to the desire of specialization in the field, being mentioned by 750 students (49.1 % of the nominations).

The second important reason mentioned by 298 persons is the reputation of the faculty/university. The third important issue, taken into account in selecting the university specialization is linked to the requirements of the labor market (249 nominations—15.8 %).

Table 5 The distribution of answers showing who helped the respondents in choosing their specialization

	Absolute frequencies	Relative frequencies (%)
Parents	766	29.7
Friends/colleagues	435	16.9
Teachers/representatives of educational institutions	400	15.5
Internet/media	214	8.3
Counselor in educational and vocational guidance	40	1.6
Nobody	720	28.0
<i>Total</i>	<i>2,575</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 12

In choosing specialization for university courses, respondents were helped, especially by parents, friends, or colleagues but also by professors or representatives of education institutions, the resulting values being presented in Table 5.

Of the students, 29.7 % have mentioned that they were helped in choosing the university specialization by parents, 16.9 % were helped by friends or colleagues, and 15.5 % have mentioned the teachers/representatives of educational institutions.

One can notice that there is a high percentage of those who have taken the decision to attend the faculty by themselves, choosing the option “nobody”—28 %. Only 1.6 % have mentioned the counselor in educational and vocational guidance as being the supervisor in choosing the school education.

2.1.3 Assessment of Counseling and Vocational Guidance Services

The second objective of this research study was evaluating existing counseling and guidance services. 481 students (23.5 % of the total sample) mentioned that the university has a Center for Counseling and Vocational Guidance. From this number, only 108 (21 %) have contacted the center in order to be helped deciding the educational path, school and vocational guidance.

Career counseling was placed by 29.9 % of the interviewed persons on the first place, being the most approached type of counseling. The Centers for Counseling and Vocational Guidance offered counseling in choosing future career and information regarding labor market, preparing the CV and the letter of intent (each receiving 25.5 % of the nominations). Self-awareness techniques and personal development and psychological counseling were ranked on last places, being considered less needed by the students.

Figure 4 presents the degree in which the students were satisfied regarding the counseling and vocational guidance services used, the calculated average score being close to level 4 of the used scale, showing the fact that they were satisfied.

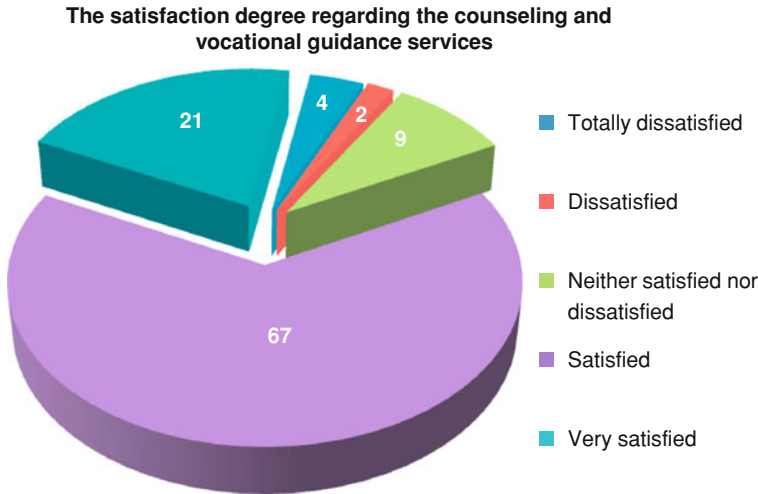


Fig. 4 The answers regarding the degree in which the students were satisfied regarding the counseling and vocational guidance services used. *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 14, graph obtained using Excel

Most of the students declared that they were “Satisfied” (67 nominations) or “Very satisfied” (21 nominations) with the quality of counseling and vocational guidance services. Only 4 persons have chosen the alternative “Totally dissatisfied” and only 2 the alternative “dissatisfied.”

2.1.4 The Perception on the Labor Market

From 2,047 last-year university students, 32 % have a job at the moment (659 persons); 74.8 % of this number come from the urban area and 54.2 % are women. Most of them are involved in a paid job, only 10 % performing volunteer activities. Three-fourth of the students have normal working hours and a contract on indefinite period. The activity fields on the labor market where students are involved are presented in Table 6.

Most of the students (26.6 %) of those who participated at this survey work in other fields than the options given. In the field of trade and sales are involved 24.4 % of the last-year university students, in services 19.9 % of the interviewed students, in production 9 %, in IT&C 5.9 % and in the secretary/administrative field are employed 8.6 %. Other fields mentioned were education, national defense, medicine, public administration, law, constructions, marketing/publicity, veterinary medicine, transports, etc.

Another important aspect was finding out how many students who have a job at the moment are working in the same field they are studying. The percentage of

Table 6 The distribution of answers regarding the fields in which students are involved

	Absolute frequencies	Relative frequencies (%)
Banks/finance	12	1.8
Trade/sales	161	24.4
Services	131	19.9
Production	59	9.0
Secretary/administrative	57	8.6
IT&C	39	5.9
Consulting	25	3.8
Other	175	26.6
<i>Total</i>	<i>659</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, Appendix 4, p. 107

those who perform an activity in the field of study is 44.6 %, the situation of the students working in the field of university studies being presented in Fig. 5.

From the total number of students studying and working in the same field, 18.3 % work in services, 9.2 % in production, 12.5 % in trade or in sales, and 13.6 % in secretary/administrative field. From the category, other fields we mention education, public administration, justice, medicine, military field/national defense.

From the total number of students who have a job, the number of students who found a job in the field of university studies is presented in Fig. 6.

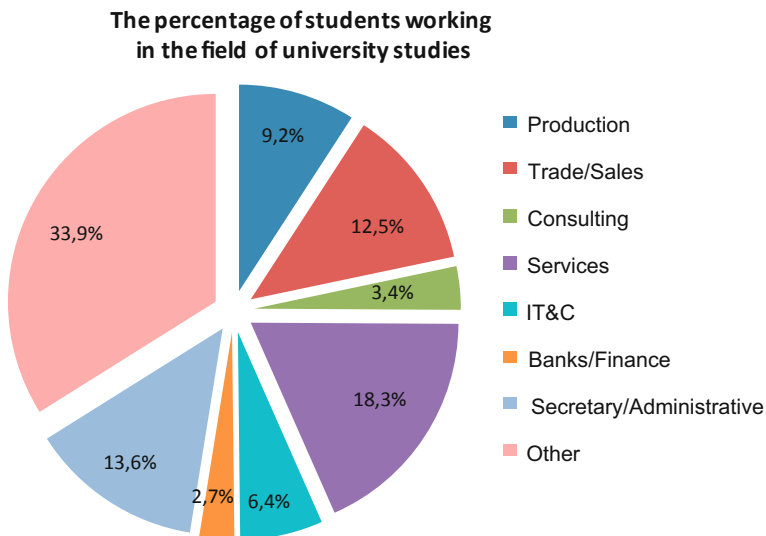


Fig. 5 The percentage of working students who perform an activity in the field of study. Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 15, graph obtained using Excel

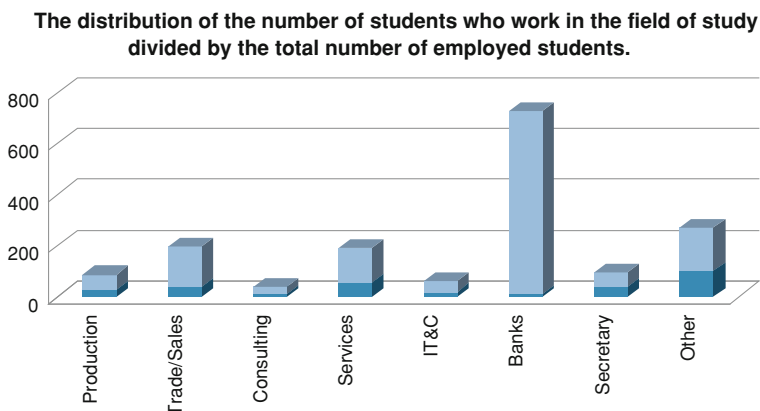


Fig. 6 The number of students who found a job in the field of university studies. *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 16, graph obtained using Excel

From the chart above, one can notice that the percentage of those who work and study in the field finance/banks is the lowest. In the alternative “other,” it was mentioned the activity field which, in a high degree, matches the field of university studies.

In order to obtain a job, utmost importance is given, according to respondents, to experience in the field, 1,326 nominations (28.2 %), and to skills acquired during specialization studies, 1,280 nominations (27.2 %). Key factors are also considered the personal relationships (family, friends, acquaintances), 18 %, proper training for contests, interviews, 17.9 %, and the consistent pursuing of the job advertisements, 7.1 %.

By correlating data with the age of the respondents, it can be noticed that for those up to 25 years, the most important factors in getting a job are, in the order of importance, experience in the field, skills acquired during university studies and proper training for interviews, contests. For the persons aged 26–30 years, the most important issues in getting a job are the skills obtained during university studies, followed by experience in the field and personal relationships (family, friends). The persons over 30 years consider that the most important issue in obtaining a job is the experience in the field, skills acquired in faculty, followed by personal relationships.

The sample included the final-year students of several universities from the counties included in the research. It also consists 34 students in the second year, 1,094 students in the third year, 774 students in the fourth year, 3 students in the fifth year, and 142 students in the sixth year. Number of years of study varies depending on the faculties and masters’ profiles, having from two to six years of studies. During the university studies, only 4.9 % of the interviewed persons have dropped the faculty classes they were attending in favor of other specializations, because they have realized that the field of study did not fit (34.9 %), from

personal reasons (27.5 %), or because they have chosen a field better ranked on the labor market(22 %). Those who made that choice came from the urban area (74.5 %from 98 subjects), most of them being males (58 %).

From the total number of 2,047 interviewed subjects, most of them are students at single faculty, 1,857 persons, respectively, 90.7, 4.8 %, respectively, 99 persons follow parallel courses of two faculties, while 90 persons (4.4 %) are graduates of one faculty and following courses of another faculty. Only one person said that is simultaneously studying at more than two faculties.

The final-year students were asked about the satisfaction degree of the knowledge level accumulated during university studies. In order to quantify the answers at this question, an ordinal scale, semantic differential type was used; the average score obtained after analyzing the results (3.65 points) indicates a high level of satisfaction regarding the information gathered during university studies.

Only 2.1 % of the interviewed persons have chosen the level of scale “totally dissatisfied,” and only 6.8 % have chosen the alternative “dissatisfied.” At the opposite side of the scale, respectively, 8.2 %, 166 persons who said that they are “very satisfied” of the acquired level of knowledge during faculty were positioned. More than half of the interviewed persons have declared to be “satisfied” with the information obtained during university courses. These results are presented in Table 7.

Those who said they are satisfied or very satisfied regarding the information acquired during university studies are from the urban area (73 % of the total number of persons choosing these two levels on the scale) and are in majority females (56 %). The correlation between the two variables is considered representative based on ANOVA significance test (Prutianu et al. 2005).

In order to follow the professional career path, the interviewed persons were asked to position themselves using several statements taking into account their preferences. These are presented in the following three figures (Figs. 7, 8 and 9).

More than half of the interviewed persons consider that probably they will find a better paid job (47.8 %), while 11.2 % are convinced of this. One-third of the interviewed persons is pessimistic in this regard, 23.9 % choosing the alternative “probably not,” and 6.5 % the alternative “sure not.”

Table 7 The distribution of answers regarding the level of satisfaction with the information obtained during university courses

	Absolute frequencies	Relative frequencies (%)
Totally dissatisfied	42	2.1
Dissatisfied	137	6.8
Neither satisfied nor dissatisfied	475	23.4
Satisfied	1,207	59.5
Very satisfied	166	8.2
<i>Total</i>	<i>2,027</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 18

Opinions regarding the statement "I will find a better paid job"

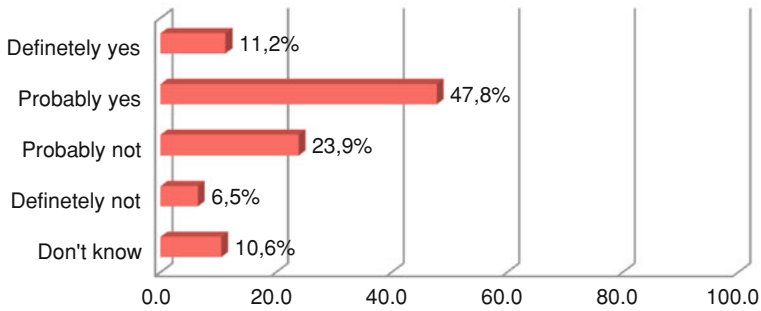


Fig. 7 The distribution of answers for the statement “I will find a better job.” *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year, Brasov 2011*, p. 19, graph obtained using Excel

Opinions iregarding the statement "I will employ in my graduation field"

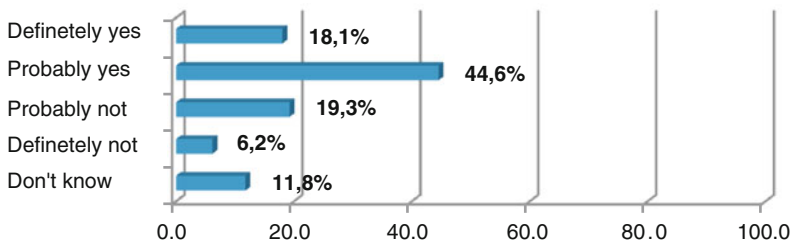


Fig. 8 The distribution of answers for “I will employ in my graduation field.” *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year, Brasov 2011*, p. 20, graph obtained using Excel

Analyzing data we can conclude that most of the persons who consider that at graduation, they will find a well-paid job are the students at Civil Navy, Physics, Food Engineering, Tourism and Environment Protection, Hydrotechnics, Dental Medicine and Wood Engineering. The persons who do not trust that the profile they are following can offer them a well-paid position on the labor market are from specializations: Theater and Television, Sociology, Psychology and Educational Science, Social Assistance.

Of the final-year students, 18.1 % have said that they are sure they will be employed in their graduation field. On this statement, 44.6 % have chosen the alternative “probably yes.” The pessimistic represents 25.5 % from the total interviewed persons (19.3 %—probably not, 6.2 %—sure not), while the percentage of undecided record 11.8 % of the expressed options.

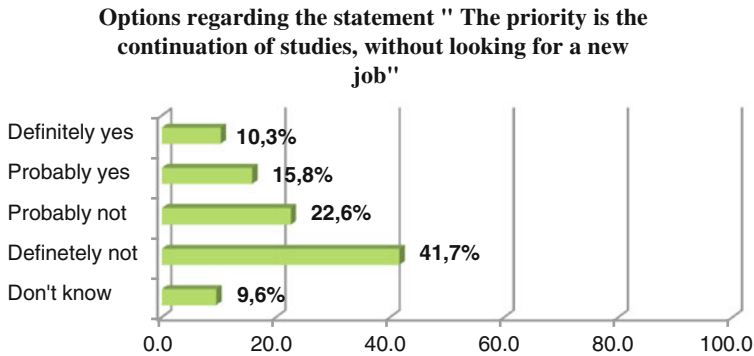


Fig. 9 The distribution of answers for the statement “The priority is the continuation of studies, without looking for a job.” *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year, Brasov 2011*, p. 21, graph obtained using Excel

Correlating data obtained on this statement in the profile in which interviewed persons are specialized, it has been noticed that most of the respondents are convinced that they will find a job in their graduation field. Only those from the fields of Arts and Textiles, Leather and Industrial Management consider that they will not be able to practice after university graduation in these fields.

For 41.7 % of final-year students, to continue studies are not a priority without searching for a job. These want first to employ in order to have financial stability, and then they turn to postgraduate studies. Only 10.3 % want to continue studies, regardless the position they will have on the labor market, while 15.8 % of the persons who participated on this survey agree that probably in the following period, the priority will be the continuation of studies, without looking for a job. Analyzing data one can notice that after university graduation, most of the graduates want to have a job in the first place and then to continue studies, those who have chosen the alternatives, probably not and sure not at this statement, 64.3 %, being more numerous than those who have chosen sure yes and probably yes, 26.1 %.

With the exception of students from Faculty of Constructions, all other participants at the survey, regardless the profile studied have mentioned that the priority after graduation is the search for a job not the continuation of studies.

3 Study Regarding the Real Educational Path of Final-Year High School Students

The second survey was done during the period of September 12–30, 2011 (effective field collection of data), and was based on direct interviews using a questionnaire that included 26 direct questions and a number of 2,364 twelfth grade high school students from the national education institutions. By applying a

multistage random probability sampling method, a maximum error of ± 2 has been ensured; 70 high schools from around the country have been included in this survey.

Just as in the survey done for the universities, the heterogeneity of the high schools specializations was taken into account. Technical and non-technical specializations were selected in order to obtain a heterogenous image on the researched topics using the answers of the students.

The used topics of the two research projects on the twelfth grade and the final-year high school students were similar to allow a comparison of the obtained results. The field collection of information needed the use of 22 operators who were previously selected and trained for data collection. The centralized questionnaires were checked by telephone in a percentage of 20 %, the database of the survey being at the company’s headquarter in order to ensure total transparency on the activities developed from the beginning of the survey until the end of the present report. The information obtained was coded and introduced with the help of a specialized statistical program, which allowed the preparation of data for analysis and interpretation.

It should be mentioned that in order to ensure a proper representativeness of the sample and to eliminate the possible sampling errors or contained by the questionnaire used, a “pilot study” has been made in the period of September 23–25, 2011, and it assumed the random interview of 110 subjects (almost 5 % of the final sample). After applying the questionnaire, a sample of 2,364 subjects resulted, out of which 58.6 % were female and 41.4 % male. The present study has tried to establish the educational path of the twelfth grade students. In order to establish the educational path, the respondents were helped, especially by parents, teachers or representatives of educational institutions but also by friends and colleagues, the values resulted being written in the Table 8:

Of the students, 43.9 % have mentioned that they have been helped in choosing the educational path by parents, 17 % by teachers/representatives of educational institutions and 15.6 % by friends or colleagues.

Table 8 The distribution of answers regarding the influences on the establishment of the educational path

	Absolute frequencies	Relative frequencies (%)
Parents	1,803	43.9
Teachers/representatives of educational institutions	700	17.0
Friends/colleagues	639	15.6
Internet/media	470	11.4
High school psychologist/counselor in educational and vocational guidance	92	2.2
Nobody	406	9.9
<i>Total</i>	<i>4,110</i>	<i>100</i>

Source Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 21

Of the students, 9.9 % have mentioned that they have taken the decision regarding the educational path by themselves, choosing for this question from the questionnaire the alternative “nobody.” Only 2.2 % have mentioned the school psychologist, the school counselor in educational and vocational guidance as being the person who guided them in choosing the educational path.

The research has captured the intensions of future high school graduates regarding the educational path (See Fig. 10). After high school graduation, 54.9 % of the interviewed persons would like to continue studies and in the same time to get a job. One-third of the interviewed persons would like at the end of the high school, to continue studies—832 people, 35.4 %. Searching for a job in a foreign country is an alternative for 3.9 % of the respondents.

The percentage of undecided regarding the options after high school graduation is a low one, 3.1 % of the total number of respondents. The decision of not continuing studies is influenced in a large extent by the desire to arrive sooner at financial independence(58.1 %); 19.4 % have mentioned that they do not want to continue studies in universities, while for 18.6 % the financial situation does not allow the continuation of studies.

After high school graduation most of the future graduates intend to continue the educational route, 90 % of the interviewed persons would like to pursue a university, while 7 % intend to pursue the courses of a post-high school.

The research has tried to identify the reasons which made the interviewed persons choose a certain specialization for the university studies or for the post-high school studies. The most important issue that would influence the interviewed persons to pursue university or post-high school courses is the desire for specialization in the field, this being mentioned by 1,682 subjects, collecting 26.5 % of nominations.

Ensuring a higher financial income represents an important factor that would influence 1,470 subjects to choose a certain specialization for university studies or post-high school studies, this covering 23.1 % of total nominations. An important issue in choosing the future educational path is linked to the labor market

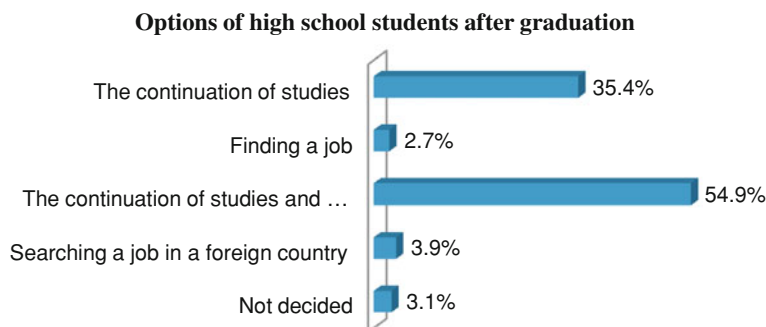


Fig. 10 Options of high school students after graduation. *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 48, graph obtained using Excel



Fig. 11 Drivers in choosing a faculty specialization/post-high schools studies. *Source* Multi Consulting Group, *Report on: Study on real professional path of students from final year*, Brasov 2011, p. 49, graph obtained using SPSS

requirements (See Fig. 11); 900 persons say they will take in consideration the decision regarding the continuation of studies that representing 14.2 % of total nominations.

The reputation of the faculty or of the educational institution is a determinant factor which gathered 13.6 % of the total nominations. Other reasons mentioned were the personal skills in that field, success in career and the work environment.

These guidelines among students are also caused by the lack of customer orientation strategies of universities, determined by the absence of direct quantitative research among higher education institutions.

In the opinion of twelfth grade high school graduates, the most important advantage of faculty graduation is the obtaining of a higher specialization (600 nominations, 28.1 %). For 545 interviewed persons, obtaining a job easily is the most important advantage while achieving a higher education level was mentioned by 404 persons, representing 18.9 % of total options.

The economic crisis has brought new problems for the young people looking for the first job because companies have high expectations regarding the level of professional training. The entry barriers on the labor market are higher because of the difficult economic environment.

The layoffs, the decrease in number of available jobs, have serious repercussions on young people compared to older ones. The report *Global Employment Trends for Youth* of the Labor International Organization indicates that the unemployment rate for the youth is more sensitive to crisis than for the older population, and the recovery of the labor market for young people will be slower. The unemployment rate for young people has increased during the economic crisis. In the developing countries, where 90 % of the young people live, the young population is more vulnerable to unemployment and poverty. In Romania, deeply affected by the economic crisis, the chances for the young people to find a job have decreased. According to the National Agency for Employment, the unemployment rate for people under 25 years old in the first term of 2010 was 22.2 % and in the second term it was 20.5 % and 38,000 young people have been unemployed for more than 6 months (Romanian National Institute of Statistics, 2010).

Compared to the persons who have a professional experience, the new graduates need a longer period to adjust to the job requirements because of the insufficient correlation between the initial professional training and educational offers and the requirements of the labor market. Regarding the employment of young people, there is no correlation between the requirements of the labor market with education programs and that is why the standards for academic training should be adjusted to the employers' needs. In 2010, the Junior Achievement Organization has initiated with the financial help of IBM, a study regarding the compatibility of graduated education with the requirements of the labor market from Romania.

4 Current Problems of Young Population from Romania

Young people share values and ambitions but also face difficulties. They represent a group in transformation characterized by hard access at a job and late foundation of a family, and distance between job and school. University and school, job and social environment do not have the same integrator role as in the past. The independent personal status is acquired later in life. This will lead to a feeling of fragility, by losing trust in the existing decisional systems and by a level of detachment from the traditional ways of participating in public life and within the youth organizations (Bratucu et al. 2011).

Some young people sustain that they do not find their values reflected in the public policies conceived by older generations but they should be taken into account because they are first affected by economic evolutions, demographic problems, globalization, or cultural diversity. They are asked to create new types of social relations, other ways for expressing solidarity and facing the differences. Although the economic and social environment is more and more complex, the young people prove a big adaptation capacity.

Different actions for young people at the European level have been taken in the educational field, and in the field of employment, professional training or in the field of access to information technologies.

The employers and relevant social partners involvement in the academic education planning is limited. The relations between universities and industry/employers are weak, compared to the practice from the professional and technical education.

Regarding the link between academic education and labor market requirements the following difficulties can be mentioned:

- The system is not correlated with the needs of a dynamic labor market;
- The lack of clear equalization between the academic training and the criteria (formal and based on competences) from the labor market;

- Lack of studies and systematic analysis regarding the correlation between the offer for academic training and the requirements of the labor market, quantitatively (the tuition figure is not grounded on an analysis of the labor demand evolution) and structural (on fields and qualification levels);
- Using narrowed educational programs (more than 270 specializations) have created several parallels, not using the financial resources in an optimal manner, and a difficult insertion of the graduates on the labor market;
- The partnerships with the business community are insufficient developed.

Based on the results of the quantitative research presented is now proposed the adoption of a common strategy by the Ministry of Education, Youth and Sports, universities, municipalities—which coordinate the preuniversity educational institution—Chambers of Commerce and Industry and other institutions involved in the national training program of young people.

Organizing job fairs by universities in collaboration with Chambers of Commerce and Industry, as part of a new customer-oriented strategy of educational institutions is an example of the proposed joint strategy.

The biggest problem faced by the university graduates is “the lack of experience.” The companies are starting to give up this condition and offer jobs as long as young people pass different internships during the university.

Taking into account that the abilities created by the Romanian education are not very correlated with the requirements of the business environment, it is difficult for a young person without working experience during studies to find a job when graduating.

In order to help young people to meet the labor market demands, to acquire practical experience and for career guidance, there is a need of a joint effort from universities and companies. The universities can extend the internship and the collaboration with the business environment, by creating joint research programs. On the other side, companies can help the future employees by developing internship or trainee programs, centers for professional and career guidance in high schools and universities.

The preliminary conclusions of the study for the IT field have revealed that the coverage of the competences required on the labor market and acquired in school is between 2 and 43 %. The lowest coverage rate is recorded for competences of project management, e-commerce, internet research, and application development (Enterprise), and a higher coverage rate is recorded for databases and operation systems.

The study highlights the old content of the courses and the low rate of change in relation to the market dynamics and the IT field, outdated equipments in schools, low coverage of courses with specialized staff, lack of content for obtaining “soft” capabilities, lack of harmonization with the internal trainings of companies for the “entry level” and the discrepancy of the contents with the young people desire for a career.

5 Conclusions: Young People Expectations Regarding the Professional Environment

A study made by the company Daedalus Consulting regarding the youth expectations from the professional environment, from the career and the employer indicates their preferences for the companies where they would like to build a career. The study has used a sample of 900 people, with ages between 19 and 28 years, students or graduates, and shows that young people consider very important the perspectives for development within the company, when they select a job or a company in which to develop their career.

The reasons that determine the young people to choose a job are the perspectives for development offered by that job or by the employer. More than 80 % of the people interviewed, employees or students without a job, have answered that the concern of the company for its employees and the pleasant environment and the training programs make the difference when selecting a job. The salary is on the second place, less than 75 % being interested by an attractive salary.

The desire to develop through complex professional challenges begins to move to advantages that can be obtained with lower efforts, as well as the company’s reputation or the mentors, they can find in the company and that can be followed easily (See Fig. 12). The salary expectations have increased for each level of experience, in the average with more than 200 euros. The years of experience from the resume are transformed in proper salaries in the work contract. A young person without experience has expectations exceeding 350 euros at employment, and a person with one-year experience could expect more than 530 euros. In the rank of the non-financial advantages, the young professionals indicate the medical insurances, meal tickets, and other bonuses for festive days.

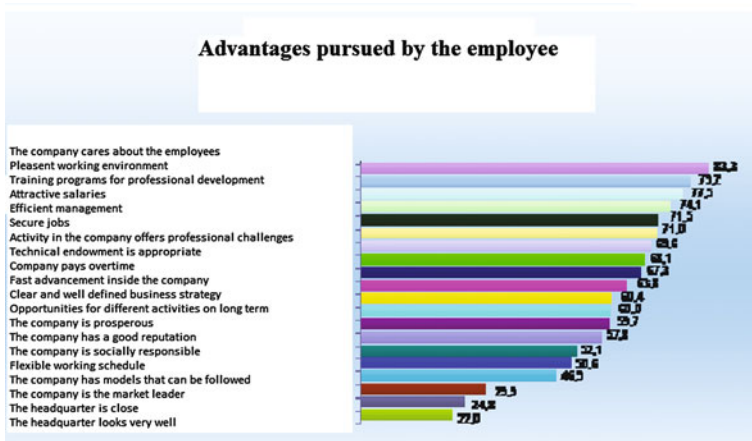


Fig. 12 Advantages pursued by young people at the employer. Source Daedalus Consulting

The mobile phone, the holiday bonuses, catering or covering the expense for lunch or transportation and the fitness club membership are some of the advantages pursued by young persons when they are employed. The most important reason for dissatisfaction is the salary as shown in Fig. 13. The unattractive salary and the opportunities for other jobs will lead to a job change. The lack of perspectives for a professional evolution, and the lack of appreciation from superiors, the tensions in the team and a bad relation with the boss are other reasons for dissatisfaction mentioned by the majority of the people interviewed.

Those who want to change their jobs have similar dissatisfaction reasons (See Fig. 14). Recently, the young professionals seem to be more loyal for their working place, many of them being prepared to work overtime and to receive professional challenges, even if the stress would increase proportional with the responsibilities.

Most young people recognize the importance of having a job during academic studies, even if it is part-time and consider that knowledge is not sufficient in our society if it is not accompanied by connections that could help in the professional advancement. For many young people, the internships, voluntary, extra-curricular activities and the registration in students' organizations are very important and represent a plus of value for the employer. The increase in the selectivity of the young professionals and the orientation toward the academic results is reflected in the decrease in the search methods for a new job. When young people are looking for a job, the most important sources are friends' recommendations and specialized recruiting sites. The most demanded field for young graduates and students are IT, Telecommunications, Banks, Industry, Consulting and also Pharmacy, Food & beverages, and Cosmetics.

The most important objectives of this research were based on the collection of information regarding: opinions on national education system, the assessment of counseling and vocational guidance services, the perception on labor market integration and the professional career.

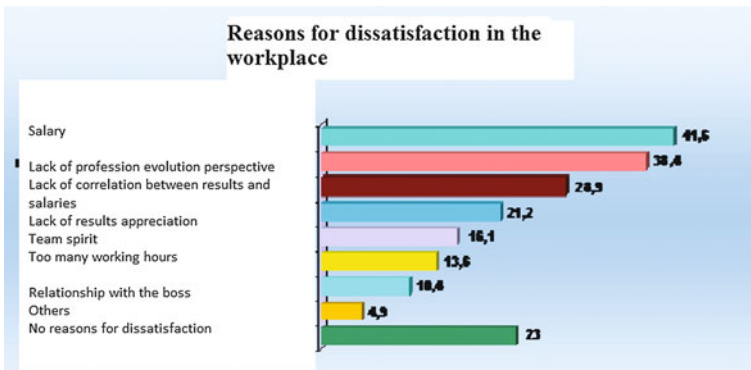


Fig. 13 Reasons of dissatisfaction at the workplace mentioned by the young employees. *Source Daedalus Consulting*

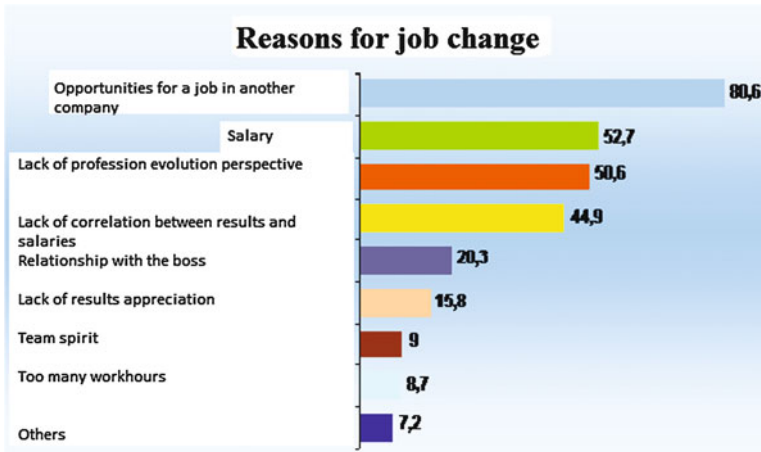


Fig. 14 Reasons for job change. *Source Daedalus Consulting*

By applying the multistage random probability sampling method, 26 universities were selected where last-year university students were interviewed and 70 high schools from the national education system. The specializations chosen were from humanities and technical fields in order to obtain a heterogeneous picture on the researched topics. The sample included 2,047 students and 2,364 high school students.

The analysis of information has shown that the last-year university students and the final-year high school students have an average confidence degree in the national education system. Only one-quarter of the students mentioned that they have a high level of confidence in the Romanian education system. One-third of the high school students mentioned that they have little confidence in the education system.

The last-year university students and the high school students consider that the present education system is not adapted to the requirements of the labor market, only 23.7 % of the students and 12.5 % of the high school students considering that the education system is correlated with the labor market and it offers trained people for the requirements of the labor market.

The participants at this survey, from both subsamples, agree that school has a decisive role in the training of a person, and the education system is one of the most important sources for a professional career. The last-year university students are aware that the access on the labor market will be difficult; therefore, they will face difficulties in finding a job, after graduation. A positive thing is the fact that many persons mentioned that they know what job they will practice after graduation.

For the final-year high school students, the number of those who know the notion of school and vocational guidance is low compared to those who mention not to be aware about the school and vocational guidance. More than half of the

high school students interviewed (55 %) mentioned that they need school and vocational guidance in order to choose their professional path.

Approximately one-third of the students mentioned that in the University of Study, there is a Center for Counseling and Vocational Guidance but only 21 % of this number has contacted the center for being supported in the decisions regarding the educational and professional path.

From the high school students, 66.8 % have mentioned that in their high school, there is a Center for Pedagogical Training for school and vocational guidance but only 16.9 % have contacted this center.

Counseling for choosing studies and future profession is required by last-year university students and final-year high school students. The university students and high school students who have contacted these centers were satisfied regarding the counseling and vocational guidance services.

Most of the high school students have mentioned that they know what kind of job they are going to practice after graduation, considering that the profession chosen is required on the labor market.

From 2,047 last-year university students included in the sample, one-third has a job, 44.6 % performing an activity in the field of study and working in fields like services, production, trade/sales, secretary/administrative.

The most important factors for obtaining a job for the students up to 25 years are the experience in the field, skills acquired during university studies and proper training for interviews and contests. Things are changing for the age 26–30 years, where the most important factors are the skills obtained during university studies, experience in the field and personal relationships.

The image created among the high school students regarding the labor market has shown the fact that the most important aspects in obtaining a job are the skills obtained during studies, experience in the field and proper training for contests and interviews. Personal relationships represent important factors only for 14.2 % of the interviewed persons, while the following of the job advertisements is important for getting a job for 213 high school students.

The last-year university students are convinced that they can find a job in the graduation field. Only those from Arts, Textiles and Industrial Management consider that they will not be able to work in the field after graduation. The percentage of those who are convinced that they will find a job in the specialization field is 6 % and they are from Law, Computer Science and Mathematics, Economic Sciences, Engineering, Sociology, Psychology and Education Science, and Veterinary Medicine. The students who think that they will not find a job in the specialization field are from Economic Sciences, Languages, Law, Engineering, History and Philosophy, Environment Science and Electronics, Telecommunications and IT.

The research has tried to quantify the reasons which determined the interviewed persons to choose the present school path. For the students included in the sample, 49.1 % pursued a certain faculty in order to specialize in the field. In choosing the university fields, the reputation of the university and the requirements of the labor market were important.

For the high school students participating in this survey, parents, teachers, or representatives of educational institutions had an important role in establishing the educational path. Only 2.2 % of the high school students have indicated the school counselor in school and vocational training as the supervisor for choosing the school path, while the percentage recorded among students is only 1.6 %.

The last-year university students declare to be satisfied with the level of knowledge gained during university studies. Students from specializations Civil Navy, Physics, Food Engineering, Tourism and Environment Protection, Dentistry and Wood Engineering. The persons who are not confident about the fact that the specialization pursued can offer a well-paid job are from Theater and Television, Sociology, Psychology and Educational Science, Social Assistance.

Regarding the intentions of students for continuation of studies, the master course is the most desired option. A small percentage of last-year university students choose PhD studies and postdoctoral studies. One-third of the students who wish to continue studies with master courses have the intention in the future to pursue a PhD.

Regarding the intentions of the high school students for the educational path, there is a high interest in attending the faculty and a low interest for post-secondary schools. The high school students should be counseled in order to know the advantages and disadvantages of a faculty compared to a post-secondary school; 90 % of the interviewed persons want to attend the faculty, while 7 % have the intention to attend the post-secondary school.

Of the interviewed high school students, 54.9 % wish to continue studies and to obtain a job after graduation. The search of a job in a foreign country is an option only for 3.9 % of the respondents. The most important advantages of faculty graduation are getting a job easily and acquiring a higher education level.

Most of the students who participated at the survey have mentioned that the priority after graduation is the search of a job and not the continuation of studies. They want first to be employed in order to have financial stability. The option of employing and continuing studies in the same time is proper for 64 % of the respondents. Almost half of the interviewed persons consider that they will probably find a well-paid job (47.8 %), while 11.2 % are convinced about this; 18.1 % of the last-year university students are convinced that they will be employed in the graduation field.

At the sample level, the respondents wish to have a job in the field of study, more than half of the students wishing the continuation of studies in the graduation field.

The high school students included in the sample are in the age group 16–23 years, and 34.5 % come from classes with mathematic profile, 32.1 % come from classes with humanistic profile, and 22.2 % study the technical profile, 71.9 % coming from the urban area. The students participating at the survey are in the age group 20–25 years, 56.2 % are women and 74.2 % come from the urban area.

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Engaging Faculty and Students: A Premise for Excellence in Business Education at Romanian Business School

Sebastian Văduva, Ioan S. Fotea and Mihai Corcea

Abstract This chapter focuses on explaining the importance of the faculty-student encounter in a business school, with a new paradigm of quality management that combines the classical view of human resources management with modern relationship marketing. Utilizing the Human Sigma model, which is a modern relationship management instrument for measuring and aligning the interest of both customers and service providers, we measured the student-faculty encounter at a small Romanian Business School (RBS) in order to enhance the quality of the education. We begin by discussing the importance of quality in education, then we outline the patterns of engagement, and finally, we present our research findings at the RBS.

1 Introduction

The purpose of this chapter is to present and test the Human Sigma model, developed by the Gallup Corporation and utilized by the global service industry, as an appropriate instrument to improve the faculty-student encounter in business education and the overall quality of educational initiatives. The discussion regarding the quality and the cost of education is a hot-topic worldwide, as nations are facing ever-decreasing educational budgets along with ever-decreasing quality

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of graduates. A major concern for many institutions of higher education is the risk of producing unemployed and unemployable individuals; therefore, new and creative solutions are sought after, to both decrease the cost of education and increase its overall quality and satisfaction. Traditionally, education was important for societies in two significant venues: it was a major determinant of the overall macro-development of society and it determined the individual development, career opportunities, and most often his/her own salary.

According to the World Economic Forum and Harvard CID (2002), the quality of a national education system is an excellent indicator of that national development status and perspectives, especially regarding its capacity to innovate, overcome barriers, develop new products or services, establish global organizations, and become competitive in the international environment. One of the main products of higher education is innovation (Sawyer 2006), given the research component of their activity. As Institutions of Higher Education (IHE) have become more efficient and effective, their research has become an important ingredient in the advancement of knowledge and the development of the entire business sectors. Stanford University has famously contributed to the creation of the “Silicon Valley” in the US while Oxford and Cambridge Universities have sprung up a series of start-up companies around themselves in the UK. Many potential solutions to challenges and crises can further be tested in IHE through various social laboratories, social experiments, round-table discussions, and forums.

The second benefit of a quality education system is the creation of an “innovative class”, the modern day elites, individuals who possess the aptitudes and the attitudes necessary to overcome various global crises (Datar et al. 2010). The quality, or lack thereof, in a nation’s education system is further an indicator as to that nation’s ability to either attract or repel new additional talents. If this education system is perceived to be vastly superior at the global level, students from other nations will temporarily migrate toward that nation. Inversely, if a nation’s system is perceived to be of a lesser quality, that nation’s own students may be tempted to leave the country and sometimes never return. Finally, a nation’s education system is also a contributor to the overall quality of individual life and level of satisfaction that can be measured through degree-based accomplishments and career development of individuals (Mruk 2006).

2 The Specifics of Educational Services

Educational services, however, do differ from other service industries such as hospitality, banking, or software development and those differences along with their particular context must be properly understood. There are at least four distinct differences that we will briefly outline in this section.

First, since educational services entail knowledge and innovation, not just information, the process of education tends to be slightly different from other

services. Information, the main ingredient of other service industries, can be encapsulated in a book, a website, a video, or a policy manual that can be detached and impersonal. In contrast, knowledge, wisdom, or discernment are always embodied in a person and can not easily be detached from the service provider. Given the personal and subjective nature of the service provider, IHE must manage the process quite differently and focus simultaneously to the service provider (professor) and the customer (student). According to Drucker (2005), this poses new challenges and opportunities not only to the traditional IHE, but also to traditional commercial firms who now must concern themselves with continuous education and life-long learning.

The *second* distinction is the high level of government involvement, regulation, and funding that exist in the educational sector. To begin with, most nations oscillate between making higher education a free right to their citizens or a privilege for those who can privately afford to pay for it. Further, the levels of reactive and/or proactive accreditations varies, raging from innovative systems in nations such as Singapore and Israel all the way to reactive and sometimes obsolete regulations in parts of Eastern Europe and South America (McLendon et al. 2006).

Third, given their non-profit nature, IHE are not subject to free-market competition in the short run; therefore, they tend to view themselves as insulated from global competition and operating in a near-monopoly situation, having a captive market. This tends to alleviate their sense of urgency and often may lead to down-right dismissal of any and all negative feedback coming either from their customers or society at large (Fife 2003). Considering the inherent and traditional position of IHE as repository or knowledge and guardians of civilization, the necessity of improvement or even of evaluation may be difficult to accept and internalize.

Fourth, there is an increase pressure on IHE to move away from their traditional and non-quantifiable role of promulgating knowledge, civilization, and national culture, toward a pragmatic and measurable provision of educational services (Scott 2006). Furthermore, there are a number of voices that advocate a “de-nationalization” of universities and a uniformity of the educational act able to service the global community of student and knowledge workers.

Nevertheless, given these constrains, pressures, and distinctions, IHE must increase their overall quality and global competitiveness (Rath and Harter 2010). As previously outlined, any improvement in a nation’s university system will, in the long run, yield significant improvement in the quality of the economy and the lives of citizens; therefore, quality improvement seems to be making its way to the top of the university administrators’ agenda (McNay 2006). Any and all improvements in the quality of the educational act have far-reaching implications as the beneficiaries are globally located and readily interconnected through modern communication technology.

Considering the importance and the far-reaching consequences of quality in IHE, there have been significant attempts to improve it and raise the overall level of satisfaction and productivity. Previously, there have been attempts to transplant

management, marketing, and quality assurance programs from the manufacturing sector into the educational sector, but they failed to provide significant improvement in the overall quality (Fleming and Asplund 2007; Bandyopadhyay and Lichtman 2007). These manufacturing systems were not equipped to take into account human relations and the irrationality and unpredictability of human behavior and interaction.

The Human Sigma model, developed by the Gallup organization, is the result of transdisciplinary research that combines objective quality measurements with relationship and human resource management. The results go beyond the measurement of “satisfaction” and into the level of “engagement” and passionate advocacy. This model proposes a fundamental paradigm shift away from an institutional-centered or student-centered approach toward a 360° evaluation of efficient relationships management (Pompper 2006; Gummesson 2008).

3 Organizational Engagement

The Enterprise Engagement Alliance is an outlet for the academic and practicing study of engagement management, which is a transdisciplinary study that aims at accomplishing long-term financial goals through the strategic alignment of the interest of all stakeholders and their interactions. Engaged organizations have the commitment to objective standards of behavior that are transparently and timely communicated throughout the whole organization and then measured with adequate feedback provided to all. Engagement manifests a high regard toward building trust-based relationships, developed mainly through standardization and process fairness (Fleming and Asplund 2007). Organizational trust is predicated upon three distinct elements: operational competence, benevolence, and problem-solving orientation (Sirdeshmukh et al. 2002). The desired outcome of engagement efforts is the stakeholder satisfaction that can then lead to long-term organizational loyalty. According to Olsen (2002), “satisfaction is a predisposition to unconsciously choose after comparing alternatives”. A satisfied customer becomes loyal to the organization that services him, increasing that organization’s long-term gain.

Fleming and Asplund (2007) moved beyond the traditional satisfaction and loyalty and onto engagement, which they define as “passionate advocacy by both employees and customers”. Their main contribution was to study the satisfaction of both employees and customers simultaneously, departing from the traditional view that an organization had to choose between satisfying either its customers or its employees. In engagement programs, the short-term feelings of both employees and customers are measured, underpinned by the belief that their satisfaction will lead to long-term retention. Among the companies that have adopted such a perspective on managing their business are Astra Zeneca, McDonald’s, and Southwest Airlines. There are four dimensions for employee engagement and four dimensions for customer engagement that are measured and managed under engagement programs. They are as follows:

Employee engagement

No.	Dimension	Description
1.	What do I get?	Perception of the level by which the company supports the employee regarding the technical needs s/he has in order to efficiently fulfill the job
2.	What do I give?	Perception of the measure of her/his value to the company as well as the importance of the job he or she does
3.	How much do I belong?	Perception of the level of her/his integration in the company's workforce environment
4.	How do we develop?	Perception of the number of personal development opportunities understanding whether the job he is doing is part of a greater process that aims first at his own professional development

Source Fleming and Asplund 2007

Customer engagement

No.	Dimension	Description
1.	Trust	how the client perceives the company in terms of keeping its promises every time, by offering a standardized and predictable service
2.	Integrity	The level by which the customer perceives the organization's standards
3.	Pride	The measure of respect perceived by the customer
4.	Passion	the supreme manifestation of feelings that a customer can have toward a company

Source Fleming and Asplund 2007

Our contribution to the current quality in higher education debate has been to apply the principles of engaged organization in general and the Human Sigma evaluation system in particular to IHE and the process of knowledge generation. Our belief is that just like their private sector counterparts, universities can benefit from being more engaged with their stakeholders, an engagement that will, in the long run, yield a higher quality of individuals and societies.

4 Case Study: Improving Excellence in Business Education at Romanian Business School

We conducted a Human Sigma evaluation during the month of May 2010 on a small Romanian business school that for anonymity purposes we will simply call "RBS". This IHE was selected based on the fact that it possessed an entrepreneurial leadership, was eager to increase its quality offering, was interested in improving its competitiveness, and was open to adapt to modern realities. The business school is a private, religious organization, located in the north-western Romania and is fully accredited by the Romanian Minister of Education and its accreditation body ARACIS. The college has 30 students in its graduate program and 85 in the undergraduate program tailored according to

the standards set by the European Union Bologna process. The institution features guest lecturers from renowned US and UK higher education institutions, which makes it distinctive to other institutions. The “RBS” is a recently founded college that just delivered its tenth generation of graduates.

Romanian Business School faculty observed that, though enrollment in the undergraduate program grew by 55 % in 2007 and by 34 % in 2008, there were difficulties regarding student retention in its newly launched Master program. Its undergraduate alumni are very well regarded in the business community and employers consider that RBS has reached excellence in the education process. Given this context, our study set out to investigate the overall engagement of the RBS stakeholders and the rationale for the low customer retention and service repurchase of the Master program. Because there were no symptoms of dysfunction in the organizational culture, the faculty built traditional instruments to periodically assess student satisfaction toward the learning experience. Such traditional instruments did not reveal concluding information regarding the levels of engagement that would translate into student retention.

We developed a questionnaire based upon the Gallup Human Sigma that was administered to 71 undergraduate students and 17 faculty members. The analysis allowed the assessment of the level of RBS enterprise engagement, which showed that the apparent positive organizational culture in the context of low customer retention was the top of an iceberg of symptoms below the surface (Buckingham and Coffman 2005). The research involved the entire population of employees (faculty) and clients (students), with the remark that there were three types of clients: clients I—first year (freshmen), clients II—second year, and clients III—third year (senior). The results showing employee engagement is represented in Tables 1 and 2.

The results reveal the fact that the most disengaged customers were the third-year students, while the most engaged students were the first-year students. The highest most variation among the engagement level of students was

Table 1 RBS employees’ (professors) engagement. (on a scale from 1 to 5, with 5 being excellent)

Q. nr.	Engagement dimension	Score
1	What do I get?	4.25
2	What do I get?	4.12
3	What do I give?	4.31
4	What do I give?	3.62
5	What do I give?	4.56
6	What do I give?	4.81
7	Belong	4.12
8	Belong	4.68
9	Belong	4.56
10	Belong	4.43
11	Develop	3.93
12	Develop	4.25
<i>Average</i>		<i>4.30</i>

Table 2 RBS customers’ (students) engagement. (on a scale from 1 to 5, with 5 being excellent)

Q. nr.		Clients I	Clients II	Clients III
1	Global satisfaction	4.45	4.08	4.12
2	Repurchase	3.09	1.96	2.24
3	Referral	4.36	4.21	4.36
4	Confidence	4.45	4.17	4.28
5	Confidence	4.32	3.79	3.88
6	Integrity	4.14	4.17	4.12
7	Integrity	4.00	4.13	4.32
8	Pride	4.27	4.25	4.64
9	Pride	4.45	4.21	4.52
10	Passion	3.95	3.79	4.44
11	Passion	2.64	2.92	3.44
<i>Average</i>		<i>4.01</i>	<i>3.79</i>	<i>4.03</i>

Table 3 RBS engagement and standard deviation

	Had an engagement score of over 4.5 (%)	Standard deviation of mean engagement level
Employees	31.25	0.441
Clients I	31.81	0.871
Clients II	16.66	0.614
Clients III	16.00	0.499

The Human Sigma metric was calculated using the formula (Fleming et al. 2005):

$$HS = \sqrt{(E\text{percentile} * C\text{percentile}) * \left(\frac{\text{percentileMAX}}{\text{percentileMIN}}\right)^{0.125}}$$

among first-year clients, and the least variation was among employees. The percentage of clients who had a mean level of engagement of more than 4.5 from the students who spent 3 years within RBS is almost half of the first-year students, and considering the lower standard deviation we can conclude that the third-year students are overall less engaged with RBS than the first-year students. Table 3.

The Human Sigma score obtained from the above formula was 0.60388 (in other words, the overall engagement is at the 60.388th percentile). This result shows that the variation of engagement between the employees and the clients is quite high, and the unit is not optimized from this point of view.

5 Conclusions

The quality of education and the quality of the institutes of higher education are issues of vital importance for the future of any nation. Education generates innovation, and innovation is a major contributor to the national prosperity and the

quality of life in a country. Given the current austerity environment, when national budgets are slashed across the board, any and all improvements in the education environment are necessary.

Even if there are significant differences between the educational sector and its private service providers counterparts, there are valuable innovations to be considered. Engaged organizations can provide a possible blueprint for productive, more innovative organizations into the future and IHE should evaluate some of their initiatives, regardless of whether utilizing engagement instruments such as the Human Sigma, universities are exploring objective quality measurement mechanisms.

Our study, to the best of our knowledge, is the first application of the Human Sigma evaluator to an institution of higher education in Romania and sets out to do exactly that. Unfortunately, being the first time that the RBS has applied such a measurement, we do not have historical data to compare it with, yet we intend to revisit this issue in subsequent years and observe whether any improvement has taken place based upon our study.

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Using Fuzzy Models in Managerial Decision

Dorin Lixăndroiu and Radu Lixăndroiu

Abstract Decision-making plays an important part in management and business. There are numerous systematic methods and models which provide assistance in the decision-making process. Classical fuzzy sets (the concept of Fuzzy Set was introduced by Zadeh in 1965) and intuitionistic fuzzy sets (a concept introduced by Atanasov in 1986) represent powerful tools in modeling complex phenomena which exhibit shades of difference and involve imprecise information. The paper presents two algorithms for the consultation process using the Delphi Method and several algorithms for multi-attribute decision models, modified for attributes values given under the form of FS and/or IFS. The devised algorithms are analyzed comparatively using numeric examples.

1 Introduction

Decision-making plays an important part in management and business. The assistance provided to the decision-making activity by means of systematic methods and models for analyzing decisions is imposed by the limits of the human decision-maker. Filip (2002) presents the main types of limits generally valid:

- *cognitive* limits linked to the manager's limited capacity to store and process information and knowledge;
- *economic* limits linked to the cost involved in obtaining and processing information;

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- *time* limits revealed in the low and faulty quality of certain decisions taken under time pressure in a competitive environment.

These limits are generally amplified by the characteristics of the economic environment. Decision-making is a difficult process due to incomplete elements and scanty information. Most of the real-world situations involve multi-attribute decision-making, which occurs when the choice of an alternative or action plan is accomplished with the decision-maker having to consider several objectives simultaneously. The objectives are different in nature and can be in contrast to one another. Managers face numerous and contradictory multi-attribute decision problems: making as high profits as possible, minimizing costs and risks, for example, in investment processes, when selecting human resources or choosing markets. Another important class of multi-attribute decision problems can be encountered in the political decision-making. That takes into account both the society's and the citizens' public interests, as well as that of interest groups or of the decision-makers' personal objectives. In this respect, we can exemplify the application for a public function, accomplishing alliances, or mergers between political parties, setting fiscal policies, setting policies for stimulating certain economic sectors (Filip 2002). These decision-making situations lead to problems with a limited number of discrete alternatives. In many situations, the evaluation of attributes cannot be accomplished precisely, which requires the development of models based on fuzzy sets.

In 1965, Zadeh first introduced the theory of fuzzy sets. Later on, many researchers have been working on the process of dealing with fuzzy decision-making problems by applying the fuzzy sets theory.

2 Preliminaries

In Zadeh (1965), a fuzzy set is defined as follows: Let $X = \{x_1, x_2, \dots, x_n\}$ be a universe of discourse, a fuzzy set A is characterized by a membership function $\mu_A : X \rightarrow [0, 1]$, which associates to each element $x_j \in X$, the degree of membership $\mu_A(x_j)$,

$$A = \{(x_j, \mu_A(x_j)), x_j \in X\} \quad (1)$$

In the particular case, when μ_A only takes the values 0 or 1, the fuzzy set A is a classical subset of X .

The definition of fuzzy sets clarifies the distinction between random and fuzzy: the random phenomenon is the result of uncertainty regarding the membership or non-membership of an object to a class; in a fuzzy phenomenon, there are several intermediate degrees of membership, set between full membership and non-membership.

Let $e_i = (x_i, \mu_A(x_i))$ and $e_j = (x_j, \mu_A(x_j))$ be two fuzzy elements from fuzzy set A . We say

$$e_i < e_j \text{ if } \mu_A(x_i) < \mu_A(x_j) \tag{2}$$

An intuitionist fuzzy set (IFS) A in X is (Atanasov 1986):

$$A = \{ (x_j, \mu_A(x_j), \nu_A(x_j)), x_j \in X \} \tag{3}$$

which is characterized by a membership function μ_A and a non-membership function ν_A , where

$$\mu_A : X \rightarrow [0, 1], \quad x_j \in X \rightarrow \mu_A(x_j) \in [0, 1] \tag{4}$$

$$\nu_A : X \rightarrow [0, 1], \quad x_j \in X \rightarrow \nu_A(x_j) \in [0, 1] \tag{5}$$

on condition that

$$\mu_A(x_j) + \nu_A(x_j) \leq 1, \text{ for all } x_j \in X$$

For each IFS A in X , if

$$\pi_A(x_j) = 1 - \mu_A(x_j) - \nu_A(x_j) \tag{6}$$

then $\pi_A(x_j)$ is called the *degree of indeterminacy* of x_j to A .

If $\pi_A(x_j) = 1 - \mu_A(x_j) - \nu_A(x_j) = 0$, for each $x_j \in X$ the IFS A is reduced to a fuzzy set (Xu 2007a).

Xu (2007b) calls $\alpha = (\mu_\alpha, \nu_\alpha)$ —*intuitionistic fuzzy number (IFN)*, where $\mu_\alpha \in [0, 1]$, $\nu_\alpha \in [0, 1]$ and $\mu_\alpha + \nu_\alpha \leq 1$. We define

the *score* of α :

$$s(\alpha) = \mu_\alpha - \nu_\alpha \text{ where } s(\alpha) \in [-1, 1] \tag{7}$$

- the *degree of accuracy* of the IFN α :

$$h(\alpha) = \mu_\alpha + \nu_\alpha \text{ where } h(\alpha) \in [0, 1] \tag{8}$$

Let $s(\alpha_1) = \mu_{\alpha_1} - \nu_{\alpha_1}$ and $s(\alpha_2) = \mu_{\alpha_2} - \nu_{\alpha_2}$ be the *scores* of α_1 and α_2 , respectively, and let $h(\alpha_1) = \mu_{\alpha_1} + \nu_{\alpha_1}$ and $h(\alpha_2) = \mu_{\alpha_2} + \nu_{\alpha_2}$ be the *accuracy degrees* of α_1 , and α_2 , respectively, then define (Xu 2007b):

$$\alpha_1 < \alpha_2 \text{ if } s(\alpha_1) < s(\alpha_2) \text{ or}$$

$$\text{if } s(\alpha_1) = s(\alpha_2) \text{ and } h(\alpha_1) < h(\alpha_2) \tag{9}$$

$$\alpha_1 = \alpha_2 \text{ if } s(\alpha_1) = s(\alpha_2) \text{ and } h(\alpha_1) = h(\alpha_2) \tag{10}$$

this obviously involves $\mu_{\alpha_1} = \mu_{\alpha_2}$ and $\nu_{\alpha_1} = \nu_{\alpha_2}$.

3 Applying Fuzzy Techniques in the Delphi Method

The *Delphi Consultation Method* was developed in the years 1964–1965 by O. Helmer from the Rand Corporation of Santa Monica. It is a group technique that is successfully applied in the areas of management and marketing decision-making. The *Delphi Method* has emerged as a better method compared to the *committee method* which involves several rounds of discussions for choosing a solution. It has been noted that oratorical gifted people, those with particular scientific reputation, succeed in imposing their opinion even if there are also better solutions. There is also almost general apprehension to admit that one's view can change from one round to the next.

The *Delphi Consultation Method* is successfully applied in the following situations (Linstone and Turoff 2002; Dick 2000; Turoff 2002).

- The problem does not require precise analytical techniques, but it can benefit from subjective collective judgments;
- People involved in the analysis of complex problems do not have a record of adequate communication and may represent diverse backgrounds in terms of experience and expertise;
- The number of people consulted is greater than the number allowing for effective face to face interaction;
- The animosity between the participants is so serious that the communication process must be mediated and/or anonymity needs to be ensured; the participants' heterogeneity must be maintained with a view to ensuring the validity of results, which means that domination by quantity or by strength of personality should be avoided.

The *Delphi Method* involves the following iterative process:

- Step 1. The problem must be defined. The group of experts is chosen in the field encompassing the problem discussed (they will be consulted separately and independently). The questionnaire is prepared and distributed.
- Step 2. The questionnaire responses are analyzed. The information obtained, which is subjective, is statistically analyzed. The results are communicated to group members.
- Step 3. Group members analyze the results and make new estimates, providing explanations for those opinions that differ significantly from the other participants'.

The process defined by *Steps 2 and 3* is repeated until the responses are stabilized, that is, they converge to a reasonable solution in terms of management. Thus, the technique allows experts to tackle a complex problem in a systematic way. From one stage to another, the relevant information is communicated and group members are further instructed. In this way, recommendations can be provided based on more complete information.

In Bojadziev and Bojadziev (1995), a method is proposed for analyzing the information provided by the target group, given a questionnaire whose answers are quantitative (numerical). The method consists in providing answers by means of fuzzy numbers.

A fuzzy number A is defined by the associated function $f_A(x)$, which has the domain of definition $A = [a_1, a_2] \subset R$ with $f_A(x) \in [0, 1]$:

$$f_A(x) = \begin{cases} \frac{x - a_1}{a_M - a_1}, & \text{if } a_1 \leq x \leq a_M \\ \frac{x - a_2}{a_M - a_2}, & \text{if } a_M \leq x \leq a_2 \\ 0, & \text{otherwise} \end{cases} \quad (11)$$

Suppose that for an uncertain value, the lowest and highest possible value can be specified, that is, the medium range $A = [a_1, a_2]$. If, in addition, the most probable value, a_M , can be specified, then the maximum will be the point $(a_M, 1)$. Having the three values, the triangular fuzzy number (a_1, a_M, a_2) can be built and the associated function can be defined (11).

The application of the fuzzy technique in the *Delphi Method*, for quantitative answers (numeric), consists of the following steps (Bojadziev and Bojadziev 1995):

Algorithm 1 (*Delphi FS-1*)

Step 1. The experts E_i , $i = 1, 2, \dots, n$, are interviewed about the realization of an event (e.g., estimating the duration of an activity for applying the critical path method in project management, forecasting a financial measure—inflation rate).

The data are provided by each expert E_i under the form of triangular fuzzy numbers:

$$A^{(i)} = (a_1^{(i)}, a_M^{(i)}, a_2^{(i)}), \quad i = 1, 2, \dots, n$$

Step 2. The average value A_m is calculated for the n fuzzy numbers $A^{(i)}$ estimated:

$$A_m = (m_1, m_M, m_2) = \left(\frac{1}{n} \sum_{i=1}^n a_1^{(i)}, \frac{1}{n} \sum_{i=1}^n a_M^{(i)}, \frac{1}{n} \sum_{i=1}^n a_2^{(i)} \right) \quad (12)$$

Each expert will receive back the differences:

$(m_1 - a_1^{(i)}, m_M - a_M^{(i)}, m_2 - a_2^{(i)})$ and the distance

$$d(A^{(i)}, A_m) = \frac{1}{2} \left\{ \max(|m_1 - a_1^{(i)}|, |m_2 - a_2^{(i)}|) + |m_M - a_M^{(i)}| \right\} \quad (13)$$

Step 3. After analyzing the data received, each expert will provide a new triangular fuzzy number:

$$B^{(i)} = (b_1^{(i)}, b_M^{(i)}, b_2^{(i)}), \quad i = 1, 2, \dots, n$$

The distance between the two fuzzy numbers A_m and B_m is calculated using relation (13).

Step 2 is resumed until the successive evaluations of the means A_m, B_m, \dots are stabilized, that is, the distance between 2 successive terms is less than the required value ε , that is, $d(A_m, B_m) \leq \varepsilon$.

Numerical Example

A group of 12 experts are consulted to estimate the time needed for accomplishing an objective (in months).

The triangular fuzzy numbers provided $A^{(i)}, i = 1, 2, \dots, 12$ are given in Table 1.

A_m is evaluated according to relation (12) and distance $d(A^{(i)}, A_m), i = 1, 2, \dots, 12$, according to relation (13). It can be noticed that the opinions of experts $E4, E5, E6$ are the most remote from the mean value A_m obtained in the first iteration. Table 2 shows the triangular fuzzy numbers

Table 1 Triangular fuzzy numbers

Expert	a_1	a_M	a_2	$d(A^{(i)}, A_m)$
E1	36	40	50	5.375
E2	40	45	60	2.375
E3	36	48	60	3.625
E4	48	60	72	15.625
E5	36	36	36	14.375
E6	38	40	42	9.375
E7	38	48	58	2.625
E8	36	42	48	5.375
E9	40	52	60	5.625
E10	48	48	60	5.875
E11	36	36	60	6.875
E12	36	48	60	3.625
A_m	39.00	45.25	55.50	

Table 2 Triangular fuzzy numbers reviewed and proposed

<i>Expert</i>	b_1	b_M	b_2	$d(B^{(i)}, B_m)$
<i>E1</i>	36	44	48	3.875
<i>E2</i>	40	45	55	1.292
<i>E3</i>	36	48	60	4.125
<i>E4</i>	45	55	60	8.125
<i>E5</i>	36	38	40	10.875
<i>E6</i>	38	40	50	4.875
<i>E7</i>	38	48	58	3.125
<i>E8</i>	36	42	48	4.875
<i>E9</i>	40	52	60	6.125
<i>E10</i>	40	48	60	4.125
<i>E11</i>	36	40	50	4.875
<i>E12</i>	36	48	60	4.125
B_m	38.08	45.66	54.08	

reviewed and proposed by the experts after the analysis of the received data $B^{(i)} = (b_1^{(i)}, b_M^{(i)}, b_2^{(i)})$, $i = 1, 2, \dots, n$. It can be noticed that (*E3*, *E7*, *E8*, *E9*, *E12*) have not changed their opinions, and others (*E1*, *E2*, *E6*) have made minor changes.

Being given that, according to (13), $d(A_m, B_m) = 0.915$, the manager can stop the decision-making process and accept B_m .

In the case of problems with qualitative (non-numeric) formulations, we suggest the use of fuzzy sets, as a Fuzzy technique in the Delphi Method, to define the membership to a certain class (property). This assumes the completion of the following steps:

Algorithm 2 (*Delphi FS-2*)

Step 1. The experts E_i , $i = 1, 2, \dots, n$, have been interviewed with regard to the degree of membership of an element to a particular propriety A. The data are provided by each expert E_i , and they will represent a fuzzy set: $A = \{(E_i, \mu_A(E_i)) | i = 1, 2, \dots, n\}$

Step 2. The average value of the set A items is estimated as follows:

$$\bar{A} = \left(\frac{1}{n} \cdot \sum_{i=1}^n \mu_A(E_i) \right) \tag{14}$$

Each expert will receive back the average value \bar{A} and the difference:

$$d_i = |\bar{A} - \mu_A(E_i)| \tag{15}$$

Step 3. After analyzing the data received, each expert will provide a new membership function $\mu_B(E_i)$. The data are provided by each expert E_i and they will form a new fuzzy set B :

$$B = \{(E_i, \mu_B(E_i)) | i = 1, 2, \dots, n\}$$

We calculate a similarity measure based on the set-theoretic approach (Xu 2007a).

We note $\pi_A(E_i) = 1 - \mu_A(E_i)$

$$S(A, B) = \frac{\sum_{i=1}^n (\min(\mu_A(E_i), \mu_B(E_i)) + \min(\pi_A(E_i), \pi_B(E_i)))}{\sum_{i=1}^n (\max(\mu_A(E_i), \mu_B(E_i)) + \max(\pi_A(E_i), \pi_B(E_i)))} \tag{16}$$

If $S(A, B)$ is close to 1, for example $0.85 \leq S(A, B) \leq 1$, it can be considered that the evaluations obtained are similar and the consultation process by means of the *Delphi Method* is over. Otherwise, the process continues to *Step 2* and a new consultation of the expert group.

Numerical Example

The same group of 12 experts is consulted to estimate the degree of membership of an element to a particular property A . For example, given the economic crisis, property A can be defined as *Compliance with the rules set by the European Union to reduce budget deficit*. The results of consulting the economic experts about a particular country from the European Union are shown in Table 3. \bar{A} and d_i are evaluated,

Table 3 Results of consulting the economic experts

Expert	μ_A	π_A	d_i
E_1	0.60	0.40	0.00
E_2	0.55	0.45	0.05
E_3	0.65	0.35	0.05
E_4	0.40	0.60	0.20
E_5	0.70	0.30	0.10
E_6	0.60	0.40	0.00
E_7	0.80	0.20	0.20
E_8	0.55	0.45	0.05
E_9	0.60	0.40	0.00
E_{10}	0.70	0.30	0.10
E_{11}	0.30	0.70	0.30
E_{12}	0.75	0.25	0.15
\bar{A}	0.60		

Table 4 The new values of the membership function to the property studied

<i>Expert</i>	μ_B	π_B	d_i
<i>E1</i>	0.60	0.40	0.0083
<i>E2</i>	0.60	0.40	0.0083
<i>E3</i>	0.65	0.35	0.0583
<i>E4</i>	0.50	0.50	0.0917
<i>E5</i>	0.65	0.35	0.0583
<i>E6</i>	0.60	0.40	0.0083
<i>E7</i>	0.65	0.35	0.0583
<i>E8</i>	0.55	0.45	0.0417
<i>E9</i>	0.60	0.40	0.0083
<i>E10</i>	0.60	0.40	0.0083
<i>E11</i>	0.45	0.55	0.1417
<i>E12</i>	0.65	0.35	0.0583
\bar{B}	0.5917		

according to relations (14) and (15) and experts are notified. After evaluating, they will pass on the new values of the membership function to the property studied (Table 4).

The similarity measure $S(A, B)$ is calculated, according to the relation (16):

$$S(A, B) = \frac{11.30}{12.70} = 0.8897$$

and so, the consultation process using the *Delphi Method* can be considered finished.

4 Applying Fuzzy Techniques in Multi-Attribute Decision Models

We consider a classical multi-attribute decision problem. Let

$A = \{A_1, A_2, \dots, A_m\}$ —be the alternatives set

$C = \{C_1, C_2, \dots, C_n\}$ —be the characteristics (attributes) set

$w = \{w_1, w_2, \dots, w_m\}$ —be the attributes weight for each characteristic,

where $w_i \geq 0, \quad i = 1, 2, \dots, m$ and $\sum_{i=1}^m w_i = 1$.

The vector w of the weights reflects the relative importance given to each characteristic (attribute). Xu (2007b) presents several methods for setting the attributes weights in the case of multi-attribute decision models based on *IFS* with several decision-makers.

The classical problem of multi-attribute decision-making resides in ranking the alternatives set taking into account the characteristics (attributes) set, considering the weights associated to each characteristic.

4.1 Determining the Weights

The algorithm (Lixăndroiu 2011b) presented in what follows with a view to determining an aggregated system of weights relies on the model proposed by (Hung and Chen 2009), which aimed at determining the objective weights of the attributes using the concept of Shannon’s entropy, and on the model proposed by (Li and Yang 2003), for optimizing the values of the weights proposed by the decision-maker (subjective weights).

In 1972 De Luca and Termini defined a non-probabilistic entropy formula of a fuzzy set based on Shannon’s entropy function:

$$E_{LT}(A) = -k \sum_{i=1}^n [\mu_A(x_i) \ln \mu_A(x_i) + (1 - \mu_A(x_i)) \ln(1 - \mu_A(x_i))] \quad (17)$$

Vlachos and Sergiadis in 2007 defined a measure for the intuitionist fuzzy entropy:

$$E_{LIT}^{IFS}(A) = -\frac{1}{n \cdot \ln 2} \sum_{i=1}^n [\mu_A(x_i) \ln \mu_A(x_i) + \nu_A(x_i) \ln \nu_A(x_i) + (1 - \pi_A(x_i)) \ln(1 - \pi_A(x_i)) - \pi_A(x_i) \ln 2] \quad (18)$$

Algorithm 3

Step 1. Input:

m-number of alternatives

n-number of attributes (characteristics) for each alternative

$$A_i = \{ \langle C_j, \mu_{A_i}(C_j), \nu_{A_i}(C_j) \rangle, C_j \in C \}, \quad i = 1, 2, \dots,$$

m-attribute values for the *m* alternatives represented by *IFSs*; μ represents the degree of membership, while ν represents the degree of non-membership of the alternatives A_i to the attribute (characteristic) C_j

$\{ (\rho_j, \tau_j), j = 1, 2, \dots, n \}$ -the weights given by the decision-maker for the *n* attributes represented by *IFSs*

Step 2. Let $\pi_{ij} = 1 - \mu_{ij} - \nu_{ij}, i = 1, 2, \dots, m, j = 1, 2, \dots, n$

$$w'_j = \rho_j, j = 1, 2, \dots, n$$

$$w''_j = \rho_j + \tau_j, j = 1, 2, \dots, n$$

We note $(wo_1, wo_2, \dots, wo_n)$ -the optimized weights of the attributes; they are obtained as a solution of the following linear programming problem:

$$\max \left\{ z = \sum_{j=1}^n \sum_{i=1}^m \pi_{ij} \cdot wo_j \right\} \tag{19}$$

under the restrictions

$$\left\{ \begin{array}{l} w'_j \leq wo_j \leq w''_j, j = 1, 2, \dots, n \\ \sum_{j=1}^n wo_j = 1 \end{array} \right.$$

Step 3. We calculate according to (18):

$$E_{LT}^{IFS}(C_j) = -\frac{1}{m \cdot \ln 2} \sum_{i=1}^m [\mu_{ij}(C_j) \ln \mu_{ij}(C_j) + \nu_{ij}(C_j) \ln \nu_{ij}(C_j) + (1 - \pi_{ij}(C_j)) \ln(1 - \pi_{ij}(C_j)) - \pi_{ij}(C_j) \ln 2] \tag{20}$$

where $j = 1, 2, \dots, n$, and the constant $\frac{1}{m \cdot \ln 2}$ ensures $0 \leq E_{LT}^{IFS}(C_j) \leq 1$.

Step 4. The degree of divergence (d_j) of the average intrinsic information provided by the corresponding performance ratings on criterion C_j can be defined as (Hung and Chen 2009):

$$d_j = 1 - E_{LT}^{IFS}(C_j), j = 1, 2, \dots, n \tag{21}$$

Step 5. The *entropy weight* of the attribute C_j is

$$we_j = \frac{d_j}{\sum_{j=1}^n d_j}, j = 1, 2, \dots, n \tag{22}$$

Step 6. The *aggregate weight value* of the attribute C_j is

$$W_j = \frac{wo_j \cdot we_j}{\sum_{j=1}^n wo_j \cdot we_j}, j = 1, 2, \dots, n \tag{23}$$

Output: values of the aggregated weights (W_1, W_2, \dots, W_n) . *STOP*

Numerical Example

We consider a multi-attribute decision problem with $m = 4$ alternatives $\{A_1, A_2, A_3, A_4\}$ and $n = 3$ attributes (characteristics) $\{C_1, C_2, C_3\}$. The values of the attributes for each alternative are presented under the form of *IFS*.

Step 1. *Input: $m = 4, n = 3$*

$$\begin{aligned} A_1 &= \{ \langle C_1, 0.75, 0.10 \rangle, \langle C_2, 0.45, 0.50 \rangle, \langle C_3, 0.60, 0.30 \rangle \} \\ A_2 &= \{ \langle C_1, 0.50, 0.30 \rangle, \langle C_2, 0.65, 0.10 \rangle, \langle C_3, 0.70, 0.20 \rangle \} \\ A_3 &= \{ \langle C_1, 0.80, 0.10 \rangle, \langle C_2, 0.55, 0.20 \rangle, \langle C_3, 0.50, 0.10 \rangle \} \\ A_4 &= \{ \langle C_1, 0.70, 0.20 \rangle, \langle C_2, 0.80, 0.05 \rangle, \langle C_3, 0.40, 0.45 \rangle \} \end{aligned}$$

The importance of the criteria is given by the weight vector presented under the form of *IFS*:

$$\{ \langle 0.25, 0.25 \rangle, \langle 0.30, 0.50 \rangle, \langle 0.35, 0.60 \rangle \}$$

Step 2. We solve the linear programming problem (19) with the software package *Quantitative Management*:

$$\max \{ 0.55 \cdot w_{o1} + 0.70 \cdot w_{o2} + 0.75 \cdot w_{o3} \}$$

under the restrictions

$$\begin{cases} 0.25 \leq w_{o1} \leq 0.75 \\ 0.30 \leq w_{o2} \leq 0.50 \\ 0.35 \leq w_{o3} \leq 0.40 \\ w_{o1} + w_{o2} + w_{o3} = 1 \end{cases}$$

We obtain the optimized values of the weights:

$$w_{o1} = 0.25 \quad w_{o2} = 0.35 \quad w_{o3} = 0.40$$

Step 3. The entropy values for the attributes, according to (20), are as follows:

$$E_{LT}^{IFS}(C_1) = 0.7337, \quad E_{LT}^{IFS}(C_2) = 0.7437, \quad E_{LT}^{IFS}(C_3) = 0.8755$$

Step 4. The degree of divergence for the attribute, according to (21), is as follows:

$$d_1 = 0.2663, \quad d_2 = 0.2563, \quad d_3 = 0.1245$$

Step 5. The *entropy weight* for the attribute, according to (22), is as follows:

$$we_1 = 0.4115, \quad we_2 = 0.3961, \quad we_3 = 0.1924$$

Step 6. The *aggregate weight values* for the attributes, according to (23), are as follows:

$$W_1 = 0.3230, \quad W_2 = 0.4353, \quad W_3 = 0.2417$$

The algorithm for calculating the weights of the attributes combines objective weights, based on the entropy of intuitionist fuzzy sets, with subjective weights given as intuitionist fuzzy sets. These subjective weights are first adjusted (optimized) according to the intuitionistic fuzzy decision matrix. Then, the final hierarchy of the decision-making alternatives may be obtained by applying different models.

In what follows, two models of multi-attribute decision-making using fuzzy techniques are presented.

4.2 The Diameter Method

The *Diameter Method* is a direct method which accomplishes the ranking of alternatives considering the homogeneity of appreciations as compared to the attributes. In order to avoid compensations, two functions φ (*appreciation*) and δ (*diameter*) are defined in the classical diameter method, whose aggregation triggers the alternatives ranking. The smaller the diameter is, the more homogenous an alternative is; and the greater the appreciation is, the better the alternative is.

The algorithm of the classical method is as follows:

Algorithm 4 (*Diameter*)

Step 1. Input: m -number of alternatives

n -number of characteristics (attributes) for each alternative

$w = \{w_1, w_2, \dots, w_n\}$ -attributes weights

V_{ij} , $i = 1, 2, \dots, m$, $j = 1, 2, \dots, n$ -set of alternatives values for each characteristic (attribute).

Step 2. We define the *appreciation function* φ :

$$\varphi : A \rightarrow R$$

$$\varphi(A_i) = \sum_{j=1}^n (m - pos(A_i, C_j)) \cdot w_j, \quad i = 1, 2, \dots, m \quad (24)$$

where $pos : A \times C \rightarrow \{1, 2, \dots, m\}$ and $pos(A_i, C_j) = k$ represent the position held by value V_{ij} in the ascending/descending order of the values of characteristic C_j , taking into account the minimum/maximum criterion. We calculate the values of the appreciation function $\varphi(A_i)$, $i = 1, 2, \dots, m$.

Step 3. We define the *diameter function* δ :

$$\delta : A \rightarrow N$$

$$\delta(A_i) = \max_j (pos(A_i, C_j)) - \min_j (pos(A_i, C_j)) \quad i = 1, 2, \dots, m \quad j = 1, 2, \dots, n \tag{25}$$

Step 4. We calculate the aggregate function:

$$\varphi \& \delta : A \rightarrow R$$

$$\varphi \& \delta(A_i) = \frac{(\varphi(A_i) + (m - \delta(A_i)))}{2} \quad i = 1, 2, \dots, m \tag{26}$$

The alternatives ranking is given by the descending values of function $\varphi \& \delta$. *STOP*.

The adaptation of the *diameter method*, when the alternatives values for each characteristic represent a fuzzy set, leads to the following algorithm for calculating the aggregate function $\varphi \& \delta(A_i)$, $i = 1, 2, \dots, m$, which will allow the alternatives ranking.

Algorithm 5 (*Diameter FS*)

Step 1. Input: m -number of alternatives
 n -number of characteristics (attributes) for each alternative
 $w = \{w_1, w_2, \dots, w_n\}$ -attributes weights

$$A_i = \{(C_j, \mu_{A_i}(C_j)), C_j \in C\}, \quad i = 1, 2, \dots, m$$

where $\mu_{A_i}(C_j)$ indicates the degree to which the alternative A_i satisfies the attribute C_j .

Step 2. We determine the matrix $P = (pos(A_i, C_j), i = 1, 2, \dots, m, j = 1, 2, \dots, n)$ according to (2), and we calculate $\varphi(A_i)$, $i = 1, 2, \dots, m$, according to (24).

Step 3. We calculate $\delta(A_i)$, $i = 1, 2, \dots, m$, according to (25).

Step 4. We calculate $\varphi \& \delta(A_i)$, $i = 1, 2, \dots, m$, according to (26), and we determine the alternatives ranking. *STOP*.

The *diameter method* modified for values of given characteristics under the form *IFS* leads to the following algorithm:

Algorithm 6 (*Diameter IFS*)

Step 1. Input: m -number of alternatives

n -number of characteristics (attributes) for each alternative

$w = \{w_1, w_2, \dots, w_n\}$ -attributes weights

$$A_i = \{(C_j, \mu_{A_i}(C_j), \nu_{A_i}(C_j)), C_j \in C\}, \quad i = 1, 2, \dots, m$$

where $\mu_{A_i}(C_j)$ indicates the degree to which the alternative A_i satisfies the attribute C_j , and $\nu_{A_i}(C_j)$ indicates the degree to which the alternative A_i does not satisfy the attribute C_j .

Step 2. We calculate the *score of IFN* $\alpha_{ij} = (\mu_{A_i}(C_j), \nu_{A_i}(C_j))$ for $i = 1, 2, \dots, m$ and $j = 1, 2, \dots, n$ according to (7).

We calculate the *degree of accuracy of the IFN* $\alpha_{ij} = (\mu_{A_i}(C_j), \nu_{A_i}(C_j))$ for $i = 1, 2, \dots, m$ and $j = 1, 2, \dots, n$ according to (8).

Step 3. We determine the matrix $P = (pos(A_i, C_j), i = 1, 2, \dots, m, j = 1, 2, \dots, n)$ according to (9) and (10). We calculate $\varphi(A_i), i = 1, 2, \dots, m$, according to (24).

Step 4. We calculate $\delta(A_i), i = 1, 2, \dots, m$, according to (25).

Step 5. We calculate $\varphi \& \delta(A_i), i = 1, 2, \dots, m$, according to (26), and determine the alternatives ranking. *STOP*.

Numerical Example

For a specific position, a company receives 5 applicants, who represent the alternatives set $A = \{A_1, A_2, A_3, A_4, A_5\}$. The selection committee wants to choose the candidate who best satisfies the characteristics: (C1) *experience*, (C2) *computer skills*, and (C3) *age (as young as possible)*. The committee has one restriction: (C4) *the salary offered and accepted should be as small as possible*. After analyzing the CVs, the letters of recommendation, interviews were held, which eventually allowed the candidates' evaluation from the point of view of the four characteristics. This example is presented and solved in (Bojadziev and Bojadziev

1995) using the *maximin method* modified for attributes values given under the form of *fuzzy set (FS)*.

For the *fuzzy set diameter model*, previously presented, the values of the characteristics for each alternative are presented under the form of *FS*. The application of the *Algorithm 5* leads to:

Step 1. Input: $m = 5, n = 4$

$$\begin{aligned}
 A_1 &= \{(C_1, 0.8), (C_2, 0.7), (C_3, 0.7), (C_4, 0.4)\} \\
 A_2 &= \{(C_1, 0.6), (C_2, 0.6), (C_3, 0.8), (C_4, 0.7)\} \\
 A_3 &= \{(C_1, 0.3), (C_2, 0.8), (C_3, 0.5), (C_4, 0.6)\} \\
 A_4 &= \{(C_1, 0.7), (C_2, 0.2), (C_3, 0.5), (C_4, 0.8)\} \\
 A_5 &= \{(C_1, 0.5), (C_2, 0.3), (C_3, 0.4), (C_4, 0.9)\}
 \end{aligned}$$

The importance of the criteria is given by the weight vector: $w = \{0.2, 0.3, 0.2, 0.3\}$.

Step 2. We calculate matrix P :

	C1	C2	C3	C4
A1	1	2	2	5
A2	3	3	1	3
A3	5	1	3	4
A4	2	5	3	2
A5	4	4	4	1

We calculate $\varphi(A_i), i = 1, 2, \dots, m$

$$\varphi(A_1) = (5 - 1) \cdot 0.2 + (5 - 2) \cdot 0.3 + (5 - 2) \cdot 0.2 + (5 - 5) \cdot 0.3 = 2.3$$

$$\text{Analogously } \varphi(A_2) = 2.4 \quad \varphi(A_3) = 1.9 \quad \varphi(A_4) = 1.9 \quad \varphi(A_5) = 1.9$$

Step 3. We calculate $\delta(A_i), i = 1, 2, \dots, m$

$$\text{It results } \delta(A_1) = 5 - 1 = 4 \quad \delta(A_2) = 2 \quad \delta(A_3) = 4 \quad \delta(A_4) = 3 \quad \delta(A_5) = 3$$

Step 4. We calculate $\varphi \& \delta(A_i), i = 1, 2, \dots, m$

$$\text{It results } \varphi \& \delta(A_1) = [2.3 + (5 - 4)]/2 = 1.65$$

$$\varphi \& \delta(A_2) = 2.70 \quad \varphi \& \delta(A_3) = 1.45 \quad \varphi \& \delta(A_4) = 1.95 \quad \varphi \& \delta(A_5) = 1.95$$

The order of the alternatives is $A_2 \succ A_4 = A_5 \succ A_1 \succ A_3$ and, consequently, candidate number 2 will be selected. *STOP*.

For the *intuitionistic fuzzy set diameter model (Algorithm 6)*, previously presented, the values of the characteristics for each alternative are presented under the form of *IFS*. The application of the *Algorithm 6* leads to:

Step 1. Input: $m = 5, n = 4$

$$\begin{aligned}
 A_1 &= \{(C_1, 0.8, 0.1), (C_2, 0.7, 0.1), (C_3, 0.7, 0), (C_4, 0.4, 0.3)\} \\
 A_2 &= \{(C_1, 0.6, 0.3), (C_2, 0.6, 0.1), (C_3, 0.8, 0.1), (C_4, 0.7, 0.2)\} \\
 A_3 &= \{(C_1, 0.3, 0.5), (C_2, 0.8, 0.1), (C_3, 0.5, 0.3), (C_4, 0.6, 0.3)\} \\
 A_4 &= \{(C_1, 0.7, 0.1), (C_2, 0.2, 0.5), (C_3, 0.5, 0.3), (C_4, 0.8, 0.1)\} \\
 A_5 &= \{(C_1, 0.5, 0.2), (C_2, 0.3, 0.6), (C_3, 0.4, 0.2), (C_4, 0.9, 0)\}
 \end{aligned}$$

The importance of the criteria is given by the weight vector: $w = \{0.2, 0.3, 0.2,$ and $0.3\}$.

Step 2. We calculate the *score of the intuitionistic fuzzy number*:

	C1	C2	C3	C4
A1	0.7	0.6	0.7	0.1
A2	0.3	0.5	0.7	0.5
A3	-0.2	0.7	0.2	0.3
A4	0.6	-0.3	0.2	0.7
A5	0.3	-0.3	0.2	0.9

and the *degree of accuracy of the intuitionistic fuzzy number*:

	C1	C2	C3	C4
A1	0.9	0.8	0.7	0.7
A2	0.9	0.7	0.9	0.9
A3	0.8	0.9	0.8	0.9
A4	0.8	0.7	0.8	0.9
A5	0.7	0.9	0.6	0.9

Step 3. We calculate the matrix P :

	C1	C2	C3	C4
A1	1	2	2	5
A2	3	3	1	3
A3	5	1	3	4
A4	2	5	3	2
A5	4	4	4	1

Matrix P calculated is identical with the one determined in the previous numerical example. This will finally lead to the same values for the aggregate function $\varphi \& \delta(A_i)$, $i = 1, 2, \dots, m$. The order of the alternatives is $A_2 \succ A_4 = A_5 \succ A_1 \succ A_3$ and, consequently, candidate number 2 will be selected. *STOP*.

4.3 The TOPSIS Method

The *technique for order preference by similarity to ideal solution method (TOPSIS)* (Hwang and Yoon 1981) is based on the idea that the optimal variant needs to have minimum distance as to the ideal solution.

The set of attribute values, which forms the matrix of attribute values, is represented for each alternative A_i by the following *IFS* (Xu 2007a):

$$A_i = \{ (C_j, \mu_{A_i}(C_j), \nu_{A_i}(C_j)), C_j \in C \}, i = 1, 2, \dots, m \tag{27}$$

where $\mu_{A_i}(C_j)$ indicates the degree to which the alternative A_i satisfies the attribute C_j ,

$\nu_{A_i}(C_j)$ indicates the degree to which the alternative A_i does not satisfy the attribute C_j

and $\mu_{A_i}(C_j) \in [0, 1]$, $\nu_{A_i}(C_j) \in [0, 1]$, $\mu_{A_i}(C_j) + \nu_{A_i}(C_j) \leq 1$,

We note $\pi_{A_i}(C_j) = 1 - \mu_{A_i}(C_j) - \nu_{A_i}(C_j)$, for all $C_j \in C$.

The *TOPSIS* method modified for values of given characteristics under the form *IFS* leads to the following:

Algorithm 7 (TOPSIS IFS)

- Step 1. Input: m -number of alternatives
 n -number of characteristics for each alternative
 $w = \{w_1, w_2, \dots, w_n\}$ -weights of the attributes
 $A_i = \{ (C_j, \mu_{A_i}(C_j), \nu_{A_i}(C_j)), C_j \in C \}$, $i = 1, 2, \dots, m$ -attribute values for the m alternatives represented by *IFSs*

Step 2. The *positive ideal solution IFS* (A^+) is calculated, defined as follows:

$$A^+ = \{ (C_j, \mu_{A^+}(C_j), \nu_{A^+}(C_j)), C_j \in C \} \tag{28}$$

where $\mu_{A^+}(C_j) = \max_i \{ \mu_{A_i}(C_j) \}$ and $\nu_{A^+}(C_j) = \min_i \{ \nu_{A_i}(C_j) \}$

And the *negative ideal solution IFS* (A^-), defined as follows:

$$A^- = \{ (C_j, \mu_{A^-}(C_j), \nu_{A^-}(C_j)), C_j \in C \} \tag{29}$$

where $\mu_{A^-}(C_j) = \min_i \{ \mu_{A_i}(C_j) \}$ and $\nu_{A^-}(C_j) = \max_i \{ \nu_{A_i}(C_j) \}$

Step 3. The *degree of indeterminacy*, corresponding to the two solutions calculated at *Step 2*, is calculated.

$$\begin{aligned}\pi_A + (C_j) &= 1 - \mu_A + (C_j) - v_A + (C_j) \\ \pi_A - (C_j) &= 1 - \mu_A - (C_j) - v_A - (C_j)\end{aligned}$$

Step 4. The Euclidean distances are calculated between each alternative and the *positive and negative ideal solutions* (Xu 2007a):

$$d(A^+, A_i) = \sqrt{\frac{1}{2} \cdot \sum_{j=1}^n w_j \cdot ((\mu_A + (C_j) - \mu_{A_i}(C_j))^2 + (v_A + (C_j) - v_{A_i}(C_j))^2 + (\pi_A + (C_j) - \pi_{A_i}(C_j))^2)} \quad (30)$$

$$d(A^-, A_i) = \sqrt{\frac{1}{2} \cdot \sum_{j=1}^n w_j \cdot ((\mu_A - (C_j) - \mu_{A_i}(C_j))^2 + (v_A - (C_j) - v_{A_i}(C_j))^2 + (\pi_A - (C_j) - \pi_{A_i}(C_j))^2)} \quad (31)$$

Step 5. The relative distance is calculated for each alternative as to the *positive ideal solution*.

$$d_i = 1 - \frac{d(A^+, A_i)}{d(A^+, A_i) + d(A^-, A_i)} \quad \text{with } d_i \in [0, 1], i = 1, 2, \dots, m \quad (32)$$

Obviously, the greatest value of d_i corresponds to the best alternative A_i .

Step 6. A classification is made on the alternatives set in accordance with the decreasing values of d_i , calculated at *Step 5*. *STOP*.

Numerical Example

We resume the same numerical example presented in the previous paragraph 4.1. *The Diameter Method*. The values of the characteristics for each alternative are presented under the form of *IFS*:

Step 1. *Input*: $m = 5, n = 4$

$$\begin{aligned} A_1 &= \{(C_1, 0.8, 0.1), (C_2, 0.7, 0.1), (C_3, 0.7, 0), (C_4, 0.4, 0.3)\} \\ A_2 &= \{(C_1, 0.6, 0.3), (C_2, 0.6, 0.1), (C_3, 0.8, 0.1), (C_4, 0.7, 0.2)\} \\ A_3 &= \{(C_1, 0.3, 0.5), (C_2, 0.8, 0.1), (C_3, 0.5, 0.3), (C_4, 0.6, 0.3)\} \\ A_4 &= \{(C_1, 0.7, 0.1), (C_2, 0.2, 0.5), (C_3, 0.5, 0.3), (C_4, 0.8, 0.1)\} \\ A_5 &= \{(C_1, 0.5, 0.2), (C_2, 0.3, 0.6), (C_3, 0.4, 0.2), (C_4, 0.9, 0)\} \end{aligned}$$

The importance of the criteria is given by the weight vector: $w = \{0.2, 0.3, 0.2, 0.3\}$.

Step 2. The *positive ideal solution IFS* A^+ is calculated, according to (28):

$$A^+ = \{(C_1, 0.8, 0.1), (C_2, 0.8, 0.1), (C_3, 0.8, 0), (C_4, 0.9, 0)\}$$

The *negative ideal solution IFS* A^- is calculated, according to (29):

$$A^- = \{(C_1, 0.3, 0.5), (C_2, 0.2, 0.6), (C_3, 0.4, 0.3), (C_4, 0.4, 0.3)\}$$

Step 3. The degree of indeterminacy is calculated as follows:

$$\pi_{A^+} = (0.1, 0.1, 0.2, 0.1) \text{ and } \pi_{A^-} = (0.2, 0.2, 0.3, 0.3)$$

Step 4. The Euclidean distances are calculated between each alternative and the *positive and negative ideal solutions*, according to (30) and (31):

$$\begin{aligned} d(A^+, A_1) &= 0.2489 & d(A^+, A_2) &= 0.1843 & d(A^+, A_3) &= 0.2949 & d(A^+, A_4) &= 0.3271 \\ & & d(A^+, A_5) &= 0.2983 & & & & \\ d(A^-, A_1) &= 0.3674 & d(A^-, A_2) &= 0.3492 & d(A^-, A_3) &= 0.3271 & d(A^-, A_4) &= 0.2701 \\ & & d(A^-, A_5) &= 0.2966 & & & & \end{aligned}$$

Step 5. The relative distance is calculated for each alternative as to the *positive ideal solution*, according to (32): $d_1 = 0.5960$ $d_2 = 0.6544$ $d_3 = 0.5258$ $d_4 = 0.4523$ $d_5 = 0.4985$

Step 6. The order of the alternatives is $A_2 \succ A_1 \succ A_3 \succ A_5 \succ A_4$ and, consequently, candidate number 2 will be selected. *STOP*.

Remark In (Bojadziev and Bojadziev 1995), the same numerical example solved by means of the classical fuzzy sets

$$\begin{aligned}
 A_1 &= \{(C_1, 0.8), (C_2, 0.7), (C_3, 0.7), (C_4, 0.4)\} \\
 A_2 &= \{(C_1, 0.6), (C_2, 0.6), (C_3, 0.8), (C_4, 0.7)\} \\
 A_3 &= \{(C_1, 0.3), (C_2, 0.8), (C_3, 0.5), (C_4, 0.6)\} \\
 A_4 &= \{(C_1, 0.7), (C_2, 0.2), (C_3, 0.5), (C_4, 0.8)\} \\
 A_5 &= \{(C_1, 0.5), (C_2, 0.3), (C_3, 0.4), (C_4, 0.9)\}
 \end{aligned}$$

leads to the hierarchy of the alternatives $A_2 \succ A_1 \succ A_3 = A_5 \succ A_4$ and, consequently, the same candidate number 2 will be selected.

5 Conclusion

Applying several multi-attribute decision-making fuzzy models for the same numerical example has led to the following alternatives rankings considered is shown in Table 5.

Table 6 presents an analysis of the ranks obtained by each alternative.

The ranking alternatives based on the position obtained in different classification models, presented in Table 6, lead to the following final ranking: $A_2 \succ A_1 \succ A_5 \succ A_4 \succ A_3$.

Classical fuzzy sets and the intuitionistic fuzzy sets represent powerful tools in modeling complex phenomena, which exhibit shades of difference and present imprecise information. However, these models need to be regarded as tools assisting the decision-making process. The final decision belongs to managers and

Table 5 Decision-making fuzzy models

No.	Fuzzy model	Alternatives ranking	Source
1.	<i>Maximin FS</i>	$A_2 \succ A_1 \succ A_3 = A_5 \succ A_4$	(Bojadziev and Bojadziev 1995)
2.	<i>TOPSIS IFS</i>	$A_2 \succ A_1 \succ A_3 \succ A_5 \succ A_4$	(Lixăndroi 2009)
3.	<i>Diameter FS</i>	$A_2 \succ A_4 = A_5 \succ A_1 \succ A_3$	(Lixăndroi 2011a)
4.	<i>Diameter IFS</i>	$A_2 \succ A_4 = A_5 \succ A_1 \succ A_3$	(Lixăndroi 2011a)

Table 6 Analysis of the ranks

Alternative	Models				The amount of ranks
	<i>Maximin FS</i>	<i>TOPSIS IFS</i>	<i>Diameter FS</i>	<i>Diameter IFS</i>	
A_1	2	2	3	3	10
A_2	1	1	1	1	4
A_3	3	3	4	4	14
A_4	4	5	2	2	13
A_5	3	4	2	2	11

will be influenced by their own intuition and experience, which generally have an important part to play in this process.

The application of vague techniques in the *Delphi Method* emphasizes the possibility to structure a decision-making process, generally fuzzy, using *fuzzy tools*.

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Antecedents and Consequences of Customer Retention and Loyalty Orientation in Romanian Telecommunications Market

Cristian Hnatiuc and Florin Mihoc

Abstract Contemporary business environment is becoming more complex and globalized. In order to maintain its competitive advantage, the organization has to develop effective long-term relationships and innovative approaches with its stakeholders, based on innovative research and methodologies. These relationships can be capitalized by maximizing customer lifetime value, customer profitability and by adopting innovative and creative approaches in the service marketing. Oftentimes even large corporations have a vague knowledge of marketing, especially in the service industry, and tend to operate with traditional and mostly transactional tools. Due to today's competitive environment, the customers' increased capabilities of choice and specialization, the importance of innovation in service marketing has never been as high. Developing an integrative model of work between the relationship marketing and innovation in telecom service industry will enable the company to achieve superior efficiency and build long-term competitive advantages. Aim of this chapter is to provide a conceptual and methodological framework for innovative relationship market approaches for telecom industry in Romania. Moreover, the purpose of the work is to provide a broad perspective on a dynamic industry within an emerging market. The key determinants, particular challenges and factors relative to the national telecom-leading players are underlined.

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1 Introduction

Relationship marketing represents a marketing strategy that is based on relationships between provider and customers. This strategy is already widely used in business and implemented from the perspective of both the provider and customer. However, not much research has been conducted on the implications of its initiatives, such as the integration of relationship approaches with innovations, especially in the service industry. The marketing of the twenty-first century is marked by the relational orientation that directs the company's efforts towards increasing performance metrics through developing long-term relationships and acquiring mutual benefits for all stakeholders—clients, suppliers and a selection of competitors.

Further, as the complexity of exchange relationships and the increased importance of long-term and durable exchanges, there can be identified new and innovative changes in the processes of *customer value*. The changes take place at a micro-level—change in internal processes and policies, change in employee mentality towards customer relationship and satisfaction—and at macro-level—changes in business environment and social responsibility. In this context, Kotler (2009) introduced the holistic orientation of contemporary marketing. The innovative concept is that of integrated marketing that is comprised, first of relationship marketing—where the relationship with stakeholders is based on trust, mutual respect and win–win relationship—and second of internal marketing that presumes the interaction with the marketing department as well as the integration of all the company's functions.

Goal of business partners nowadays in a service context is mutual value creation, while the service itself represents a mediating variable for (Gronoroo 2010) accomplishing this and enhancing the overall quality of interactions and relationship between partners.

2 Profile of Romanian Telecommunications Market

The Romanian telecommunications market represents one of the most competitive in the European Union. This is a direct consequence of several important factors. First of all, due to the fact that in the post-communist era (after 1989), there was only the fixed telecommunications provider that had monopoly for over a decade, the market was in the need to better and mobile communicate. This fact provided a good market for the mobile network development and an increase in demand. Second, the investments in the telecommunications sector over the years have increased exponentially, so that the potential market was an important market driver. This led to the mobile phone penetration of over 110 % of the market in 2009, so that the average Romanian businessperson now has 1.9 mobile phones. The increase in investments in coverage and network development meant the need

of growing market share, and thus, the Romanian telecommunications companies have launched a massive campaign of gaining customers' at all costs. This means that the average revenue per unit (ARPU) decreased. In the latest years, due to the decrease in prices and reaching the lowest revenue per user in the whole European Union, the telecommunications companies realized that they need to focus more on the relational side of the business, they need to better innovate both the products and services and the ways these are offered to the customer. More importantly, companies understood the importance of customer retention and loyalty in terms of business provisioning and forecasting. The third factor is the Romanian low buying power. Due to one of the lowest average income per capita in the European Union and to a low competitiveness of economical medium, the buying power of potential customers is limited. This fact determines a low price expectation and because of high competition and market penetration to high demand. This paradox low price–high product expectation determines a low margin for telecommunication companies operating on Romanian market.

In discussing retention and loyalty in the telecommunications sector, we must take in consideration of two important factors. The first one is the continuous contractual transactional side of the business (Gerpott et al. 2001). Every contract is signed for a specific period of time, usually 1–2 years. During this period, the customer is required to pay a certain amount of time and in return he expects to benefit from a constant service quality. In the same time, the network provider sets up barriers of exit for the customer out of the network in the form of early termination fees (ETF). These represent the cost of the relationship and the cost of opportunity, on one side, and on the other side, a potential threat to the customers that want to exit out of the network. The second factor that is important for the telecommunications sector is the different approaches to the residential sector and the business sector. Each of these segments of customers have different expectations, different buying behaviours and require different relational approaches. For each segment, the telecommunications company must design and implement different retention and loyalty programs. In this chapter, we will address the business sector and more specifically the retention and loyalty approaches to key accounts.

Telecommunications market in Romania has also known a rapid development in the last two decades. The post-communist Romania with its main economic undertakings, challenges associated with transition to a functional market economy and its milestones for the last two decades (NATO joining in 2004, and European Union accession in 2007) privatization process definitely exhibits particularities of a fairly sizable emerging economy for the Central and South-Eastern European region. Telecommunication sector while a vital one in the overall economy is also a fairly accurate barometer for the entire national economy, and a very dynamic one, where the privatization process of both mobile and fixed telecom companies definitely had an early positive upturn in Romania. Business climate on this market converges rapidly towards a more predictable and an international standards business practices regulated environment.

The Romanian telecom market also has a series of differences from European market. From 1992 to 2007, the telecom market has grown from 0.1 million users

to over 22 million users. Then from the 2009 until 2012, the market has stalled, mainly because of the decrease in purchasing power and structural economical problems of the country (Fig. 1).

While the customer’s number remained almost the same, the traffic generated by calls and especially data has grown significantly. Voice traffic in own network grew with 18, 14, 3 and 9 % yearly from 2009 to 2011 (quarterly). To other networks, the traffic also grew with 8, 4, 40 and 12 %, indicating that the decrease in prices and promotional offers influenced the customers to increased their data and voice traffic. This is not much different that what typically has been accomplished in the other telecom markets of the emerging, post-communist economies in the region indicating that the Romanian market is still a relatively young and underdeveloped market that is still far from a mature one (Fig. 2).

The post-European Union accession stage definitely poises Romanian overall economy, with its telecommunication sector for robust growth, provided the present challenges will be converted into real market opportunities, based on relational approach, service dominant view from the providers in an entrepreneurial manner, presented in here.

3 Customer Retention and Loyalty: Antecedents and Consequences

3.1 Literature Review

In this section, we will review the literature regarding the conceptual model proposed. We will first address the antecedents in the model—relationship marketing and innovation orientation. We will then address the customer retention and loyalty approaches of the organization as the main focus point of the conceptual model. The consequences of relationship marketing influence and innovation

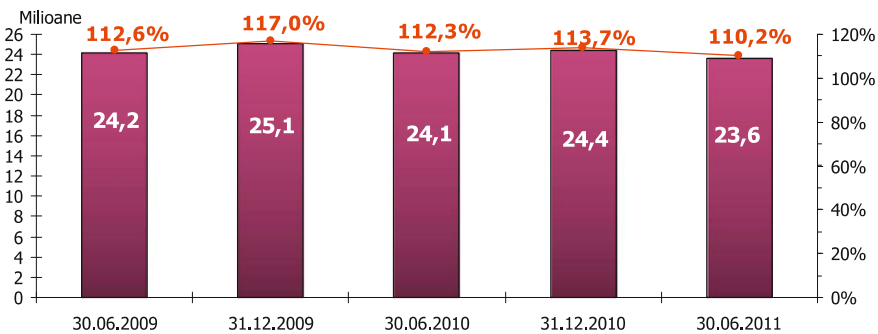


Fig. 1 Romanian telecom market evolution—number of customers Source www.ancom.org.ro

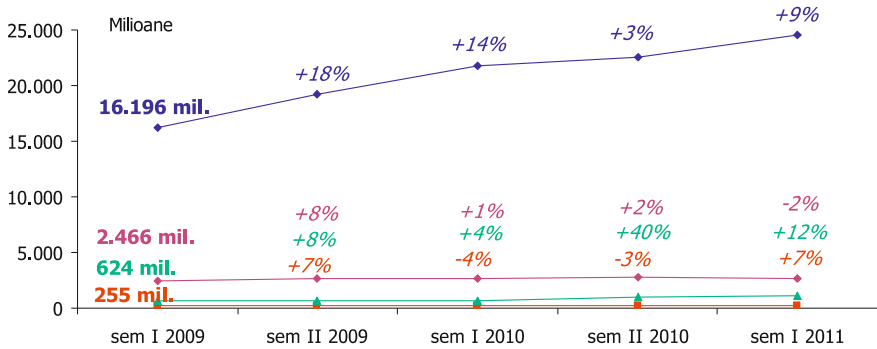


Fig. 2 Romanian telecom data and voice evolution (from 2009–2011 quarterly) *Source* www.ancom.org.ro

orientation over retention and loyalty approaches are considered to be an increased customer satisfaction and superior organizational performance.

3.1.1 Antecedents: Relationship Marketing and Innovation Orientation

Gummesson notes (Gummesson 1997) that search for a global definition of relationship marketing is in essence a “ghost hunt”, while fact of building business relationships is the tantamount for conducting businesses. Other researchers view relationship marketing as a distinct sub-discipline that parallels service marketing (Grove et al. 2003), which is not commonly accepted although there is common ground between the two fields. Relationship marketing, although a widely studied concept, is still viewed as an emergent field and its existence can be traced back to the preindustrial era (Sheth and Parvatiyar 2002).

Relationship marketing is defined as the process of establishing, maintaining and enhancing, and when necessary terminating relationships with customers, for the benefit of all involved parties, through a process of making and keeping promises (Gronroos 2007). Making promises requires the provider firm to connect with customers’ processes (sales, marketing communication, offers, etc.) while keeping promises is related to provider’s continual support for various processes that are relevant for customers (inquiries, payments, complaint management, etc.).

Scholars (Sheth et al. 1995) pinpoint some of the major economical factors that influenced the rebirth of relational approaches leading relationship marketing philosophy rapid developments of technology, adopting TQM programs, increased importance of services in economy, creating specialized teams of account managers and increased competition and focus on customer retention. Undoubtedly, this view has represented a renaissance in marketing and paradigmatic change; however, its application faced some serious challenges especially when it comes to services in nowadays complex and dynamic playfield.

One of the most important macro-economical force that eventually led to the rebirth of relational approaches, especially in the area of service industry, was the increased focus on *customer retention* (Seo et al. 2007). Unprecedented growth in the telecom and wireless telecommunication market, increased competition and due to the fact wireless services are not one time sale items led to the increased importance of customer retention and satisfaction. Over the total lifetime of the customer, the service provider can offer additional services in order to generate more revenues. There are four key players operating on the Romanian telecom market that generate yearly consolidated revenues in excess of 4 billion Euros. Two-thirds of the revenue are coming from SMEs and large companies and are rather based on a long-term relationship with their providers and effective retention and loyalty programs (Capital 2010).

Earliest developments of services marketing began to take shape in the 1970s and emerged as a genuine field of marketing by the mid-1980s (Berry and Parasuraman 1993), while the last two decades have recorded a phenomenal development of interest, instruments and innovative ways services marketing. Service marketing began to conceptualize as a different concept in the field of marketing in the beginning of the 1970s (O'Malley and Tynan 2008). The attempts of applying general marketing concepts and production approaches in the field of service marketing were doomed, as products need a different micro- and macro-approach of marketing.

Although the service marketing literature began as a distinct perspective from the conceptual domain of traditional marketing, we can identify different elements that in time have been adopted as part of relationship marketing (Table 1).

One of the recurring themes in service marketing for future will be setting its boundaries and rethinking its domain, as marketing for products becomes increasingly service intensive. The four key factors intangibility, heterogeneity, inseparability and perishability used to differentiate services from physical goods are considered simplistic to capture the nature of service offering given the pace of developments (Grove et al. 2003).

The concept of innovation can be defined from at least two perspectives. From one point of view, innovation represents new products and processes, new organizational forms and sources of raw materials. This perspective identifies the term innovation with invention, which represents a completely new idea or product/service. From another point of view, innovation is identified with everything new in an organization. Innovation is the end of a complex process of identifying a new solution—technical, managerial or organizational (Drucker 1993)

The contributions of researchers and scholars in the area of innovation came from different perspectives. Avlontis et al. (2001) concentrated on the service itself and the degree that service-oriented organizations innovate. On the other side, Gadrey et al. (1995) implies that innovation in the service industry cannot remain in the area of new products and services but must first focus on the redesign and organization of existing procedures in the presentation of the service. Innovation in the service sector can be defined as the continuous process of improving existing activities of service delivery that will lead to increased customer interaction and

Table 1 Characteristics of relationship marketing

Elements of service marketing	Characteristics	Authors
1. Importance of interactions of implicated parties	As opposed to traditional marketing, where the intermediary usually interacts with end user, in service marketing the relationship is direct.	Gronroos (1994)
2. Importance of formal, long-term relationships as a process of creating brand loyalty	Brand loyalty increases the probability of customer repurchase. This process implies the existence of a relationship that transcends the formal economical relationships.	Gummesson (1987)
3. The quality of service may increase customer satisfaction	Benefiting from a high interaction and service support from the supplier, customer satisfaction will be greater than that of competition.	Gronroos (1994)
4. Customer evaluate service quality from the perspective of technical and functional perspective	Technical quality represents the intrinsic quality of the product; functional quality represents the quality of the service delivery process. The functional quality can, in many instances, become a differentiating factor from the competition.	Gummesson (1987), Gronroos (1990)
5. Importance of part-time marketers	The part-time marketer's concept implies the creation of a company environment that is customer oriented.	Gummesson (1987)
6. The importance of internal marketing	This approach uses relationship and classic marketing tools and applies them to the organizational environment with the aim of increasing service quality and customer satisfaction.	Gronroos (1994)

satisfaction. De Brentani (2001) focuses on discontinuous innovations—defined as innovations, mainly in the technological areas, that have a high degree of newness—represent a competitive advantage for the organization.

3.1.2 Customer Retention and Loyalty

Customers' retention, loyalty and satisfaction are some of the main purposes of a profit-oriented organization. In order to maximize results, the organization is to focus on new customer acquisition, as Peter Drucker mentioned—the main purpose for a business is to generate new customers—however, within the current market circumstances, organizations are to give the same degree of importance, if not an even larger one to the current customers retention and their loyalty.

Technological advancements and the adoption of new telecommunications methods—fixed digital telephony and mobile telephony—telecommunications sector have emerged into a dynamic and important economic area, which generates significant revenues (Gerpott et al. 2001). This reality has determined an exponential development of telecommunications operators (both for fixed and mobile areas) and also a rise of the rivalry among players. National monopolies elimination from this field, especially within fixed telephony sector and also an increasing importance of communication in the overall economy, have led to a superior importance of this area in the national and global interconnected context.

Such concepts as customer retention and loyalty are exchangeable within the literature, especially when addressing the customer satisfaction broader theme (Gerpott et al. 2001). Related elements as retention, loyalty, customer satisfaction, trust and customer obligation to continue business relationships with a specific supplier are often jointly approached within the literature treated as a whole. According to Bruhn (1998), customer satisfaction is a factor with a major influence in the customer loyalty gaining process, which is posing a major influence on the customer retention process.

Customer retention defines the final construct between satisfaction, loyalty and retention mechanisms and can be defined as “the process that focuses on maintaining existing business relationships between suppliers and customers” (Gerpott et al. 2001). Based on this perspective, customer retention is the process through which supplier builds different barriers aimed at keeping the customer part of the current business relationship. Customer retention can be accomplished through repetitive acquisitions of the customers, or in the telecommunications by extending the contractual duration. In most cases, automatic contractual extension can generate a legal bond between the two parties; however, at the personal level can generate discomfort due to obligation factor imposed by such a practice. Another way of customer retention achievement is via the introduction of associated contractual elements with a high degree of innovation so as the customer will hardly identify a more viable alternative to the current offering. Nonetheless, deregulation services process—which represents the possibility to port out the telephone numbers to another provider—has significantly influenced the way that telecommunications operators are approaching customers’ retention and loyalty. This way, customer can have the flexibility of keeping the same telephone number—factor of crucial importance when is evaluating the possibility of contractual relation cessation with the current provider—significantly contributed to an increased relevance of customers’ loyalty programs at the expense of the retention ones.

While retention processes consist in most of the cases of stopping customer migration or avoid ending of relationship between the two entities, the loyalty processes consists of ways to identify and influence customer behaviour so as this will have a positive attitude towards the current telecommunications services supplier and will generate a favourable attitude towards business relationships continuation.

Bruhn’s (1998) conceptual model emphasizes the customer satisfaction as the final element of the retention and loyalty processes. The author states that customer satisfaction is “an assertion founded on customer experience associated with the product/service provided by the current supplier and vis-à-vis the degree to which the present offering meets customer’s expectations in terms of individual and functional characteristics of the product/service” (Bruhn 1998).

One of the most important surveys regarding Germany’s telecommunications market (Gerpott et al. 2001) underlines four situations within customer retention and loyalty processes. The model exhibits four such customer types that react differently to retention and loyalty mechanisms (Fig. 3).

The literature identifies development directions for the retention and loyalty mechanisms and a series of management practices for the internal processes, as well. A *first step* is represented by the customer total satisfaction measurement (Ang and Buttle 2006). The premise is that total satisfaction measurement has to be effectively planned in time and fully integrated with different methods and moments of customer interaction. This step is of crucial importance, considering satisfaction relevance when it comes to retention and loyalty of the customers, in securing a customer portfolio.

The planning of the customer retention and loyalty processes represents a *second step* of the overall process. While for the new customer acquisition actions companies are willing to invest up to 80 % or more out of the total marketing budgets (Weinstein 2006), a much lower allocation is destined to retention and loyalty processes. During the last several years, the companies have started to invest increasingly in the orientation and focus towards maintaining and development of the relationships with the existing customers, especially due to relatively reduced capacity of continual development for new customer portfolio. Nonetheless, an intensified level of rivalry among players and the deregulation of

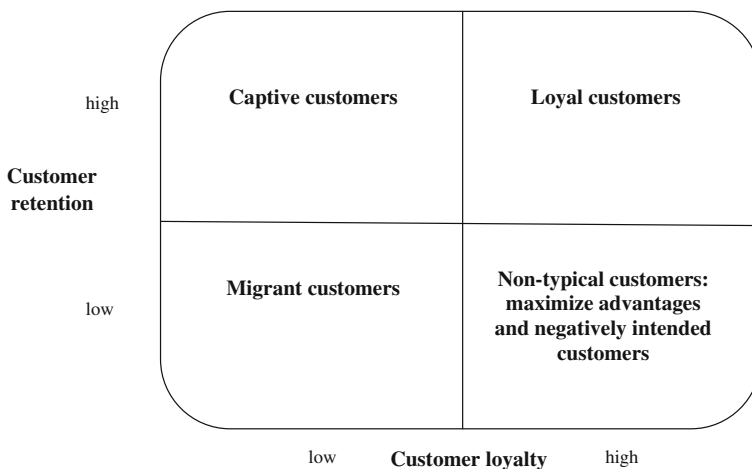


Fig. 3 Customer retention conceptual model *Source* Gerpott et al. (2001), p. 255

telecommunications markets have facilitated the possibility to select from a significant number of suppliers for a vast percentage of the customer portfolio.

A *third step* for the process is the quality assurance. During this stage, the supplier seeks to identify the weaknesses of the internal processes that ensure a consistent quality to the overall offering. As the emphasis is placed on the long-term stability within the business relationships, the customers will have a preference for a constant and predictable level of quality.

The *fourth step* is the regaining of the lost customers who migrated to direct competitors. In spite of the fact that this process has no associated cost to the organization, this has the advantage of an existing previous relationship with the customer and a superior knowledge vis-à-vis the customer. The customer regaining process also presents an extensive revenue increase potential, through the expansion of the customer base.

The customers' claims management gives *the last phase* of the process. This last mechanism is a vital one for the customer retention and loyalty process first of all due to superior satisfaction ensuring possibility. There are surveys that show (Ang and Buttle 2006) that organizations reaching an efficient identification and handling customer claims process can provide a superior value to their clients through a high emphatic degree vis-à-vis their customers and a proactive capability of meeting their ever changing needs.

The customer retention and loyalty processes require identification of customer segments that are most suitable as targets for these programs and also outcome measurement. Customer segmentation and targeting those, which are significantly contributing to organization objective reaching, revenue and profitability growth, would have to become a priority for the organization. Not all the customer segments are contributing to the same degree to the revenue increase, and some of them act as "question marks" for profitability. Thus, selecting the appropriate target segments towards which specific retention and loyalty efforts and resources are deployed would ensure an efficient allocation. The measurement and quantification of the outcomes display an organizational dilemma. On the one hand, the customer retention and loyalty strategy has to be quantifiable, and its efficiency has to be determined in terms of its outcomes, on the other hand, not all retention and loyalty efforts are measurable on the short run, so as the entire process could be rigorously evaluated. The studies on defining and measuring retention and loyalty processes (Aspinall et al. 2001) identified two ways of correlating the organizational performance indicators—*key performance indicators* (KPI). Firstly, there are general measurements of retention that are not taking into account profitability or the revenue generated by the individual customers. From this perspective, all the customers are to be retained, and retention is defined as a rate of retained customers in the portfolio, regardless of the revenue generated by the individual customers. Secondly, there are sales- and profit-based figures, which allocate each customer to a different profitability category and different value levels are defined. Depending on the organization's objectives, there will be selected those customers with a high degree of profitability and significant sales volumes so as the retention and loyalty will be aimed towards these. Moreover, the importance of customer

migration management to different levels of value has been underlined. The overall customers' tendency over time is not to cease relationship with the supplier, but to purchase lower values and lesser amounts. Customer migration management towards lower levels becomes as such an important component within retention and loyalty efforts.

Researches on customer retention and loyalty (Coyles and Gokey 2005) show that organizational efforts aimed only at retaining the customer in the relationship are not adequate. In order to increase customer loyalty degree, the companies are to reach a deep understanding of the attitudes, motivations and, moreover, to identify the changes related to customer needs. Moreover, customer migration towards inferior segments of the market is posing a major threat to retention and loyalty programs. However, customer migration management brings also an opportunity for the supplier, due to a superior knowledge of the customers and their motivations that have led to a shift in their needs mix.

3.1.3 Consequences: Increase in Satisfaction and Profitability

Customer satisfaction has been linked to internal marketing, within holistic marketing view (Kotler 2009). Within the process, internal marketing has the role of building internal customer satisfaction. Whether we take into consideration the teams directly involved in the customer relationships, or the indirect staff members, a higher degree of satisfaction of the internal customers will definitely lead to an increase in personnel performance and an organization enhanced performance in its relationships with external customers. A positive performance perception of the external customers can lead to their superior satisfaction.

Empirical surveys have shown also that there is a direct influence between organizational performance and its efficiency in providing the offerings on one side, and in customer satisfaction on the other side (Hwang and Chi 2005). As Theodore Levitt asserted, "the businesses goal is to create and maintain customers" (Blythe 1999). Once the customer base has been generated, it is vital that customers are satisfied through quality, value and superior services offerings, without losing from consideration that customer base generation is a dynamic process, as well. Literature identifies direct relationship between development and maintaining a high level of internal customers' performance and the rise of the external customers' satisfaction, and as such the improvement of the overall organization performance.

Moreover, for the analysis regarding the difference between customers' expectations on one side and perceived quality and satisfaction on the other side, scholars are identifying a series of discrepancies that may occur within the customer satisfaction process (Parasuraman et al. 1985). One of the most important such discrepancy is that between customer's real expectations and those identified by the supplier. Whenever the provider is not correctly identifying customer's real expectations, the offering will not lead to customer satisfaction. A decisive role for effective expectations identification is played by the marketing research. Another

major discrepancy that substantially influences customer satisfaction is that between promised performance and the real performance that the customer ultimately obtains. This may be generated as a result of inadequate communication among departments, or erroneous product/service details or simply due to the underdeveloped quality control policies.

Satisfaction represents a customer's feeling that results from comparing perceived performance or results with the initial expectations (Kotler 2009). Customer-perceived satisfaction is formed by the reactions referring to any discrepancy between expectations regarding service offering and experience associated with the acquired service. A superior degree of customer satisfaction is often resulting in customer loyalty (Futrell 2010) (Fig. 4).

The defining process of the service customers' satisfaction has undergone through a wide array of approaches and directions (Ekinci et al. 2008). The literature records at least two main conceptual models of the service customers' satisfaction: *satisfaction specific to the transaction* and *general service satisfaction*. The later refers to evaluating customer's satisfaction as a result of a distinct experience related to a purchase that cannot be repeated and that can be best recorded in the post-acquisition phase. In spite of the repeated interaction with the purchased service, does not represent an individual transaction in time, the evaluation of customer satisfaction and behaviour is best conducted as soon as possible post-acquisition. With regard to *general satisfaction* of utilizing the service, it represents a more subjective evaluation in nature, which is realized at a significant longer time after purchasing moment. This satisfaction is a function of evaluating multiple moments and transactions over time and captures the perceptions and general service performance, through comparison with a series of standards from the previous customer's experiences.

The satisfaction literature also records analyses conducted from the standpoint of positive influences towards customers' behaviours (Soderlung 1998). On the one hand, a direct relationship has been identified between a high level of customer satisfaction and loyalty. The higher the service satisfaction, the higher the likelihood, the customer will remain loyal to the providing organization. Moreover, there has been identified a direct link between satisfaction and propensity of customers to make referrals. Recommending the supplier's services is an advantage to the organization, as it reduces promotion costs and increases potential customer base and its revenue.

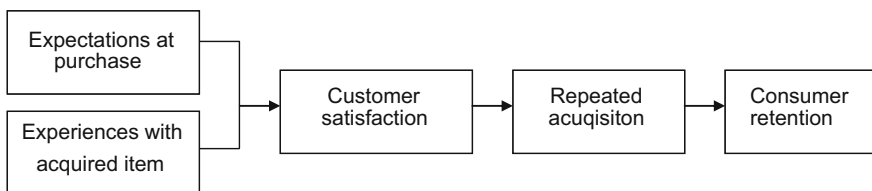


Fig. 4 Customer's experience phases at the purchase *Source* Futrell, ABCs of Relationship selling, 2010

Satisfaction has been considered in the literature as an antecedent of customer relative attitude towards the service offering (Wu 2011). Satisfaction or dissatisfaction with service influences customers' attitude and can lead to loyalty achievement vis-à-vis service or the provider organization. Whenever service performance is higher than customer expectations, this will lead to a satisfied customer, and conversely, whenever customer demands are not met, this will generate dissatisfaction. Satisfaction evaluation is also realized through the past and present customer experiences with the service or the providing organization.

The current paper approaches satisfaction with its three main dimensions: *satisfaction provided by the organization*, *satisfaction provided by the personnel* and *service provided satisfaction*.

3.2 Conceptual Model Proposed

Innovation and relationship marketing have been studied for a long time as distinct functions of a company. Associated services and support were also used in customer retention, satisfaction and to increase the trust between parties involved in the relationship.

The premise of this proposed model is that by strategically integrating innovation in the process of creation and delivery of a service in a relationship marketing-oriented company, the result will be increased customer retention, loyalty and satisfaction, leading inevitably to overall increased company performance (Fig. 5).

In a key business relationship, an extended service offering is an interactive process consisting of several sub-processes and resources supporting corresponding customer practices in a way that helps the customer create value in all its practices (operational efficiency), and through this ultimately has a value-creating impact on the customer's business process (business effectiveness) (Gronroos 2010). In the final analysis, within the relationship, the provider operates as an integrated part of the customer's process, while the customer operates as an integrated part of the supplier's process. A crucial factor in determining the relationship outcome is the quality of the interactions between parties (Fyrberg and Jürriado 2009). Value for customers, which represents the focus orientation of

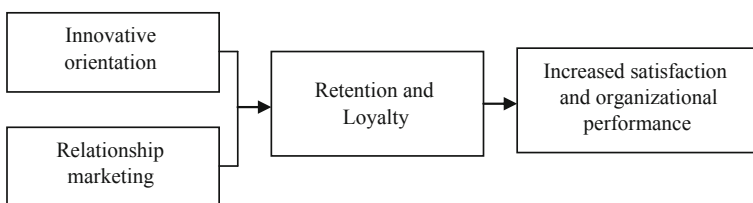


Fig. 5 An integrative model of antecedents and consequences retention and loyalty approaches in Romanian telecommunications market

relationship marketing, “means that they (customers), after having been benefited from the provision of resources or interactive processes, are or feel better off than before” (Gronroos 2008). Value for customers (*customer’s value*) can definitely be measured in monetary terms, and in addition has a perception dimension to it, influenced by factors as trust, commitment, and attraction (Gronroos 2010).

The integrative model has also an internal dimension within the company, as implications for management are extensive in this area. Traditionally, marketing was responsible only for promotion (making the promise) while keeping the promise and generating customer loyalty phases were under responsibility of other functions (Brown 2005). When execution of functions as customer service or problem solving is integrated in the marketing process, marketing becomes pivotal in promise keeping and creating loyalty. During processes of development, design, delivery and follow-up stages, simultaneously customer and provider participate into each other’s operation as co-developers.

4 Research Methodology

The research methodology that we are proposing is mainly a qualitative in nature based on an in-depth interview with seven key accounts from the Romanian telecommunications market. These customers have all met the research criteria (as further defined) and were willing to answer to our questions and discuss in detail perspectives.

Malhotra (2010) underlines the main differences between qualitative and quantitative researches, and this is our theoretical basis on why choosing a qualitative method as a starting point represents an advantage (Table 2).

In this present study, we opted for the semi-structured interview on key accounts in the business sector. As defined by the Nordic School (Schmidt and

Table 2 Qualitative versus quantitative research *Source* Malhotra, Marketing Research, Prentice Hall, 2006

	Qualitative research	Quantitative research
Objective	Obtaining relevant and valid results in regard to motivational decisions taken by the subjects	Quantifying the information obtained and generalizing the results
Sample	A small number of unrepresentative statistical cases	Large number of statistical representative sample
Data collection	Unstructured	Structured
Information analysis	Is not statistical representative	Statistic
Results	Developing of early understanding	Statistical generalization of results

Hollensen 2007), the in-depth interview represents a research methodology that gives very few directions to the sample, giving them full liberty to express their opinions and feelings, and in the same time offers the researchers the opportunity to meet their research objectives better. In the same time, the interview can obtain information more freely and through a direct approach can capture motivational and emotional perspectives better. The interview was based on the conversational guide that was not limitative. The sample was given the freedom to add new elements and perspectives to the discussion.

In-depth interview, as presented in the literature, can be used in different research approaches (Kates 2000). On the one hand, the interview can be used when the researcher is identifying new information that can be the basis of a later quantitative research. This instrument is mainly utilized in the exploratory researches. On the other hand, the in-depth interview can be used as a single instrument in a research. This is mainly recommended when researching not so easily accessible groups and groups with high competitiveness between them.

Research objective was to identify the different concepts presented in the literature review, the interactions between them and to validate or invalidate the conceptual model proposed. We firstly wanted to underline the importance of the two antecedents—relationship marketing and innovation orientation—over the retention and loyalty approaches of telecommunications companies. On the other hand, we focused on the importance of retention and loyalty programs and their influence on the customer perception of service offered. As a result or consequence of this influence, we identified the two results: increased customer satisfaction and profitability.

Research has been conducted in the period of June–July 2012 at the level of business customers defined as key accounts of telecommunications companies in Romania. All interviews were taken at the accounts location.

Selection process of the sample was based on the literature recommendations and sample availability. The first criterion was that of customer buying power, respectively, of how much money they spent on telecommunication services. As defined in the Romanian market, the key accounts usually spend over 1,500 euro/month for this type of services. In the same time, we identified a direct link between the customer invoices and the relational and retention programs telecom companies undergone. The third criterion was that of customer lifetime with the provider—over 3 years—because we wanted to observe the evolution of relation over time and the effectiveness of retention and loyalty programs.

4.1 Information Analysis and Results Interpretation

The results from the seven key accounts identified were compiled, and their names were given confidentiality as required by the sensitive information and personal interpretation of perceptions. All the seven key accounts met the established criterion. In regard to quantity of services acquired from telecom companies and

invoice size, all of them had invoices of over 1,500 euro per month, one of them with invoice of over 20.000 euro per month. Also, all of them had an experience with the current provider or providers of over 3 years.

In regard to *innovation orientation*, all the customers have stated that in the Romanian telecom market, at the product and technological level, they are satisfied. This comes as a confirmation that customers appreciate the investments made in the network by the providers. In regard to the support services and customer relationship management, *key account #2* underlines “*When we installed our VPN service in all our six locations we had mixed feelings. On one side, we were satisfied with the service technical capacities and with our excellent relationship with the account manager. The offer was presented to us in a professional manner and we agreed on a fair price for the service. On the other side, when it came to the implementation of the contract, the implementation department was not tuned with all our requirements. The first team that came to our office did not call first, so we could not synchronize with our IT department. Then, they were late 2 h on the next appointment and later on they messed up with our IP’s*”. Such an opinion, even if satisfied on the technological capabilities of the service provided and the price offered implies that it is very important the relational perspective of the service. This will influence the capability of the provider to extend the contract period (create a retention process) and the availability of the customer to voluntarily remain in the relationship (loyalty).

The *relational perspective* was emphasized by four of the seven key accounts that were interviewed. They pointed out that 90 % of the retention capabilities of the supplier organization lay in the personal relationship between the people on both sides. More importantly, because of the relational approach, in all seven cases 85 % of the respondents had their services secured with the provider for another 12 months. The *key account #4* said “*We are always looking to the relationship we have with the organization and more important with our account manager. When we buy a service we buy a relationship and we want to know that every problem—and even with the best service there will be problems—we know that we have a direct communication, we are always being assisted to overcoming the difficulties*”. Another respondent, *key account #3* pointed out that he refused an offer from the competitor of the current internet provider with 40 % discount based only on the relationship with the current account manager.

In terms of *customer retention and loyalty programs and approaches* in all the seven cases, the respondents agreed that there would always be a lower price alternative than the current one. In the nowadays business environment, every company wants to reduce costs and increase efficiency, but in the same time, the important businesses will always recognize the importance of quality and the rewards that a long-term relationship offers. As *key account #5* points out “*Our current provider did not think good of us for a long time. Then, over 5 years ago, we moved all our services to their competitor. We did not take this move because it was a tariff reduction, but because we did not feel that they wanted us and invested in keeping us happy. After 24 long months, when the account manager of our old provider approached us every month, we decided that we want to come back. It*

was a more flexible approach from the provider and we now benefit from a complex loyalty and reward program, we have our dedicated account manager and we feel that we each appreciate what we get from the other side". This is a very important perspective especially for the Romanian market where the traditional view is that the smaller the price the better the chances in winning a customer. Even if Romanian businesses are struggling with increased competition and efficiency issues, for strong business owners it is very important to feel that the provider is backing them up and offering the best service at a competitive price.

Customer satisfaction was emphasized by all seven interviewed organizations. Service quality and satisfaction is an important aspect of the business and is influenced by innovative approaches, relational perspectives of supplier and the retention and loyalty programs. The respondents also underlined the importance of functional quality—the increased quality over time—but more importantly, the continuous development of long-term relational satisfaction. Increased satisfaction leads to superior levels of retention and loyalty and ultimately to an increased expenditure on telecommunication services. Satisfied telecom customers will tend to remain with the current provider for a longer period of time and have an increasing potential of developing new business areas with the provider.

5 Conclusions and Implications

Current paper lays out a comprehensive and solid foundation of conceptual and methodological innovative approaches and relationship orientations towards improving customer retention and loyalty, with the ultimate purpose of improving customer satisfaction and organizational performance. It can be asserted that in the current stage, there are new opportunities for long-term successful partnerships development for large telecom companies that are facing a highly competitive environment. Providers that engage in a mutual partnership with customers adopting a proactive role for value creation are enabled not only to make value propositions, as was the case in the traditional paradigm, but also to engage and direct keeping the promises that were made.

Relational interactions between service providers firms and their customers always pose a set of managerial tasks and challenges. Provider is to proactively and directly engage into value creation activities seeking to attain synergies internally (intra- and inter-departments) and externally with the partner. Integrating departments and activities will need continual adjustment, investment efforts and improvements. On this basis, a service company can develop new solutions, pricing models and ways to effectively communicate with partners on the basis on its extended service offering. Effective management of people, activities and financial resources can ensure successful implementation of relationship marketing paradigm, which can be very costly if is improperly implemented, monitored or controlled.

In regard to the proposed antecedents, relationship marketing and customer innovation, we can assert several important aspects of Romanian telecom market. First, the relational approaches in the telecom market focus on the key accounts, which are the most important segment of customers. They have the largest acquisition budgets and financial allocations and bring high revenues to the providers and thus are the most targeted segment in the whole telecom market. The importance of relationship marketing and relational approaches is underlined by the answers of the questioned sample of key accounts. They all agreed on the importance of relationships in the process of retention and building customer loyalty. Romanian telecom companies must also understand that they need to invest in creating, building and sometimes ending relationships with these accounts for a long term in order to develop high levels of loyalty and ultimately an increased profitability rate. On the other hand, the Romanian telecom sector invests in the area of product and network innovations, but lacks the innovation in terms of service offering and people management innovations. Some respondents identified the need for providers to better innovate at the organizational level and better integrate business functions, so that the customer can better benefit from this synergetic effect.

In terms of improving retention and loyalty programs and approaches, the Romanian telecommunications market suffers from the same myopia that is so evident in the global market. The main focus is on retaining customers—by creating high barriers of exiting the network and by signing contracts for longer periods of time (in many occasions over 3 years). By creating such retention programs, there is a risk that customers develop an adversity towards the existing provider and can ultimately choose to end the contractual relationship against all costs. The influence of innovation and relationship marketing can better influence the loyalty programs that have the capability to create a positive perception of customers towards existing providers. By strategically integrating innovation, relational approaches and loyalty programs, the telecommunication organizations can benefit in the long term. In the context of high competition and cost focusing, creating long-term loyalty in the key accounts segment can assure that revenue provisioning can be more accurate.

Customer satisfaction is the most important effect of loyalty. By offering a superior customer satisfaction because of a better and innovative product and associated services, by developing a series of networked relationships between different business functions of the provider and customers and by designing better loyalty and retention programs, attaining customer satisfaction is a more realistic goal. As a by-product of increased and superior customer satisfaction, the provider organization can benefit from increased revenue base and profitability.

In terms of the present research, we believe that our main goal of validating our proposed conceptual model has been achieved. Further research avenues will have to take into account other functions responsible for creating, maintaining and development of customer retention and loyalty. We believe that entrepreneurial orientation (Foltean and Feder 2009) can also offer a positive influence over customer satisfaction and loyalty. Romanian telecommunications industry with its

particularities and challenges is definitely suitable to a rigorous relationship marketing approach, in the context of an emerging market.

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