Klaus North · Gregorio Varvakis *Editors*

Competitive Strategies for Small and Medium Enterprises

Increasing Crisis Resilience, Agility and Innovation in Turbulent Times

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Preface

"*It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change*." This quote by scientist Charles Darwin goes back more than 200 years, yet it is more relevant now than ever. Individuals as well as companies worldwide increasingly have to learn how to cope with ambiguities and a fast changing economic and social environment.

Small and medium enterprises are the most important sources of job creation and local development in increasingly knowledge-based economies. As turbulence in globalized economies expands, SMEs will have to learn to sustain competitiveness in this new kind of environment by developing their "dynamic capabilities." Based on the findings of a 4-year European and Latin American research project, this book provides a theoretical framework, practical instruments, and case studies of how SMEs in differing economic, social, and cultural contexts can develop crisis resilience, increase agility, innovate, and thus successfully compete in turbulent times.

Before the crisis years, around 2008/2009, SMEs in Europe relied on fairly stable economic conditions and long-term relationships; however, they are now faced with stagnating markets and a "roller coaster economy." In the turbulent economic and social environment of Latin America (including different ethnic characteristics, inflation, rapidly changing regulations, social inequality, fast changing economic environments etc.), SMEs have survived by adopting flexible strategies of short-term resource exploitation, resulting in low productivity and low degrees of internationalization.

Consequently, SMEs will have to learn to become and remain competitive in this new kind of economic environment. "**What is a successful management model for SMEs to compete in turbulent environments**?" is the overriding research question addressed in this book. Based on empirical data, case studies, and action research findings, the authors argue that combining European innovation and organizational learning models with Latin American survival strategies can contribute to sustain competiveness in these turbulent settings.

These contextual differences provided a unique mutual comparative research and learning opportunity, in which differences and complementarities contributed to the development of a "Dynamic SME" framework supported by tested instruments and methodologies to sustain competitiveness in turbulent times.

This book highlights the need to differentiate between management of business processes in "normal" situations and in "turbulent" situations. It is not just an adaptation of the normal business model for a turbulent environment, it is a different concept which helps managers to develop a cognitive map for this situation. This can only be achieved if there is a better focus on the managers of SMEs. This publication helps to open the "black box" of SMEs.

The combination of a sound theoretical framework for SME development along with practical instruments and case studies makes this book a unique read for researchers, SME management courses, SME policy makers, practitioners from SME support institutions, owners/managers of SMEs as well as trainers, consultants, and coaches. The book is supported by an extensive website (www.dynamic-sme.org) containing further publications and a YouTube channel "Dynamic SME" comprising videos on instruments and SME cases.

The research leading to these results would not have been possible without the funding from the European Union Seventh Framework Programme under grant agreement n° PIRSES-GA-2010-268665 (Project "Dynamic SME"). The project strengthened research partnerships through staff exchanges and developed a joint learning and co-development process of five research teams from the following universities:

- RheinMain University of Applied Sciences, Wiesbaden Business School, Germany (Project coordinator)
- Universidad Autónoma de Madrid, Business Management Institute IADE, Spain
- Universidade do Minho, Department of Management and Department of Information Systems, Portugal
- Universidade Federal de Santa Catarina, Knowledge Engineering Department (EGC), Brazil
- Universidad Nacional de Rosario, Industrial Engineering School and Department (IES&D), Argentina

Furthermore, the project led to a research network "Dynamic SME" (http://www.dynamic-sme.org/es1/red-dynamic-sme) which continues to develop joint research, training, and further SME support activities.

Our thanks go to the researchers who have actively contributed to furthering insights of what constitutes a "Dynamic SME" and to the cooperating enterprises, who openly discussed problems and practices. We are also grateful to institutional support, in particular by SEBRAE Santa Catarina (Brazil) and Asociación de Desarrollo de Rosario (ADERR) and their willingness to experiment with the "Learning to grow" methodology, yielding excellent results.

The many videos produced at the Distance Learning Unit of Universidade Federal de Santa Catarina would not have been possible without the dedicated support of the LED/EGC-Team.

Finally, we thank in particular Christopher Drodge from Wiesbaden Business School for language editing and proofreading of the book chapters and Dorzeli Salete Trzeciak from the EGC Department at Universidade Federal de Santa Catarina for merging individual contributions into one consistent book format as well as compiling the glossary.

Wiesbaden Klaus North
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February 2016

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Introduction: What Is a "Dynamic SME"

Klaus North and Gregorio Varvakis

Abstract This chapter addresses the question: "What is a successful management model for SMEs to compete in turbulent environments? After an introduction into the universe of SMEs a model of a "Dynamic SME" is developed integrating the results of the 4 year European-Latin American action research project www.dynamic-sme.org. Based on a literature review, empirical data, case studies and action research findings strategies and practices of a "dynamic SME" are discussed. This chapter also serves as an introduction to the book relating the following chapters to the Dynamic SME model.

1 The Universe of Small Businesses

Small and medium-sized enterprises (SMEs) are part of a heterogeneous universe of extremely diverse economic agents, whose characteristics vary depending on the business sector they operate in, the markets they serve, the products they produce and how involved and connected they are to the macroeconomic context and support institutions (Latameconomy 2013).

According to studies by McKinsey and the International Finance Corporation (IFC) the total number of SMEs worldwide amounts to between 420 and 510 million, of which 360–440 million are located in emerging markets (IFC 2010, p. 12). In 2013 across the EU28, some 21.6 million SMEs in the nonfinancial business sector employed 88.8 million people and generated €3666 trillion in value added. Expressed another way, 99 out of every 100 businesses are SMEs, as are 2 in every 3 employees and 58 cents in every euro of value added (EU 2014). Table 2 compares an equivalent summary of 27 European Union members to Argentina

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Table 1 European Union definition of SMEs

Company category	Employees	Turnover	or Balance sheet total
Micro	<10	< €2 million	< €2 million
Small	<50	< €10 million	< €10 million
Medium	<250	< €50 million	< €43 million

Source: EU (2014, p. 10)

and Brazil, displaying differences and similarities which will be further discussed below.

Due to their role in local development, job creation and innovation diffusion, governments see SMEs more and more as effective agents for poverty alleviation. Furthermore, entrepreneurs prosper through new business concepts and creative frameworks enhancing competitiveness and improving the business environment (Gurria 2013).

Usually, what constitutes a micro, small or medium sized enterprise is based on criteria such as number of employees and turnover, while this can vary around the world (see EU definition in Table 1). In general, the threshold for staff size used in the definition for SMEs in Latin American and Caribbean (LAC) companies is lower than in the EU (Ibarrarán et al. 2009). In LAC small companies have between 5 and 19 employees and are considered medium-sized with a limit of 99 employees.

A different approach will be adopted and **define an *SME as "a small social collectivity whose participants share a common interest in its survival and engage in collective activities to secure this end"*** (Scott 1987, p. 23). This definition presents an SME as a social entity with limitations and strengths in coping with turbulent environments.

Since 2008, **in Europe** SMEs have fared very differently across countries, size class and sectors, while clear fracture lines have emerged. For a good summary of the state of SMEs in Europe we recommend the European Commission's (EC) Annual Report on European SMEs. The following paragraph is based on the report 2013/2014—"A Partial and Fragile Recovery" (EU 2014).

In the 28 EU countries (EU28) the most important SME sectors are: "wholesale and retail trade sector"—the largest SME sector in all Member States; "manufacturing"; "construction"; "professional scientific and technical activities"; and, "accommodation and food". Together these five sectors account for almost four fifths of all SMEs in the EU28. Some SME sectors have posted relative strong positive growth from 2008 to 2013, with "business services", "retail and wholesale trade" and "other sectors" (which include all other non-financial business sectors) posting positive value added growth. In contrast, the construction industry has suffered severely, with an almost −22 % cumulative decline in value added from 2008 to 2013. It has also registered an 18 % decrease in the level of employment and the number of enterprises is 10 % lower.

As the majority of EU28 SMEs operate in sectors that serve domestic demand, they did not share in the benefits of increased foreign demand, which was the key

macroeconomic driver of growth from 2008 to 2013. Many SMEs are not in export-oriented sectors, particularly the micro and small enterprises. Micro SMEs suffered the biggest decline in total number and number of employees between 2008 and 2013. Medium-sized SMEs account for almost 2/3 of the total increase from 2008 to 2013 in the value added generated by SMEs in the EU28, while small SMEs did not contribute at all to the growth in SME value added and micro SMEs account for 1/3 of the growth in valued added (EU 2014, p. 24).

An excellent overview over **SMEs in Latin America** can be found on the Latin American Economic Outlook website[1] from where we have adapted the following text. A fundamental aspect of Latin American SMEs is how extremely diverse they are. Some microenterprises were born out of an individual person's need for self-employment. Such businesses often operate informally and have low human capital, difficulty in accessing external financial resources, very little internationalization, and work activities with very few technical requirements. At the opposite end of the spectrum are high-growth SMEs, known as "gazelle companies", which are much more dynamic in terms of sales revenue and job creation, exploiting market opportunities through efficient, innovative business management. Therefore, the concept of company size conceals what is in fact a very diverse reality for this type of production unit.

Despite the difficulties in comparing data between one country and another, there are general patterns in the relative productivity and distribution of firms by size among the region's SMEs. Latin American SME relative productivity levels are, on average, below those recorded in selected OECD countries. For example, the national productivity levels of small firms relative to large firms range from 16 % to 36 % in Latin America, but from roughly 60 % to 75 % in Europe (ECLAC 2013). These discrepancies in productivity affect the wage gap, where people working in SMEs earn only half or less the wages of workers in large companies. In Europe, SME workers earn roughly 10–30 % of their counterparts in large firms. This has major consequences for income distribution and inequality in the region (Table 2).

The effects of low productivity are manifold, as displayed in Fig. 1. Low productivity does not only lead to loss of the home market due to foreign competition but also reduces the possibilities of integration in international value chains. European, Brazilian and Argentinean SMEs have in common the enormous impact that globalization has had on them. Increased competition and low cost products imported from the Asian countries that threaten their internal market, are just some examples. The resulting fragility of SMEs reduces the innovation capabilities and options for production upgrading, which again results in low productivity. Low productivity along with the loss of market results impacts on the survival chances of SMEs.

[1] http://www.latameconomy.org/en/outlook/2013/traits-and-policies-of-latin-american-smes/regional-overview-of-smes/

Table 2 Enterprises, employment and gross value added of SMEs in the EU27, 2011

		EU-27	Brazil	Argentina
Number of SMEs/total of enterprises	Total	99.8 %	99.7 %	98.2 %
	Micro	91.8 %	94.0 %	71.2 %
	Small	6.9 %	5.1 %	21.7 %
	Medium-sized	1.1 %	0.6 %	5.3 %
Density of SMEs (per 1,000 inhabitants)		41.7	30.4	11.9
Average size of an enterprise (employee/enterprise)		6.4	4.2	10.3
Number of persons employed by SMEs/total of enterprise	Total	67.4 %	68.3 %	51.8 %
	Micro	29.7 %	24.5 %	12.7 %
	Small	20.7 %	27.7 %	19.2 %
	Medium-sized	17.0 %	16.0 %	19.9 %
Contribution to GDP		58 %	20 %	40 %
Export turnover		24 %	19.7 %	10.7 %

Source: Häner (2011) based on Eurostat (2011) and National Statistical Offices

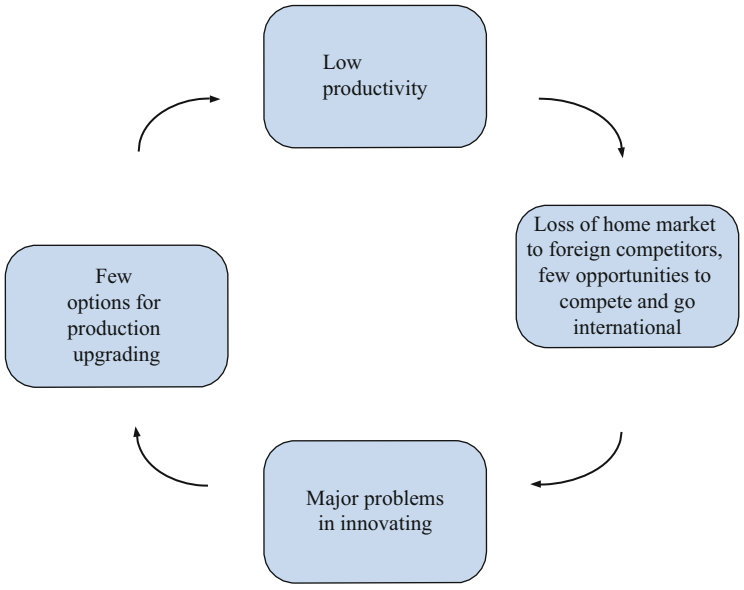

Fig. 1 The vicious circle of low productivity. *Source*: Adapted from Economic Commission for America and the Caribbean (ECLAC 2013, p. 12)

According to a comparison of business entry and survival rates between Argentina, Brazil, Colombia and Mexico and European countries, there are huge differences in the business dynamics (Bartelsman et al. 2004). Mexico for example has higher entry rates than Argentina, Brazil and most European countries. However,

the survival rate of Mexican SMEs is lower than in other countries from the region, indicating a business environment in which entry is easy but medium-term survival is more difficult. Although there is no detailed analysis of these dynamics in all Latin American countries, it is important to remind ourselves that the region's diversity shows how important the production environment is in determining SME performance. During highly volatile economic cycles, the mortality rate of firms is inversely correlated to their size and the entry rate of new firms (Latameconomy 2013).

How these highly volatile economic cycles impact on SMEs in Argentina is described in **Chap. 7 by Juan Carlos Hiba**, setting the scene for our empirical studies of how SMEs survive in a chronically variable socio-economic environment. In **Chap. 8, Ricardo Detarsio, Klaus North and Maialen Ormaetxea** present strategies from a sample of 25 companies in the area of Argentina's third biggest city Rosario. These SMEs have survived all major crises in the past 15 years and thus, have demonstrated their ability to cope with economic turbulences successfully. The following **Chap. 9** analyses in detail how owner/managers handle turbulent situations in four Argentine SMEs. **Peter Friedrich and Juan Carlos Hiba** found significant differences between managers in respect to the organizational learning processes. The development of a cognitive map for turbulent situations, in combination with manager motivation to engage in turbulent situations; their acceptance of these circumstances as a special task, which can be learned; their understanding of the 'right' time for learning; and the goal they want to achieve (spontaneous adaptation or embedded intelligence), are discussed as important preconditions to a develop learning mechanism for handling turbulent situations.

2 Capabilities to Cope with Turbulent Environments

2.1 Navigating in an Ocean of Uncertainty

"The environment in which SMEs now operate is subject to sharp changes and upheavals that are bound to have an impact on the way these firms develop and compete. The fast pace of scientific, technological and managerial change is having an impact on production, opening new possibilities for the use of modern technologies that are transforming ways of producing and doing business." (ECLAC 2013, p. 11).

By definition, the environment is the "pattern of all external conditions and influences affecting the life and organizations development" (Mintzberg et al. 2002). In turbulent environments such patterns present continuous and substantial changes that are uncertain and unpredictable (Brown and Eisenhardt 1998). A turbulent environment is difficult to predict and is characterized by disruptive changes (Dankbaar 1996).

It is important to distinguish a turbulent environment against a rapidly changing environment. While expectations may hold in a period of rapid change, under turbulence there is no better expectation over chance.

A turbulent environment is difficult to predict (Emery and Trist 1965). In line with this concept, Stigter (2002) states that the amount of instability, uncertainty and lack of control on the market denotes that the company is a part of a turbulent environment.

Ansoff and McDonnell (1990, p. 185) classify environmental turbulences in five levels as repetitive, expanding, changing, discontinuous and surprising. While the fourth level still provides partially predictable opportunities regardless of its discontinuous development, level five is characterized by completely unpredictable surprises. Turbulences increase to an extent where unexpected situations hit the companies faster than they can respond, as the element of surprise gains the upper hand.

Looking at required change, Stacey (1993) describes three different types of change situations, namely: closed change, contained change and open-ended change. Closed change refers to unambiguous issues, where the connection between cause and effect is logical and can be examined looking back at the history of previous events in the market or company, as their nature is rather repetitive. Therefore, it is possible to confidently predict the future and rational decision-making techniques can be used. Contained change only allows for making predictions to a certain extent, based on probability statements of performed actions and their consequences. However, their repetitiveness can only be identified to a limited degree. Open-ended change is the complete opposite of closed change. Forecasting becomes absolutely impossible as this type of change is characterized by complete uncertainty.

In the past firms have mainly learned to deal with closed and contained change triggered by repetitive, expanding, changing turbulences of the business environment. In the future firms will be confronted more and more with open-ended change in a discontinuous and surprising environment. This world is well characterized by Morin (1999): "Pieces of certainty do exist, but are very rarely to be found. We are navigating in an ocean of uncertainty that contains some archipelagos of certainty, not the other way around."

What does it mean for SMEs to navigate in this ocean of uncertainty? Is robust strategic decision making possible in today's world?

2.2 Implications for Competitive Strategies

To sustain competitiveness in turbulent environments, SMEs face major challenges due to their limited human, organizational and financial resources and capabilities. On the other hand SMEs are more flexible to react to changing situations than big enterprises (Detarsio et al. 2013). Owner/managers are overloaded by daily business and are pressed to delegate and integrate new employees (Van Bruystegem

et al. 2008). While striving to cope with current business, SMEs tend to lose grip on future development and thus deplete resources while growing in an often uncoordinated manner. Yet periods of growth can be quickly followed by periods of decline. Hence the need to learn (Holt and Mcpherson 2006) and adapt to turbulent environments (Detarsio et al. 2013). In such a situation, companies need to be adaptive, agile and are required to develop a degree of resilience (Liu 2013). Turbulent times, or times of crisis, in particular require SMEs to be resilient and to take steps towards changing people's minds and attitudes, their way of planning and doing things; and, tailoring tools and techniques to the business situation (Poolton et al. 2006). Consequently, in turbulent times companies have to learn even faster how to adapt their strategies to an ever-changing environment (Silverblatt and Korgaonkar 1987). The effect of turbulences, without a doubt, is demanding for those directly affected. But the turbulence in itself is not necessarily bad because it can offer favorable circumstances for structural adjustments to take place (Hall and Harvie 2003). According to Liao et al. (2003), it was mainly the consequence of turbulences which essentially contributed to adaptation in SMEs.

Theories of organizational learning and development of "dynamic capabilities" (e.g. Teece et al. 1997)) focus on big enterprises and need to be adapted and operationalized for SMEs. A literature search conducted in the Web of Science revealed that this is still a virgin research area. Our research question therefore is: ***"What is a successful management model for SMEs to compete in turbulent environments?"***

Turbulent environments cause threats and offer opportunities which require capabilities to survive "the storm" or a longer "drought". In this context Bhamra et al. (2011, p. 5375) argued: "*It is not only disasters but also small uncertainties or deviations that can cause challenges to organisations. Sometimes when large organisations cannot withstand these challenges, it is essential that sufficient effort is channeled into making small and medium enterprises (SMEs) robust and resilient to withstand these uncertainties and challenges."* Therefore, for firms it might be good to develop their awareness how vulnerable they are to prepare better for an unknown future. In **Chap. 10 Iñaki Garagorri** proposes a vulnerability analysis for SMEs and presents results of its application in the Basque country (Spain) following the economic crisis of 2008/2009.

In developing competitive strategies, firms will have to learn to deal not only with "the known knowns" but find ways to come to grips with the "known unknowns", which can be grasped through different ways of exploration and finally increasingly learn to deal with the "unknown unknowns", which are less easily dealt with (Leleur 2012). The evolution of strategic approaches reflects this journey towards sustaining competitiveness in an increasingly complex business environment. While the focus of strategic management in the 1980s was on positioning in the market and competition by restructuring and value chain configuration, in the 1990s the view on resources and capabilities to focus on core competencies became the doctrine. In the last 15 years strategic approaches of learning to develop dynamic capabilities in turbulent environments gained increasing importance (Leibold et al. 2002).

It has become widely accepted that the sustainability of competitive advantage, especially in context of dynamic markets, demands approaches that consider the need for reconfiguration of organizational resources (Eisenhardt and Martin 2000). The dynamic capabilities approach aims to understand the sustainability of competitive advantage in rapidly changing contexts, considering the resources and the company's capabilities for matching its environment (Gonzálvez et al. 2009). These capabilities support organizations not only in adapting to the business environment, but also structurally through innovation and collaboration with other companies, organizations and institutions (Teece 2007).

In order to use external knowledge, dynamic companies need to internalize (*sense new opportunities and learn from the knowledge acquired*) and combine (*integrate*) the information and new knowledge, coordinating it with the existing knowledge base (Pavlou and El Sawy 2011).

In **Chap. 2 Diego Kurtz and Gregorio Varvakis** explain how turbulent environments, dynamic capabilities and organizational resilience are interrelated. **Maurício Manhães and Guillermo Antonio Dávila discuss in Chap. 4** how creativity is a key element to deal with challenges that SMEs must overcome to innovate and thus seize opportunities offered by turbulent environments. The authors identify **innovation** challenges in SMEs and explain how creativity and organizational innovation are interrelated.

Creative processes, innovation and the development of dynamic capabilities in SMEs depend very much on the role and orientation of the owner/manager. As in most SMEs there is no formalized strategy process, the strategic orientation of the entrepreneur is crucial for the survival of the firm. Miles and Snow (1978) describe four types of entrepreneurs and how they act in "normal" situations. Based on their case study of Argentinian owner/managers of SMEs in **Chap. 9 Friedrich and Hiba** have extended this classification to the behavior in turbulent situations (Table 3).

Table 3 Differences in the strategic orientation of SMEs in 'normal' and 'turbulent' business

Strategic orientation	Business in normal situation (Miles and Snow 1978)	Business in turbulent situation (Friedrich and Hiba, Chap. 9)
Prospector	The value is to be first with new products, markets and technologies.	The value of crises is that they are used as a possibility for new actions.
Analyzer	Seldom first to market, but frequently a fast follower with a more cost-efficient or innovative product.	Crises are thoroughly analyzed without leading to actions.
Defender	Locates and maintains a secure niche by protecting their position in a relatively stable product or service area.	The company is put in a state of hibernation until the worst is over.
Reactor	Responds to market changes when required by environmental pressures.	Learning by acting and continuous adaptation of actions.

Source: Friedrich and Hiba (see Chap. 11) adapted after Miles and Snow (1978)

Let us now look a bit deeper into how to make business more resilient to the impacts of environmental turbulence as well as agile to stay in the market and capture new business opportunities.

3 The Dynamic SME

3.1 Structural Factors Enhancing Agility and Resilience of SMEs

In response to the identified challenges a turbulent environment creates, the dynamic SME seeks to create a business model more resilient to the impacts of environmental turbulences as well as more agile to stay in the market and capture new business opportunities through enhancing capabilities.

We define **agility** as the ability of a system to rapidly respond to change by adapting its initial stable configuration. In a business context, agility is the ability of an organization to rapidly adapt to market and environmental changes in productive and cost-effective ways (Wieland and Marcus Wallenburg 2012).

According to Walker et al. (2002) **resilience** is the ability to maintain the functionality of a system when it is distressed; or the ability to maintain the elements required to renew or reorganize if a disturbance alters the structure or function of a system (see also Bhamra et al. 2011 for a review of resilience concepts).

In the Dynamic SME project (www.dynamic-sme.org) **Detarsio et al. (see Chap. 8)** investigated how Argentinian SMEs successfully cope with crisis situations. Table 4 summarizes the findings and shows that resilience and agility are closely associated to structural factors and management practices of SMEs. Studies on entrepreneurial family businesses in uncertain environments by Nordqvist et al. (2014) in Latin America and by Dyer and Mortensen (2005) in Lituania support our findings.

In a dynamic SME the resilience and agility are rooted in the above structural factors, in the knowledge of people, in processes and routines as well as leadership

Table 4 Structural factors enhancing resilience and agility in SMEs

Resilience	Agility
Family-like structure	Low degree of formalisation
"Low" fixed costs	Quick decision making
Integration into local community	Involvement of few actors
Adaptability (downscaling and upscaling) of capacities	
Diversified activities of entrepreneur	Informal problem solving
Reliance on own financial resources	Short ways of "getting things done"
Willingness to maintain business at "all cost"	Close interaction with clients

Source: Own compilation based on Detarsio et al. (2013)

and employee behaviour. We will deal with each of these "ingredients" in the following sections.

With the aim to put these "ingredients" together in a structured manner and provide guidance to businesses for improving performance, Management Excellence Models (also called Business Excellence Models) have been developed. These models have not been thought specifically for dealing with turbulent situations, but rather with a view to improve management practices which should lead to a better performance. Based on their research covering 1006 small and micro-enterprises of Santa Catarina (Brazil), **Marcondes da Silva Cândido and Jackson André da Silva argue in Chap. 6** that Management Excellence Models can contribute to the growth of micro- and small enterprises.

In the above discussions we have focussed on the single SME. In turbulent situations, rapid growth or shrinking of markets collaborative networks will allow SMEs to share resources, knowledge, risks, costs and benefits. Working in collaboration with different degrees of formalization and intensity with each other, also leverages SMEs capacities to better handle variable, on-demand and larger customer requests, thanks to the larger scale and wider pool of competences that companies get when working together. This collaboration approach is discussed in detail by **Ricardo J. Rabelo and collaborators in Chap. 15,** using the case of a collaborative network formed in a group of mold-maker SMEs in the South of Brazil as a means to enhance their competitiveness.

3.2 Knowledge as Key Resource to Compete in Turbulent Environments

To understand how SMEs develop agility and resilience, i.e. survive, grow and remain competitive in turbulent times we have to take a closer look at knowledge as a key resource. Creating, sharing, using and protecting knowledge effectively allows the research of new market opportunities, increase of productivity and helps develop competitive advantage, which consequently leverages business success (Mathew 2008, p. 29–30; North and Gueldenberg 2011).

Three chapters of this book are devoted to knowledge and intellectual capital in SMEs. In **Chap. 11 Susanne Durst and Helio Aisenberg Ferenhof** present an approach to knowledge risk management for managing better critical knowledge in order to master present and future business challenges. **Eduardo Bueno, Carlos Merino and Cecilia Murcia** take an intellectual capital perspective to provide strategic guidance for New Technology Based Firms in **Chap. 5**. To act in an agile manner in turbulent times, SMEs require effective tools for managing knowledge. In **Chap. 12 Klaus North and Renia Babakhanlou** provide an overview of simple tools for SMEs.

Managing knowledge is closely linked to developing dynamic capabilities. Following Pavlou and El Sawy (2011) argument that dynamic capabilities are

based on sensing, learning, integration and coordination, we will explore how these capabilities are related to managing knowledge and what the specific challenges are for SMEs (see also Chap. 12).

Sensing capability: turbulent environments require receptiveness to weak signals, a constant gathering of information on the business environment, market and technology trends and customer needs, followed by interpretation of this information with the available knowledge and to draw conclusions. As in SMEs this "sensing" is mainly done by the owner/manager the challenge here is to communicate internally what is changing and create a shared understanding of what this means for the firm.

Learning capability: in turbulent environments new business opportunities and threats to existing business arise, which require new knowledge and skills to offer new or revised products, services or change business models. The challenge is here to integrate learning into daily operations and business development (see "Learning to Grow" methodology discussed below).

Integration capability: integration focuses on building an overall sense-making and understanding throughout the organization. Shared tacit knowledge is at the core of an integration capability. New or changed ways of doing business require the ability to combine individual knowledge into new operational processes of a team or a unit. The challenge here is that everybody quickly learns to assume his or her new role in the "game".

Coordination capability: coordination focuses on orchestrating individual tasks and activities. This includes maintaining the acceptance of change, establishing monitoring systems and assuring the availability of financial and human resources. For SMEs, the challenge lies in empowering employees who need to develop the knowledge and competences to decide, monitor and act in an entrepreneurial spirit. Owner/managers need to learn how to delegate.

In this sense we **define a dynamic SME** *as a small social collectivity with a well-developed sensing, learning, integration and coordination capability. These capabilities become manifest in an agile, resilient and innovative behavior leading to sustainable competitiveness in turbulent environments.*

3.3 Processes and Routines of a Dynamic SME

Knowledge and learning need processes and routines in order to be connected to the value generation in a firm. In Chap. 2 Kurtz and Varvakis compare similarities between the concepts of dynamic capability development and the components associated to organizational resilience. This is presented using a list of related capabilities and routines proposed by the two constructs based on Pavlou and El Sawy (2011) Sensing –Learning- Integration –Coordination sequence.

In the following we summarize key processes for achieving resilience and agility in turbulent environments using this sequence.

Sensing processes:
- Monitoring the environment in which the organization operates.
- Monitoring and tracking of changes in market and competition.
- Processes of identifying weak signals, interpreting them and recognizing factors that can trigger crises.
- Processes of rapid adaptation or new development of products, services, production processes or business models to exploit new market opportunities.

Learning processes:
- "Customer insight" process to understand and anticipate customer and supplier needs
- Shared reflection and "lessons learned" process (Who are we? What have we learned? What are the possible scenarios? How do we want to act in the future?) to develop a shared (tacit) understanding for adapting to changes naturally.
- Learning processes close to the job.
- Experimentation and creative processes as a basis for innovation.

Integrating processes:
- Definition of roles and responsibilities in the organization.
- Communication processes towards shared objectives and goals.
- Processes of employee participation (in strategic decisions).
- Processes of quickly integrating what has been learned in operations.

Coordination processes:
- Planning process: designing the actions considering contingencies.
- Allocation process of tangible (physical structure, finance and human resources) and intangible (relations, social capital and knowledge) assets.
- Agile management of interdependencies among tasks and actors.
- Tracking processes of the results obtained.

3.4 New Roles for Leaders and Employees

Developing sensing, learning, integration and coordination capabilities requires, apart from routines and processes, a change in leadership and employee behavior. There is research evidence that shows "the management style and external orientation of owner/managers appear to be significantly influential in the mode, scope and processes of learning" (Zhang et al. 2006). Owner/manager openness to their organizational context and their interpretation of environmental signals influences the degree of interaction, the amount of information that flows across organizational boundaries and learning opportunities (Child 1997).

In a study of 108 SMEs, Aragón-Correa et al. (2008) found that companies' "potential to adopt proactively to environmental practices is associated with specific organizational capabilities, based on their unique strategic characteristics of

shorter lines of communication and closer interaction (*in the company*), the presence of a founder's vision, flexibility in managing external relationships, and an entrepreneurial orientation. These capabilities are shared vision, stakeholder management, and strategic proactivity." Antonacopoulou and Sheafer (2013) argue that learning in crisis is a mode of learning that encourages individuals and organizations to exercise their judgments by questioning deeply held beliefs and deeply embedded norms, reconstructed in the process of their core practices. The flow of information into the firm and an intensive interaction with the outside world requires the building of social capital and external networks to access political, human and financial capital and is considered very important for owner-managers to cope with hostile environments (Dyer and Mortensen 2005).

These new roles and behaviors need to be learned. In such an environment, leaders who dominate strategic and operational issues and practice limited delegation and reduced internal communication will not be successful. Leaders have to learn to act rather as coaches, inducing participative strategy development, delegation of operational responsibilities and practice intensive communication.

In the context of the Dynamic SME project, Friedrich and Hiba (Chap. 9) analyzed the leadership and learning behavior of owner/managers of Argentinian SMEs and as a result, highlight the importance of the "cognitive map" of the manager/owner. They summarize their findings as follows: "In which way owner/managers choose to address turbulent situations, seems to be preconditioned by their overall understanding of and experiences from previous turbulent situations.

Comm (2012) concludes, based on a case of a small Irish print firm, that dynamic capabilities emerged as a result of the interaction of the CEO's capacity to engage in higher order learning and the CEO's knowledge and networks as they relate to the business that allow the CEO to identify, assimilate and exploit new knowledge.

Changes in leadership practices also induce different behaviours of employees. In stable environments it might be tolerable that employees have a limited understanding of business, execute their predefined tasks and show a reactive behavior responding to a patriarchal leader. In an environment which requires quick action, tapping ideas how to overcome the crisis, acceptance of reduced working hours and pay in order to contribute to the survival of the firm and secure the own workplace, employees need to take a role as active players. This requires an understanding of the business and client needs, a motivation to work towards objectives, and taking initiative in a proactive mindset. This change requires trust building and a learning process to accept and practice the new roles.

Also external service providers such as consultants and SME which support institutions have to evolve their services to enhance the development of dynamic capabilities in SMEs. While traditionally SMEs tend to hire expert consultants who implant "ready-to-use" solutions, in changing environments coaches and process consultants need to develop a helping relationship (Schein 1999) to enable teams of the firm to develop their own sustainable solutions. Equally, SME support institutions have to change their approach from standardized training and consulting towards the creation of tailored learning environments which also enhance inter-

Table 5 Changed roles of actors in stable and turbulent environments

Actor	Approach in stable environments	Approach in turbulent environments
SME owners, managers	***Leaders as "captains":*** Dominant in strategic and operational issues, Limited delegation Reduced internal communication	***Leaders as "coaches":*** Participative strategy development Delegation of operational responsibilities Intensive communication
Employees	***Employees as subordinates:*** Limited understanding of business Execute predefined tasks Reactive behavior	***Employees as active players:*** Understand business and client needs Work towards objectives Take initiative, proactive behavior
Consultants	***Expert consultants***: implant "ready-to-use" solutions	***Coaches and process consultants:*** Enable firm teams to develop their own sustainable solutions
SME support institutions	***Standardized solutions:*** Support individual firms with standardized training and expert consulting	***Tailored learning environments:*** Create learning and innovation environments and processes, enhance inter-firm collaboration

firm collaboration. Table 5 summarizes the changed roles of actors in stable and turbulent environments.

4 Conclusions and Management Implications

In the project "Dynamic SME" we have asked the question: "What is a successful management model for SMEs to compete in turbulent environments? Our answer is the concept of the "Dynamic SME", which is characterised by five capacities the development of which is a leadership and management task.

The Dynamic SME:

1. recognizes or anticipates changes in the environment and (re)acts to them with high efficiency and speed;
2. actively exploits market opportunities;
3. develops a management approach of employee empowerment and fosters the entrepreneurial spirit of employees;
4. develops a high capacity for learning and innovation, and integrates learning on–the-job into daily business;
5. cultivates emotional intelligence, which results in trustful and collaborative behavior.

In a dynamic SME the above capabilities are rooted in structural factors as well as processes, routines, leadership and employee behaviour. How firms develop these five capacities varies according to the cultural settings they are acting in. Family, firm or country cultures can be both barriers and enablers to cope with turbulent situations. **Chapter 3 by Peter Friedrich and Jaqueline Rossato** therefore looks into the question: "What are the dimensions of organizational and national culture which support organizational learning for efficient handling of turbulent situations?"

External assistance can help SMEs to become "Dynamic SMEs". There is an abundance of programmes worldwide aiming at an improvement of SME performance by providing external advice. Programmes vary widely in their approaches and effectiveness. The experience with currently about 90 projects demonstrates that the "*Learning to grow*" methodology is an effective way of developing capabilities relevant to sustain growth in SMEs. As **Klaus North, Thomas Hardwig and Manfred Bergstermann explain in Chap. 13**, combining business objectives with a learning journey addresses the desire of owner/mangers for measurable short or midterm business results and introduces changes of attitudes and behaviours towards a more participative management. Employees gain confidence in their capabilities and learn how to evaluate and develop their competencies. The highly successful results of transferring the *"Learning to grow"* methodology to eleven SMEs belonging to the textile sector in southern Brazil are reported in **Chap. 14**. Furthermore, three case studies from Germany and Argentina explain how firms can profit from empowering employees based on the "*Learning to grow*" methodology.

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Dynamic Capabilities and Organizational Resilience in Turbulent Environments

Diego Jacob Kurtz and Gregorio Varvakis

Abstract This chapter discusses the role and importance of dynamic capabilities for SMEs, considering how these capabilities can assist adaptation and resilience to maintain competitiveness in turbulent environments. The Dynamic Capabilities approach aims to understand the sustainability of competitive advantage in rapidly changing contexts, considering the resources and the company's capabilities in adapting to its environment. Turbulence, instability and difficulties coming from the external environment can impact on the growth potential and survival chance of Small and Medium Enterprises (SMEs). In this context, the term Organizational Resilience incorporates strategic actions to maintain and adapt the organization in its environment. The chapter proposes an integration between the concepts and establish the initial steps to develop Dynamic Capabilities and Organizational Resilience, especially for SMEs.

1 The Challenge of Rapid Adaptation and Resource Reconfiguration

The sustainability of competitive advantage, especially in context of dynamic markets, demands approaches that consider the need for reconfiguration of organizational resources (Eisenhardt and Martin 2000). The Dynamic Capabilities approach aims to understand the sustainability of competitive advantage in rapidly changing contexts, considering the resources and the company's capabilities for matching its environment (González et al. 2009). These capabilities support organizations not only in adapting to the business environment, but also structurally through innovation and collaboration with other companies, organizations and institutions (Teece 2007).

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In order to use external knowledge, dynamic companies need to internalize (*sense new opportunities and learn from the knowledge acquired*) and combine (*integrate*) the information and new knowledge, coordinating them with the existing knowledge base (Pavlou and El Sawy 2011).

This becomes even more evident when we turn the lens to Small and Medium Enterprises (SMEs). It is important to consider that turbulence, instability and difficulties coming from the external environment can impact on the growth potential and survival chance of these organizations in a medium or long term perspective. Especially if we consider that SMEs can be more susceptible to such changes because of their informal procedures and lack of structure (financial and expertise, for example). The critical factors consist of defining how to understand this environment, which aspects should be considered and how to proceed with the integration of the several variables available in the organizational environment.

In this sense, the questions are related to identifying the paths and comprehending how to combine pre-existing knowledge, as well as capturing and processing it in order to better match opportunities. How to leverage these capabilities in difficult times in order to make business more agile or resistant to the impacts of environmental turbulence?

The answer may come from the context in which the organizations are located. Companies that operate in rapid change environments are more open to a larger share of business opportunities and new or improved products, than those operating in stable and predictable conditions.

Especially in times of rapid adaptation and resource reconfiguration, Nogueira and Hallal (2013) address an important element in assessing organization responsiveness in turbulent conditions. The term "organizational resilience" is used in contexts that require strategic actions to maintain and adapt the organization in their environment, even in situations of unexpected events. These features demonstrate a positive impact on overall organizational performance.

This chapter aims to discuss the role and importance of dynamic capabilities for SMEs and explain how these capabilities can assist the adaptation and resilience, in order to maintain competitiveness.

2 Theoretical Background

Our theoretical framework is based on three major constructs: (1) Dynamic capabilities; (2) Turbulent environments; and, (3) Organizational resilience. All analysis considers the application to the context of SMEs.

2.1 Dynamic Capabilities

Teece (2007) proposes the literature integration among innovation and strategy based on a framework that highlights the critical management capabilities in order to maintain the evolutionary fitness and company business. Dynamic capabilities enable companies to create, deploy and protect the intangible assets that support the superior long-term business performance.

The foundations of these capabilities consist in skills, processes, procedures, organizational structures, decision rules and distinct disciplines that motivate and promote the detection (**sensing**) and capture (**seizing**) opportunities in order to reconfigure (**transforming**) their capabilities (Teece 2007).

Dynamic capabilities consist of creating resource combinations that create value and are difficult to imitate, including an effective coordination of inter-organizational relationships on a global basis that is able to provide competitive advantages to the company. Dynamic capabilities are conceived as a source of sustainable advantage in Schumpeterian regimes of rapid change (Griffith and Harvey 2001). Pavlou and El Sawy (2011) identify a set of capabilities focused on the detection of opportunities, learning, coordination and integration aiming at reconfiguring the existing capabilities, in order to better match the environment. Given these scenarios, it is important to explore market opportunities quickly, providing high capacity for learning, innovation and integration (Teece 2007). For Cepeda and Vera (2007), the implementation of dynamic capabilities—using the knowledge configuration available—is the cornerstone of new operational capabilities.

Dynamic capabilities research is part of an emerging field. It studies the activities of companies included in turbulent administrative environments. Empirical results suggest that these capabilities are related to organizational renewal and reconfiguration according to their environment conditions. Companies need to be flexible and innovative when market and technological changes require quick decisions or when competition and market structures are difficult to predict. In other words, dynamic capabilities should be established at the core of the strategic management process, consisting of a set of specific and identifiable processes.

The sustainability of competitive advantage, especially in contexts of dynamic markets, demands approaches that consider the need for organizational resources reconfiguration (Eisenhardt and Martin 2000). The approach complements and goes beyond the classical view of competitiveness (Porter 1980), core competencies (Prahalad and Hamel 1990) and the organization's resources based view (Barney 1991). Table 1 shows a set of definitions related to Dynamic capabilities.

Considering the approaches presented, our dynamic capabilities concept is based on González et al. (2009) and Pavlou and El Sawy (2011), where dynamic capabilities are understood as the ability to adapt to rapid changes and unpredictable environments, being proposed as instruments for the reconstruction of existing capacities, classified as: (1) sensing/detection; (2) learning; (3) integration; and, (4) the coordination capacity.

Table 1 Definitions related to dynamic capabilities

Author	Definition
Teece and Pisano (1994)	"Subset of skills or capabilities that enable the company to create new products and processes, thus responds to changing market circumstances."
Collis (1994)	There are certain organizational capabilities that drive the exchange ratio of common resources.
Teece and Pisano (1994)	He argues that the ability to change the organizational resources is a story of strategic routines by which managers alter the resource base of the company (purchase and shed resources, integrate and combine them all together) to generate new strategies for creating value.
Henderson and Cockburn (1994)	They feature the "Architectural Skills" as they are the architects behind the creation, evolution and recombination of resources in search of new sources of competitive advantage.
Helfat (1997)	"The Dynamic Capabilities allow companies to create new products and processes and respond to changing market conditions."
Teece et al. (1997)	"Ability of the company to integrate, build and reconfigure internal and external skills to adapt to the rapidly changing environments." As in: "reflect the organizational ability to achieve new and innovative forms of competitive advantage."
Zahra (1999)	"Capabilities that can be used as platforms, from offering new products, goods and services when change is the norm."
Helfat and Raubitschek (2000)	"The ability of companies to innovate and adapt to changes in technologies and markets, including the ability to learn from mistakes."
Cockburn et al. (2000)	"The competitive advantage of a company is derived from the company's strategic response to changing environments or new information about opportunities to benefit."
Zajac et al. (2000)	Organization's ability to "make the necessary changes" when "faced with the need to change (defined by environmental contingencies and organizational), which results in a greater benefit."
Eisenhardt and Martin (2000)	"It consists of strategic and organizational specific processes (such as product development, alliances and strategic decision making) that create value in companies operating in dynamic markets by manipulating resources into new strategies for value creation."
Rindova and Kotha (2011)	Use the term "Continuing Metamorphosis" to refer to "profound changes" that takes place within the company to change the "dynamic adjustment of the company's resources and external factors associated with a changing environment."
Makadok (2001)	Shows the "importance of an alternative mechanism for generating income (Schumpeterian) called construction capabilities, different feature selection" (obtaining Ricardian rents).
Griffith and Harvey (2001)	The Global Dynamic Capabilities consist in creating combinations of resources difficult to imitate, which includes coordinated effective inter-organizational relationships on a global basis that can provide a company a competitive edge.
Lee et al. (2002)	"The dynamic capabilities are designed to rise in sustainable competitive advantage in rapidly changing Schumpeterian regimes."

(continued)

Table 1 (continued)

Author	Definition
Zollo and Winter (2002)	Learned pattern of collective activity through which the organization systematically generates and modifies its operating routines to achieve greater profitability.
Zahra and George (2002)	"They allow the company to reconfigure their resource base and adapt to market conditions in order to achieve a competitive advantage."
Aragón-Correa and Sharma (2003)	If you deal with skills that arise from the implementation of "pro-active strategies" that allow the organization to align with changes in the global business environment.
Winter (2003)	Describes the Dynamic Capabilities and organizational capabilities (high-level routines or set of routines) affected by the change and that "can change the product, production process, scale, or customers (markets) attended."
Helfat and Peteraf (2003)	"By definition, the dynamic capabilities require adaptation and change, because they build, integrate and reconfigure other resources or capabilities."
Zahra et al. (2006)	"The ability to reconfigure resources and routines of a company as established and considered as the most appropriate for its main decision-maker"; "Presence of rapidly changing problems" for which the company has "the ability to change the way that solves their problems (dynamic capacity of a higher order of change capacity)"... through "dynamic ability to change, reconfigure their existing organizational capabilities."
Teece (2007)	"Capabilities of the company, difficult to imitate, needed to adapt to customer demands and new technological opportunities. It also includes the company's ability to configure the environment in which it operates, develop new products and processes and design and implement viable business models".
Augier and Teece (2007)	"Capacity (inimitable) with which the company has to form, reform, configure and reconfigure its asset base to respond to changes in markets and technologies."
Wang and Ahmed (2007)	"Orientation behavior of the company for continuous integration, reconfiguration, refurbishment and rebuilding of their resources and capabilities and, more importantly, the increment and reconstruction of their core capabilities in response to a changing environment in order to sustain competitive advantage."
Ng (2007)	"It refers to the ability of organizations to develop and seek new resources and configurations that fit the changing market conditions."
Oliver and Holzinger (2008)	"It refers to the ability of companies to maintain or create value by developing and deploying internal competencies to maximize consistency with the requirements of a changing environment."
González et al. (2009)	"The ability to adapt to rapidly changing and unpredictable"
Pavlou and El Sawy (2011)	"The dynamic capabilities are proposed as instruments for the reconstruction of existing operational capabilities, classified as: (1) detection; (2) learning; (3) integration; and (4) the coordination capacity."

Source: Adapted from Rossato et al. (2011)

2.2 Turbulent Environments

By definition, the environment is the pattern of all external conditions and influences affecting the organization's life and development (Mintzberg and Quinn 2001). In turbulent environments such patterns present continuous and substantial changes that are uncertain and unpredictable (Brown and Eisenhardt 1998). A turbulent environment is difficult to predict and is characterized by disruptive changes (Dankbaar 1996). Ansoff and McDonnell (1990) provide a multilevel model with five levels of turbulence (ranging from 1 for minimum and 5 to maximum) to categorize the current condition in which an organization operates. Kipley and Lewis (2009) summarized the stages as follows (see Fig. 1):

The first level, where only few organizations operate, is stable and no changes occur. Level 1 is defined as "stable"; within this level the environment has no change and tomorrow will be similar to the present, hence, planning at level 1 is extrapolative.

Level two is found in segments where the economy is growing rapidly and demand exceeds supply. In such cases, prices are the determining factors in decision making, while production and efficiency is the key to success. Level 2 is "expanding"; change is slow and incremental, visible, and predictable, planning at level 2 is also extrapolative.

Level 3 is "changing"; although change is fast, it is still incremental and fully visible. The first three levels of environmental turbulence are subclassified by Ansoff as "history driven" in that the future is a logical extension of the historical past and present (Ansoff and Mcdonnell 1990). Level three represents environments where customer demands are differentiated by purchasing power and differentiated products, the success factor here depends on marketing effectiveness.

Levels 4 and 5 are defined as "discontinuous & surpriseful" by Ansoff; the future is very different from the historical past and past successes do not guarantee future

Predictability Changeability	Turbulence Level	1	2	3	4	5
	Environmental turbulence	Repetitive	Expanding	Changing	Discontinuous	Surprising
	Complexity	National Economic	–	Regional Technological	–	Global Socio-Political
	Familiarity of events	Familiar	Extrapolable		Discontinuous Familiar	Discontinuous Novel
	Rapidity of Change	Slower than response		Comparable to response		Faster than response
	Visibility of future	Recurring	Forecastable	Predictable	Partially Predictable	Unpredictable surprises

Fig. 1 Levels of turbulence. *Source*: Ansoff and Mcdonnell (1990)

success. Level 4, a major departure from the extrapolative environment, is defined as "discontinuous". In order to be successful a firm must abandon its historical attachment to particular customers, technologies, and/or products that it was accustomed to in Level 3 and formulate its strategy with a new set of rules. The challenges that face a firm in Level 4 include limited visibility, partial predictability, rapid change and inability of the firm to react to the new change within the time required. At level four the future is difficult to predict and changes are occurring at a faster rate than the company is able to respond. In this environment, the production efficiency, marketing effectiveness and product responsiveness are success determinants, but these actions must be constantly adjusted in response to market changes.

Ansoff's Level 5 is described as "surpriseful"; change at this level occurs without notice, without visibility, unpredictable, and extremely rapid. In order for firms to become successful at this level they must be open and flexible to create products and services with advanced innovative technological ideas. SMEs who compete globally most likely align within the description of turbulence Level 5. An extension of the definition of Levels 3–5 environment was provided by (Ansoff et al. 2004) to include "the pace of change, planned and unplanned product obsolescence coupled with the discontinuous rate of change." "This increased intensity changes the existing paradigm of firms focusing solely on industry competitors, and creates a new paradigm which includes threats from unrelated industries". In last and most unstable is level, leadership is the key success factor (Ansoff and Mcdonnell 1990).

It is important to distinguish a turbulent environment against a rapidly changing environment. While a rapid change can be expected, turbulence cannot. A turbulent environment is difficult to predict (Emery and Trist 1965). In line with this concept, Stigter (2002) states that the amount of instability, uncertainty and lack of control on the market denotes that the company is a part of a turbulent environment.

According to Cameron et al. (1987), "the experience provided by the turbulence is discontinuous". Usually these changes are radical, non-linear, but may occur frequently. Johnson and Scholes (1989) define turbulence with two basic parameters: dynamism and complexity.

Emery (1977) argues that in turbulent environments, adaptation is not possible without understanding the complex interaction of socioeconomic and political effects with the business. Emery's turbulent environment also highlights that it is unlikely individual systems can, by their own individual efforts, adapt continuously to this type of environment. Organizations facing crisis and technological uncertainty should develop technology skills through learning and investing in innovation capacities (Garcia-Morales et al. 2007).

In order to overcome environmental instabilities and uncertainties, Johnson et al. (2004) state that organizations must develop their knowledge base on trends and changes in the external environment. Through the comparison of different types of strategies (conservative and innovative), Leidner et al. (2011) show that when the market is highly uncertain, the performance of organizations based on conservative strategies are negatively affected. Furthermore, this study provides evidence that

strategies focused on innovation tend to perform better in both conditions (high instability and moderate environments).

Complementing the approach presented, our proposal argues that, at the highest level of turbulence, agility and resilience also are critical success factors for sustainable competitiveness. To achieve a status of excellence, it is essential to quickly respond and maintain a resource base not weakened in difficult times.

We define Turbulent Environments based on Dankbaar (1996) and Brown and Eisenhardt (1998), as environments in which uncertain and unpredictable external phenomena combine to form disruptive changes.

2.3 Organizational Resilience

As discussed by Nogueira and Hallal (2013), the organizational resilience concept was first applied to describe the need for organizations to respond to rapid changes in the business environment. The authors also present the work of Hamel and Välikangas (2003) arguing that successful organizations are those who understand the dynamic nature of their business environments.

Whitehorn (2011) shows that organizations should consider some behaviors and strategies such as agility, integration, leadership, change and communication. Nogueira and Hallal (2013) also cite the work of Donnellan et al. (2007), indicating that resilience is related to predicting and preventing unexpected threats. Is also important to have sensitivity, change perception and manage a flexible decision-making process. Resilience should be used as a central strategy through a continuous process, enabling the establishment of trends that can unbalance the business. The successful outlook occurs when the organization can understand the process of change before the need for change becoming obvious.

It is in this context of uncertainty and rapid changes that Moraes et al. (2007) argue that there will always be a path to act in a creative way, even in the most difficult situations. Resilient organizations will always find a way to seize opportunities and take advantage of the situation.

Resilience is the ability of a system to overcome the disturbance caused by external phenomena, and still remain unchanged. In this sense, the resilient companies are positioned in a way that they can respond to these challenges. To survive in a turbulent world only the resilient companies will be able to see the changes caused in a crisis scenario (Hamel 2007).

The following table presents a set of Resilience concepts based on Bhamra et al. (2011) (Table 2).

Finally, Nogueira and Hallal (2013) structured a number of variables and metrics related to resilience characteristics and organizational agility, which in the context of this study, may be linked in a higher or lower degree with the business dynamism outlined by the dynamic capabilities; presented and discussed in the following section.

Table 2 Definitions of resilience

Author	Context	Definition
Bodin and Wiman (2004)	Physical systems	The speed at which a system returns to equilibrium after displacement, irrespective of oscillations indicates the elasticity (resilience)
Holling (1973)	Ecological systems	The measure of the persistence of systems and of the ability to absorb change and disturbance and still maintain the same relationships between state variables
Walker et al. (2004)	Ecological systems	The capacity of a system to absorb a disturbance and reorganise while undergoing change while retaining the same function, structure, identity and feedback
Gunderson (2000)	Ecological systems	The magnitude of disturbance that a system can absorb before its structure is redefined by changing the variables and processes that control behaviour
Tilman and Downing (1994)	Ecological systems	The speed at which a system returns to a single equilibrium point following a disruption
Walker et al. (2002)	Socio–ecological systems	The ability to maintain the functionality of a system when it is perturbed or the ability to maintain the elements required to renew or reorganise if a disturbance alters the structure of function of a system
Carpenter et al. (2001)	Socio–ecological systems	The magnitude of disturbance that a system can tolerate before it transitions into a different state that is controlled by a different set of processes
Luthans et al. (2006)	Psychology	The developable capacity to rebound from adversity
Bruneau et al. (2003)	Disaster management	The ability of social units to mitigate hazards, contain the effects of disasters when they occur and carry out recovery activities that minimize social disruption and mitigate the effects of future earthquakes
Paton et al. (2000)	Disaster management	Resilience describes an active process of self righting, learned resourcefulness and growth. The concept relates to the ability to function at a higher level psychologically given an individual's capabilities and previous experience
Coutu (2002)	Individual	Resilient individuals' posses three common characteristics. These include an acceptance of reality, a strong belief that life is meaningful and the ability to improvise
Hamel and Välikangas (2003)	Organisational	Resilience refers to the capacity to continuous reconstruction
Horne and Orr (1998)	Organisational	Resilience is the fundamental quality to respond productively to significant change that disrupts the expected pattern of event without introducing an extended period of regressive behaviour
McDonald (2006)	Organisational	Resilience conveys the properties of being able to adapt to the requirements of the environment and being able to manage the environments variability

(continued)

Table 2 (continued)

Author	Context	Definition
Hollnagel et al. (2006)	Engineering	The ability to sense, recognise, adapt and absorb variations, changes, disturbances, disruptions and surprises
Hamel (2007)	Organisational	Organizational Resilience is the ability of a company to overcome the disturbance caused by external turbulences, and still remain unchanged and competitive.
Donnellan et al. (2007)	Organisational	Resilience is related to predicting and preventing unexpected threats.

Source: Adapted from Bhamra et al. (2011)

We consider that organizational resilience permeates a complete paradigm shift into various sectors of the company. In the "century of knowledge" companies need to respond quickly to external changes even when these are chaotic and unpredictable. Economic instability and business discontinuity require agility and organizational resilience. Terms like *Flexibility, Focus, Organization, Positive and Proactive* seem to be common features that cross various studies in this area.

For conceptualization, we support Walker's (2002) defining resilience as the ability to maintain the functionality of a system when it is perturbed or the ability to maintain the elements required to renew or reorganise if a disturbance alters the structure of function of a system.

3 Dynamic Capabilities and Organizational Resilience Development

In the same way that the alignment between dynamic capabilities and organizational resilience are essential for survival in turbulent environments (to the extent that the level of turbulence increases, more of these capabilities are required), the planning and strategy related to such implementation must also be considered. Pavlou and El Sawy (2011) reconciled the various labels and meanings from the dynamic capabilities literature, and grouped them under a parsimonious set to reflect Teece et al.'s (1997) and Teece's (2007) conceptualization. As showed below, dynamic capabilities are viewed as tools that enable the reconfiguration of existing operational capabilities (Pavlou and El Sawy 2011) (Fig. 2).

There are critical factors that allow the internalization of practices in the context of SMEs. They should be considered in order to adapt the traditional organizational culture (involving employers and employees). In the next topics we will try to explore some synergic characteristics between these concepts.

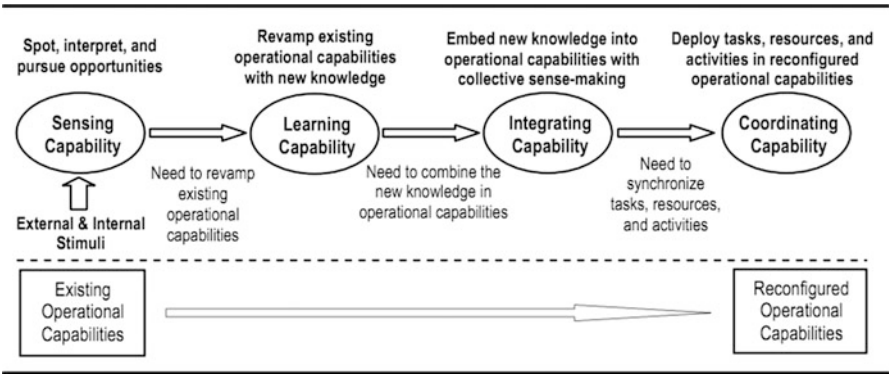

Fig. 2 A framework for representing the proposed measurable model of dynamic capabilities. *Source*: Pavlou and El Sawy (2011)

3.1 Sensing Capability

Understanding the needs and desires of customers is not always an easy task. Some customers have needs of which they are not fully aware (Kotler 2000). Organizing procedures, routines and best practice to facilitate the identification of these needs is critical. In other words a "radar system" of perceived opportunities is intrinsically related to the dynamic capability of "**sensing**".

According to Pavlou and El Sawy (2011), the three basic routines of the sensing capability are: (1) generating market intelligence (Galunic and Rodan 1998); (2) disseminating market intelligence (Kogut and Zander 1996); and (3) responding to market intelligence (Teece 2007). Generating market intelligence is related to identifying customer needs (Teece 2007), being responsive to market trends (Amit and Schoemaker 1993), identifying business opportunities (Day 1994), recognizing rigidities (Sinkula 1994), and detecting resource combinations (Galunic and Rodan 1998). Disseminating market intelligence relates to interpreting market intelligence (Kogut and Zander 1996), making sense of events and developments, and exploring new opportunities (Teece 2007). Responding to market intelligence also relates to initiating plans to capitalize on market intelligence (D'Aveni 1994) and pursuing specific market segments with plans to seize the new market opportunities (Teece 2007).

Considering the characteristics that help the maintenance of organizational resilience (Nogueira and Hallal 2013), it is possible to identify potentially converging factors with the dynamic capability of "sensing". The features that confer organization resilience are related to the ability of recognizing the triggers of crises, as well as the ability to monitor market changes and competitors. A clear understanding of market and competitors, combined with systematic procedures of monitoring the environment can help organizations to predict periods of crisis or even adapt their resources in advance to deal with situations of instability. Knowing

the most effective way of how to identify such opportunities, especially those associated to the market, is crucial at this stage.

3.2 Learning Capability

Once a market opportunity is identified it must be addressed with new products (Pavlou and El Sawy 2011), which require a decision to remodel existing operational capabilities with learning, new knowledge and skills (Teece 2007).

Learning capability is defined by Pavlou and El Sawy (2011) as the ability of remodeling existing operational capabilities with new knowledge. According to Zahra and George (2002) who described absorptive capacity (learning) as a dynamic capability, the four underlying routines of the proposed learning capability are acquiring, assimilating, transforming, and exploiting knowledge. Cohen and Levinthal (1990) suggest that learning helps groups become more proactive by enhancing their "creative capacity".

The competence of transforming new knowledge opportunities in order to be more resilient should include the ability to exploit such opportunities to increase competitive advantage. The learning stage should also consider the awareness of the weaknesses (and what should be done for their mitigation) and strengths (including respective enhancement strategies).

The conversion of received signals into new knowledge should occur naturally, especially when the organization is facing abrupt changes. Resilient organizations prepared for change should make use of the available knowledge and learning results to minimize the impact of external instability.

Finally, it is ineffective to have a good monitoring system when the organization is not prepared to convert the data and information collected into knowledge and understanding while anticipating both the needs of customers and suppliers. In other words, the product of the "sensing" step should be interpreted and its outcome must permeate the organization's value network.

3.3 Integrating Capability

Integrating capability is the ability to combine individual knowledge into the unit's new operational capabilities (Pavlou and El Sawy 2011). Its routines, contribution, representation, and interrelation of individual input to the collective business unit, are closely related to the dynamic capabilities literature. Specifically, contribution is related to disseminating individual suggestions within the business unit (Okhuysen and Eisenhardt 2002).

Considering that knowledge integration should be performed to align the tasks at the level of both the individual and the organization, it is necessary to define the roles and responsibilities of employees to recognize leaders and to establish clear

objectives and goals toward their actions. Is also critical to equalize hierarchical relationships by encouraging and involving the employees in organizational strategic decisions.

3.4 Coordinating Capability

Although coordination focuses on orchestrating individual tasks and activities, integration focuses on building an overall sense-making and understanding through the organization (Crowston and Kammerer 1998). Coordinating capability should facilitate the reconfiguration of operational capabilities. The ability to orchestrate and deploy tasks, resources and activities in the new operational capabilities.

Coordinating a dynamic company can be a complex task. Besides maintaining the acceptance of change necessity, monitoring systems, learning and resources integration, it is also necessary track the results using clear and easily understandable metrics.

Through clear and updated information of available resources, it is possible to design and predict business scenarios and follow the respective plans. The aim at this stage is to promote the organization's ability to plan its actions considering the possible contingencies and different paths. The result is the maintenance of competitiveness and protection of tangible (physical structure, finance and human resources) and intangible assets (relations, intellectual capital and knowledge).

4 Matching Dynamic Capabilities and Organizational Resilience

In order to develop such capabilities Dynamic capabilities (DC) and Organization resilience (OR), it is essential to create new products and processes, implement new organizational forms and business models, driven by an intensely entrepreneurial genre of management. The dynamic capabilities approach forms the basis of understanding that opportunities, once sensed, can be seized to reconfigure the business when the market and/or the technology inevitably is transformed once again (Teece et al. 1997).

Complementarily, Pavlou and El Sawy (2011) show that dynamic capabilities do have an effect on performance, but they do so indirectly by reconfiguring operational capabilities into new ones that better fit the environment. The authors present the positive role of dynamic capabilities in the entire spectrum of environmental turbulence.

The organizational performance is also shown as a reflection from resilient organizations (Nogueira and HallaL 2013). The relationship with the dynamic organization is located in the continuous process of looking for opportunities and

the interest in understanding trends (Mathaisel and Comm 2011). The goal of both approaches is the same: the maintenance of sustainable competitiveness in the long term.

Understanding these issues is essential for survival in highly turbulent environments and becomes even more critical when considering the context of small businesses. There is a high bankruptcy rate in the first 2 years of existence, arising from the difficulty to access resources (e.g. financial) and orientation (e.g. knowledge). We can also add market uncertainty (turbulence) to illustrate how the situation can be even more complex.

We have discussed the similarities between the development of dynamic capabilities and the components associated to organizational resilience, specifically in high turbulence contexts. To better understand how these concepts can be connected, we present Table 3 below summarizing the associations between the approaches and its synergistic steps/common goals.

Table 3 Dynamic capabilities and organizational resilience associations

Process and routines		
	Dynamic capabilities	Organizational resilience
Sensing capability	Generating market intelligence Disseminating market intelligence responding to market intelligence	Monitoring the environment in which the organization operates. Market opportunities are quickly exploited. Monitoring and tracking of changes in market and competition. Capability of recognizing factors that can trigger crises.
Learning capability	Acquiring, assimilating, transforming, and exploiting knowledge	Knowledge creation to understand and anticipate customer and supplier needs. Ability of adapting to changes naturally. Enhancement of strengths and mitigation of weaknesses through shared knowledge. Ability to exploit organizational competitive advantage.
Integrating capability	Contributing individual knowledge to the group Representation of individual & group knowledge Interrelation of diverse knowledge inputs to the collective system	Definition of roles and responsibilities in the organization. Capability of recognizing the leaders using clear objectives and goals toward their actions. Ability to encourage the employees' participation in strategic decisions.
Coordinating capability	Assigning resources to tasks Appointing right persons to right tasks Identifying synergies among tasks, activities, and resources Orchestrating activities	Planing and designing the actions considering contingencies. Protect tangible (physical structure, finance and human resources) and intangible (relations, social capital and knowledge) assets. Effective allocation of available resources based on updated information. Ability to track the results obtained.

Source: Adapted from Pavlou and El Sawy (2011) and Nogueira and Hallal (2013)

The understanding and development of such capabilities can facilitate business leverage and resilience in times of crisis and turbulence. We believe that the more organizations develop such renewal processes, the more easily new cycles of business opportunities will occur.

5 Conclusions and Management Implications

This chapter discussed the combination of dynamic capabilities and some possible implications for the development of organizational resilience.

The dynamic capability of "sensing" can promote and enhance business opportunities, monitor procedures and, in some cases, even predict crisis or turbulent situations. Similarly, it is possible to consider that the skills related to "learning capability" could increase the practices focused on generating and sharing knowledge. It is further considered that the ability to "integrate" is facilitated through the correct resources allocation and may positively influence the competitiveness and decision making assertiveness through the involvement of the whole work force.

Finally, we presented the company's capability to "coordinate" tasks and critical resources for reconfiguration. In these cases, the more dynamic a company is, the easier will it be to institutionalize processes, expand the possibilities to generate and capture value, plan and design actions, protect the assets and monitor the results, bringing about higher chances of adaptation.

Based on that, we summarize some possible initial steps in order to develop Dynamic Capabilities and Organizational Resilience (presented in Table 1), especially for SMEs.

Sensing capability and market prediction

1. Recognizing the problems, organizational strengths (internal level) and environmental opportunities (external level).

Learning capability and knowledge creation

2. Mapping existing resources and those actually needed to ensure competitiveness and organizational learning (aiming to be clear about what actually should be learned).
3. Have full knowledge (resulting of learning processes) of the needs and gaps to be covered in order to generate new business opportunities.

Integrating capability and knowledge management

4. Know the risks associated with the business and promote/encourage solutions to existing problems, with active participation of employees, involving sharing of knowledge and its externalization to the organizational level.

Coordinating capability and monitoring results

5. Based on the ability to coordinate activities at the organizational level, promote periodical assessment of the opportunities and risks involved with adequate IT support, in order to predict environmental trends and plan actions that affect the value chain.
6. Finally, monitoring results, simulating scenarios and designing the best strategy to minimize the crisis impact or seize opportunities.

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Case: XENON Automation Technology: Cutting Edge Competence as Competitive Strategy

Tobias Reissmann and Thomas Hardwig

1 A Head Start in Innovation Thanks to Competence

XENON Automatisierungstechnik GmbH have been developing and manufacturing machines and plants for automation of production processes for more than 20 years. Customers from the automotive, electronic, photovoltaic and medical technology sector all around the world appreciate the performance and reliability of the customized production plants from XENON. Founded in 1991, XENON won their first innovation award in 1995: "The Big Award of the Medium Sized Businesses". Since 1995, the special machinery manufacturer regularly received awards for its innovation capabilities. The last important acceptance was received in 2014 with the "Infineon Preferred Supplier Award" and the "Preferred Supplier of Bosch Group" award. XENON are now ranked as one of the leading providers of complex turn-key automation plants in Germany and Europe. Ever since, the company has been characterized by constant growth. Having started in 1991 with only 11 employees and today employing 170 workers, mostly engineers, the company targets high end technologies in automation. Only in 2009 and 2010, during the financial crisis, did the turnover declined temporarily. However the company was able to keep up the number of employees even during these difficult years. Due to their specialized skills, staff was not considered as dispensable. The crisis even gave the chance for XENON to hire talented new engineers and technicians from other companies. Since 2011 the growth rate has been stronger than it has ever been before and in 2014, turnover reached 24 million Euros; more than a doubling in comparison to 2009. This growth would not have been possible without globalization. Growth here included creating subsidiaries in China; firstly

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in Hong Kong (2009) and later in Suzhou near Shanghai (2013). A subsidiary in Mexico may eventually follow.

Growth in this field of high-end technical special machinery puts great requirements on expertise and competence. The high degree of plant performance and reliability are the overall preconditions for successful production. The complexity of the business requires expertise with constant enhancement. XENON is an independent system integrator for a great variety of manufacturing technologies. On one side this implies a special competence in research. In research projects, specific high-end technology modules are tested and developed and then integrated as standards in the XENON lines. On the other side there is a need of competences to collaborate successfully with customers in order to find particular solutions for their manufacturing processes and assist them in selecting the ideal technology for production. Automation solutions are realized in long-term collaborations with customers and selected suppliers. Meanwhile, XENON takes the role as main contractor for automation plants with financial risks of more than five million Euros.

Looking at this success story, the question arises of how XENON realized this remarkable growth and developed the special capabilities of the firm. What enables their teams to deal with the challenges of the organizational growth process?

To answer this question, it is to be said that competency is centred at and the based for competitive strategy. It became clear that the continuous development in competence of employees is at the heart of this business as well as organizational competence. Furthermore, since then an effort has been made to manage the growth process of the firm as a holistic approach.

2 Participation on the Joint Research Project "Learning to Grow"

In 2009, XENON took part on the joint research project "*Learning to grow*". This project was realized by the University of Applied Sciences RheinMain in cooperation with different partners (associations, 114 small-medium firms, consultants) (see Hardwig et al. 2011) aiming at developing a concept for business development which improves the growth-competence of SMEs. This concept has been put in to practice as a working example in 27 SMEs, in order to test and develop it further.

The project offered managers from participating firms the opportunity to analyze the growth factors of their firm and to reflect the use of human resources ("competency development") and its influence for further economic success. The analysis contained a standardized questionnaire on the conditions of growth, an interview about the situation of growth and perspectives of development of the company as well as a self-assessment of the quality of management. The latter is based on a model of competence-orientated management that summarizes the insights of competence and innovation research and empirical results in 114 cases of participating firms.

During the analysis Tobias Reißmann realized that a competence-based management centrally contributes to growth for XENON. At this point the practical question arose of how to put this idea into practice. Firstly, it was important to integrate the competency management approach into the competitive strategy of XENON. Secondly, the need to put a new knowledge management system for XENON in practice was identified. This implementation was supported by a consultant with the aim of realizing this project as a working example. Among his own practical experiences with his project, the exchange of experience between other company decision-makers, consultants and scientists during this joint research project consolidated our belief that XENON needed a holistic growth strategy founded on competency development.

3 XENON Competency Management as Part of a Holistic Growth Strategy

Six years later is a good point in time to assess the results of this endeavour. At first, the remarkable success story just presented above should be considered. How was such a transformation possible? The answer from the XENON management emphasized that competency management has a cornerstone role for success.

To explain this in detail, let's track the eight steps of the "Wheel of Growth" (see figure) and present the actions taken into account. The "Wheel of Growth" (see Hardwig et al. 2011a, b; Nort et al. 2014) was constructed as a means to analyze growth capabilities for SMEs. It comprises four central challenges and two "growth levers" for each challenge. This self-analysis tool will be used to show what actions XENON put into practice in order to leverage its growth capabilities:

3.1 Sensing Growth Potentials (Searching for Growth Opportunities, Building Market Competence)

The first question is, how does XENON sense new growth opportunities? At XENON, all sales representatives are brand managers and interconnected with customers in their special fields (automotive, electronic, photovoltaic and medical technology sector), being confronted with new possibilities and special demands from their customers. So they are the ones at the forefront of market trends. In annual innovation meetings, the sales representatives discuss the new technological and market trends. At this meeting they bring together the insights from different customer fields and projects. Based on this knowledge transfer they evaluate the market potentials of new technologies, solutions or trends and also plan new research and innovations projects.

The second lever aims at developing the market competence of the firm. At this point it must be noted that since 2003, XENON's management system is certified according to ISO 9001:2000 standard. The engineers improve the internal working standards and processes as well as the quality of products and machine technology with a continuous improvement tool, which is part of the intranet Knowledge Management System (this is in turn rooted in the project that started 2009). The other sources for continuous improvement are customer satisfaction surveys. The quality of the machines would be ensured by a constant optimization of the internal processes with regard to development and manufacture.

3.2 Designing Growth Objectives (Defining Growth Strategy, Motivating Employees for Growth)

Growth does not just happen, on the contrary; growth is the result of constant effort. At XENON the growth strategy is on the one hand part of the strategic management process. All management levels participate in and support the definition of the next steps for growth in specific market segments and product groups as well as in global areas. Goals of product groups and market chances include a time span of 3 years, which would be planned in detail. Last year XENON extended their market presence in China with a new production site in Suzhou (China). Becoming established in China is the result of an extremely rapid process of learning and development.

Again, growth strategy at XENON is an integral part of communication with the employees. Every single employee needs to understand the strategy for effective performance and successful projects. Three times a year the management board presents and puts to discussion goals and results at company meetings. Motivating employees for growth requires ongoing information and employees with the ability to think for themselves. In this regard, the intranet Knowledge Management System at XENON takes a central role. It presents current information from management, allows participation in free discussion boards and supports the knowledge management.

3.3 Seizing Growth Potentials (Empowering Employees, Developing Skills and Capabilities)

Empowering employees and leading them to think and act as entrepreneurs needs flat structures and intensive collaboration. Previous big departments have been decentralized because of the lack of leadership and insufficient closeness between team-members. XENON's organization is now based on group structures, consisting of teams composed of between 7 and 10 employees. Group leaders

receive daily coaching from senior management. Intensive collaboration and a good team spirit are now perceptible. The effects can be verified from controlling on the basis of key performance indicators.

Growth lever six is the development of skills and capabilities. At XENON, a minor share of the employees takes external further training. It is important for the development of leadership skills for the management and for certain technical or soft skills for team-members. However, the larger share comes from intensive evaluation of the knowledge gained from the current project work. The skills of the engineers and technicians are constantly developed further in the form of specializations with regard to the different process technologies. XENON gives importance to the "XENON Wiki" as part of the knowledge management system to save and share this knowledge with the whole company. The data is maintained by the employees and specialists in the product teams. Every specialist accepts responsibility for the correctness of his or her Wiki-article. The power and dynamic of this self-organized knowledge management is fascinating.

3.4 Coping with Growth and Managing Transformation (Up-Scaling the Organization, Ensuring Resources Proactively)

The seventh lever is the ability to upscale the organizational structures so as to preserve efficiency and quality of the collaboration. Growth of organizational structures has side-effects; they can be avoided with decentralized team structures such as the ones at XENON and a constant reflexion of the organization. The doubling of staff during the past 10 years is an enormous challenge for internal communication. The knowledge-management presented above is one contribution aiming at solving this problem. The bigger challenge lies in the necessity to temporarily integrate external resources to a high degree; large projects attract for a limited time high manpower, members from design offices, software development, engineering services. Even so, it is important to find a good balance between external and internal resources, to secure the high quality at XENON. Therefore a capacity which facilitates the planning of obtaining and integrating specialists for 6 month in advance is needed.

Growth needs resources and some resources need time for development. This is true for the special skills and capabilities of the engineers and technicians at XENON. Therefore vocational training and intensive cooperation with technical universities play an important role for recruiting. Individual appraisal interviews and support of the individual development are important obligations of managers. This is also true for investments. XENON takes constant effort to modernize its equipment investments. Every 5 years a new construction is needed and annual investments are made, for machines and equipment of more than one million Euro.

4 Growth Strategy Embraces All Employees and Not Only the Management

The lesson is clear: The success story of XENON is based on a growth strategy that integrates all employees and not only the management. This growth strategy is in that sense "holistic" as it comprises all requirements of growth management. The aspects are presented by tracking the "Wheel of growth"; the analysis-tool which indicates levers for the development of growth capabilities of small and medium enterprises.

At the beginning it started with the declared will of the entrepreneur to constantly grow and expand the business activities of XENON. This vision was founded on two pillars. The first is the permanent reflection of the entrepreneur about his role and function in his firm and consequent delegation of tasks in order to give room for strategic work. The second is systematically collecting the tools and strategies needed to realize these ambitious goals: systematic development of competencies and organizational capabilities; permanent optimization of the organizational work processes; systematic knowledge management and a holistic growth strategy are the means to fulfil the requirements of growth.

As pointed out before, growth is a challenge for every organization (see Greiner 1972). But a major challenge is double-digit growth in the field of high-end technological special machinery with its special requirements on expertise and competence development. It is possible to master the speed of innovation with an expanding organization, the case of XENON tells us in which way they succeeded.

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Culture for Organizational Learning in Turbulent Environments

Peter Friedrich and Jaqueline Rossato

Abstract This paper sets out to answer the following: "What are the dimensions of organizational and national culture which support organizational learning for the efficient handling of turbulent situations?" Organizational learning processes which develop dynamic capabilities to meet the business environment changes and turbulences are taking place in the context of national, organizational and other environmental factors; summarized as cultures. The moderating effects of national, organizational and learning culture on organizational learning are explored in a literature review. Some results of an exploratory study about *barriers to organizational learning* are discussed as a possibility to integrate cultural aspects in SME management approach. Our goal is to contribute to a conscious balance between a focus on the inner world of a company and the external world. Research focuses on the creation of awareness, the operationalization of culture as a moderator, and techniques to embed this approach into business processes. This study shows the importance for managers to know that they are acting and managing in a certain *cultural dimension*, that currently managers are not often consciously aware of. Today, company values and their manifestations are frequently not respected as an important resource to handle turbulent situations. Knowledge about external and internal spheres of culture could be a success factor for SMEs.

1 Introduction

Turbulent environments (caused by political and economic instability) are part of an SME's socio-economic, political & ecological context. Organizational learning processes for the development of capabilities to handle external turbulent situations

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are taking place in a certain context of national, organizational and other environmental factors, summarized as cultures. "What are the dimensions of organizational and national culture which support organizational learning for efficient handling of turbulent situations?"—is the research question which we will try to answer in this chapter.

To gain a deep understanding of SMEs' capabilities to learn to act and react in turbulent situations in a certain context, this section will elaborate on the relationship between turbulent environments, organizational learning and the influence of cultural or contextual aspects.

Studies conducted within SMEs reveal that the business environment in many emerging economies, including Latin America, is hostile and characterized by a lack of skilled workers, basic education and vocational training systems (Nordqvist et al. 2014). Moreover, excessive governmental intrusion (e.g. burdensome regulations and political uncertainty), corruption and a lack of legal protection add further dimensions to the characterization of the environment as hostile (Rodriquez and Vidal 2014).

During the time of aforementioned studies, the economic and political situations in Brazil and Argentina had differing implications for two countries' SMEs. Whilst in Argentina the turbulent situations were caused by regulatory changes and high inflation, the economy in Brazil went into a more or less expected down-phase. This is in line with Banham's (2005) findings that technological advances, changes in customer expectations and supplier requirements, regulatory changes and increasing competition are the most important external threats to SMEs.

Common to these threats is the lack of management's ability to control influencing factors. The common denomination for these factors is "context". Very often context is used to describe that there is something more than the dimensions managers and researchers choose to direct their attention on. Context is the aspects, dimensions of a reality, which are known to exist but are not focused on in order to simplify a situation. "...elements in the environment, which bear on an activity without entering directly into the description of the activity, are defined as context" (Hegarty et al. 2013, p. 59).

The degree of environmental uncertainty is context-specific as activities and internal processes in a single company are intertwined with the environmental uncertainty in which entrepreneurship occurs. To manage the specific phenomena carried along with turbulent situations requires an understanding of the complex context, of which cultural aspects represent a fundamental part.

Friedrich and Hiba (2016) have shown that the concept of organizational learning (OL) can be used as a theoretical frame to understand the quality of learning processes, which can develop as a result of, and in the preparation for, external turbulent situations. Managers in SMEs are not specifically communicating in terms of OL when facing turbulent situations but they behave in line with this theoretical frame. Their behavior can be analyzed using this theoretical frame to evaluate the effectiveness of their practices.

2 Organizational Learning

OL is a theory about learning processes (see box below for a choice of definitions), describing how existing knowledge changes and grows in organizations. The focus lies on characteristics of processes and their interrelationships, at the individual, group, team or internal departmental levels, and especially the transfer of knowledge between those levels and the external environment. For SMEs the processes of learning and transferring knowledge between stakeholders in the external environment and the company are of certain importance (see Friedrich and Hiba 2016).

OL is a Collective Learning Process

- "in which individual and group-based learning experiences concerning the improvement of organizational performance and/or goals are transferred into *organizational routines, processes and structures*, which in turn affect the future learning activities of the organization's members" (Schilling and Kluge 2009, p. 338).
- "by which an organization continuously adjusts and/or changes itself by utilizing and enriching organizational knowledge resources in an *effort to adapt to both external and internal environmental changes to maintain a sustainable competitive advantage"* (Chen 2005, p. 472).
- to enhance an organization's "*ability to acquire, disseminate and use knowledge in order to adapt to a changing external and internal environment*" (Hoe and McShane 2010).

Barker Scott (2011, p. 20) describes OL as the transformation of knowledge in four steps: "members of an organization individually. . .firstly acquire, create, and apply knowledge". Secondly, this knowledge is "shared, combined, expanded, tested, and applied amongst individuals to become community knowledge". Thirdly, the knowledge is "captured, spread and embodied in organizational features" (see also Hedberg 1981), such as procedures, norms, strategies, forms and protocols (see also March 1991); and, fourthly, becomes part of an organizational context or "code". That code influences which type of groups, communities and individuals learn; and how their learning occurs. The code continues to evolve as it is influenced by further learning of individuals and groups.

'Transfer', 'adjust', 'change', 'acquire', 'disseminate', and 'use knowledge' are some of the processes. These processes (in form of interactions between people) are happening in different contexts and it is the influence of these contexts on OL processes, which is our focus. Whether or not there is, for example, an open climate (for new ideas and even failures) in a company or a country; if managers are respectful to their employees or not; if managers trust their employees or not; if employees trust each other or not; has an impact on how organizational learning processes develop.

Table 1 Facets of organizational learning

Facets of OL	Definitions for assessment
Structural	Do structures and organizational learning mechanisms (OLM) enable organizational members to collect, analyze, disseminate, and apply information and knowledge? This includes roles, functions, and procedures. The existence of OLMs explains how organizations learn, but it does not account for effective learning (both creation of valid knowledge and taking action on that knowledge).
Cultural	Does the organizational culture support structures and mechanisms for effective OL?
Psychological	Does the organization and the management recognize, that the willingness of employees to act on and internalize learning-oriented norms is influenced by the way they think and feel (e.g. their psychological safety and commitment to organization)?
Leadership and Policy	Is leadership behavior and organizational policy in agreement with the development of OLMs and of learning-oriented cultural norms?
Contextual	Does the organization and the management know the factors outside direct managerial control that have a significant impact on organizational learning?

Source: Adapted from Lipshitz et al. (2007, pp. 14–18)

In the multi-facet model of organizational learning (Lipshitz et al. 2007), culture is beside structure, psychological climate, context, leadership and policy, one of five factors which determine the extent to which learning is organizational and effective (see Table 1). Theses sets of criteria can also be used to assess necessary actions to promote learning around a particular task (e.g. handling of turbulent situations) in a particular organizational context. Lipshitz et al. (2007) uses the term culture for organizational culture. Aspects of national culture are part of the contextual facet.

The contextual facet (Lipshitz et al. 2007) helps to specify important factors outside the immediate control of management that have an influence on the likelihood and the quality of organizational learning (Dodgson 1993). Factors such as the degree of environmental and task uncertainty, task structure, proximity of the learning to the organization's core task, and the cost of errors have an important impact on organizational learning, but are largely outside of managerial control. SMEs' interdependency and interaction with the environment is on one side a 'pressure' (turbulences, risks, quick changes etc.) and on the other side a 'possibility' (as a market, as knowledge provider etc.).

3 Organizational Learning and Culture

Research on OL has tended to focus on large companies to determine the key activities in the organizations' learning process (Garcia-Morales et al. 2007). Small-and medium-sized enterprises have remained under-researched (Birdthistle

2008). In recent years the field of learning in SMEs has attracted more researchers (Zhang et al. 2006, p. 300). Lately there have been some studies in SMEs in different countries, which show the importance of OL and aspects of OL for business performance (Sampe 2012; Zaini et al. 2014). The study of Sampe (2012) in Indonesian SMEs revealed that organizational culture was the main determinant of the organizational learning process. He found that trust among employees and a culture of trust within an organization are two crucial aspects for the existence of an organizational learning process.

There is very little research on the implementation of OL in practice and for this reason not many evaluation studies and criteria for successful OL exist (Taylor et al. 2010). To answer the question "what kind of culture is a conducive or 'good' antecedent for successful OL?" is complicated as long as the criteria for "successful" OL are not known. "Perhaps the best test of whether an organization is designed for learning is the extent to which it's code (the organizational features) supports and enables continuous learning of both people and the code" (Barker Scott 2011, p. 19) or to which extent its context and infrastructure support and enables continuous learning.

Aycan et al. (1999) model of "cultural fit" (Fig. 1) is a theoretical framework to understand the complex processes of interactions between various cultural spheres and different aspects of Human Resources Management (HRM), including organizational learning. In the original model there are three levels of culture: organizational; institutional (enterprise culture); and, national (socio-cultural). According to Lumpkin and Dess (1996) both the internal context, such as organizational culture, and the external context, such as industry environment and national culture (see Fig. 1) have an impact on an organization's entrepreneurial capabilities (Gupta and Levenburg 2010; Gupta et al. 2008). Managing organizational learning processes in

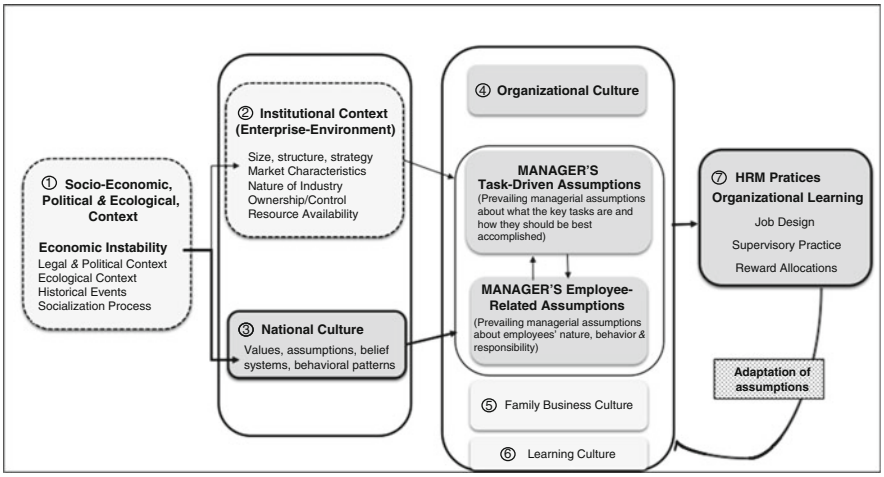

Fig. 1 Managerial assumptions in the context of the "culture fit model". *Source*: Adapted from Aycan et al. (1999)

turbulent environments (see point 1 in Fig. 1) requires understanding and action in regard to the influence of both the internal and external environments of the company.

In the description of Aycan et al. (1999), the internal environment is represented by the business's internal work culture. Internal work culture refers to "shared managerial beliefs and assumptions about employees' nature and behavior", whereas the socio-cultural environment refers to managerial perceptions of "shared values among people with respect to how a society is structured and how it functions" (Aycan et al. 1999, p. 196). The external environment is the enterprise- or institutional culture as well as the social cultural environment. Both of these environmental forces are influenced by the physical and socio-political context. Aycan has, like many other researchers large enterprises (LE) in mind. In SMEs the distinction between internal work culture and organizational culture is not very relevant. To the original model we added "family business culture" and "learning culture" as specific subcultures, which are of high importance for the kind of companies (SMEs) the research will focus on.

Organizational learning cannot be considered in isolation as it is deeply embedded in a firm's Human Resources Management (HRM) practices (see 7 in Fig. 1). Schmitz (2015) has shown that qualitative compensation schemes, selection and training of personnel, the use of performance management tools (such as self-assessments and feedbacks) and participative decision-making styles are essential drivers for organizational learning.

Organizational culture (see points 4–6 in Fig. 1) is understood as a pattern of shared managerial beliefs and assumptions that influences all kind of HRM practices (see point 7 in Fig. 1). OL is one of those HRM practices. These managerial beliefs and assumptions relate to two important organizational elements, the task and the employees. Managerial assumptions which relate to the task deal with: the nature of the task; how it can be best accomplished; how it can be learned; how it can be organized; etc. Assumptions concerning the employees deal with employees' nature, behavior, motivation, responsibility, commitment, etc. According to this model managers implement HRM solutions and by this OL practices, which are based on their assumptions about the nature of both the task and the employees.

These managerial assumptions are shaped by two other spheres of cultural forces: the institutional context (see point 2 in Fig. 1); and the national culture (see point 3 in Fig. 1). The institutional context is about certain characteristics of an enterprise, like the type of ownership (e.g. owner/manager or public), type of sector (e.g. service or manufacturing), resource availability (e.g. human resources or technological resources). The foundation of a national culture is the shared value orientations among people in a given society. A manager's assumptions about their employees (how they are feeling; what they can do; what to expect) is influenced by the manager's perceptions of what kind of values are important in their own society.

Managers' experiences and learning from the implementation of chosen HRM practices and OL mechanisms should help to evaluate their assumptions, support or falsify them. This learning mechanism, as a feedback loop, is missing in the

cultural-fit model. It is through the experience of this feedback, that managers have the possibility to question their assumptions (about tasks and employees) and their foundation in dimensions of national culture.

The following focuses on national and organizational culture, and its interactions with organizational learning in the context of turbulent situations. Case studies (Friedrich and Hiba 2016; Wolf 2011; Babakhanlou 2011) have shown that the institutional context is important for SMEs, but the literature review does not provide in-depth studies in this area. One reason for this might be that the cultural sphere is more relevant for SMEs then for LE, with most of the research being carried out in companies larger than the definition of an SME. Many managers are embedded into local branch and sector organizations, thus their assumptions about employees and tasks are incused.

The assumption of this study is, that greater awareness about the dynamics and power of culture (its spheres) and its impact on people's behavior will help managers to evaluate their own and employee's readiness to change basic assumptions, which might block efficient organizational learning processes. Eventually it might be possible to help SMEs to develop an understanding about how cultural aspects interact with, precondition, or hinder organizational learning processes for handling turbulent situations.

This preliminary study of the "the moderating role of cultural dimensions on OL" contributes to three areas:

- Elaboration on a theoretical frame for the "moderating role of culture on OL".
- Presentation of relevant results from research.
- Contribution to proposals of how to operationalize this problem for SMEs, so they can act according to research recommendations.

4 Spheres of Culture

Hofstede (2011) defines culture as "the collective programming of the mind which distinguishes the members of one group or category of people from others". Culture is "the socially transmitted and sometimes transformed bank of acquired traits" (Gellner 1997, p. 3). It is a social phenomenon. All cultures have a system of communication (linguistic and non-verbal), comprise the basis of self-identity and community, and exhibit behaviors and practices that are visible.

For our purposes, Schein's (1992) definition is most useful: "a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid; and therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems". Our interest is focusing on those assumptions which are task- and employee related, as we expect an impact on the management of business processes, especially in turbulent times. Given our theoretical frame,

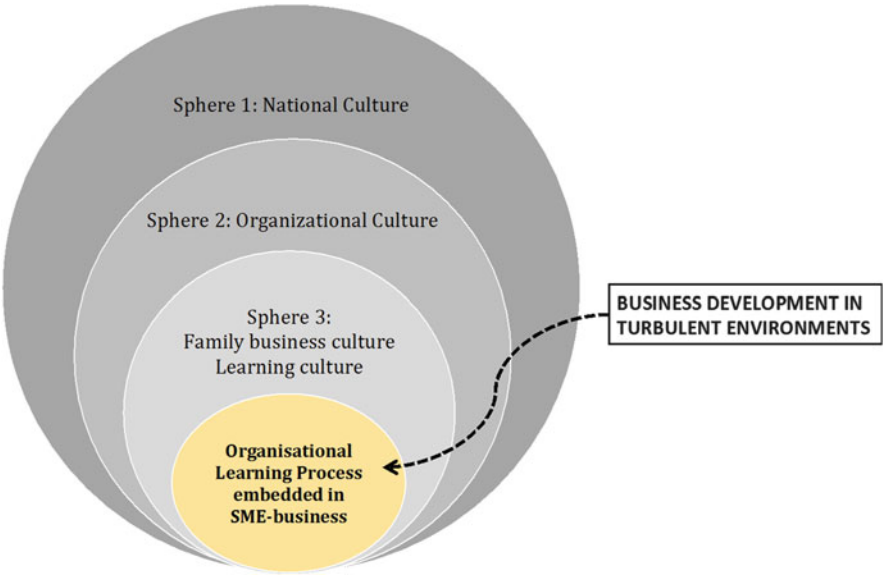

Fig. 2 Cultural context and SMEs' business development (through organizational learning)

organizational learning (OL) processes are not only influenced by cultural phenomena (their assumptions and manifestations) but also shaped in this learning process.

We can speak about varieties of cultures such as subcultures, macro-cultures or micro-cultures; beside religious cultures (e.g. Catholic, Islamic etc.); social cultures (e.g. hockey players, snowboarders); occupational or work cultures (military, business, actors/actresses) and so forth. The boundaries among these different spheres overlap, are permeable, change, and evolve over time.

Companies and their managers' orientation are embedded in different spheres of culture (see Fig. 2). Culture is a concept, which exists both inside and outside the organization. Outside there is national culture (sometimes differentiated into regional culture and also institutional culture) and inside is company (organizational) culture with subcultures (e.g. work culture, learning culture). It is well known that SMEs, especially family businesses, often develop a qualitatively different organizational culture (family-business culture) in comparison to LEs. As a consequence, management is less attuned to the macro-culture of an organization, which means that changes are easier to initiate (Hatum and Pettigrew 2006). The external spheres of culture are the context of the internal cultural aspects.

Assumptions made about culture, understood as a pattern of shared values, could act like a silent agreement about 'how things are done' during turbulent situations. Culture is in this case an extra resource for SME business development, but it could also be a barrier.

By presenting and discussing relevant literature to this question and by proposing recommendations, this study supports managers in SMEs in being able to screen their own assumptions about their business processes for hindrances and/or

opportunities due to cultural influences. To develop an organizational culture, in which the management of uncertainty in an external environment is embedded, is an important means for handling turbulences.

4.1 Sphere 1: National Culture

Employees and managers in SMEs do not only work within a specific group and organizational context, but also within a specific national culture (Hofstede 1983). We know that there are differences between national cultures and it is obvious that differences in national cultures have an influence on all kind of processes, also organizational learning processes in a country, organizations and SMEs. The interesting question is, would the quality of organizational learning processes in SMEs could be changed for the better, if a cultural perspective was applied. It seems that there are some dimensions of a national culture, like individualism, power distance and long term orientation (Hofstede et al. 2010) that have an influence on individuals' (managers and employees) basic values and assumptions about working in a SME.

In the 1960s and 1970s, two theorists, Geert Hofstede (1980) and Edward Hall (1976), independently developed paradigms for the organization and identification of cultures. This research produced five universal categories that span over social communities and nations, and are applicable to cultures all over the world: Power-Distance; Feminine-Masculine; Uncertainty Avoidance; Long Term Orientation; Collectivist-Individualistic. Later "indulgence" was added as the sixth category (Hofstede 2011). These dimensions are describing preconditions, which theoretically should have an influence on organizational learning processes (for business development).

Dimensions of National Culture (Hofstede 2011)
Power distance: the degree to which inequality or distance between those in charge and the subordinates is accepted.
Individualism–Collectivism: the extent that individuals focus on individual wants and needs versus the needs of the group.
Masculinity-femininity: the degree of distribution of emotional roles between women and men.
Uncertainty avoidance: the extent to which people prefer rules, regulations and controls or are more comfortable with unstructured, ambiguous or unpredictable situations.
Long term orientation: the extent to which members of society are prepared to adapt themselves to reach a desirable future, or the extent to which they

(continued)

take their guidance from the past and focus on fulfilling their present needs and desires.
Indulgence-Restraint: the extent of which a society allows free gratification vs. control of basic human desires related to enjoying life and having fun.

Impact of National Culture

Co-determination, empowerment, direct and participative communication, and leadership by expertise are the characteristics of a low *power distant* country like Germany. The German society is a truly individualistic country. Loyalty is based on personal preferences for people. The sense of duty and responsibility is defined by the contract between the employer and the employee. Communication is direct. *Long-term orientation* shows that Germany is a pragmatic country, where people believe that truth depends very much on situation, context and time. Traditions are easily adapted to changed conditions.

Germany (like Brazil) is a society that shows a strong need for rules and elaborate legal systems in order to structure life and to *avoid uncertainty*. Both in Brazil and Germany bureaucracy, laws and rules are very important to make the world a safer place to live in. Figure 3 elaborates on these differences in national culture between Germany, Brazil and Argentina. Power distance, individualism, uncertainty avoidance and long-term orientation are distinctly different as drivers of South American culture compared to Germany.

The very high score in *power distance* for Brazil mirrors a society that believes hierarchy should be accepted and inequalities amongst people are acceptable. Power distance is slightly lower in Argentina but even there status should be emphasized and status symbols of power are very important. In Germany, a direct and participative communication and meeting style is common and leadership is challenged to show expertise. The low score in *individualism* in both Argentina and Brazil means that people are from birth integrated into strong groups, which protect them in exchange for loyalty. This is also true for working life, where older and powerful members help younger members to get a job in the own company. In Argentina, more individualistic traits can be found, with a rather calculative

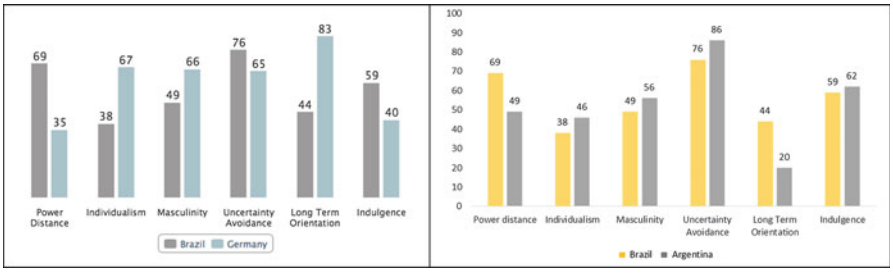

Fig. 3 Dimensions of national culture in Brazil, Argentina and Germany (http://geert-hofstede.com/brazil.html 2015)

employer-employee relation. In Germany there is a strong belief in self-actualization while communication between employee and employer is very direct.

The very high scores on *uncertainty avoidance* in both Brazil and Argentina reflect the need for rules and elaborate legal systems in order to structure life. The individual's need to follow the rules is rather hesitant. In Germany, there is a slight preference for uncertainty avoidance as Germans try to compensate for this by more heavily relying on expertise. The rather low scores of *long-term orientation* in Argentina and Brazil reflect a normative culture with a belief in absolute truth. Countries with a pragmatic orientation (like Germany) have a capability to adapt traditions easily to changed conditions, a strong tendency to invest in and prepare for the future, while in Brazil and Argentina the focus is rather on achieving immediate results.

Kats et al. (2010) discuss that characteristics of national culture are embedded in organizational culture and influence organizational practices. They reflect about the influence of cultural traits on specific norms for HRM, which in their turn have an impact on HRM practices (Table 2). One example: in a strong collectivist culture one organization may emphasize the rewarding of team performance, as group reward management is consistent with the higher level of culturally based collectivism. In a less collectivist culture an SME might choose to reward individual performance.

The literature review of Meshksar (2012) shows that there is some evidence in research about the impact of national traits (see column I, Table 3) on HRM practices (see column II, Table 3). OL is not specifically mentioned as a practice in its own right but there are several other areas, which directly (e.g. empowerment, payment scheme, job description) or indirectly (e.g. recruitment, assessment) disable or enable this learning process. The degree to which inequality or distance between those in charge and the subordinates is accepted (power distance) seems to be an important cultural trait for effective organisational learning, as it affects managers understanding and priorisation of empowerment and personnel development. The extent to which individuals wants and needs or the needs of the group

Table 2 The influence of cultural dimensions and norms on HRM practices

Cultural dimension	Norms regarding HR practices	HR practices (Gong et al. 2009)
Power distance	Empowerment	Reduction of status distinctions
Uncertainty avoidance	Stability and security	Employment security
Individualism versus collectivism	Rewarding individual performance	Performance appraisal
Femininity versus masculinity	Gender equality	Selective hiring
Long-term orientation	Deferred gratification: taking a long view on the value of skills and career development	Career planning and advancement

Source: Kats et al. (2010, p. 406)

Table 3 Impact of national traits on HRM-practices

National culture dimensions (Hofstede 2011)	Impact on HRM-practices	Further information
Empowerment		
High Power Distance	Employees favour hierarchies and centralized power structure	Hughes (1999)
High Power Distance	Manager will not participate employees in decision making, he has the authority and right to make every decision	Aycan et al. (1999)
High Power Distance	Employees do not need to be empowered	Debrah and Budwhar 2004
Low Power Distance	Employees prefer decentralized power structure, flat organization, equal privileges	Hughes (1999)
Job description		
Individualism	Job descriptions are prepared for individual workers	Aycan (2005)
Collectivism	Unit of analysis in description in job description is the work group	Aycan (2005)
Training		
High Power Distance	One-way (instead of participative) delivery of training; instructor possesses adequate authority Senior managers rather then external trainers have this roll.	Wright et al. (2002)
Career & personnel development		
High Power Distance	Rare systematic and participative HR-planning	Aycan (2005)
Low Power Distance	Long-term, rational and systematic approach to HR planning	Aycan (2005)
High Uncertainty Avoidance	Managers pursue systematic, internal and long-term orientations in personnel development	Reichel et al. (2009)
Collectivism	Seniority based promotion decisions	Reichel et al. (2009)
Individualism	Employee's promotion based on task performance	Reichel et al. (2009)
Payment		
High Uncertainty Avoidance	Focus on individual performance-based pay Perfer seniority- and skill based reward systems	Schuler and Rogovsky (1998)
Collectivism	Group-based reward allocation & Lower overall pay dispersion	Easterby-Smith et al. (1995)
Individualism	Pay for performance schemes	Easterby-Smith et al. (1995)
Recruitment & Selection		
Collectivism	Difficulty for candidate externally recruited to enter the strong social networks within the organization, with resistance following the appointment	Björkman and Lu (1999)

(continued)

Table 3 (continued)

National culture dimensions (Hofstede 2011)	Impact on HRM-practices	Further information
Collectivism	Prefer to use the internal labour markets in order to promote loyalty to the firm	Kovach (1995)
Collectivism	Employee selection person-centred (fit with the rest of the company)	Rousseau and Tinsley (1997)
Individualism	Selection on basis of necessary skills and task abilities	Rousseau and Tinsley (1997)
Individualism	Highly structured bureaucratic interview for selection	Spence and Petrick (2000)
High Uncertainty Avoidance	More use of selection tests, conduct more interviews with a greater intent to collect objective data	Ryan et al. (1999)
High Power Distance & Collectivism	Greater importance on soft recruitment criteria (social-political connections and status)	Budhwar and Khatri (2001)
High Power Distance	Educational qualification are more important in hiring due to status	Ryan et al. (1999)
High Uncertainty Avoidance	More Structured selection practices	Stohl (1993)
Masculinity	Greater use of highly structured interviews with uniform guidelines	Spence and Petrick (2000)
Assessment		
High Power Distance	Autocratic assessment styles	Snape et al. (1998)
Low Power Distance	Participative and egalitarian forms of performance appraisal	Snape et al. (1998)
Uncertainty		
High Uncertainty Avoidance	Employees dislike uncertainty, like to have orders and rules	Hughes (1999)
Low Uncertainty Avoidance	Employees prefer fewer rules	Hughes (1999)

Source: Based on Meshksar (2012)

(individualism–collectivism) are in focus, is a cultural trait which has effect on managers choices related to work organisation, assessment practices, recruitment and personnel development.

The extensive list of studies and their results highlight the impact of national traits (culture) on managers' decisions about HRM practices. The problem is that only a few or may be none SME is implementing and practicing this knowledge.

The Power of National Culture

According to Meyer (2007) is it a necessity to 'contextualize' organizational learning by investigating how specific national cultural characteristics influence organizational learning processes. There are only a few studies about the moderating effect of national culture on the development of organizational learning culture and processes (Skerlavaj et al. 2013; Hong et al. 2006). Albert's (1996) work about

Latin American cultures and their patterns does not explain how different themes in South American national culture affect organizational life and what kind of implications they have.

Organizational learning culture is a set of organizational norms and values that support systematic and in-depth approaches to achieve higher-level learning ("strategic or generative learning") (Skerlavaj et al. 2013). Osland et al. (1999) study of expatriate managers' behavior shows that decoding cultural behavior and untangling organizational problems is often interrelated.

Mendelek-Theimann et al. (2006) discuss the determination of globalized management and human resource practices by national culture for the case of African businesses. They show how contextual differences in national culture lead to differences in the practice of leadership and management in East Asia and Africa compared to the 'ideal' state. Focusing on the national values and thought systems (in this case diverse post-colonial systems and their different operating systems (Portuguese, Belgian, French, English etc.) in Africa) it is important to understand their impact on the working behavior of (African) leaders and managers. This observation should also be true for the Latin American countries.

Brazil is known for its traits as paternalism, loyalty, formalism and flexibility (Barros and Prates 1996). These traits need to be reflected upon to determine how they can impact on organizational learning processes. Care, support, and protection provided by paternalistic leaders may address employee's need for frequent contact and close personal relationships, creating a positive impact on employee's attitudes in collectivistic cultures (Gelfland et al. 2007). Dorfman et al. (2012, p. 508) show that national cultural values are antecedent factors that influence leadership expectations. "For instance, power distance values at the national or organizational level are predictive for three culturally contingent leadership dimensions; status conscious, self-sacrificial, and internally competitive". Lewit (2103) analyses the culture context as a boundary condition for Brazilian leadership style and is especially focusing on the aspect of paternalism.

Vieira et al. (2012) study about the influence of corporate governance, innovativeness and knowledge management on the transgenerational potential of family businesses takes the interference of national and organizational traits into account. In an exploratory study of three Brazilian companies they found that flexibility, authoritarianism and paternalism are the three traits, which influence the quality of those management processes that deal with management professionalization and succession. They argue that corporate governance has to be adapted to cultural traits and only then can it be recognized as a means to set rules, to consolidate values and serve as a cornerstone of sustainability.

Skerlavaj et al. (2013) study of 1333 companies (with more than 50 employees) in seven countries, suggests that national culture dimensions (measured as power distance, individualism, masculinity and uncertainty avoidance) are restraining organizational level explanations for the development of organizational learning culture.

4.2 Sphere 2: Organizational Culture

Organizational culture (OC) is widely recognized as having an important effect on organizational learning and knowledge management (McDermott and O'Dell 2001). Many researchers have defined OC as dependent on shared assumptions about values and practices (Schein 1992). According to Peters and Waterman (1982) shared values do represent the core of a corporate culture but Hofstede et al. (1990, p. 311) empirically verified that the shared perceptions of daily practices are the core of an organization's culture.

Values are formed during the early stages of life and therefore they are very difficult to change (Hofstede 2011). Consequently if we want to change shared understanding about values, then it may be appropriate to consider that OC exists not only in values but at the more superficial level of practices (Hofstede et al. 1990). Organizational practices are learned through socialization at the workplace.

Hofstede et al. (1990, p. 286) characterization of organizational culture states that this phenomena "is socially constructed, soft and difficult to change" and it is manifested through symbols (words, gestures, pictures, objects that carry a particular meaning), heroes (persons who possess characteristics highly prized in culture), rituals (collective activities that are from a efficiency point of view superfluous but are socially essential) and values. "Symbols, heroes, and rituals are subsumed under the term 'practices', as they are visible to an observer. Their cultural meaning lies in the way they are perceived by insiders. The core of the culture is formed by values, which cannot be observed as such but are manifested in alternatives of behavior" (Hofstede et al. 1990, p. 291).

Hofstede et al. (1990) defines organizational culture along a six-dimensional model, integrating perceived common practices, which are manifested in symbols, heroes, rituals and values that carry a specific meaning within an organizational unit:

- Process or result-orientation;
- Employee or job oriented (concern for people vs. concern for getting the job done);
- Parochial or professional (employees derive their identity largely from the organization vs. when people identify with their type of job);
- Open or closed system (communication climate);
- Loose or tight control (internal structuring of organization; tight: strict unwritten codes (e.g. dress and dignified behavior));
- Normative or pragmatic (customer orientation; task-driven vs. market-driven).

In the empirical studies of SMEs in turbulent situations, observations were made which support the process of certain practices developing during the handling of turbulent situations, from the shallow symbols to deeper rituals but most in relation to heroes and values.

4.3 Sphere 3: Family-Business Culture and Learning Culture

Literature is adding another aspect of culture to our discussion about organizational culture, the family business culture. Here culture refers to the values and commitment that the family brings (Dyer 1986 and Zahra et al. 2004). A study of Argentinian family businesses' capability to adapt quickly to changing circumstances (Hatum and Pettigrew 2004, 2006) discusses five determinants of organizational flexibility: dominant coalition centralization, formalization of decision-making, low macro-culture embeddedness, use of organizational scanning and a strong organizational identity (Lumpkin et al. 2013).

The absence of embeddedness in a macro-culture is positive when SMEs are striving for organizational changes. The perceived "under-investment" in training in SMEs relative to larger companies may be a result of a misinterpretation of data on investment levels in training (Hóbáin 2002). Larger companies may require higher levels of training for reasons of coordination or perhaps indoctrination in company culture. This is not required in smaller companies to the same extent (Schultz and Hatch 1996).

Learning Culture

A very important dimension of organizational learning is commitment to learning. Commitment to learning concerns the values placed on learning activities within an organization. Culture for organizational learning is the result of how an organization creates assumptions, knowledge and rules that allow sharing knowledge, as a development opportunity. This creates a sense of belonging, facilitating the employees' climate, allowing and encouraging the transfer of tacit, explicit and virtual knowledge. The organizational climate for learning is composed of physical and psychosocial variables, perceived in a subjective way that will determine the individual effectiveness to develop its learning potential (Garzón Castrillon et al. 2012).

Due to the social nature of organizational learning, productive organizational learning is dependent on the existence of a learning culture (Lipshitz et al. 2007). Spicer and Sadler-Smith (2006, p. 150) contribute with an action oriented approach (in contrast to the very frequent descriptive and analytical studies) towards organizational learning by focusing on the "learning orientation" (active or passive) in SMEs. Learning orientation is understood as "a culture in which organizational procedures, routines, scripts are open to challenge and to reinterpretation", to avoid the risk of institutionalizing a certain culture and decreasing flexibility. It is suggested that a learning culture stimulates experimentation, encourages risk taking, reflects a readiness to accept errors and learn from them, and promotes open communication (Conner and Clawson 2004).

The influence of differences in national cultures on learning culture is shown in Lee et al. (2003) study of the perceived relationship between working hard and attaining knowledge and ability (learning motivation). Whereas Americans view effort as unrelated or negatively related to ability, East Asians appear to view ability

as solely a product of hard work and effort. American workers display a proving goal orientation without endorsing a learning goal orientation, while Koreans view these two goal orientations as distinct, but inextricably linked.

5 Evidence for the Impact of Culture on Organizational Learning

One of OL's goals is to implement learning processes which help SMEs adapt to both external and internal changes, such as those found in turbulent situations. The results of organizational learning (e.g. procedures, norms, strategies, forms, protocols, structures) influence the existing organizational context/culture and by this affect future learning activities. The question which arises: is it worthwhile for managers to directly address turbulences, or should they be accepted as context (not to be defined circumstances)? If the latter is the case then there will no learning possible (see Friedrich and Hiba 2016). Four aspects to capture the concept of OL and its processes for turbulent situations have to be considered: manager's motivation to handle TS; to accept TS as a task to be learned; the time to learn for TS; and, the definition of the learning goal (spontaneous adaptation or company embedded intelligence for TS).

OL needs not only specific organizational conditions that enable and/or hinder the process (Garcia-Morales et al. 2006; Yanow 2000; Kalkschmidt 2013; Sun and Scott 2005). The processes are also moderated by different spheres of culture (national, organizational etc.). Organizational culture is beside employees' mindsets, their skills and motivation; group dynamics; leadership; organizational structure; political activities mentioned as one important enabler for OL (Berthoin Antal et al. 2003; Lawrence et al., 2005).

Regarding the organizational culture construct, Sampe (2012, p. 27) showed that organizational efforts to create a culture of trust amongst employees is an important aspect; "a culture of trust that has been embedded in an organization as a major aspect of organizational culture was found to be positively related to the propensity of employees to engage in organizational learning". "A rational decision making process, a measuring system of performance, clarity of strategic direction and trust between employees as aspects of organizational culture were related to organizational learning as measured by encouraging employees to think from global perspective, existence of trust among employees, reward for learning and maintaining an up to date database of employee skills" (Sampe 2012, p. 272).

Literature about the relationship between organizational culture and organizational learning has more or less focused on the ways (barriers) in which OC inhibits learning (Tan and Heracleous 2001) and not so much on what is conducive for learning (e.g. cultural islands in the organization, characterized by cultural norms which are supportive for OL). Schilling and Kluge (2009) theoretical approach "barriers to organizational learning" follows the 4I-model (Crossan et al. 1999);

intuition, interpretation, integration and institutionalization of knowledge. Each of these processes can be negatively affected (barriers) by following factors:

1. **Actional-personal:** these aspects are related to thought, attitudes and individual behavior; and include psychological phenomena on how the individual perceives the environment, such as cognition (e.g. biased perceptions), motivation (e.g. lack of motivation), emotion (e.g. fear of disadvantages).
2. **Structural-Organizational:** these aspects are grounded in organizational strategy, technology, culture and formal regulations and are related to barriers that affect mainly the degree of freedom for people or for new perspectives (e.g. lack of clear and measurable organizational objectives, too little freedom for action due to restricted positions, strict rules and regulations).
3. **Social-Environmental:** these aspects are related to customers, suppliers, competitors, the socio-political environment and technology, including features about the possible lack of knowledge regarding the organization (for example, about the business idea, the business success criteria, lack of knowledge about the market in which the company operates).

A thorough analysis of the theoretical concept of learning barriers shows that it includes many aspects of culture, which could act as barriers to organizational learning. A persons 'perceived incompatibility with culture' is one example for an action-personal barrier. A 'monolithic corporate culture with homogeneous work force', an 'organizational blame culture', and organisations with outspoken 'status culture' are examples for structural-organizational barriers. 'Cultural distance', a 'low level of experience in the relevant culture', and 'problems with linguistics and certain aspects of a certain national culture' are examples for societal-environmental barriers.

With the exception of Rossato (2014), there is not much empirical use of this promising approach. In an interview-study of 12 Brasilian SMEs she collected data about barriers for organizational learning to screen manager's understanding of the structural and social/environmental context of their companies. The selected companies are from Maranhão (mechanical industry) and Brusque (textile industry).

The statements of the managers have been analyzed and clustered according to their possible origin in HRM practices (column III, Table 4) and according to relevant dimensions from cultural spheres described earlier (column II, Table 4). The empirical study of barriers to organizational learning in Brazilian SMEs shows that many hindrances mentioned by managers (column I, Table 4) are related to the institutional context in northern Brazil but the examples show also that their origin could be related to dimensions of learning, organizational, and national cultural spheres (column II, Table 4) and their affect on HRM practices (column III, Table 4).

Table 4 shows that the roots for the described barriers are related to a mixture of national cultural traits, organizational culture, learning culture and the institutional context, which then has an impact on what kind of HRM practices are implemented. One example for this is the described resistance to teach new colleagues ("guys do not like to teach each other how to produce more – they want to stand out in the

Table 4 Barriers to organizational learning in the light of cultural spheres

I. Barriers for organizational learning (statements from managers)	II. Potential influence of cultural spheres (see also Figs. 1 and 2)	III. Affected HRM practices
Lack of skilled worker ("not available on the labor market and high turnover")	Institutional context: Resource availability	Recruitment and workplace related skills development
Skills development is not synchronized with the speed of change in technology ("the technology often travels at a speed we cannot follow. Technology helps, but if you can't follow it damages you")	Institutional context: Resource availability	Recruitment and workplace related skills development
Lack of opportunities to empower employees ("lack options to empower employees. If they had more options I would do it")	OC: managers task-driven assumptions NC: Power distance	Empowerment and participation
Problems with the mission and vision of the company ("no clear vision of the rules and procedures of the company, we have no defined vision and mission"; "we have the company handbook, with mission & vision but the staff unfortunately doesn't read it")	OC: managers assumptions are not transparent NC: long-term orientation	Empowerment and participation
Lack of feedback to the employees ("we do neither conduct feedback sessions with employees nor do we inform about goals and plans")	OC: managers employee-related assumptions NC: Power distance	Organizational Learning
Resistance to teach new colleagues ("guys do not like to teach each other how to produce more. They want to stand out in the production goals alone")	Learning culture: Trust NC: Power distance	Work organization/ teamwork Reward Allocation
Older employees have problems with the acceptance of ideas from new employees ("we have a hard time putting new people to work, current employees find it difficult to accept new people with new ideas")	Learning culture: Trust Work culture	Empowerment Work organization
Resistance to change (e.g. new machinery)	OC: Trust NC: Uncertainty avoidance	Organizational Learning
The ability to learn is low for people with a low education ("the level of education in the country's N and NE is very low and the receptivity of staff to learn is low")	Institutional context: Resource availability	Recruitment
Problems with the commitment of trained employees ("many leave the company for better salary")	OC: Managers employee-related assumptions NC: Long-term orientation	Reward allocation

OC organizational culture, *NC* national culture

production goals alone"). This situation could be related to that in Brazil inequality or distance between those in charge and the subordinates (power distance) is accepted. This knowledge advantage is a powerful mean for some employees, and this is often supported by a reward allocation policy focusing on individual performance. All that together creates a situation, which is in contradiction to develop an effective learning culture which is heavily depending on trust between employees.

The results above show that companies' human resource management (HRM) practices and the options they choose, can have an important effect, acting as facilitators and barriers to OL processes. Critical reflection about relevant options for HRM practices (e.g. empowerment or not, trust or not) give managers the possibility to support and/or avoid barriers in the organizational learning process. At the same time it is beneficial for managers to evaluate how their own assumptions about employees and tasks are influenced by national cultural traits.

6 The Impact of Culture on Managers' Perceptions and Assumptions

There are many findings in research showing that organizational culture has an impact on organizational learning (Egan et al. 2004; Bates and Khasawneh 2005; Chang and Lee 2007; Lucas and Kline 2008; Jung and Takeuchi 2010; Skerlavaj et al. 2013). In those studies there is no distinction made between a normal business situation and business in a turbulent environment. The findings of Chang and Lee (2007) show that clan culture, mission culture and adaptive culture have a significant positive influence on building shared vision. Personal mastery and systematic cooperation is of interest here, as these effects are important in turbulent situations.

SMEs' cultural background also shapes organizational values and assumptions, and consequently are embedded in organizational HRM practices (Aumann and Ostroff 2006). HRM practices are based on culture induced transmissions of norms and beliefs about how employees and tasks should be managed (Khapova et al. 2012); which of course has an effect on organizational learning mechanisms. "Organizations embedded in the same societal cultural context are likely to develop organizational cultures that share certain attributes derived from that culture" (Aumann and Ostroff 2006, p. 9). The consequence is, that organizations in similar cultural contexts are likely to develop similar HRM practices. There is a necessity for managers to reflect about this 'automatic behavior', as sometimes it may fit the problem and sometimes not, especially if the cultural norms are beneficial in normal times but not in turbulent times.

Generally spoken, cultural norms are often exhibited in the organizational norms regarding HRM (including OL) and consequently in HRM practices, if there is not a mechanism in an SME which is counteracting this automatism. Gong et al. (2009) suggest that the following HRM practices are likely to be sensitive to cultural

influences: employment security, reduction of status distinctions, selective hiring, training and development, performance appraisal, career planning and professional advancement.

In all organizations, leaders can use social interaction mechanisms to influence the cultural understanding of employees or groups of employees and try to control (conscious or unconscious) the development of shared understanding about important phenomena (De Hilal 2006). For SMEs, which very often are controlled by a single leader, it is obvious "that this individual could foster the development of cultural agreement in the entire organization" (De Hilal 2006, p. 160) and influences the shared understanding and practices (Pfeffer 1981; Smircich and Morgan 1982). "The values of founders and key leaders shape organizational cultures but the way these cultures affect ordinary members is through shared practices" (Hofstede et al. 1990, p. 311). This transfer of owner/management values into employee practices is the core of our interest for the influence of culture on organizational learning.

It is clear that there is a risk managers become locked in a cultural 'enclosure': they have an understanding of *values* which they transport to their employees, developing as *practices* and in everyday work with colleagues. Organizational learning processes in SMEs are embedded in a situation, where factors in the external and internal context have an influence on the learning processes, either as an effect or as an interaction.

6.1 *Eureka for the Importance of National Culture: A Study Visit of Brazilian SMEs to Germany*

Our conclusion is that knowledge about a company's contextual dimensions of organizational and national culture is of significance for OL. It helps to explain the positive and negative impact of assumptions made about tasks and employees in their own company. The sudden insights (aha-moments) from a group of Brazilian SME managers during a study visit (who applied the 'Learn to Grow' method in Brazil) to Germany (see box below) can be explained by their business thinking, which has been enclosed in certain traits of Brazilian culture, especially regarding power distance, individualism and long-term orientation.

Statements of Brazilian Managers in the Light of National Culture*

Germany: Low ***Power distance*** ***Brazil: High***

"Focus on people: There (Germany) are the employees and customers the most important elements of the organization. The entrepreneur must be able to motivate the employees, develop their skills and delegate responsibilities properly. There is no growth without a committed team and without a division

(continued)

of decisions and responsibilities to enable the business owner to do what it does best: create and plan."

Germany: Low ***Power distance*** ***Brazil: High***

"Creativity is essential for being innovative, especially in SMEs. It was noted that managers have shown an open mind, focus and stimulate teamwork to achieve goals such as: explore new markets & create new products or improve. Every company has creative people, to a greater or lesser extent. Therefore, this feature should be maximized by leadership and the organizational culture itself."

Germany: High ***Long-term orientation*** ***Brazil: Low***

"There must be a strategy: Any growth project need to have clarity on what the company wants. What is the customer segment that you want to achieve? What is the product or product family to prioritize?"

Germany: High ***Individualism*** ***Brazil: Low***

"The learning is of no use if it does not become a new process or method. Companies must learn to capture the knowledge of employees and from the external environment, but even more important is to incorporate it in the production process, to create value for the customer."

Germany: High ***Individualism*** ***Brazil: Low***

"There are many ways to succeed in any endeavour. The companies visited had different skills, different organizational cultures, influenced by their national cultures and different value systems. They created their own role in managing to get revenue in this context and were successful, each with its particular way."

*(source: Davila and Da Silva 2014)

Brazilian managers who became aware of that differences between German and Brazilian SMEs regarding their own assumptions about leadership, participation, empowerment, trust, task performance, employee efficiency, work organization etc. were influenced by cultural dimensions on the organizational and national level, like individualism, long-term orientation and power distance. The summary above shows that they noticed several aspects of their learning about German companies, which are different to the common approach in Brazil. They also learned that this has an influence on the successful implementation of the 'Learn to Grow' method. The sources of these differences are very often described as culture, meaning "something outside the manager's control". Even if cultural aspects are not changeable by managers, it is good to know that they can have an impact on managers' assumptions, which they can do something with or not.

The above example shows that Brazilian managers became aware that their leadership is based on assumptions and values, which are accepted in the Brazilian culture but might hinder business processes in general organizational learning processes and general business processes in their SMEs. On the other hand, there might also be (not yet explored) preconditions in the Brazilian culture, which are

conducive to business development; however, it is necessary to know this if a manager wants to make use of the positive preconditions of Brazilian culture to counteract the negative barriers.

7 Conclusions and Management Implications

The main results of our exploratory study about the moderating effects of culture on organizational learning are:

– The literature review and the selected empirical results have shown that a significant impact of cultural forces on managers' assumptions related to organizational learning have to be expected.
– There are not many empirical studies about this issue.
– There are not many evaluated tools for embedding cultural aspects into managers' decisions about business processes
– The cultural-fit model is a noteworthy contribution to make culture traits and their impact on OL detectable.

We have been inspired by the literature search on theoretical and empirical issues relevant for our study but it still might be possible that we have not found all relevant studies. The literature review and the few empirical studies gave rise to the following key insights:

1. Trust and commitment are significant cultural dimensions for OL:
   - Trust among employees, and a culture of trust within a company, is a necessary antecedent for organizational learning. Trust is a dimension, which is significantly dependent on organizational and national culture.
   - Cultural values, like trust and commitment, can be a barrier for the collective idea of OL. The process from information (about turbulent situations) to action in a company is facilitated or hindered by trust or distrust.
   - Without commitment to learning, OL is not possible. Commitment is influenced by national and organizational cultural traits.
2. Low embeddedness into a macro-culture is conducive for OL in SMEs:
   - The embeddedness in organizational culture (macro-culture) is less limiting for SMEs. In SMEs there are normally not so many subcultures as in LE. Cultural changes are easier to induce, due to the pure size of the company.
   - The challenge for family businesses and SMEs is to identify how their family character can be managed and developed to sustain and not inhibit their flexibility and entrepreneurial orientation in highly uncertain environments.
   - The moderating role of cultural aspects is both a resource and a problem for SMEs to develop productive OL. The external context is not only important

due to the initiated changes but also as a source for organizational learning, as the knowledge about environmental characteristics is important.

3. Managers are not aware of culture as a moderator for OL:

   - Managers are the stakeholders for the moderating role of cultural forces in SMEs.
   - Knowledge about national culture dimensions is important in the way that it helps to become aware of/reflect about preconditions (e.g. HRM practices), which can have an impact on certain processes (like OL and OC).
   - Managers in SMEs are not aware of this, as probably all companies they know in their environment act in the same way

4. Visibility of cultural traits:

   - Managers need to be aware that there is a need to specify contextual and cultural aspects. Defining them "as being outside of our control" is not a productive shortcut.
   - For managers, it is complicated to be observant to the influence of cultural forces on their decisions about OL. The question is: who will be the reminder and how can managers be reminded?
   - OL needs to be made visible for managers.

The literature review and the exploratory studies have shown that there are many conditions in SMEs, which are related to cultural aspects. A better knowledge (among managers and employees) about the impact of cultural aspects on organizational learning and platforms for reflection about their impact is a way to make organizational learning processes more effective. The following are main areas to focus on to help SMEs:

– Creation of awareness about cultural aspects in SMEs (most SMEs think that culture is something which is just outside the company and it's only there). Culture is both a force which has to be accepted and be a resource which has to be explored to be used in a positive way for the company.
– Help to operationalize the moderating effects of culture on organizational learning, so it is easier to implement this efficiently.
– Knowledge about possible activities/actions to deal with the existence of cultural aspects which have an impact on OL (how to approach this aspect in daily business?)

Creation of Awareness About National Traits

To implement effective organizational learning mechanisms in SMEs it is important that the "cultural bias" regarding managers' assumptions and decisions about tasks and employees is controllable. Lipshitz et al. (2006) propose to develop norms for a so-called "cultural repertoire" that facilitates learning to generate valid knowledge and lead people to act on this knowledge. Cultural norms have been translated into questions about behavioral aspects:

- Inquiry: are we persistent in investigation and avoid judgement until full understanding is achieved?
- Issue orientation: do we focus learning on a specific issue and consider the relevance of information regardless of the person's position in the organization?
- Transparency: do we expose our thoughts and actions, so they can be scrutinized and adopted by others?
- Integrity: do we admit errors in our judgement.
- Accountability: do we take responsibility for learning and for the implementation of lessons learned?

This "cultural repertoire" will support an open process, which will help for better and conscious control of the impact of national and organizational cultural dimensions. To describe what inquiry means Lipshitz et al. (2006) explains that the understanding and tackling of non-trivial, ill-defined problems in complex and dynamic situations requires persistent investigation in spite of difficulties. This situation is comparable to handling turbulent situations.

Operationalize the 'Moderating Effects of Culture' for Managers of SMEs

Fostering an organizational culture conducive to learning is clearly much more difficult than establishing organizational learning mechanisms, despite the fact that cultural change is much more difficult to achieve in the short run then the development of organizational learning. Lipshitz et al. (2006, p. 65) argue that "focusing on behavioral norms is the place to begin in changing culture and instilling values", rather than on values or underlying assumptions, as behaviors are more easily observable.

Figure 4 illustrates a possible way to help managers to become aware of their own understanding of their national culture (I); how it effects their assumptions about managing the organization and their organizational culture (II); about the impact this has on chosen HRM (III); practices and necessary adaptations (IV).

There is at least one important precondition for developing cultural awareness: the *status of SMEs' environmental orientation* (also defined as 'contextual facet' by Lipshitz et al. 2006). How much energy, time etc. do managers and employees use

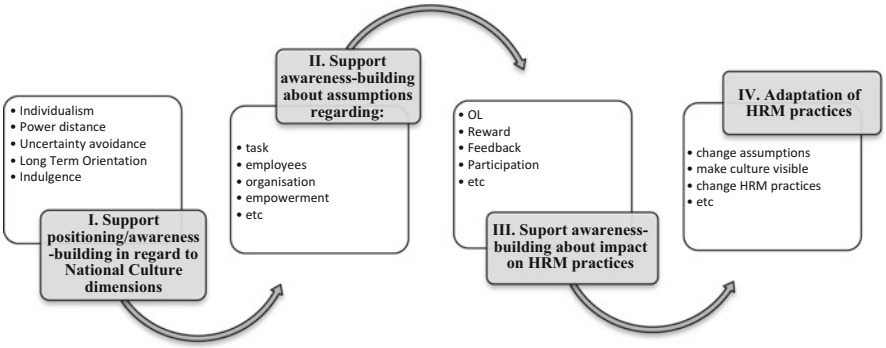

Fig. 4 Support of managers to consider cultural dimensions in their decisions

to be in touch with what is happening in the environment outside the organization? This is not only valid in situations of turbulence. The environmental scanning activities of SMEs are still not good enough. A bigger interest for the moderating effects of cultural spheres on organizational learning (including stakeholders outside the company) might help to better understand the importance of interacting with the environment.

According to Diamond (2005), the most successful cultures adapt to outside forces, manage their environmental resources equitably and sustainably, make friends with their neighbours, and have relatively egalitarian social and economic structures. Exploratory studies in Brazil (Wolf 2011) and Argentina (Babakhanlou 2011) have shown that Brazilian companies are satisfied with their activities in recognizing the general development of the market, they are much less satisfied with their own exchange with customers, suppliers etc. and the involvement of their employees.

Actions and Activities to Deal with Cultural Aspects

To support the ability of managers in SMEs to deal with the moderating role of cultures in daily business processes they need help with the process. The following steps need to be taken to implement an organizational culture (understanding of task and people) which support OL:

- articulate a vision for the organizational culture that supports OL.
- the owner/manager spotlights regular activities that reinforce the cultural vision.
- managers communicate cultural values through words and actions.
- managers uphold their commitment to values during difficult times.

These recommendations follow Schilling and Kluge's (2009) statement that the only way to overcome barriers is by adapting leadership at all levels of the organization. One way to do so, is to make use of the barriers approach regarding the process of organizational learning by the following actions:

1. Study and get to know the barriers; as part of a self-assessment process which is constantly looking for improvements.
2. Find a better integration between individual learning and organizational learning processes, through integration of the results from above into "good practices". These practices become part of the accepted knowledge and routines of the organization (organizational culture).

Future Research

There are many studies that focus on organizational factors that may have an influence on learning, such as culture, strategy, or structure. But most of them are promoting general models of what organizational learning could be instead of empirical research centered on aspects related to learning in a real organizational context (Rebelo and Gomes 2008). There is an obvious need for empirical studies about cultural spheres as a moderator for organizational learning, which among other things could focus on:

- If there are any difference between the efficiency of OL in SMEs depending on a positive or negative assessment of the cultural aspects (as a chance or a threat)
- If context and cultural aspects are less important (for OL) for a certain kind (certain sector) of SMEs?
- What other kind of processes are affected by cultural aspects?

Based on the conclusions, we recommend future *empirical research* on following questions:

1. Is knowledge about cultural aspects important for the effectiveness of organizational learning in SMEs?
2. What are the characteristics of cultural aspects as preconditions for successful organizational learning to handle turbulent situations (theoretical and empirical evidence)?
3. What are practices of OL in SMEs, which are influenced by those basic assumptions, and which characterize organizational and national culture?
4. How is the choice of practices related to dimensions of national culture? What dimensions in the national culture could be of interest for choices, regarding:
   - organizational culture
   - acceptance of/way to handle turbulent situations
   - Interest in organizational learning

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The Innovation Triple Challenge: A Creativity Check for SMES

Maurício Manhães and Guillermo Antonio Dávila

Abstract In this chapter you will learn how creativity is a key element to deal with challenges that SMEs must overcome to innovate. For this purpose, the innovation challenges in SMEs are reviewed, the concept of creativity and its relationship with organizational innovation is discussed. A five-step approach to act creatively producing innovative propositions is presented. Finally, a creativity check for SMEs based on the Need for Closure Scale invites to a self-assessment.

1 Innovation Challenges in SMES

The global economy, understood as a dynamic and turbulent environment for business, is constantly being reconfigured at an ever increasing speed. This dynamic and turbulent environment for business is both a cause and a symptom of the globalization phenomenon, which reached new heights as markets expanded and competition extended overseas. In this context, innovation became a key competitiveness factor for companies in taking advantage of opportunities provided by new technologies and changing marketing to provide goods and services that meet and exceed customer demands (Baregheh et al. 2009).

Although nowadays, it is accepted that companies need to innovate sustainably to be successful, SMEs' characteristics seem to pose seemingly unsurmountable barriers to innovation, which cannot be tamed by a simple adoption of an innovative framework. Academic research demonstrates that creativity is the main resource to overcome those barriers and that all social groups have an inherent creativity potential (Loewe and Dominiquini 2006; Sarooghi et al. 2015). An SME can be defined as a small social collectivity whose participants share a common interest in its survival and engage in collective activities to secure this end (Scott 1987, p. 23).

In that sense, what that particular small collectivity, as an SME, is capable of comprehending from its environment is what will be manipulated to create

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innovations to manage complexity; i.e. to thrive and secure its survival in turbulent environments.

Schumpeter (1927), one of the first authors to write about the concept of innovation, outlines innovation as being one or many of the following: the introduction of a new good or the introduction of an improvement to an existing one, the introduction of a new production method, the opening of a new market, the finding of a new source of supply; all of which will enable the capture of some temporary monopoly rents.

Through the last decades, there has been a growing research interest in innovation, its inputs and its outcomes. Therefore, nowadays, innovation can also be understood as a "collaborative recombination or combinatorial evolution" (Vargo et al. 2015, p. 64) and adoption by a social context of a new "application of operant resources (knowledge and skills)" (Vargo and Lusch 2008, p. 7).

However, is it easy to innovate in SMEs? Actually, it is a big challenge due to the existance of some barriers. Finance can be considered the main barrier for innovation in SMEs, according to most academic researchers. North and Vickers (2001) advocate that, besides "finance," other barriers are: "shortage of management time", "lack of in-house expertise" and "insufficient volume of production".

Similar findings were obtained by research in a German context, which identified financial problems, government support, and shortage of skilled labor as the main barriers for innovation in SMEs (Tiwari and Buse 2007). Another study developed with SMEs in Spain adds that issues related to costs are one of the greater barriers for innovation (Madrid-Guijarro et al. 2009).

North et al. (2013) developed a Brazilian-focused research, identified a convergence in these main innovation challenges for SMEs: insufficient financial resources, difficulties for attracting and retaining skilled professionals, biases in both strategic planning and decision making processes, high taxes and complex tax procedures and laws, difficulties for export products, and others.

Instead of pointing to the convergences existing in research about innovation barriers in different contexts, other research highlight that operating in a turbulent environment and lacking strategic posture affects innovation in organizations. In this text, a turbulent environment is one in which actions have unpredictable results, so it is difficult to understand and requires a flexible organization in order to strategically react in a fast and adequate way to face unexpected events (Dankbaar 1996). These unexpected events are embedded into the presented concept of turbulence which is about dynamism and complexity (Johnson and Scholes 1989).

Thus, in turbulent environments, SMEs should have to have a greater capacity to develop and implement new management practices and process technologies compared with larger organizations. For SMEs, organizational creativity is a key characteristic for continually seeking opportunities, and being flexible to adapt and respond to a changing external environment (Laforet 2011).

In a similar way, other research has shown strong relations between the concepts of creativity and innovation, describing "creativity as the process of generating

ideas whilst seeing innovation as the sifting, refining and most critically, the implementation of those ideas" (Gurteen 1998, p. 6).

Loewe and Dominiquini (2006, p. 27) point out that "building a sustainable competence for innovation requires an organization to harness the creativity of its employees". Lately, Sarooghi et al. (2015) developed empirical research exploring the relationship between creativity and innovation, producing relevant results. Firstly, there is a positive correlation between innovation and creativity, especially at the individual level. Also, creativity is important for innovation in SMEs, even though the correlation is stronger in larger firms. Thirdly, creativity is more important for process-related innovations than for product-related innovations. Fourth, the correlation between innovation and creativity is stronger in low-tech industries than in high-tech industries.

Consequently, as academics demonstrate, the innovation challenge in SMEs has definitively a need for creativity. But, what is creativity, how can it be defined in an SME environment and what are the challenges SMEs face when use creativity to innovate?

2 Innovation and Creativity

Fundamentally, companies' calls for creativity are based on the assumption that people are sensible enough to understand different points of view; to abandon their tradition and prejudice. There is a belief that just by adopting a creative frame of work it will enable people to free themselves of their prejudices and embrace the "different"; that it will enable people to make the "fusion of horizons", as described by the hermeneutical literature (Gadamer 2004). Unfortunately, the necessary empathic understanding to "pivot" ones own view of the world is not evenly distributed amongst a population. Open-mindedness seems not to be a free-entrance territory. Nevertheless, since the end of the Second World War, "open-mindedness is considered to be a virtue" (Allport 1979, p. 20).

Departing from understanding hermeneutics as a practical philosophy,[1] Gadamer (2004, p. xxxiv) clearly states that:

> What man needs is not just the persistent posing of ultimate questions, but the sense of what is feasible, what is possible, what is correct, here and now.

As in any creative efforts, it is not just about the genuineness of an idea, it is also "the ingenious manipulation of fixed forms and modes of statement" (Gadamer 2004, p. 62) that generates a creative solution at the end. The concept of prejudice as 'fixed forms and modes of statements' can be of a very practical application at the 'here and now' of organizations. Specially, if considering that it can be

[1] In a sense that "there are no universals given in advance that could be cognized and afterwards in an unchanged form utilized: the field of praxis depends on concrete situation" (Dobrosavljev 2002, p. 606).

ingeniously manipulated to enable organizations to "act into the future" toward fostering innovation. The Hannah Arendt perspective of *acting into the future* as a "We" not an "I" helps make sense of how organizations can approach creative efforts. In her own words, when she answers questions by Roger Errera[2] about a contemporary persistence of thinking based on historical determinism:

> The trouble with this whole business—and it is really an open question—is the following: We don't know the future, everybody acts into the future [which] nobody can at all know. Nobody knows what he is doing, because the future is being done. Action is a WE and not an I. Only where I am the only one, if I were the only one, could I foretell what's going to happen from what I am doing.

What Arendt brings to the concept of group creativity is the perspective that, as it is a We-Action into the future that involves an "enormous amount of variable", its level of predictability is forcefully lower than the one of an I-Action that involves few variables. This We-Action of manipulating fixed forms and modes of statement could be promoted by increasing the awareness of organizations' members about the impacts that their own prejudices have on creative efforts. What an organization, as a social context, itself part of a society, considers valid is what receives a "stamp from the commonalities of social life. Such a society chooses and knows what belongs to it and what does not" (Gadamer 2004, p. 73). If an organization, as a generic subjectivity, decides that itself is not creative, then none of its members will be able to make sense of the "new".

As it is known, there are several examples of organizations that adopted particular creative frameworks without resulting in any significant achievement towards fostering innovative propositions (Verganti and Öberg 2013). This is supported by several hermeneutical scholars, especially Gadamer (2004), whose emphasis that the process of listening to new and external interpreters (Verganti and Öberg 2013) "cannot be reduced to the application of a 'method'" (Thompson 1997). A method, as any kind of control, drives out the potential for innovativeness. The necessary "immanent logic" (Adorno 1965) of originality will not blossom whenever:

> [...] organization becomes synonymous with control, and generic subjectivity becomes sealed off from any chance for reframing, learning, or comprehension of that which seems incomprehensible. (Weick 1995, p. 73).

The possibility to make sense of what seems incomprehensible, the possibility to invent "innovations to manage complexity" (Weick 1995, p. 73) increases when tension between intersubjective meaning[3] and generic subjectivity (control) does not so much confine "as suggest incitements to play" (Gadamer 2004, p. 41). To be able to reflect about organizational tradition and its enactments of control, it is necessary to take into account the fact that "even most genuine and pure tradition

[2] Hannah Arendt 1974s interview with the French writer Roger Errera. Accessed in 23/06/2014 at http://www.youtube.com/watch?v=b1u5OjatwqA, around 3′40″.

[3] "Intersubjective meaning becomes distinct from intrasubjective meaning when individual thoughts, feelings, and intentions are merged or synthesized into conversations during which the self gets transformed from "I" into "we"." (Weick 1995)

does not persist because of inertia of what existed" (Gadamer 2004, p. 282). Essentially, preservation is as much a freely chosen act of reason as are revolutions and innovations. Thus, revolutions are not extraneous acts to organizations, they are as much acts of reason as the control ones are; however, organizational knowledge paradigms, like "Evidence" (Kristensson Uggla 2010, p. 80), constitute beliefs embedded in frames and ideologies that influence what is noticed and how events unfold (Weick 1995): "believing is seeing".

Even though innovative frames of works can be said to be self-deceiving[4] tools, it seems that in some cases its use did help enact an empathic understanding of the "different" and spur innovative solutions (Brown 2008). One good "educated guess" (Allport 1979) that could help explain that phenomenon may lie in the very own characteristics of the group of people that created that particular solution. Not in the framework itself. Therefore, organizations that adopted successfully an innovative framework would be successful if it had adopted any frames of work. The success of its innovative effort was due to the particular generic subjectivity that characterizes that organization. It was due to its creative people.

2.1 Creative People

The contemporary organizational literature and sense making discourses (Weick et al. 2005) have several examples and anecdotes that help shed some light on how "creative people" are. One of these anecdotes, to mention but a few, was brought to life by Steve Blank, who declared in an interview that Steve Jobs (one of the founders of Apple Computers, Inc) "was truly a renaissance man." Describing that Jobs "actually talked to a lot of people from a variety of fields" (Cook 2013). Maybe what Blank meant is that Jobs was just curious and interested in knowing different perspectives. As do most creative frameworks, especially Design Thinking ones, they suggest that organizational people should have to free themselves from their entrenched standpoint and go "out there" to meet the 'Other', to meet the different.

Taking Steves Jobs personality as an example, it is important to understand that he was a very "different" person. As several anecdotes that can be read in his biography (Isaacson 2011), he used to be a radical vegan, and taking a shower was a rare event for him during his early adult life. To release stress he used to soak his feet in the toilet (p. 82); and, before having a family, he used to rent bedrooms of his house to all sorts of "crazy people" (p. 87). This kind of person has a privileged vantage point of the social context. She or he can better reap the benefits of co-creation, on viewing the perspective of others; on creating "reality distortion fields" (Isaacson 2011); and enacting the fusion of horizons. But creativity is *not* about "eccentric personality," as described by Amabile (1996, p. 2) in a text about

[4] "In matters of sense making, believing is seeing." (Weick 1995)

creativity and innovation in organizations, reinforcing that "truly creative work is not only novel; it is also appropriate."

Thus, these anecdotes about Steve Jobs are also suitable to make sense of two characteristics endorsed by the hermeneutical perspective: the openness to the "Other" and the "sense of what is feasible, what is possible, what is correct, here and now" (Gadamer 2004, p. xxxiv). In that sense, "creative people" can be defined as a combined capability of "persistent posing of ultimate questions" (Gadamer 2004, p. xxxiv) in one extreme, *and* having a sense of what is 'feasible here and now' on the other. Which means that either questioning endlessly a situation *or* focusing solely on what is feasible here and now will not commit people in a determined social context to act "into the future".[5] This *commitment to act* being understood as a sense making process (Weick et al. 2005) that produces new knowledge, i.e. increases the capacity to act (Nonaka and von Krogh 2009).

Therefore, one key ingredient for creativity is the awareness of the prejudices at play on a determined social context. To understand what it is meant by the word 'prejudice' it is necessary to consider Gadamer's discussion about it. First, he advocates "that all understanding inevitably involves some prejudices" and, by prejudice, Gadamer (2004, p. 272) means "a judgment that is rendered before all the elements that determine a situation have been finally examined". Based on that assumption, creativity can only be enacted when prejudice is metaphorically:

> [. . .] put aside in order to think, in order to dare to think—according to the famous adage *sapere aude*—so that one may reach the age of adulthood or *Mündigkeit*." (Ricoeur 2007, p. 274).

In that sense, accepting that one must be aware of his/her prejudices in order to think, creativity (as an act of thinking) can only be enacted by an individual after daring to reframe, learn, or comprehend "which seems incomprehensible" (Weick 1995). One description that gives meaning to the enactment of creativity is understanding it as a process of blind variation and selective retention (Campbell 1960; Simonton 2010). This perspective, although built upon Darwin's theory, cannot be farther from the liberal ideology. Which created its discourse based on Newtonian naturalistic philosophy, oriented by the principle of least action, as clearly explained by Celso Furtado[6] (Furtado 2008, p. 83).

The demands of *sapere aude* are diametrically opposed to the principle of least action. Blind variation can only be obtained by daring to reframe, learn, or comprehend "which seems incomprehensible." (Weick 1995) Besides a qualitative difference in the created variations, it is also necessary for variations in quantity.

[5] Hannah Arendt 1974s interview with the French writer Roger Errera. Accessed in 23/06/2014 at http://www.youtube.com/watch?v=b1u5OjatwqA, around 3′40″.

[6] "A primitiva ideologia liberal formou o seu discurso com elementos da filosofia naturalística que se impôs de forma avassaladora no século subsequente à publicação dos *Principia* de Newton. Os indivíduos, orientados pela lei do menor esforço (expressão da razão inerente à natureza humana) e impulsionados pelo desejo de melhorar o próprio bem-estar, produziram coletivamente um sistema de forças sociais cuja adequada canalização institucional assegurava o *progresso*." (Furtado 2008)

From the work of Simonton, (Simonton 1997, 1999, 2010) it is possible to justify that, for the method to generate records of "quality," records must be produced in "quantity." According to Simonton (1997): "Quality is then a probabilistic function of quantity."

By adopting the evolutionary process as a generative metaphor (Schön 1979) to approach creativity of groups, makes it possible to understand the process as a self-organizing phenomenon (Abel and Trevors 2006). Which, the evolutionary process, can make complex global patterns emerge from local interactions (Lansing 2003).

Some of these interactions occur from and between certain people with certain attitude and aptitude (Schumpeter 1927). Interactions which "require creativity and energetic activity in order to create anything new of importance" (Schumpeter 1912, p. 74). This reasoning places the focus on the capacity to create anything new of importance; i.e. back to the phenomenon of creativity. As explained by Simonton, creativity is

> [...] positively associated with personal traits that I associated with the capacity to general blind variations, namely, divergent thinking, openness to experience, and reduced latent inhibition (Simonton 2010).

Thus, creativity can be understood metaphorically as an evolutionary process of blind variation and selective retention (Campbell 1960; Simonton 2010). To clarify the relation between blind variation and open-mindedness, it is worth mentioning that this particular "variation" must be the product of explorations "going beyond the limits of foresight" (Campbell 1960). In that sense,

> [...] the successful explorations were in origin as blind as those which failed. The difference between the successful and unsuccessful was due to the nature of the environment encountered, representing discovered wisdom about the environment (Campbell 1960).

Fundamentally, any creativity frameworks should enable groups to create new knowledge; i.e. to discover wisdom about the environment. But most of the times, if any, they seem to enable knowledge sharing only, particular knowledge sharing (Nonaka et al. 2000; Nonaka and Toyama 2003) and in very precise directions. Sharing knowledge is not enough for enacting creativity, it is necessary to create knowledge. Which can only be created in

> [...] the spiral that goes through seemingly antithetical concepts such as order and chaos, micro and macro, part and whole, mind and body, tacit and explicit, self and other, deduction and induction and creativity and efficiency (Nonaka and Toyama 2003).

To summarize, knowledge can only be purposely created by organizations if it avoids controlling the creative process. If it enables generic subjectivity to be exposed to antithetical concepts, to opportunities for reframing, learning, or comprehending that "which seems incomprehensible" (Weick 1995), the organization will be able to create new knowledge to augment its people's capacity to act.

2.2 Organizational Creativity

Several studies of organizations, regions and nations indicate a connection between economic success and human capital diversity (Florida 2003). Østergaard et al. (2011) explain that, as social context becomes more diverse, "this creates possibilities for new combinations of knowledge." And their research also indicates that there is a positive relationship between human diversity and the organization's likelihood to innovate. More precisely, diversity of backgrounds should give "groups a larger pool of resources that may be helpful in dealing with non-routine problems" (van Knippenberg and Schippers 2007).

One interesting perspective on diversity is presented by the work of Hong and Page (2004), as they differ identity-difference ("differences in their demographic characteristics, cultural identities and ethnicity, and training and expertise") from functional-difference ("how people represent problems and how they go about solving them"). Based on a series of computational experiments they demonstrate that

> [. . .] a collection of diverse agents can be highly effective collectively, locating good and often optimal solutions, confirming the widely accepted belief. More interestingly, we find that a random collection of agents drawn from a large set of limited-ability agents typically outperforms a collection of the very best agents from that same set. This result is because, with a large population of agents, the first group, although its members have more ability, is less diverse. To put it succinctly, diversity trumps ability (Hong and Page 2004, p. 16386).

However, at the same time that diversity presents possibilities of innovation, it strengthens the need for intergroup interaction and communication and "might lead to conflict and distrust" (Østergaard et al. 2011). Other streams of research also indicate that cognitive diversity "may be detrimental to team satisfaction, affect, and members' impressions of their own creative performance" (Hennessey and Amabile 2010). Additionally that diversity can just as easily "lead to negative as to positive outcomes" (Hennessey and Amabile 2010). Hong and Page (2004, p. 16389) also highlight the fact that "problem solvers with diverse perspectives may have trouble understanding solutions identified by other agents". In other words, the ability "to actively bridge different knowledge traditions" (Jahnke 2013), to hermeneutically *build bridges with the* "*Other*" is an important aspect of solving problems and creating meaning. As stated by the following text:

> Differently than established theories that often consider innovation as stemming from a process of problem solving, or from a process of ideation, hermeneutics provides a framework to look at innovation as a process of interpreting and envisioning (or generative interpretation). It therefore better suits the investigation of change in meaning, and has the potential to lead to complimentary explanations of why some companies are more effective in managing the radical innovation of meanings. In addition, hermeneutics offers an important angle to investigate the role of networks in the process of making sense of things, since external players may significantly affect the way firms reframe their interpretation of the meaning of product and services (Verganti and Öberg 2013).

Therefore, to be creative organizations should have to overcome the triple challenge of: (1) understand the prejudices of its members; (2) to understand its historical context; and, (3) create innovative meaning propositions. These challenges can only be overcome by creating new knowledge: by finding new ways of augmenting the potential to act (Von Krogh et al. 2013, p. 4). Also knowledge, by its turn, can only be created by building bridges, as *arcs herméneutiques* (Ricoeur 1986, p. 158) between seemingly incompatible concepts. Thus, organizations have to enable individuals to overcome the triple challenge mentioned above through a process of Socialization, Externalization, Combination and Internalization (Nonaka et al. 2000; Nonaka and Toyama 2003). But how can organizations facilitate this process? What should managers do in order to operationalize this?

3 The Innovation Triple Challenge

Therefore, one of the goals of this text is to enable people to act towards creatively producing innovative propositions. Thus, permitting to focus initial efforts on facing the triple challenge of (1) understanding the prejudices of its members, (2) to understand its historical context and, then, (3) create innovative, meaningful propositions. In order to facilitate the commitment to act towards facing that challenge triplet, this interdisciplinary approach to innovativeness efforts of groups proposes a heuristic method. The present authors believe that; at the same time this proposition maintains the innovativeness potential of teams, without relying on control processes, it enables organizations to act by providing an academically supported discourse in the form of a heuristic.

The operationalization of the proposed heuristic to overcome the triple challenge is divided into simple steps:

1. Closed-mindedness assessment: based on the results of the mentioned literature and research, it is possible to assess the participants of an existing group to verify the closed-mindedness of each individual and, if necessary, proceed to personnel selection or reassignment. This assessment is obtained with the Need for Closure (NFC) scale, which is an instrument to measure the level of closed mindedness of individuals. The NFC scale was developed by Professor Arie W. Kruglanski (2004) and has 41 questions. From which only 15 items are taken into account for obtaining the NFC levels of each individual (see questionnaire at the end of this chapter).
2. Design of innovativeness groups: design groups based on diverse levels of individuals' NFC. Thus, it is a straightforward process to assess possible candidates with the NFC scale and to design higher innovative potential groups based on the aggregate mean levels of NFC. According to Manhães (2015) the innovativeness of groups were higher when portraying mean NFC levels between 52 and 59 (when considered the answers for the 15 questions referred above) and a Coefficient of Variation around 0.14 and 0.24. The differences between groups

that are in this NFC range and those that don't suggest the formers is rated almost 50 % higher at the innovativeness perception level of its products.

3. Governance policies: adopt governance policies that enforce non-hierarchical intergroup contact. For instance, if the organization has already assessed its members as to design a highly innovative potential group; then it must assure that this group has the appropriate governance policy that will foster its innovative potential. Therefore, the adoption of a governance policy that supports the awareness of the prejudices at play can be considered as an innovativeness enhancing strategy for a group. The suggested governance policy should have to be based on Allport Key Conditions for intergroup contact as to (1) create conditions of equal individual or group status; (2) necessarily direct all individual actions towards common goals; (3) which could only be attained by obligatorily cooperation and interdependency; and (4) supported by clear messages and actions from authorities reinforcing these conditions.
4. Autonomy: provide organizational autonomy for the designed groups. The organization does not obligatorily need to have a clear idea on how it will "act into the future." Therefore, the best place to start is to seek evidence that its members form a highly innovative potential group and then it must assure that this group has the appropriate governance policy that will foster its innovative potential. At the end, the organization provides autonomy for its innovativeness group and asks its members to define ways to "act into the future," setting autonomously courses of action, milestones, goals and deliverables.
5. Resources: define a time frame and available resources, manage them and verify continuously their comfort inside the process, and their outcomes, for the group and for the business.

The above suggested steps should enable organizations to create *Bildung* prone groups where the imaginative productivity is richest because it will not be merely free. This research shows that the adoption of practices which increase the awareness of the prejudices at play, fosters the confidence towards groups by its members and the surrounding communities. If the organization has no clear idea on how it will "act into the future," nor knows how/where is the best place to "understand reality," its managers must start with the appropriate governance policy that will foster its innovative potential. Governance must build bridges to enable the organization to connect with "Others"; with different discourses and realities.

3.1 Creativity Check for SMEs

From the proposed heuristic, it is possible to suggest a Creativity check for SMEs. This check is designed to be used by managers of SMEs in order to verify if the respective organization has the highest potential to act towards facing the triple challenge of innovation.

The proposed check process is based on five questions, to which managers have to answer by a Yes or a No. The questions are:

1. Do organizational members, as a whole, represent diverse types of mindedness (open and closed)?
2. Does the group directly responsible for the innovative effort is composed by the right mix of different mindedness (open and closed) individuals?
3. Does this group obey to a governance policy that enforces intergroup contact conditions: equal status within the situation; common goals and interdependence?
4. Does this group have complete autonomy to define courses of action, milestones, goals and deliverables?
5. Does this group was clearly informed about the resources (budget and time frame) that it is obliged to comply with?

Those questions are directly related to the five items described at the heuristic above. To augment the probability to overcome the triple challenge of innovation, based on the reasoning that supports the present heuristic, SMEs managers have to respond positively (Yes) to all questions presented above. Each negative answer prompts managers to implement the directives suggested by the correspondent item from the five ones described upstream.

4 Conclusions and Management Implications

As presented by this chapter, the current world of organizations is constantly being reconfigured at an ever increasing speed, creating a dynamic and turbulent environment for business. In this context, innovation is perceived to be a key competitiveness factor for organizations.

Finance, shortage of management time, lack of in-house expertise and insufficient volume of production are shown to be the main barriers for innovation in SMEs. However, according with up-to-date academic researchers, in turbulent environments, organizations have to be able to develop dynamic capabilities for creatively seeking opportunities and being flexible to adapt and respond to a changing external environment.

Therefore to be creative, organizations should have to overcome the triple challenge of (1) understanding the prejudices of its members, (2) to understand its historical context and, only after these two challenges have been overcome, (3) to create innovative, meaningful propositions. These challenges, as a whole, can only be overcome by creating new knowledge: by finding new ways of augmenting the potential to act. This is the main theoretical contribution of this chapter.

At its core, the above proposed sense-making discourse can be summarized as: To perform better, organizations have to be aware of their prejudices. Or, put another way: Organizations that are aware of their prejudices are probably more likely to have better performance. Thus, in order to facilitate the commitment of an

SME's groups to act towards creating innovative opportunities, this text proposes that they should focus on activities that fosters their self-awareness, then on activities that augment the awareness of the social context where they should create new values and finally, on creating new values propositions.

We believe that this chapter has a practical relevance for SME entrepreneurs, because it provides the triple challenge framework as a tool for improving organizational creative-based capabilities, for supporting sustainable innovation and consequently, competitiveness. To extrapolate, consultants or development agents responsible for supporting an SME's innovation and development, can use the same steps to operationalize innovation efforts in a cluster of SMEs, or in any kind of arrangement considering competitors, partners, customers, and other private or governmental players.

Annex: Need for Closure (NFC) Scale

The NFCS 41 items questionnaire is presented below. The 15 items taken into account for obtaining the NFC levels of each individual are marked with "X". Details about how it should be used to obtain individual NFC levels and groups NFC Mean and NFC CoV can be found at Manhães (2015).

Instructions

Read each of the following statements and decide how much you agree with each according to your beliefs and experiences. You are encouraged not to think too long about each question, just answer spontaneously. Please respond to the 41 items according to the following scale:

1—strongly disagree
2—moderately disagree
3—slightly disagree
4—slightly agree
5—moderately agree
6—strongly agree

41 Questions	15 items	1	2	3	4	5	6
1. I think that having clear rules and order at work is essential for success.							
2. Even after I've made up my mind about something, I am always eager to consider a different opinion.							
3. I don't like situations that are uncertain.	**X**						
4. I dislike questions which could be answered in many different ways.	**X**						
5. I like to have friends who are unpredictable.							
6. I find that a well ordered life with regular hours suits my temperament.	**X**						

(continued)

41 Questions	15 items	1	2	3	4	5	6
7. When dining out, I like to go to places where I have been before so that I know what to expect.							
8. I feel uncomfortable when I don't understand the reason why an event occurred in my life.	**X**						
9. I feel irritated when one person disagrees with what everyone else in a group believes.	**X**						
10. I hate to change my plans at the last minute.							
11. I don't like to go into a situation without knowing what I can expect from it.	**X**						
12. When I have made a decision, I feel relieved.	**X**						
13. When I am confronted with a problem, I'm dying to reach a solution very quickly.	**X**						
14. When I am confused about an important issue, I feel very upset.							
15. I would quickly become impatient and irritated if I would not find a solution to a problem immediately.	**X**						
16. I would rather make a decision quickly than sleep over it.							
17. Even if I get a lot of time to make a decision, I still feel compelled to decide quickly.							
18. I think it is fun to change my plans at the last moment.							
19. I enjoy the uncertainty of going into a new situation without knowing what might happen.							
20. My personal space is usually messy and disorganized.							
21. In most social conflicts, I can easily see which side is right and which is wrong.							
22. I almost always feel hurried to reach a decision, even when there is no reason to do so.							
23. I believe that orderliness and organization are among the most important characteristics of a good student.							
24. When considering most conflict situations, I can usually see how both sides could be right.							
25. I don't like to be with people who are capable of unexpected actions.	**X**						
26. I prefer to socialize with familiar friends because I know what to expect from them.							
27. I think that I would learn best in a class that lacks clearly stated objectives and requirements.							
28. When thinking about a problem, I consider as many different opinions on the issue as possible.							
29. I like to know what people are thinking all the time.							
30. I dislike it when a person's statement could mean many different things.	**X**						
31. It's annoying to listen to someone who cannot seem to make up his or her mind.							
32. I find that establishing a consistent routine enables me to enjoy life more.	**X**						

(continued)

41 Questions	15 items	1	2	3	4	5	6
33. I enjoy having a clear and structured mode of life.	**X**						
34. I prefer interacting with people whose opinions are very different from my own.							
35. I like to have a place for everything and everything in its place.							
36. I feel uncomfortable when someone's meaning or intention is unclear to me.							
37. I always see many possible solutions to problems I face.							
38. I'd rather know bad news than stay in a state of uncertainty.							
39. I do not usually consult many different opinions before forming my own view.	**X**						
40. I dislike unpredictable situations.	**X**						
41. I dislike the routine aspects of my work (studies).							

Source: Kruglanski and Webster (1996), Kruglanski (2004), Roets and Van Hiel (2007, 2011a)

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Intellectual Capital as a Strategic Model to Create Innovation in New Technology Based Firms

Eduardo Bueno, Carlos Merino, and Cecilia Murcia

Abstract This chapter highlights the importance of SMEs and New Technology Based Firms (hereafter NTBFs) for sustainable economic development and discusses the need to incorporate dynamic resources and capabilities to facilitate their performance under the current economic scenario of crisis and change. Focus is placed on the strategic role of intellectual capital, through the leverage of creative and innovation capabilities, to strengthen and develop firms; thus emphasizing the micro-strategic perspective of dynamic capabilities in innovation processes of NTBFs. In addition, an evaluation of the role that Intellectual Capital Reports (ICR) play in this process and in the development of core competences, through implementation in almost 100 NTBFs located in science and technology parks of Madrid, is presented.

1 Introduction

The high presence of SMEs in economies of both developed and emerging countries, alongside the importance of NTBFs and the current situation of crisis and turbulence in the global economy, justifies the need for research into facilitating NTBF knowledge transfer. To support sustainable development, models and tools which develop dynamic capabilities in these companies by acting as sources of innovation are developed.

NTBFs are Knowledge-intensive firms based on the exploitation of an invention or technological innovation, and generating a high proportion of qualified

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employees. They represent a unique and important case of SMEs in turbulent times as they begin their life-cycle processes based on knowledge or R&D to create innovation. Therefore, knowing your intellectual capital is essential for consolidation and development.

The literature on NTBFs begins to reach a common understanding through basic references of Little (1977), Shearman and Burrell (1988) and Storey and Tether (1998). References referring to the definition of NTBFs can be summarized as the following concept: "Firms recently established by a group of entrepreneurs, based on the exploitation of a technological innovation while being characterized by an analytical knowledge base and strong reliance on explicit and tacit knowledge as their basis for competitive advantage".

Intellectual capital is understood as a driver of innovation in SMEs through a specific development and implementation model, i.e. Intellectus Model. Its role in the process of dynamic capabilities identification and incorporation is paramount for carrying out good governance of companies from the perspective of the available resources (both, tangible and intangible assets) and capabilities.

Consequently, this paper analyses the strategic role of intellectual capital as the set of intangible assets based on knowledge, an expression of resources and capabilities possessed by the SMEs. This is as compared with tangible assets of large companies, to generate value and innovation within companies, especially to consolidate and develop the NTBFs.

Therefore, identification and measurement of intangible assets (intellectual capital) represents the main aim of the work, as these may explain the ability of a company to compete in turbulent environments.

2 Intellectual Capital as a Source of Innovation and Creative Capability

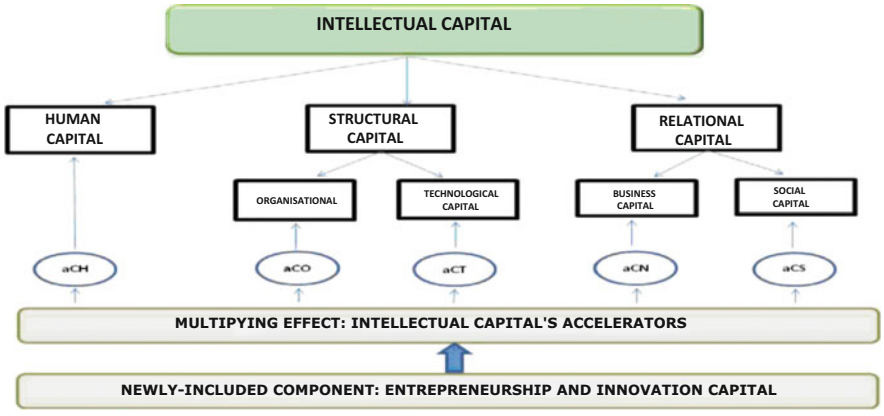
2.1 Towards a More Dynamic Approach to Intellectual Capital

Intellectual Capital, with nearly 50 years of existence as an economic concept in today's society and knowledge economy, explains the wealth owned by organizations, i.e. it expresses intangibles which generate value in organizations (Edvinsson and Malone 1997; Stewart 1997; Bontis 1998; Bueno 1998; Lev 2001). It has experienced a conceptual evolution from the analysis of knowledge processes in action, to the creation of organizational value or how intangible assets integrate the different components (Davenport and Prusak 1998; Roos et al. 1998; Andriessen 2004; Bueno and CIC-IADE 2003; Bueno et al. 2008). It has been emphasized that as a more dynamic conception as a system of strategic nature to create innovation within organizations in its broader socio-economic sense (Bueno and Murcia 2010).

We define Intellectual Capital as "Accumulation of knowledge that creates value or cognitive wealth owned by an organization, composed of a set of intangible assets (intellectual) or knowledge based resources and capabilities, which when put into action, as determined strategy, in combination with physical capital or tangible, it is able to produce goods and services and create competitive advantages or core competencies for the organization in the market" (Bueno 2005).

Consequently, identification and measurement of intangible assets that integrate Intellectual Capital is particularly critical in the case of SMEs as their size or recent establishment means the businesses does not yet possess the financial and tangible capital to compete in global markets and obtain the required funding. This is particularly critical in the case of NTBFs comprising Biotechnology, Nanoscience, Energy and other sector companies undergoing an incubation process. The analysis of human, structural and relational dimensions[1] offers a panorama of intangible assets related to knowledge and skills of their employees, internal processes and value-generating relations in this firms. This allows internal strategic thinking and also communication to the market of important business structure aspects which are not included in traditional financial reporting.

The Intellectus Model[2] illustrated in Fig. 1 has three basic dimensions, Components or Capitals (grouping of intangible assets): Human Capital; Structural Capital, divided into Organizational Capital and Technological Capital; Relational



a= *accelerator*

Fig. 1 Intellectus model. a: accelerator. *Source*: Bueno and CIC-IADE (2012)

[1] Main components of intellectual capital accepted internationally.

[2] Measurement and management of intellectual capital model developed in 2003 and updated in 2012 in Spain. It was the result of the participation and consensus of public and private agents in the 'Knowledge and Innovation Intellectus Forum' as a reflection and transfer platform conducted by IADE (the University Research Institute in Business Administration of the 'Universidad Autónoma de Madrid').

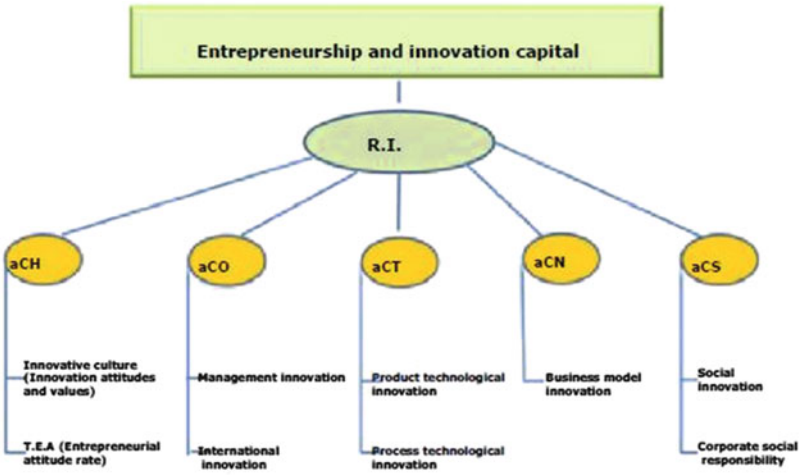


Fig. 2 Basic accelerators: variables for the construction of "creativity capability". a: accelerator, R.I.: innovation outcome. *Source*: Bueno and CIC-IADE (2012)

Capital, divided into Business Capital and Social Capital; and the new Entrepreneurship and Innovation Capital, adding the dynamic role of the entrepreneurship and innovation processes to the realization of the R&D function and the organizational culture (Bueno and CIC-IADE 2003).

These capitals attempt to make explicit the value added to intellectual assets: Elements (homogenous groups of intangible assets of each component); Variables (intangible assets integrated within an element); Indicators (instruments for measure the intangible assets that are represented by the elements and variables).

The updated Intellectus Model allows formulating a basic map of the main elements and critical variables or 'accelerators'. This map is illustrated in Fig. 2 and has been built with the main elements and critical variables of the five initial forms of capital that have been identified in the best known practices. The map also incorporates the main element and accelerators of the new category of capital (the Capital for Entrepreneurship and Innovation). The objective of this map is to make it easier to identify the forms of capital and accelerators that create dynamism and lead to the evolution of a firm's IC (Bueno and CIC-IADE 2012).

This conceptual evolution, in the case of the Intellectus Model (Bueno and CIC-IADE 2012), has resulted in the proposal of a new component of "Entrepreneurship and Innovation Capital" which integrates variables or elements identified as intellectual value accelerators such as Human Capital Accelerator (aCH), Organizational Capital Accelerator (aCO), Technological Capital Accelerator (aCT), Business Capital Accelerator (aCN) and Social Capital Accelerator (aCS) (Bueno

et al. 2006). Accelerator (a) concepts reflects the ideas of the "income multiplier" of the Keynesian Model and the "accelerator principle" of the Harrod Model, as a way to identify the variables or intangible asset that stimulates and develops intellectual capital; i.e. reflecting the "multiplier effect of knowledge in action." These accelerators or main variables act as facilitators of "creativity capability" and innovation and are shown in Fig. 2. All of the accelerators represent the role of dynamic capabilities. This implies the need to discuss both the new strategic role of the concept of "creativity ability" in the Innovation System (R&D System), as addressed in the next section (Bueno 2013), and a new agenda for its further development (Bueno et al. 2014).

In short, accelerators or variables that are shown in Fig. 2 represent intangible assets in the different capitals or Intellectual Capital components that form the indicated "creativity capability". This explains the function of the entrepreneurship and innovation capital in the updated Intellectus Model.

2.2 Strategic Perspective Based on Dynamic Capabilities

This approach is related to the resources and capabilities theory as well as to the development of dynamic capabilities (Teece 2007, 2012; Teece et al. 1997). It acts as an expression of the new micro paradigm of current strategic management theory that analyses the strategic phenomena of the company to a more concrete level linked to individuals within the company, its characteristics, actions and interaction (Abell et al. 2008; Felin et al. 2012; Foss et al. 2012; Molina-Azorin 2014). Implied is a conceptual proposal that excels and differs from the traditional concept of discipline in their nearly 40 years of existence based on a macro-strategic approach.

In addition, a changing and dynamic scenario gives way to a basic organizational need: the possession of a capacity for rapid and flexible response allowing regenerative processes in both existing and new organizations.

It is at this point where the dynamic capabilities perspective arises to improve the explanatory power of theoretical approaches regarding the sustainability of competitive advantages in an environment of rapid change, considering the evolving nature of resources and capabilities of a company related to changes in the environment where it operates (Wang and Ahmed 2007).

After Teece et al. (1997), Eisenhardt and Martin (2000), Zollo and Winter (2002) and Winter (2003), dynamic capabilities can be defined as "high-level routines or key processes by which organizations reconfigure their tangible and intangible resources so as to adapt themselves to changing environment".

According to Teece (2007), capabilities to detect, capture and transform enable organizations to create, deploy and protect those intangible assets that support performance and create competitive advantages.

Thus, it is argued that dynamic capabilities are integrated within the intangible assets of the organization. In particular, into its intellectual capital, acting as accelerators in creating innovation to meet the sustainability of SMEs in current

turbulent environments. Therefore, an effective way to identify and develop dynamic capabilities within an organization is the identification, measurement and analysis of its components of intellectual capital (Uriona et al. 2013).

As a result of this, the current entrepreneurial and innovative processes must be applied in a holistic view and start from the analysis of potential interactions between the elements of the socio-economic referential system with open and evolutionary ends. In this sense, the creation of companies in the society of knowledge must start from the perspective of accepting complexity and its management (Bueno and Merino 2007).

This applies mainly to NTBFs, for which the creation and development processes of scientific knowledge are essential and require a solid business project, especially in the early stages. Therefore the identification and measurement of intellectual capital is paramount, both from an internal perspective of intangible elements management improvement and from the external communications perspective of their business project.

2.3 The Creative Capability of Intellectual Capital

As mentioned above, the Intellectus Model evolution specifies the new strategic perspective of intellectual capital through the new entrepreneurship and innovation capital, a proposal that brings together those variables, representing intangibles assets and indicators. This enables a measurement and identification of the dynamic capabilities as entrepreneurship and innovation accelerators.

Thus, it deepens the role played by the relationships between entrepreneurship, innovation and intellectual capital as a new strategic perspective for the creation of value. In this value creation Intellectual Capital acts as an 'umbrella' covering all intangible assets created and existing from the moment knowledge processes start operating (Bueno 2013).

Consequently, the role of intellectual capital's "creative capability" in this system is shown in Fig. 3. It depicts a basic structure in which the inputs are classified into three analysis levels and the results/outputs, according to innovation types known, are subjected to assessed and evaluated from different measurement dimensions such as, economic, human, organizational and social (Murcia-Rivera 2012). The input-output system relation is specified in the transformation or innovation generation process of "creativity capability".

The indicated inputs highlight the set of resources and techno-scientific capabilities that characterize the innovation processes in SMEs. Additionally, intellectual capital appears as a value generating system, in terms of entrepreneurship and innovation (analysed in the next section). Finally, when considering inputs, it is important to note the role of entrepreneurship as creating attitude and ability, while also recognising effective R&D effort that "innovators" perform.

The "creative capability" as a value-creating process will depend mainly on the quality and efficiency of entrepreneurship, technology and knowledge governance

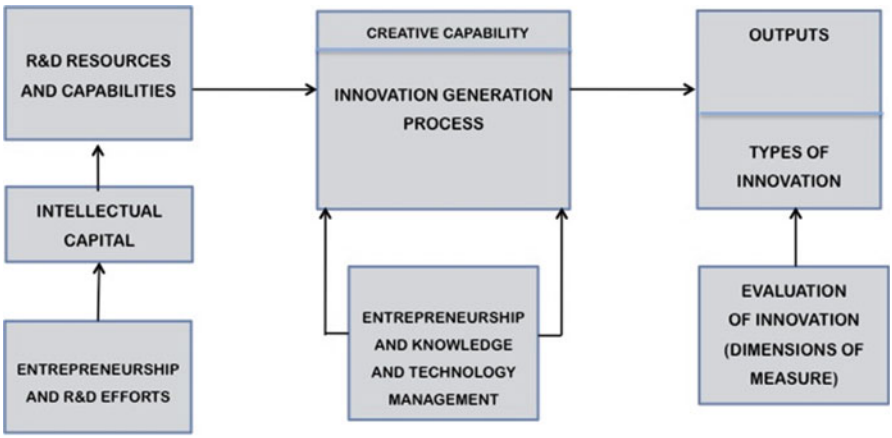


Fig. 3 Innovation and intellectual capital system. *Source*: Bueno (2013)

processes implemented within the organization. Processes generally in SMEs and in particular in NTBFs are based on the principal assets of human and technological capital.

3 The Role of Intellectual Capital Reports in the NTBFs Innovation Process

3.1 Introduction

Research (Hurst and Lusardi 2004; Motohashi 2005) has provided a deeper insight into NTBFs, especially the role played by innovation in business strategy. Therefore, it is clear the need to understand the process that leads to true innovative behaviour, incorporating the discourse of intangible assets and creating the need for new leadership and management schemes for this type of assets. From Stewart (1997) to Edvinsson and Malone (1997), Bueno (1998) and Bontis (2001) and finally to Abhayawansa and Guthrie (2014), a number of studies tried to define the essence of a model in order to manage these intangibles.

Whenever a model emerges, an application protocol appears as well. In this case we refer to the intellectual capital report (ICR) as an instrument to describe the situation of an organization in terms of its intangible assets, structured in their variables of human, structural and relational capital. This report is a tool to support decision making, whether internal or external, reformulation, innovation, valuation, etc. on issues the NTBFs considers especially interesting given their particular life cycle in which their intangible assets constitute much of its potential future.

One of these NTBFs was Genetrix, a Spanish biomedical company specialized in the creation of technological medicines based on the manipulation of mother cells.

Created in 2001 as a spin-off of the National Center for Biotechnology. In 2004, this Company, supported by CIC (Autonomous University of Madrid), became the first Spanish biotechnology company to develop an intellectual capital report for the strategic area of cell therapy.

The objective of this report was to serve as complementary information to the annual report of the company (balance sheet, income statement and management report). It included non-financial indicators and data on intangible assets, which show the full company development and a list of participants in the funding round that the company planned to carry out for employing specialized international capital.

The report showed that the company had at the time an economic value of intellectual capital nine times higher than reflected in its accounting equity, highlighting aspects such as creativity, leadership and research relationships with international elite groups, owned by the organization.

Thus, the company obtained resources amounting to 9 million euros, which is why the company decided that year to create a sister company—Cellerix, currently one of the most important European companies in the biotechnology area.

Therefore, ICR becomes a key element for leadership and management processes by presenting strengths and weaknesses on issues related to people, structures and relationships of the organization. This highlights the relevance of the "spiral knowledge" (Nonaka and Takeuchi 1995), which reflected the need for patterns of socialization, externalization, combination and internalization to develop a learning organization.

Moreover, its implementation in almost 100 NTBFs proves its relevance not only regarding the analysis of their capital, but also due to the possibility of identifying cause-effect relationships between variables of different types of capital, highlighting the systemic nature of the intangible assets in the organization. Therefore, the ICR must be analysed "vertically and horizontally" to obtain evidence that hides behind the results of its application and which are the real information nodes that should star in processes of the so-called "knowledge management" (Zack 2002).

In short, ICR identifies and highlights the key intangible assets of the organization to later disclose the various aspects that make up the value of this organization. Thus, this report assumes coverage of the following issues (Bueno and AECA 2012):

- To report on how the process of identifying the critical intangible assets for value creation in the organization has been developed. Starting from the elements and relevant variables of the model components of intellectual capital model.
- To disclose the process of systemic measurement of such items or variables, based on efficient and effective selection of the scoreboard that represents the identity and activity of the organization.
- To submit, in the most precise way, the chosen indicators so as to proceed, once weighted and according to the established criteria, to construct the corresponding synthetic index that represents the value of intellectual capital at referential time.

- To provide a policy guidance to direct and better manage critical intangible assets, from a strategic perspective, with the view to creating value for the organization, based on its government processes of existing knowledge.

The use of ICR is well suited to the type of organizations in the NTBFs group: the incubators of science and technology parks, a highly developed context in Spain (www.apte.org), with international references which may increase the interest of this paper (www.iasp.org).

3.2 Experiences in NBTFs Located at Science and Technology Parks

The habitat that Science and Technology Parks represent for NTBFs is better understood from the sphere of intangible assets. Without a proper reading of the interactions of human, structural and relational capital, a company might as well be located in a Park or in a traditional office building (Ondategui 2006). Therefore, understanding the characterization of NTBFs as "new knowledge in action" is the key to providing the search for space in a Science and Technology Park with strategic sense, ensuring that the Park itself has also assimilated the discourse on intangibles and not on real estate.

Once these issues have been addressed, it seems necessary for the implementation of the ICR in the context of NTBFs to consider the nodes and flows that interact in order to improve business skills, the provision of knowledge and resources, regardless the connection to the external references which may appear of greater interest for the business (institutional, scientific, commercial, etc.)

In this scenario, there is a shallower analytical, although more strategic version, with an approach already provided by European Public Administrations (InCaS Project 2008), the National Plan for R + D + I and from lines such as education or employment alike. It supports entrepreneurship, self-employment, science, technology with social and economic impact (Etzkowitz and Leydesdorff 1998) and hence the existence of programmes that encourage the creation of innovation ecosystems where Science and Technology parks happen to be one of the protagonists. Thus, with institutional support to formulate schemes for implementing the ICR within NTBFs and financing specific technical assistance over the past 10 years, the network of agents associated with the group Intellectus research of UAM has developed multiple projects referring to the use of ICR in NTBFs across different Science and Technology parks (Bueno et al. 2008, 2014; Bueno and Merino 2007; Merino and Villar 2007; Merino 2010).

Specifically, the basic structure of an ICR is divided into the following sections:

1. Introduction and presentation of the company or organization;
2. Model of Intellectual Capital for the entity (adaptation of the Intellectus Model): elements, variables and critical indicators for the organization;

3. Results from the report: measuring intangible assets;
   (a) Intellectual Capital Indicators. Selection of the most representative indicators of the company, ranked by each of the Intellectus Model capitals;
   (b) Appraisal and constructing axis of the Synthetic Index on the appraisal of the most relevant intangible assets of the Intellectual Capital;
   (c) Analysis of the strengths and weaknesses of capitals which comprise the organisation's Model of Intellectual Capital;
4. Conclusions and recommendations: preparation of a document that comprises the general comments.

These experiences provide a series of lessons of diverse nature, namely, methodological, operative, filing and utilitarian. Such lessons are summarized below with the purpose of sharing this valuable contribution:

- Methodological factors. The focus of the ICR must be adequately explained prior to its implementation. To assimilate the concept of intellectual capital and make the process of execution of ICR visible are the key elements in giving coherence and agility to its development.
- Operational factors. The ICR cannot invade the agenda of the NTBF but it must be based on the flow of information already available. It is therefore necessary to check the documents or references that already exist and can be reused for the report, e.g. SWOTs, strategic plans, website, etc. which facilitate better business understanding and the initial measurement (albeit pending of validation) of some indicators for the variables of the different capitals.
- Presentation factors. The ICR must be able to respond to various applications (both internal and external), which implies to handle different document and even audio-visual typologies. In this sense, the very same presentation of the ICR must have time to assimilate the results, not only to listen to them, validating all possible interpretations.
- Use factors. The ICR has the added value not only regarding the interpretation of the results associated with the different variables and capitals but also the recommendations provided to develop the next steps so as to avoid that the report is just another document to be filed. In addition, this use is the most evident element targeted to those possibly interested in financing the project, which implies that the report brings together the best results from intangible assets to integrate them into an annex of the business plan or any other documentation that will be submitted in funding scenarios.

Taking all this into account, using the scheme of intellectual capital models and counting on a NTBFs accessible background, the consolidation of these enterprises creates a high added value path.

4 Conclusions and Management Implications

This chapter has demonstrated that the new strategic perspective of intellectual capital as a creator of innovation within the organization can provide guidance to manage knowledge intensive firms. This implies the analysis of the incorporation of the entrepreneurship and innovation capital into the Intellectus Model, which focuses on measuring and managing intellectual capital, thereby identifying those accelerators of the organization intellectual value.

This is of particular importance for New Technology Based Firms since these SMEs define customer business as R&D and innovation as their mission.

Based on this analysis, intellectual capital is termed as the 'umbrella' of all intangible (either existing or newly created) assets in the company, turning knowledge processes into action. Similarly, dynamic capabilities are registered within the intangible assets of the organization, with special attention to its brainpower. Therefore an effective way to identify dynamic capabilities within an organization and subsequently to develop them, is the identification, measurement and analysis of the components of intellectual capital that organization processes.

Finally, we have analysed the importance the reports of Intellectual Capital play in such processes and in building core competencies. The experiences developed by NTBFs located in Science and Technology Parks highlighted the added value that this reflection process on the assets of intellectual nature has in order to consolidate these enterprises. The ICR enabled these companies to access venture capital to finance their consolidation and development.

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An Analysis of Micro and Small Enterprises Growth: An Application of the Management Excellence Model (MEG)

Marcondes da Silva Cândido and Jackson André da Silva

Abstract This chapter aims to determine which dimensions of the Management Excellence Model® (MEG) can contribute to the growth of micro- and small enterprises. The research corresponds to 1006 small and micro-enterprises of Santa Catarina (Brazil), being representative of sector and region. Findings suggest there are dimensions and control variables which impact positively on the growth of the investigated enterprises. Dimensions that can disrupt this growth were also found, highlighting aspects that deserve more attention from entrepreneurs.

1 Introduction

The fact that companies operate in a turbulent, complex and unpredictable environment has permanently influenced the decision-making process, thus a constant review of their management systems and strategic planning is required. Elements such as the scarcity of resources, especially those focused on innovation, centralized management and dissemination of information and knowledge between strategic and tactical levels, can slow-down the growth of these companies (Ribeiro Neto and Caulliraux 2008).

For this reason the Support Service for Micro- and Small Enterprises of the State of Santa Catarina (Sebrae/SC), institution, whose mission is to promote the competitiveness and sustainable development of small enterprises and foster entrepreneurship, has promoted every 6 months since 2011 a research publication entitled: "Sensor of the Micro and Small Enterprises of Santa Catarina". The research generates an index that measures the competitiveness, using a scale from 0 to 100 points, based on eight dimensions of the Management Excellence Model® (MEG) and on the results achieved by the enterprises during the surveyed period (SEBRAE/SC 2013).

The use of MEG for evaluating the performance of the SMEs also has support in other investigations. Xavier and Sales (2011) interviewed 30 entrepreneurs living in

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the state of Rio de Janeiro who had applied for the award SME Brazil ("Prêmio MPE Brasil"), searching for factors fostering business success.

The MEG model was created by the National Quality Foundation (NQF), a non-profit organization founded in 1991, in order to promote a culture of excellence and increase competitiveness for organizations in Brazil. In its introductory notebook, NQF quotes studies in which the user enterprises show growth and improvement in performance indicators such as development of sales, EBITDA margin, profit, etc. (FNQ 2008). However, it is not yet known what the influence of each dimension is on business growth.

Therefore, this chapter will move towards verifying which MEG dimensions contribute towards the growth of micro- and small businesses.

In order to achieve this goal the challenges of business growth in Brazil, the Brazilian model of excellence in management, the methodology used in the empirical study and an analysis of the data will be presented. Furthermore, a final discussion will draw conclusions, highlight limitations, and provide suggestions for further research.

2 Challenges of Business Growth in Brazil

SEBRAE (2011) revealed that in Brazil the Small Business survival rate with up to 2 years of activity is 73.1 %; and, only 51.8 % remain in operation until the end of the third year (PEGN 2013).

Recent research indicates that the main challenges faced by Santa Catarina business leaders in the early stages of implementing a new venture are: definition of the business focus; identifying an opportunity; product knowledge, service and marketing; limited access to financing; competition (Ortigara 2006) and the family participation; the number of partners; the ability to deal with new situations; and, the need to develop and use management control instruments (Silva et al. 2014). For those who manage to overcome the first obstacles, the difficult task of growing in a sustainable way still remains.

An aspect of sustainable growth that is considered as vital is the search for financial resources needed to fund working capital as the company faces a strong period of growth, since the Brazilian financial system, although diversified, requires certain guarantees and works with high interest rates. Despite the reported difficulties, data presented by SEBRAE/SC (2013) shows that the number of micro- and small businesses who use bank loans has increased.

Another aspect that should be taken into account when seeking business growth is the availability of a skilled workforce. Human capital is the main source of competitive advantage (Cravo et al. 2012) and its scarcity has increased competition for more skilled professionals. Brazil currently has an unemployment rate of around 5 % (IBGE 2013b), which means that now, more than ever, it is necessary for entrepreneurs to invest seriously in a training plan and talent retention (Deloitte 2011).

In addition, other difficulties that prevent the growth of micro- and small enterprises include access to new markets and the search for funds to finance new ideas that will be converted into innovative products and processes (SEBRAE/SC 2013).

To circumvent these difficulties, the MEG model, which will be detailed next, seeks to integrate the processes of management and results control with the development of personnel, using new technologies. According to North (2010), the combination of processes (production and management systems), people (skills) and technologies (features and interfaces) generates organizational knowledge, which is the main production and value added factor; the fuel that drives the business growth.

3 Management Excellence Model: MEG

MEG was created and is managed by the National Quality Foundation (NQF), whose mission is: "to spread the foundations of management excellence in order to increase the competitiveness of organizations and of Brazil" (NQF 2010, p. 8). It originated from the Malcolm Baldridge Award (USA) and from the Deming Prize (Japan), which were analyzed by a team of Brazilian professionals from several fields, culminating in a model that is currently composed of eight dimensions and 23 items symbolizing the interaction of the organization with the external environment. According to NQF (2010), the components of the model, surrounded by knowledge and information, are related with each other for generating results (Fig. 1).

Thus, the survival and success of a company are directly related to its ability to meet the needs and expectations of *customers* and its responsible actions in *society* and the communities with which it interacts. Therefore, the *leadership* should listen to customers and society in order to identify the needs (*information and knowledge*) that will guide the formulation of *strategies and plans*, including the establishment of goals.

Plans and goals are communicated to the *people* who must comply and be qualified so that the *processes* are executed as planned. It also highlights the importance of the relationship with suppliers, seeking to meet the customer needs. Finally, the *results* should be followed-up by the company and for this the company needs to know how the results arise, by means of monitoring and following-up the historical evolution of the established rates.

The scoring system is based on the evolution of each of the eight MEG criteria, reaching a maximum of 1000 points following the scoring established for the Malcolm Baldridge and EFQM (European) models, which are used as a *benchmark* in the updating process that occurs annually.

The model proposes the use of a self-evaluation, following the PDCA cycle, starting with the Planning (letter P). For this, the strategies need to be formulated by the leadership (mission, vision and goals), which will determine the positioning and the competitive advantages. In order to achieve the desired strategy, goals are set considering the internal (strengths and weaknesses) and external (opportunities and threats) environments, focusing on industry performance and competitive analysis. Action plans established to achieve the goals are broken down into all levels of the

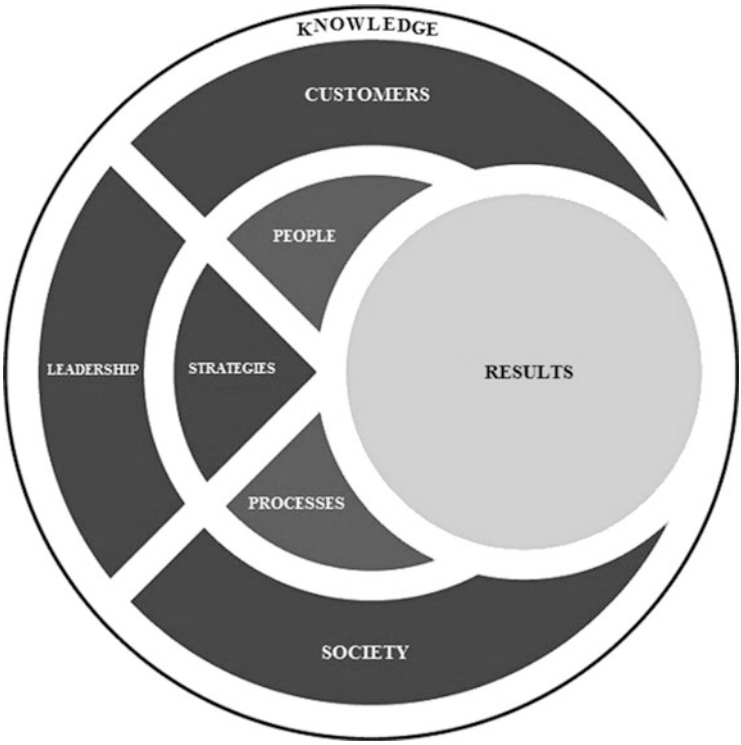

Fig. 1 Management excellence model. *Source*: NQF (2010)

organization, impacting on temporal dimensions in the short, medium and long term.

In order for the Execution step (D) to be performed properly, it is necessary to communicate the strategy to the entire workforce, including the interested parties, so that everyone understands and is satisfied. This results in an environment driven by a culture of excellence and management processes that create value for customers.

Control (C) must focus on the measurement of the results related with the economic and financial situation, customers and markets, people, society, core business processes, support processes and suppliers. This control should be performed based on the comparison between the targets set with the values attained during the period, providing historical measurements in order to assist in time, the implementation of any corrections. With the Evolutionary Analysis (A), the company is able to generate information and knowledge which foster learning and intelligence at all levels of the organization.

The choice of MEG as a guiding tool is justified as the orientation instrument for the preparation of the questionnaire applied in this study due to its reach, non-prescriptive nature and proven applicability in the context of micro- and small enterprises by means of the Prize MPE Brazil.

4 Methodology

This research was performed by means of a survey in order to verify which of the model dimensions can contribute to the growth of micro- and small enterprises, by applying a structured questionnaire (Marconi and Lakatos 2009). The research sample consists of micro- and small companies headquartered in the state of Santa Catarina, located at the south of Brazil.

For the classification of size and identification of the research sample the number of employees was considered (Table 1); a criteria used by IBGE (2013a). This criteria was chosen due to the ease of access to information and statistics on the Brazilian business environment, using data collected by means of the RAIS (Annual Social Information).

The sample was selected considering the proportionality and representativeness of companies in each region and sector. Data were collected on two occasions (*cross-sectional*),seeking to describe and analyze the situation of the variables applied to the developed model (Sampieri et al. 2010).

In the first collection the performance of the company during the period between January/June 2013 was rated, in which 527 valid questionnaires were obtained. In the second stage, referring to the July/December 2013 period, 479 questionnaires were collected. From the total of 1006 questionnaires collected, 744 were answered by entrepreneurs of micro- enterprises and 262 by small business entrepreneurs. Regarding activity sectors, 270 commerce companies, 273 industrial companies, 403 service provider companies and 60 companies from the agricultural sector took part in the survey.

The internal reliability was tested using *Cronbach's alpha* for the eight dimensions and 23 items of MEG. The analysis showed a value of 0.946, indicating that the chosen scale has a high reliability (Field 2009). Data validation was performed with the application of *Step*, *Block and Model* tests, -2LL, *Nagelkerke* R^2 and *Hosmer & Lemeshow* with the results showing that the model has a good fit. Next, an analysis of the collected data will be presented, performed using the SPSS 15.0 software for Windows.

Table 1 Classification of the size of companies based on the number of employees

Sector	ME	PE
Commerce	Until 09 employees	10–49 employees
Services	Until 09 employees	10–49 employees
Industry	Until 19 employees	20–99 employees
Agribusiness	Until 09 employees	10–49 employees

Source: IBGE (2013a)

5 Data Analysis

Since the small companies which were investigated have more human and financial resources compared to the micro-enterprises; respectively, an average workforce of 23.7 versus 4.3; and, an average income of R$ 141,300 against R$ 40,700, it is expected that they would have more advanced processes of performance control and general management. For this reason the Mann-Whitney *U* test was used in order to compare the averages of micro- and small enterprises, a factor that would justify the division of the analysis into two groups, separating them by size. Results demonstrate that all eight MEG dimensions have significant differences ($P < 0.01$), supporting the hypothesis that the analysis can be performed by means of the two groups previously indicated.

In order to validate the model, firstly the impact of variables was analyzed by means of logistic regression, trying to understand which dimensions can lead companies to increase revenues (Table 2). The selected statistical technique is recommended for samples that have ordinal and dichotomous variables, such as the ones presented in this study.

The micro-enterprises with the **best control processes** are 1.3 times more likely to be in the group that had **increased sales**, those that **invested in innovation** are 1.5 times more likely, those that **did not contract or that reduced taking working capital loans** showed a probability 3.1 times higher and those that performed **actions to access new markets** during the study period are 1.4 times more likely to have had sales increase.

One factor that may have contributed to the reduced number of dimensions that explain the studied phenomenon is the fact that micro-enterprises have a more

Table 2 Values of logistic regression by business size

	Micro-enterprise			Small enterprise		
Model variables	B	Sig.	Exp (B)	B	Sig.	Exp (B)
Constant	−3.758	0.000	0.023***	−6.069	0.000	0.002***
Independent variables						
Leadership	0.289	0.121	1.335	−1.074	0.003	0.342***
Strategy and plans	−0.180	0.206	0.836	−0.168	0.479	0.845
Customers	−0.216	0.213	0.806	0.329	0.312	1.390
Society	0.133	0.312	1.142	0.454	0.063	1.575*
Information and knowledge	−0.037	0.793	0.964	−0.055	0.823	0.947
People	−0.168	0.290	0.845	0.797	0.010	2.218***
Process	−0.033	0.833	0.968	0.215	0.511	1.240
Results	0.284	0.096	1.329*	−0.064	0.822	0.938
Control variables						
Innovation	0.430	0.011	1.538**	1.275	0.000	3.580***
Turnover	0.119	0.494	1.127	0.730	0.013	2.075**
Loan CG	1.131	0.000	3.098***	0.680	0.023	1.973**
New Markets	0.348	0.066	1.416*	0.163	0.630	1.177

*$P < 0.10$; **$P < 0.05$; ***$P < 0.01$

centralized leadership (Cândido et al. 2010), which makes information sharing, strategic alignment, management of people and processes, and even investment in actions of social responsibility more difficult. Thus, the only dimension that seems to benefit from the centralized management of micro-enterprises is performance control.

For small enterprises the leadership, society and people dimensions are presented as explanatory variables in the model. However, the variable **leadership** had a negative effect, which indicates that a small business with more structured processes in that dimension is less likely to be in the group that generated increase of revenues. One possible explanation is that the results may have been influenced by the culture of the investigated companies, as employees and interested parties may not be prepared to participate in the strategy formulation process and in the pursuit of excellence, given that they often have a more centralized management.

People management proved to be a major challenge for small enterprises, since companies with better processes in this dimension are 2.2 times more likely to be in the group that showed an increase of revenues and those that managed to reduce the turnover also have a high probability of being part of this group (2.1 times).

Issues such as environmental responsibility and social development are also shown as explanatory factors for the phenomenon under analysis, since companies with better processes in this dimension have a 1.6 times greater likelihood of being in the group of companies that have increased revenues.

In addition to the dimensions analyzed, small enterprises investing in innovation showed a 3.6 times higher likelihood of having increased revenues, while those who did not take loans for working capital demonstrated a 2.0 times higher likelihood.

The results provide insights to the impact of each dimension of MEG in the management processes and in the results control of the investigated companies; which can be seen in the recommendations suggested in the following topic.

6 Conclusions and Management Implications

This study aimed to determine which dimensions of the studied model can contribute to the growth of micro- and small enterprises. From the analysis of the collected data it was possible to compare the results obtained using the reference system of self-evaluation from the Management Excellence Model® (MEG).

The results show that small enterprises have better management processes and results control than micro-enterprises, which justified the separated analysis, as a joint analysis may have distorted the results.

For the micro-enterprise samples, results question the effectiveness of the dimensions related to the MEG management process, as none of the dimensions had a sufficient significance level to explain the increase in revenues. As for small enterprises, only three of the eight dimensions showed significant results to explain the business growth.

From these results, recommendations can been provided about MEG to the academy, institutions of support or development of MPEs, business consulting companies as well as for entrepreneurs, the major stakeholders in the growth of their company.

For **entrepreneurial owners of micro-enterprises,** we recommend special attention to the processes of results control, as well as the targeting of investments for innovation, actions creating access to new markets and the reduction or limitation of taking new loans for working capital. These variables had a significant impact on companies who saw revenues increase. The result of the research also suggests that micro-enterprises should prioritize the use of their own capital or seek to negotiate the payment term directly with suppliers in order to sustain their growth, especially in the Brazilian market where interest rates practiced by the market are high.

Thus, the use of their own resources to finance their growth appears to be more advantageous than obtaining funds from financial institutions.

The problem	Why it happens	The solution
No management process (criteria 1–7) proved to be significant in explaining the growth of the micro-enterprises investigated.	Micro-enterprises have fewer resources (financial and human) than the small ones, requiring the entrepreneur to act in all areas of the company.	The entrepreneurs of micro-enterprises who better control their results, use less working capital from loans and invest in innovation performed better than the remaining entrepreneurs.

For **small business entrepreneurs** it is recommended to take a more careful analysis about their leadership style, since it is not enough to simply perform isolated actions to stimulate participation in the strategy formulation process. A set of actions is necessary, including an analysis of the corporate culture that favors the sharing of information and knowledge that promotes business excellence. Other factors are also significant because they impacted positively on the growth of the small enterprises surveyed. Among them, the socio-environmental issues, social development, investment in innovation, reduced turnover and the reduction in taking loans for working capital.

The problem	Why it happens	The solution
The leadership criteria had a negative and significant impact on the performance of small enterprises.	It is believed that employees of small enterprises are not used to being involved and receiving information about the business.	If the entrepreneur decides to opt for a more participatory leadership model, it is suggested to carefully analyse the company culture in order to identify if people are able and willingly to contribute to the decision-making process.

For **teachers and students** it is possible to verify with the results found during this study that in certain models, such as the one used (MEG), a global analysis, without considering the peculiarity of each surveyed variable (dimensions), can hide relevant material. This study provides supporting evidence through the variables which were not statistically significant in explaining the phenomenon related to business growth it is recommended that some aspects may be explored future

research, such as: verifying if the variables remain significant when considering the peculiarities of each business sector (industry, commerce or service); or when comparing the performance of exporting companies with the ones acting only on the domestic market. The inclusion of new measurements of financial performance, such as profit margins, cost reduction or a more qualitative analysis, such as measuring the increase of the quality perceived by businesses and consumers, can also be explored.

The problem	Why it happens	The solution
Only a few dimensions proved to be significant in explaining the growth of the micro- and small-enterprises investigated.	Like all models of excellence, the MEG is not prescriptive, but works as a guidance only, leaving to the management of the company the task of identifying the most relevant criteria for its business. It is not possible to conclude that all dimensions will contribute with the same intensity for all types of business.	For the academy, the result suggests caution during the adoption of the evaluated model, not being enough to simply applying it without an individualized analysis of the situation of the companies. It is also recommended that teachers and students replicate the study in other contexts, testing the consistency of results.

In Sebrae/SC, the **Support Service for Micro- and Small Enterprises of the State of Santa Catarina**, the results point to reflections about their products and services and aims to support business growth. For example, in recent years Sebrae/SC has changed their style of target-group segmentation, which was based on their activity time (up to 2 years, 2–5 years and over 5 years) and is now based on size (potential entrepreneur, potential micro-entrepreneur, individual micro-entrepreneur, micro-enterprise and small-enterprise). Since the year of 2013 the institution develops specific products and services for those segments, confirming the results found in this study. In addition, the results point to important aspects of the management, which can serve as a reflection for entrepreneurs.

The problem	Why it happens	The solution
The study showed different results for each segment of a target-group (micro and small enterprises), indicating that the actuation for each segment should focus on different aspects of management.	Micro-enterprises have fewer resources (financial and human) than small enterprises, demanding that the tools used in the management should be simpler and agile in their updates.	Since the entrepreneurs of micro-enterprises need to act in all areas of the company, they have less time to update the information of their management systems. Therefore, the supporting institutions need to be aware of this and develop targeted and intuitive management tools, easier and more agile to be applied so that the entrepreneurs have more time to devote to servicing their customers.

These recommendations have limitations which need to be understood before performing any extrapolation from the presented results. The first limitation concerns the scope of the study, which included only companies located in the state of Santa Catarina. It should also be noted that the data was collected during a given period of time (1 year), but it was sought to reduce a possible bias by applying in the questionnaire in two distinct stages, each one corresponding to the period of 6 months.

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Case: KST Turbine Components: "Qualiyspeedservice" as Competitive Strategy

Heiko Dittmer and Thomas Hardwig

1 "Qualityspeedservice" as Core Competence

Sometimes it happens that a complete machine standstill occurs in a power plant because a special component, perhaps a shaft, has broken or been damaged. The cost of such a standstill is high and therefore the pressure to supply this high precision component in a very short time is even greater. However, it is usually impossible to source high quality components for gas or steam turbines from active inventory. They have to be manufactured as individual items according to customer requirements. Due to quality conditions, special materials are needed with certain specifications which must be provided by a few selected specialized suppliers. This alone takes up more time than any power plant operations manager facing machine standstill would want.

However, assistance is being provided by a small company in Berlin. Founded in 1996 as a management buyout, *KST turbine components GmbH* are able to deliver these specialized components faster than any other competitor. KST is a well known established manufacturer and service provider for the Turbine industry, specializing in complex, precise parts and assemblies. They produce for globalcustomers such as Alstom Power, Siemens and Rolls Royce. The highest safety requirements, extreme precision production and extensive quality control are part of both their trademark and company philosophy.

How KST turbine components was able to grow initially from 30 to 75 employees and to establish their business against strong competitors? The main customers (Alstom, Siemens and Rolls Royce, as mentioned above) are producers for turbine components too. Nevertheless they rely on KST, allowing them to attain a strong

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market position as the leading supplier for specialized turbine components. Their key to success is pursuing a unique competitive strategy in order to deliver the high precision parts faster than any other competitor. The result of the constant effort towards gaining competitive strength is a core competency characterized by KST as "qualityspeedservice". This is the value they create for their customers.

This means that beyond the promise of high quality and service, the unique competence of KST is the mastering of speed. Specialized component producers inevitably have long delivery times. On one side it is a matter of finding special material or component sources in low quantities. KST know immediately who is able to deliver a specific material in a very short time. They have built up a network of special material suppliers and cultivated special relations with them over the years. On the other side, long delivery time is caused by the highly skilled manufacturing process. Special high precision machines and highly skilled, experienced employees are called into action; as a means to keep costs reasonably limited, the average utilization of resources is very high. This implies a long-term scheduling of machine utilization. However KST has learned to integrate short-term orders into the multi-staged manufacturing process and to steer the manufacturing process successfully, even under an immense time pressure. The result of an extremely professional organization is the most robust industrial productivity and flexibility is guaranteed as "on time delivery".

2 Does the "Qualityspeedservice" Survive Organizational Growth?

Seven years ago, in 2008, questions arose of how to save the special competence "qualityspeedservice" and how to develop this capability further. The size of the organization has doubled since 1996, but the disposition of orders and the scheduling of machine utilization still remain the responsibility of the managing director of operations. One advantage of this solution is that one person oversees the complex interdependences of orders and dispositions and thus the managing director is able to decide quickly and clearly. However, it became obvious that the task exceeds the managing director's individual capacity and puts a strain on him. Moreover, the dependence on one single person for a key task must be seen as a risk for the business.

The question was, in which way decentralizing this task can be made possible? The first idea was to implement a planning program. However, from initial communication with software companies, it proved to be nearly impossible to define the complex decisions in a reliable algorithm. In addition to that, the managing directors worried about the possible loss of flexibility and self-organization that would occur.

The next idea involved the delegation of the task to a team of three planning engineers, who were engaged in the technical planning process, but not at this point in the scheduling of specials orders. Could a team of technical planning engineers take over the responsibility and be able to make decisions as quickly and effectively as a single technical director did before?

The problem of scaling up organization without sacrificing special competencies concerned the managing directors. So in 2009, the company took part on the joint research project "*Learning to grow*" (Hardwig et al. 2011b). It was the first time KST worked collaboratively with a consultant discussing management issues. This project was realized by the University of Applied Sciences RheinMain in cooperation with different partners (associations, 114 small-medium firms, consultants) working on a concept for development that improves the growth-competence of SMEs. This concept has been put into practice as a working example in 27 SMEs and is still being tested and developed further (see Hardwig et al. 2011a).

The project offered managers/owners from participating firms the opportunity to analyze the growth factors of their firm and to reflect on the use of human resources ("competency development") and its influence on further economic success. The insights of this analysis were put into practice with the method of "project based learning" (see North et al. 2014). KST defined the delegation of order disposition and machine scheduling to the team of planning engineers as an innovation project ("working example"). With support from an external consultant, the managing directors analyzed the situation together with the team-members, created a new solution and implemented it step by step. As mentioned above, it was the first time the company worked collaboratively with a consultant. It was also the first project that started with participation of employees in an organizational development scheme. In this sense it was the trigger of a longer-lasting organizational learning process. An important impact of the joint research project "*Learning to grow*" was the opportunity for the management to share their practical experience with other company decision-makers, consultants and scientists.

3 The Outcome of the "Learning to Grow" Project

Summarizing the effects of the "*Learning to grow*" project of 2009, three outcomes can be identified. First, the direct project results, aiming at having the goals scale up the "qualityspeedservice" competence. Second, as a mediate effect, an extended form of internal collaboration could be established. Third, the extended participation of the "project based learning" expanded the capability of the organization to solve problems and realize innovation.

3.1 Development of New Team Capabilities of the Planning Engineers

The most important result of the change process is that the delegation of the order disposition and machine scheduling succeeded. Today the team of planning engineers are collaboratively steering the process very effectively, so from this point onward the firm is able to guarantee very ambitious delivery dates to its customers. Sometimes it is not easy for the team members to integrate the competing

requirements in one reliable decision and to find a workable solution. To overcome this they have learned to discuss options, find agreements and quickly come to conclusions. They also take full responsibility for their task. The competence of "qualityspeedservice" has been transferred to a larger scale of the organization and the technical managing director has delegated the task completely to the team. The concern that the growth of the organization could corrode the core competency has not come to fruition, rather the contrary.

3.2 New Forms of Internal Collaboration

In addition to realizing the goal of the project, a second outcome was that the firm established new forms of internal collaboration; managing directors have learned to delegate responsibility to employees, disengaging from operative tasks and processes, thus saving time for strategic activities. The project gave them the certainty that the team members assume their part of entrepreneurial responsibility. For the employees, the takeover of responsibility is a challenge for personal development, but it also shows recognition of their competence and dedication. This usually leads to an increased job satisfaction. The cooperation between both levels is now characterized by respect and awareness. During the project the whole team has learned to communicate and reflect on situations together. They also experienced that it is helpful to sometimes adopt the perceptions of their partners in order to better understand the motives behind their actions as a means for productive cooperation. That does not imply the absence of any conflicts; in fact it is the other way around. They have learned to manage diverse and opposing interests better and to solve conflictual social relations.

3.3 Deeper Participation of Employees in Innovation and Organizational Development

The positive project experience encouraged the managing directors to expand employee participation. The process of the "*Learning to grow*" project proved that participation is worth the effort. Managing directors could see how employees can be integrated while working on a business problem and realize that these participative learning processes take time and need resources. Moreover, the solutions found this way are better and implementation is much faster because of the employees' commitment.

One innovation that was realized in the new participative way was the implementation of the lean management workplace organization method "5S" ("sort", "straighten", "shine", "standardize", and "sustain"). This project succeeded in a short time period. The next project now planned is a digital archive of all technical drawings and construction plans. As one knows from practical experience of

knowledge management projects, such a database-application needs commitment from all employees if it is to succeed. Such projects often fail because the interests of the users are not taken adequately into account. KST has learned that participation of all parties involved in the planning and implementation phase of such a change leads to better solutions and higher co-worker commitment.

4 Conclusion: Project Based Learning as a Trigger for Strengthening Dynamic Capabilities

In conclusion, the "learning to grow"-project has had a sustainable effect. Not only could the targeted results be reached and put into long term practice, with the support program finished 5 years ago, the project also worked as a trigger for organizational learning that strengthened the "dynamic capabilities" of KST. "*A dynamic capability is the capacity of an organization to purposefully create*, *extend*, *or modify its resource base*." (Helfat et al. 2007). In this sense, KST extended their capacity for innovation. The managing directors disengaged from operative tasks, employees took over entrepreneurial responsibility and engage in solving organisational challenges. The capability of the "qualityspeedservice" is now rooted in a much broader way throughout the organization. In addition, the dynamic capability has been strengthened by utilizing the ideas and knowledge of the participating employees and by new forms of sophisticated, reflected collaboration.

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Argentina: A Chronically Variable Socio-Economic Environment for SMEs

Juan Carlos Hiba

Abstract This chapter presents a brief profile of Argentina describing its economic and social history over the past 70 years. An overview of human and economic development data is presented and highlights various economic indicators surrounding the turbulent country situation. Its purpose is to contribute to understanding the evolution of the social climate and economic trends applied by successive governments. The second part discusses the impact of the highly volatile economy on SMEs. A descriptive and detailed table in the Annex presents a summary of the main political, economic and social developments since 1946 until today.

1 Argentina: A Compact Socio-Economic Country Profile

> [. . .] *it will never be completely understood how a country with tremendous potential has had such a contorted past* (*Davide G. Erro—Resolving the Argentine paradox*) (*ROJAS* 2002).
>
> *There are countries which are rich and countries which are poor. And there are poor countries which are growing rich. And then there is Argentina* (*According to a classification attributed to Mario Vargas Llosa*) (*ROJAS* 2002).
>
> *The country we deserve will be the result of our efforts*, *not of our illusions*; *the result of our work*, *not of our crying*; *of our production*, *not of gifts* (*Aguinis* 2003).

Both the evolving, and sometimes unpredictable, national and international economic and social contexts have an impact on the life of enterprises. These pages briefly describe the ups and downs of Argentina based on social and economic indicators during the last seven decades. The focus on this period also provides some key data to understand the critical situations that small and medium sized enterprises confronted to in order to survive and develop in spite of, or favored by, variable socio-political external circumstances. It is acknowledged that in addition there are several other factors affecting SME's business operation.

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Argentina is a country that has produced three Nobel scientists and two Peace Prize winners, renowned figures of culture and sport, an extensive and varied geography with cosmopolitan urban centers, a combination of cultures and religions, diversified agro-industrial structures and services, a demanding and high capacity for mobilization, and more than 30 consecutive years of democratic civil society. There has been, however, "another" Argentina manifested, for example, in regional economic disparity, levels of inequality and income distribution are decreasing yet still high for historical standards, education and health care quality are becoming income elitist and a worrying growth of residential segregation is occurring (PNUD 2010).

With a population of 42.1 million (of which about 94 % is urban), a life expectancy of 76 years at birth and a Gross Domestic Product (GDP) of more than US$609.9 billion, Argentina is one of the largest economies in Latin America. Regarding its average population income level, the World Bank Group (2015) classifies it as a country in the upper middle income level (US$ 4126–12,745). Its economy is characterized by its valuable natural resources, leading the country to be one of the main producers of food, thanks to extensive agriculture practices and quality cattle breeding. Argentina is one of the largest exporters of beef in the world and the top world producer of soybean, sunflower crops, *yerba mate*, lemons, and soybean oil (World Bank Group 2015).

The top five import commodities during the period 2011–2013 were (i) motor cars and other motor vehicles principally designed for transportation; (ii) petroleum oils, other than crude; (iii) parts and accessories of the motor vehicles; (iv) petroleum gases and other gaseous hydrocarbons; and, (v) electrical apparatus for line telephony or line telegraphy. The top five exports commodities during the same period were (i) oil-cake and other solid residues; (ii) maize (corn); (iii) soya-bean oil and its fractions; (iv) motor cars and other motor vehicles principally designed for the transport; and, (v) soya beans, whether or not broken (UNdata 2015).

Human Development

For much of the twentieth century Argentina stood out in Latin America for the quality of their health and education systems, and its per capita GDP was the highest in the region, a considerable distance from the second. According to PNUD (2010), however, in recent decades the average performance was not up to the potential of the country. The virtuous interaction between health, education and economic growth was weakening, and this interplay diminished its human development.

Argentina was also portrayed during much of the twentieth century as a more equal and more social mobility society compared to the rest of Latin America. This transformed it into a destination for immigrants from neighboring countries, Europe and the Middle East. Health systems and public, free and quality education, a wide range of employment opportunities and investment, and an extensive social safety net characterized the country. However, this situation has begun to change since the mid-1970s, especially in the time of political-economic experimentation resulting in catastrophic consequences (PNUD 2010).

In the period 1970–2010 human development in Argentina had, on average, a moderately positive trend. However, this evolution was lower than expected.

While, although improved, the average performance across the country in health and education was within the average of a group of comparable countries with Argentina, its economic growth was volatile and suffered sharp falls. According to PNUD (2010), its development was consistently below the indices of health and education. It was the oscillation of its economy, then, that kept the expansion of human development in Argentina below its potential.

In relation to health, the life expectancy of 76 years and clear dominance in the causes of death of non-communicable diseases (cardiovascular, cancer), categorize the health status of Argentina to that of a developed country. However, the levels of maternal and infant mortality and the presence of emerging and reemerging diseases (like tuberculosis and hantavirus) recall that Argentina has not outgrown the health risks of developing countries (PNUD 2010).

Education in Argentina was marked by the early universalization of primary education. Although access to secondary education has not grown at the same rate, since the restoration of democracy it has significantly grown. However, students attend today very different educational institutions, with school populations which tend to segregate in social status (PNUD 2010).

In social terms, according to the current government, the income gap between the richest 10 % and poorest 10 % of the population fell between 2003 and 2014 by half, in 2014 the participation of employees in the income reaches 50.9 %, while in 2004 it was 30.6 %. Also, the social protection and inclusion system of Argentina today reaches more than 16 million rights-holders, with programs covering pregnancy, childhood and school completion. In addition, two pension plans were implemented bringing the coverage to virtually 100 % of the population (Argentina 2015).

Although life expectancy and education levels have grown in the last 50 years, i.e. the economically active population is more educated and healthy, the country has grown very little in that period. Figure 1 shows the evolution of the indices of these variables.

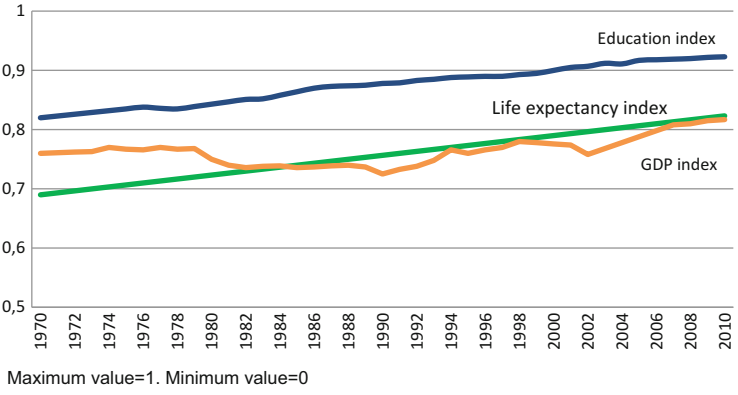

Fig. 1 The dimensions of human development in Argentina 1970–2010. *Source*: PNUD (2010)

Employment

According to ILO (2014), the economically active population is 20.5 million people (projection 2015). The proportion of employees on total employment is higher than 70 % and to that amount 4 % of employers should be added. Only 18.5 % are self-employed and 6.4 % are in households. The number of residents in social security coverage for health in 2013 was 72.6 and 52.1 % in pensions. In late 2014, Argentina presented an urban unemployment of around 6.9 %, controlled after a severe crisis in the past decades and a rate of unregistered employment of 34.3 % (ILO 2014).

If there is one appropriate issue able to show the oscillations of Argentina's economy that is employment. In Fig. 2 the evolution rate of unregistered (or informal) labor (in percent); of current (or real) salary (in units based in 1970) in Fig. 2; and of unemployment (in percent) in Fig. 3, clearly show the undulating behavior of its economy. The three following figures illustrate the evolution of those indicators along the last 30 years.

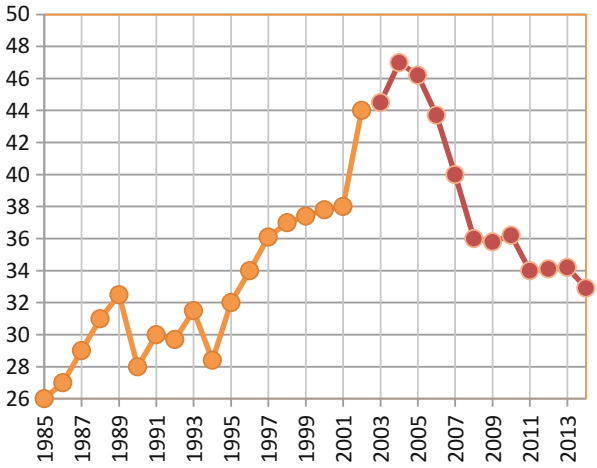

Fig. 2 Evolution (%) of unregistered work—period 1985–2013. *Source*: Processed by Chequeado.com. Based on data from INDEC, Permanent household survey. (The division from 2003 onwards is due to a change in methodology of INDEC)

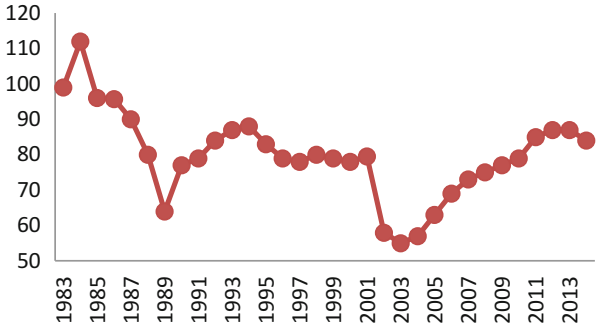

Fig. 3 Evolution rate of current (or real) salary—1983–2013. Units based in 1970. *Source*: Processed by Chequeado.com. Based on data from Damián Kennedy, CEPED

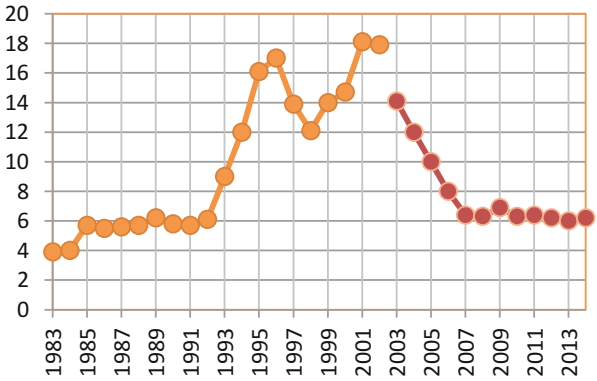

Fig. 4 Unemployment (%)—1983–2013. *Source*: Processed by Chequeado.com. Based on data from the Permanent Household Survey (Break observed in 2003 data is due to a change in methodology registration by INDEC)

The great increase of unregistered work observed in the period 1995–2003 corresponds to the second government of Mr. Menem, followed by the big crisis of 2001–2002 and then the first 2 years of Mr. Kirchner's presidency.

According to ILO (2014), since 2003 Argentina adopted a strategy to reduce labor informality, and has introduced a number of programs, adopted legislation and put forward different initiatives for this purpose. These actions have reduced the unregistered work from nearly 50 to 34 % between 2003 and 2014.

Figure 4 shows the oscillations of real salary along the period 1983–2013. The drop observed for 1989 corresponds to the hyperinflation of that year; the one of 2001–2003 is explained by the wide-reaching socio-political crisis and abandonment of the Peso currency peg to the US Dollar.

The increase in the rate of unemployment that started in 1991 and that reaches a peak of 17 % corresponds to the first presidential period of Mr. Menem. The second peak occurred during the socio-economic crisis of 2001–2002.

A recent international report (ILO 2014) showed three other indicators related to employment for Argentina. The current labor force participation rate is 60.8 %[1]; the employment-to-population rate reaches 56.5 %[2] and the unemployment rate is 7.1 %.[3]

[1] Labour force participation rate: The proportion of the country's working-age population that engages actively in the labour market, either by working or looking for work. Source: International Labour Organization, Estimates and Projections of the Economically Active Population (EAPEP), 2013 Edition (accessed March 2015).

[2] Employment-to-population ratio: The proportion of the country's working age population that is currently employed as a percentage of the total population. Source: International Labour Organization, Trends Econometric Models, October 2014 (accessed March 2015). Cited from World Economic Forum. The Human Capital Report 2015.

[3] Unemployment rate: The number of unemployed persons as a percentage of the total number of employed and unemployed persons (i.e., the labour force). Source: International Labour Organization, Trends Econometric Models, October 2014 (accessed March 2015). Cited from World Economic Forum. The Human Capital Report 2015.

1.1 Brief History of Economic Development of Argentina

Argentina confronted and declared five defaults along its history as an independent country (Boggiano 2014): two in the nineteenth Century (1827 and 1890), and more recently in 1982, 2002 and 2007. Three key periods can be identified in the Argentine economic development since the last quarter of the nineteenth century to the present (Ferrer 2008). The first, which began late in the second half of the nineteenth century and ended with the international crisis of 1930, is known as the agro-export model. The second, marked by import substitution industrialization, extending from the 1930s until the mid-1970s. A third period began in the mid-1970s in a context of increasing globalization and dominance of neoliberal policies. There is now a new development period, which started after the collapse of 2001–2002 (Ferrer 2008).

Lagos and Lach (2011) point out that Argentina achieved a very strong economic growth in the period 1870–1910 during which it jumped up from 18th to 9th position concerning per capita GDP when compared to the global GDP ranking of developed countries. During that period its per capita GDP increased from being in 1870 a merely 60 % of average of the 16 most developed countries, reaching to almost 99 % of that average in 1910.

With certain ups and downs it retained that relative positioning until 1933–1934. From those years on, Argentina started a steady process of slower development: in the 1960s its per capita GDP was again only 60 % of that achieved by most developed countries.

After the rather stable period from 1964 to 1974 where those GDP growth figures were stable, throughout the period 1975–1990 development worsened, with a drastic drop of per capita GDP to a third of those achieved in most developed countries.

From 1991 on, the ratio Argentina's per capita GDP/average per capita GDP of more developed countries did not suffer a significant drop, but oscillated between 30 and 42 %. Argentina's economy has been characterized in recent decades by a marked volatility, alternated with periods of high growth rate and stronger contractions, including situations of productive collapse (PNUD 2010).

Figure 5 shows the path of Argentina's economy since 1875 until today based upon the most synthetic and general indicator: GDP per capita. The graph shows that GDP has grown steadily but unevenly. If we review the past 40 years break in trend and high volatility recorded from the mid-1970s can be seen. This shows that in 1990 per capita GDP was similar to 1965 and in 2002 it was almost equal to 1970. An accelerated growth after 2002 can also be observed. After the 2001–2002 crisis a high growth rate has been recorded. Between 2003 and 2009 per capita GDP grew at an average annual rate of 6.2 %, well above the average of the last 50 years. However, this growth stalled in 2009 due to the international crisis and domestic shocks, before recovering in 2010 (PNUD 2010).

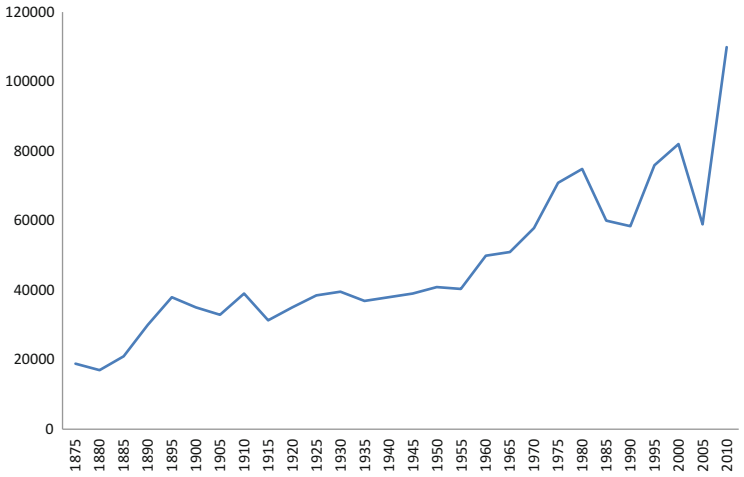

Fig. 5 GDP per capita. Period 1875–2010. *Source*: Lagos and Lach (2011)

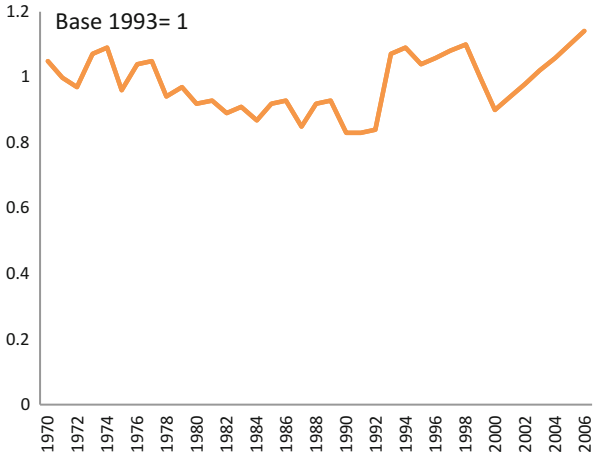

Fig. 6 Total factor productivity. Period 1970–2006. *Source*: Coremberg et al. (2007)

The per capita GDP of Argentina in 2002 was almost the same as in 1970. The productivity evolution of its economy offers a first understanding of its stagnation. It has followed an erratic course, and the average growth was almost zero (Fig. 6).

Lagos and Lach (2011) point out that from an econometric perspective, only four variables are statistically significant in explaining the slow steady growth of Argentina: (i) the closing (or opening) of the economy (measured using the ratio exports plus imports as percentage of GDP); (ii) volatility of GDP levels; (iii) the acceleration of inflation; and, (iv) a dummy variable that captures the differential behavior of those series during the two world wars of the twentieth century.

Concerning volatility the historic evidence is shocking. In 125 years the Argentine macroeconomy showed 32 cycles of extreme ups and downs: a world record. And in the period 1970–2010 the volatility rate of Argentina has been 8 times bigger than those of Brazil, Chile, Egypt or Australia, and around 20 times bigger than those of USA, Canada, Germany or England.

1.2 The Socio-Economic Crises and Their Impact on Development

A historical resume of Argentina reflects clearly that Argentina has not had continuous economic and political stability for a period greater than 10 years. Contrariwise, it can be said that it has faced turbulences in both these areas that have generated a state of almost constant uncertainty (Detarsio et al. 2013).

In its 200 years of history, Argentina has had two economic decisive points of no return: one occurred in the 1930s when it went from an open economy to a closed economy. The other key issue was the hyperinflation of 1989–1990, which developed in the period 1990–1995 into far-reaching changes, like the privatization of practically all public companies. In the case of the 45,000 km national rail network, in 1991 around 45,000 workers were dismissed and only some of the main and more profitable passenger and freight lines were "concessioned" (franchised) to private operators. Therefore the last 30 years, where the two biggest crises and many other turbulences of the country's whole history have taken place, are taken into account.

Over the past four decades observation could be made on the implementation of economic changes arising from international conditions and from very different, even diametrically opposed, economic regimes, some of which constituted real economic experiments with catastrophic consequences (PNUD 2010).

Scarpinelli (2009), cited by Detarsio et al. (2013), the first big economic crisis corresponds to the hyperinflation of 1989 and 1990. The high inflation process that began in 1976 protracted during the 1980s and converted into a hyperinflation. This hyperinflation dragged thousands of people into poverty, devastating salaries, generated revolts, lead to a rise in crime and finally ended the first democratic government that started in 1983 after 7 years of military dictatorship. According Romero (1994), cited by Detarsio et al. (2013) this derived into a structural reform of the state, named by some authors as the Copernican Revolution.

The second crisis was the so-called Convertibility crisis that occurred in 2001. As result of all the problems that the country faced, amongst others the great quantity of external debt and unemployment of Argentina, the law of convertibility collapsed when external debt was defaulted upon leading to a devaluation of the Argentine currency by more than two thirds. This was the biggest economic crisis in the history of Argentina.

Mercado, Cicowiez and Coremberg (2011), cited by PNUD (2011) address these questions. A look at growth over the 1990–2006 period shows that it was predominantly of extensive nature: it was largely based on the accumulation of productive and human capital, with a meager contribution to overall productivity level of the economy. While in the first part of the 1990s such productivity increased moderately, it stagnated in 1996 and collapsed after 1998. Productivity only began to recover after the crisis of 2001–2002, though at a rate lower than expected.

Economic policies pursued by Argentina achieved economic growth between 2003 and 2014 that averaged 5.7 %. This economic growth and macroeconomic stability have allowed the investment rate to stand at 19.8 % of GDP in 2014, representing a 5.5 percentage points higher than in 2003. The fall of the national public sector debt from 137.8 % in 2003 to 42.8 % in June 2014 allowed for the redirection of resources to productive uses and social policies that the country demanded. Moreover, the decline in external debt, which rose from 79.2 % of GDP in 2003 to 15.1 % in 2014, freed up foreign exchange to boost investment, particularly in infrastructure (Argentina 2015).

To summarize, Argentina has had hyperinflations of 500 % annually, two devaluations of the currency of more than 300 % and many more with lower rates, two confiscations of bank deposits and the biggest default of the financing sector worldwide. Not to mention the political changes that led to variations of the economical conduction that on average did not even manage to continue for 2 years. Table 1 in the Annex shows Argentina's main political, social and financial events of the last 70 years.

In the words of Natanson (2015), "Argentina's uniqueness lies in the dramatic way in which the transition from one cycle to another is processed, the depth of the falls and the dazzling speed of rebounds".

Certainly, all these historical economic ups and downs and socio-political turbulences have had an impact in the management of SMEs. These turbulences should be taken into consideration when studying and analyzing Argentine SME evolution as well as the behavior, decisions and survival strategies adopted by their owners and managers during such times.

1.3 Impact on SMEs in Argentina

According to Fundación Observatorio PYME (FOP 2015) the main issues affecting the processes of development and innovation confronting small and medium sized industries in Argentina during the last five decades can be summarized as follow: (i) the implications of a steady inflation rate on business; (ii) lack of sufficient credit for investment and innovation; and, (iii) availability and capacity constraints in human resources.

Inflation

As a consequence of the current inflation rate, the conditions of contracts with suppliers are established with payments no longer than 1 month to 75–80 % of companies or at most a quarter for the rest (15–20 % of them).

The renegotiation terms of contracts with customers has also shortened: 7 out of 10 SMEs renegotiate sale prices and payment terms monthly.

Since 2000 a downward trend is being observed in existing deposits at banks as a share of GDP: the fall is from 39 % in 2000 to 20 % in 2014.

Capitalism Without a Financial System

A second dimension that Donato (2015) emphasizes is the lack of an efficient financial system to support SMEs. Public programs contribute to moderating the lack of credit to small and medium enterprises, but they are insufficient. In the period 2009–2015 the public financing programs contributed a total of 26.808 million dollars given to all industries, irrespectively of their size. Micro, small and medium industrial enterprises received only 4.665 million US (17 %) of the total credit.

Lack of Suitable Human Resources

Paradoxically, the processes of re-industrialization that has occurred in Argentina after the neoliberal government of the 1990s and the major socio-economic crisis of 2001–2002 has also affected the capacity of SMEs to produce and be more competitive. Indeed, the closure of the technical schools occurred during the administration of President Menem has impacted and continue to do so on the development capacity of SMEs. Moreover, the lack of paid employment was due to the closure of dozens of state enterprises during the 1990s.

Another government decision taken during the 1990s that affected SMEs was the unrestricted opening of markets in line with the globalization of economies. This openness led to the closure of many companies of all sizes because they could neither compete on price nor on quality or product range with the flood of foreign goods.

Consequently, it was, and still is, a need to create and maintain mechanisms for distributing unemployment benefits. These were assigned and continue being distributed to millions of people. In turn, in many cases these subsidies to unemployment have negatively influenced in the desire to seek employment and to have or develop good work habits.

Main Current Problems in SMEs

In short, the impact of inflation, limited access to bank loans or to government development programs and the unpredictability of the economic decisions of governments in recent decades have generated in SME entrepreneurs a remarkably cautious approach when studying development opportunities and when taking decisions to invest in innovations. Friedrich and Hiba in the paper “Management of turbulent situations by owner-managers in Argentine SMEs” in this book discuss

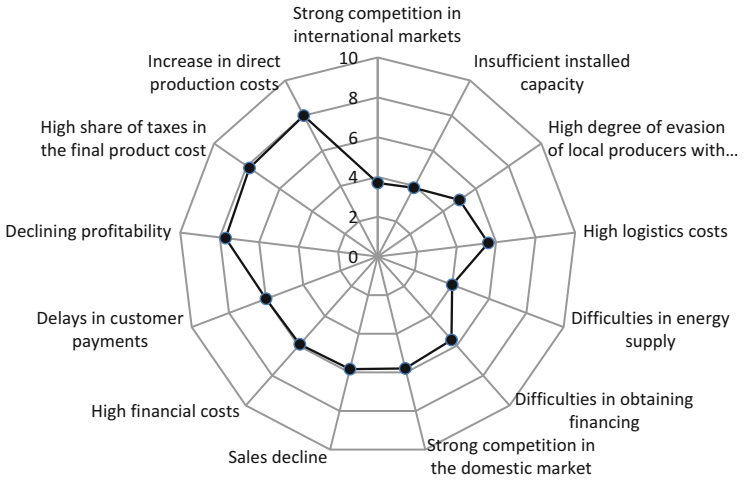

Fig. 7 Main problems of the SME business community. Average rating by degree of relevance. Scale of 1 (least important) to 10 (most important). Year 2013. The survey was applied to 1300 small and medium sized manufacturing industries with a manpower ranging from 10 to 200 workers. The coverage area was all domestic districts. The response rate was 93.2 %. *Source*: Fundación Observatorio PYME (2015)

thoroughly this issue. Figure 7 shows the main problems as expressed in a survey applied to owners and managers of small and medium sized enterprises carried out by the FOP between November 2013 and April 2014 and published in a comprehensive report in June 2015 (Donato 2015).

The two problems rated as less important by respondents were: (i) Strong competition in international markets and (ii) insufficient installed capacity. Conversely, the three top issues are: (iii) increase in direct production costs; (iv) the high share of taxes affecting the final product cost; and, (v) declining profitability.

The first two less relevant topics can be explained through the low rate of export from SMEs in Argentina, and that the current production of those servicing the domestic market can easily meet demand.

On the other side, the increase in direct production costs and taxes are explained, respectively, by the unwanted effects in input prices of a 25 % inflation annually, wages and the cost of energy. Consequently, the negative impact on profitability is the result.

It is also interesting to compare these problems identified by the owners and managers of SMEs in Argentina with the respective sector and global issues highlighted by the ILO (2014). In a recent ILO report it is stated that the main factors which generally limit the growth of SMEs, as perceived by the business

owners in all countries, are access to finance, access to electricity and competition from informal firms. However, the extent of limitations varies depending on the level of country and regional development (OIT 2015a, b).

1.4 Conclusion and Management Implication

To summarize according to Donato (2015), industrial SMEs in Argentina face a fundamental problem: to increase their competitiveness in an environment where there is damaged infrastructure and widespread insecurity episodes (two out of ten respondents—i.e. 20 %—stated that they suffered criminal episodes in their own facilities).

Moreover, access to electricity service without interruption is key to ensuring the daily running of the establishments. However, between 70 and 88 % of the companies (varying according to different regions of the country) suffered power outages of more than 30 min during the last year.

Regarding the quality of environment, on average, one in ten industrial SMEs believes that the level of environmental pollution in the area of the company is high, while 49 % say that it is normal and the remaining 41 % estimated that the level of contamination is low.

Concluding, the FOP report raises its voice about the importance of developing public policies that address the basic problems faced by SMEs as they are the necessary conditions under which they have to operate to become more competitive.

Finally, if it is possible to draw any conclusions derived from the thorny circumstances that native SMEs have transited in Argentina in the last 70 years, we could say that they have had to suffer the ravages of a wide variety of prickly socio-economic and political situations that put them many times, perhaps too many, on the verge of disappearance.

Under the urgent need to overcome such undesired external shocks, being of domestic or foreign sources, those establishments that have triumphed over them, made use of their dynamic competences and developed a variety of effective survival strategies that often strengthened them and, in some successful cases, have also allowed for expansion and meeting new national and foreign market demand, and in some cases to design and implement new business plans. Meanwhile, other companies unable to overcome external shocks disappeared.

Annex

Table 1 Main political, financial and social events in the last 70 years in Argentina

Year	Main political facts	Main socio-economic and financial events
1946–1951	First presidency of Juan D. Perón (elected, militar)	The import substitution model started in 1946 and furnished opportunities for launching and sustaining (with ups and downs) an industrialization process with SMEs playing a significant role in the development of the economy.
1951–1955	Second presidency of Juan D. Perón (deposed).	
1955–1955	Presidency Eduardo Lonardi (not elected, militar, deposed)	
1955–1958	Presidency Pedro E. Aramburu (not elected, militar, deposed)	
1958–1962	Presidency Arturo Frondizi (elected, civil, deposed)	
1962–1963	Presidency José M. Guido (not elected, civil, interim)	
1963–1966	Presidency Arturo H. Illia (elected, civil, deposed)	
1966–1973	Consecutive Presidencies Onganía, Levingston, Lanusse (not elected, three militars)	
1973–1973	Presidency Héctor J. Cámpora (elected, resign)	
1973–1973	Presidency Raúl Lastiri (not elected, interim)	
1973–1974	Third presidency Juan D. Perón (elected)	
	Presidency María E. Martínez de Perón (elected, civil, deposed)	
1976	"*Coup d'état*" and instauration of a military dictatorship regime lasting 6 years	More than 30,000·"desaparecidos". Drastic structural reform of the National State and the Provincial States. Abandonment of a national industrialization policy and adoption of a neoliberal approach to development. Starting of a process of inflation.
1977	Military dictatorship regime	Reformulation of economic policy and financial reform
1978	Military dictatorship regime	Adoption of a "Conversion table" linking value of argentine peso to U$S dollar (explicit predetermination of the exchange rate)
1981	Military dictatorship regime	End of the "Conversion table"
1982	Malvinas war and end of the military dictatorship regime	Rescue of the banking system and liquefaction of entrepreneurs' debts. The fourth default.

(continued)

Table 1 (continued)

Year	Main political facts	Main socio-economic and financial events
1983	Restoration of democracy. Presidency Raúl R. Alfonsín (elected, civil)	New currency "Pesos Argentinos" according to Law 22.707
1985	Presidency Raúl R. Alfonsín	New currency named "Austral" according to Government Decree 1.096
1987	Presidency Raúl R. Alfonsín (resigned in 1989)	Economic plan "Primavera" ("Spring" economic plan)
1989–1990	Presidency Carlos S. Menem (elected, civil)	Hyperinflation
1991	Presidency Carlos S. Menem	Domingo Cavallo appointed Minister of Economy. Beginning of the "Convertibility plan". Law of Convertibility 23.928 Currency "convertible pesos". Starting process of privatization of more than 50 national or provincial companies and banks. Dismiss of thousands of workers from the public sector.
1992	Presidency Carlos S. Menem	New role of Central Bank—Law 24.144 establishing a new legal framework for the financial system.
1994	Presidency Carlos S. Menem	Constitutional reform reducing presidential term from 6 years without re-election, to two consecutive periods of 4 years with reelection.
1995	Carlos S. Menem is reelected president	Impact of the Mexican crisis.
1997–1999	Presidency Carlos S. Menem	Beginning of a new economy's recession cycle. Impact of the Brazilian crisis.
1999–2000	Presidency Fernando de la Rúa (2 years in power and then resign)	Domingo Cavallo is appointed Minister of Economy. New bailout of the banking system. Restrictions on withdrawals from banks, after which street protests begin.
2000	Two weeks with four presidents: Ramón Puerta (2 days in power and then resign)	Street protests continue.
2000	Presidency Adolfo Rodríguez Saá (8 days in power and then resign)	Announced suspension of payments of the external public debt and not devaluation of the peso or full dollarization of economy.
2000	Presidency Héctor Caamaño (1 day in power and then resign)	Street protests continue.
2001–2003	Presidency Eduardo Duhalde (interim to complete the period of De la Rúa)	End of Convertibility. Cessation of external payments Fifth default.
2003–2007	Presidency Néstor Kirschner (civil, elected)	Renegotiation of remaining external debt.

(continued)

Table 1 (continued)

Year	Main political facts	Main socio-economic and financial events
2007–2011	Presidency Cristina Fernández de Kirschner (civil, elected)	Recuperation of key ex-state enterprises, launching of a thorough reindustrialization policy, massive system of subsidies (transport, gas, water, electricity)
2011–2015	Presidency Cristina Fernández de Kirschner (reelected)	Splitting of exchange market (though not officially recognized); universal child allowance program; renegotiation of remaining external debt continues.

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Surviving and Competing in Times of Crisis: Cases of Strategies by Argentine SMEs

Ricardo Detarsio, Klaus North, and Maialen Ormaetxea

Abstract In this chapter you will learn which strategies and measures SMes take to survive crisis. Cases from a sample of 25 companies located in the surrounding area of Argentina's third biggest city, Rosario, are presented. These SMEs have survived all major crises in the past 15 years and thus, have demonstrated their ability to cope with economic turbulences successfully. In the current economic crisis, many European SMEs are struggling to survive and it seems appropriate that some of these strategies could be applied in the European context. This chapter forms a "trilogy" with the previous chapter on Argentinan economic development and the following chapter which explores the role of owner/mangers in turbulent environments.

1 Navigating in an Ocean of Uncertainty

SMEs are the major employers and generators of work in all economies. Nevertheless they are also more vulnerable than other companies in times of turbulences. In Argentina the SME represent 99.6 % of all economic enterprises, account for 70 % of the overall employment and generate half of the total sales of Argentina. Moreover, they aggregate more than 30 % of the total value added to the economy.

As explained in the previous chapter throughout the last 50 years, Argentinian SMEs have faced many and varying economical turbulences that forced them to become more flexible in order to cope with the changing environment that they are competing in (see also Muchnik 2005; Roura 2009; Scarpinelli 2009).

The intention of this chapter is to demonstrate which strategies Argentinian SMEs have developed in order to face these economic turbulences.

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Generally turbulences or crises are predictable in the very short term when the "storm" is at sight and imminent to happen. This implicates that the managers constantly have to face a degree of uncertainty of their economic business and be attentitive to already weak signals of a coming turbulence.

Accordingly assure Ramiro and Dos Ramos Farias (2002, p. 5): "As well individuals, organizations are constantly searching for stability, equilibrium and regularity. Nevertheless it is necessary to understand how to live with the changing environment, as it is a common characteristic of economic systems, which is the great difficulty when predicting one's behavior. The rules from the past won't always work as guidance for the future as this exercise is a constant challenge when developing successful strategies. Moreover it is a continuous frustration for the executers, who tend to clutch to known patterns in order to predict future behaviors".

Turbulences affect the population, institutions and the development of the overall economy. They have a different impact on each of these three named areas although there is one common principal to each of them: uncertainty. This constant uncertainty, which increases in turbulent environments, currently characterizes markets. The outcome of this is an economic environment full of opportunities and at the same time a lot more risks than before. As Morín (1999) confirms: "Pieces of certainty do exist, but are reduced. We are navigating in an ocean of uncertainty that has some archipelagos of certainty, not the other way around."

Throughout the interviews of owner/managers in the 25 companies and a literature review it has been detected that Argentinian SMEs have faced common business challenges (Briner and Cusmano 2003, p. 27) in times of economic turbulences. These amongst others have included:

- *Price competition from imported goods*: as the domestic market was opened up to foreign competition customs restrictions were reduced or reduced. Many domestic companies saw themselves threatened by international companies due to their uncompetitive pricing. With higher prices not only was the domestic market under price competition but also the possibility to sell their products abroad was weak.
- *Missing dynamic of the domestic market* (*decrease in demand*): turbulent times are characterized by declining domestic market demand due to impacts felt by consumers and their spending. In this case, where reduced purchasing power negatively affects demand, there is excess supply in the market.
- *Difficulties to access adequate financing*: turbulence makes it more difficult to borrow from banks as they lose confidence in the credibility of the company. Interest rates rise, deadlines for amortizations shorten and the amount companies are able to borrow becomes insufficient. In some instances special guarantees and information about the company is requested. In particular, Argentinian SMEs have had trouble to take on medium- to long-term debt from the bank, relying on current account overdrafts which accrue very high costs and risks.
- *Difficulties to position products abroad*: many SMEs have problems in selling their products abroad due to their insufficient competitiveness in price, quality and not fulfilling the required standards. In addition, delays in customs clearance and tax refunds create even higher costs to foreign markets.

- *Competition against higher quality imports*: another problem is the substitution of domestic goods by imports due to the increased quality. This is a smaller factor than prices, but still has an impact. Sometimes the quality of imported goods is higher than the quality of domestic products; this occurs mainly in the technological industries.
- *Difficulties to access primary goods and materials due to the high concentration of markets and the restrictions in payments*: firms find it also difficult to access primary materials, especially when inputs must be imported and the market faces import/export restrictions. Additionally when foreign currency purchase restrictions are in place or high inflation stimulates the retention of goods. This influences those products and materials of markets with higher supplier concentration such as cement, polymer, combustibles and iron.

2 Strategic Focus in Turbulent Environments

The strategies that are explained in this paper are based on data collected in a survey that was carried out in various SMEs located in Conglomerate Gran Rosario (CGR). The participating companies were selected with the following criteria: successful companies existing for more than 15 years (which implies existence throughout the economic phases in which SMEs faced turbulent environments). These SMEs belong to different sectors: metal, mechanical, plastic and technology and have been selected according to their presence within the productive range of CGR (cf. Babakhanlou 2011). Also some companies available in the bibliography and included in the paper are located in Santa Fe.

The main objective of the interviews and surveys with these companies has been the identification of SME survival strategies when facing times of turbulent environments (cf. Kipley and Lewis 2009), thus affected competitiveness. The strategies observed and analyzed do not differ much between sectors, as the previously described crises have affected all sectors in a similar way. It can be said that there is no evidence the behavior of SMEs from different sectors is different in times of crises. Nevertheless, the obtained results cannot be generalized as the investigation is based on a selection of companies that is not necessarily representative.

The strategies and actions (cf. Morales Lozano et al. 2012) taken by the companies can be classified in three groups depending on the time they are considered; before (preventive strategies), during (immediate actions) or after the crises (actions to leave the crisis). In Table 1 a summary of the results of this study is demonstrated:

Long-Term Preventive Strategies

The companies that are known to have a long-term vision consequently plan their strategies before the crisis. In many cases, these strategies are not clearly defined by the management but throughout the analysis of their actions. It can be concluded that the plans and actions taken are based on linear strategies which will be explained further.

Table 1 Summary of strategies and actions of Argentinian SME

	Before the crisis	During the crisis	To successfully leave the crisis
Strategy and negotiation model	– Serve market niches (Diversification) – Internationalization	–	– Reduction of the company – Association strategy
Functional/ operational strategy	– Production when ordered – Dynamic leadership	– Keep liquefiable assets – Reduce costs "cut in payment chain" – Keep best personnel	Anti-cyclic formation
Funding	Auto-financing or debt prudence	Interest default	Start paying debt or at least try not to take on any more debt
Relationship with customers	Create long term relationships	Sustain current relationships	Sustain current relationships
Relationship with suppliers	Create long term relationships	Sustain current relationships	Sustain current relationships

Several Different Niche Markets

One of the actions that have been observed from successful SMEs is their market share/coverage. The SMEs are aware that it is not sufficient to only participate in one niche. Therefore many of them decide to compete in different market niches with differentiated or homogeneous products. The main objective of this strategy is to reduce the global risk of the company in a way that external impacts can be weakened.

Company A[1] S.A., founded in 1985, is part of the biotechnological sector and consists of four business units: Bioengineering; Laboratories; Systems; and Informatics. These business units have been formed over time due to innovative processes, which have always been their keyto survival. Company A has always kept in mind that if they wanted to survive in the domestic economy it would be crucial to promote innovation and detect consumer needs; diversifying from others. However, in time of crisis there was only little to no investment provisions. To generalize their actions, they can be seen as focusing on diversification to cope with the crisis through knowing how to minimize risks. Currently the company has 60 employees and they have never reduced personnel in a crisis. The only thing they have done to their employees is motivate their staff in order to survive the crisis successfully.

(continued)

[1] The cases have been prepared base on the interview reports of the Knowledge Management Research group, Universidad Nacional de Rosario (UNR).

The production or manufacturing of goods and services is oriented according to costumers' wants and needs. Therefore, the company focuses their activities on improving quality and assuring good customer service. Company A is part of the 'Polo Tecnologico Rosario', which allows them to benefit from the synergy opportunities of collaborating various companies. Moreover, there are agreements in place with foreign companies such as Microsoft, Siemens or Festo. This type of associations provides many advantages: greater promotion of the company by increased knowledge about the company; easy access to new clients; more possibilities to use chances given in the market; and easier funding when it comes to projects because they are contracted with these big companies.

The strategy they want to use in the long run is continuous improvement, with a constant search for market opportunities once the company operates in different business areas and client groups.

Internationalization Strategy

Another way to reduce risks is through internationalization. Due to the globalization and integration of economies it becomes easier to sell products outside the borders of the country. Moreover, this is a way of reducing risks when the domestic or international economys changes. Many of the companies choose to sell their products abroad, so if Argentina is hit by a crisis, the company is not as vulnerable. These exports, even if only small, help the SMEs to survive critical situations and avoid losses in sales and bankruptcy.

Company B, founded in 1963, manufactures and distributes electronic balances. Since 1996 they have been the market leader in Argentina with 45 % scales-market share. They started out by differentiate themselves from commercial scales to rather specific scales for supermarkets; however, their main strategy to safeguard against crises has been internationalization. In doing so they are not as dependent on the domestic market and less influenced by its turbulences.

Currently 15 % of their goods are exported to other Latin-American countries, which they aim to increase. One part of the company takes up residence in Mexico, where distribution and commercialization is done. They have also built an innovation center there, as the Mexican market offers very fast homologation of products. The Mexican market is the motor of innovation as the company can develop and sell new equipment. This has become one of the main competitive advantages of company B.

Most important for the company are Human Resources and Technology. As they compete against big multinational companies that have the possibility to offer a cheaper price, they focus in value creation, quality and after-sales care.

(continued)

Outsourcing also bears certain difficulties as consumers from different cultures have different preferences or tastes. Therefore, it is necessary to provide many modifications of the products and adapt after-sales care. Panama is a prime example, as in order to enter the very small market they had to specialize their products and modify the design.

They sell scales especially designed for small supermarkets. Just like in Mexico, the contact between company and the Panamanian clients is more direct, with B actually openinge offices and a technical service in this country to maintain this relationship.

Customer Retention Strategy

Another preventive strategy for times of crisis is to tie clients to the company by building a long lasting relationship, which will lead the clients to still trust in the company even in times of crisis or turbulence. This way once a crisis is overcome the relationship will remain. As the company completely relies on its clients and their purchases it is crucial to maintain this relationship.

The majority of the analyzed companies conduct such a strategy, but still keep their focus on providing high and stable quality in their products as well as after-sales services. The aim is to build a strong brand in order to be recognized by clients as a symbol of great value.

Company D S.A., created in 1988, manufactures conveyor chains mainly used for grain products like soya or corn. This company produces anything that implies indoor transportation of materials from band-conveyors to elevators for grain. These utilities are produced in high volume and stick out for their remarkable quality. They differ from other companies due to the fact that they permanently import goods directly from their manufacturers and not via distribution networks. This not only leads to cheaper costs but also a higher quality in their primary materials. The customers recognize and value high quality products, which is why the company has focused on obtaining certifications from the beginning. Although many clients do not pay attention to these certificates, they gained a higher market share through being the first in the sector to have ISO certification.

According to the director: "*The quality of our products is better than our competitors' because they are superior thanks to this characteristic and being the only ones to use the necessary materials to enhance the productivity and lifetime of the product*".

In Argentina they have 50 % of market share and also export to several South American and Central American countries. The company's name stands for quality and clients buy it for this reason. As they are a well-known brand, they do not consider it necessary to spend much on advertising

(continued)

and promotion in the country. Being the market quality leader they have performed the strategy of product quality branding to ensure a wide and long lasting client base.

Strategy of Production per Order

This type of strategy is an extreme version of the segmentation strategy (Jones and Hill 1996) in a way that every client forms a single segment. The fabrication of goods specifically ordered allows designing and adding features according to the taste of the client. This case implies complete value creation; the product is not only manufactured and distributed in a personalized manner, but is particularly designed for one client. Also it is common to have a standardized raw product in a basic design, which is then modified according to the needs and wished of a client.

Company C S.A., founded in 1961, operates in the metal and mechanical sector. It began with foundry production and was then adapted to the automotive industry, in which they now supply matrices for the measurement of certain parts in automobiles. The company works based on specific orders which are always different projects.

When the launch of a new product is foreseen the order is budgeted accordingly and the conditions and guidelines are negotiated with the client. Then a new order is generated with all the material necessary for its production, which is then sent to an engineering office. Each project team is led by a special engineer and mechanics develop how this new project should be construed. The continuous interaction with the client allows them to perform certain amendments to the pieces according to the definition of the project and various steps of the conformation process.

The market in which the company operates is highly competitive with foreign competition from different countries such as India or China. These countries have the advantage of manufacturing at very low costs, which can be passed on to clients in cheap prices. However, the main disadvantage of these countries is that they have very long transportation transit times, which on the other hand is turned into a competitive advantage for company C as they can deliver in a timely manner.

In addition to achieving minimum delivery deadlines, also quality and innovation of the projects are important objectives. Therefore, every project is unique and exclusive for the client, fulfilling their requirements and expectations.

Strategy of Dynamic Leadership

Finally, one of the most common strategies for Argentinian SMEs is undertaking dynamic leadership. There is no exact definition or plan how exactly this strategy has to be carried out, like for the other ones, as this strategy is developed in the short

run depending on the necessity of rapid action when scenarios are unstable and changing.

All decisions made are prudent, for example, they try not to get into high debt and have short circles of investment amortization (do not undertake huge investments and try to keep primary materials in stock in case of turbulences that might prohibit the purchase of these materials). They have a pool of various machines and therefore do not depend on just one.

Concretely they are summarized as:

- *Funding*—they try to utilize their own resources of auto-financing. They do not trust banks because of the history they have had with them. If they have to take on debt from the bank they do it as little as possible.
- *Small investments*—the investments are rather small according to the size of the company. That way they amortize in a short period of time.
- *Stock capacity of 2–4 months*—in case an external factor prohibits them from purchasing necessary materials, they are able to keep producing for at least these months.
- *Open information and communication*—develop shared values in the company. It is very important that the employees know of the current situation of the company at all times as well as the actions that the company is involved. In some cases companies install panels in different areas of the firm to keep the employees up to date.

One example for dynamic leadership of a firm is **Company E** that manufactures machinery for the production of bread. The company began its activities in 1949, with the fabrication of the first electrical oven for bakeries and bars and the promotion of the first kneading machine made in Argentina. The company has always financed themselves without taking on debt.

From 1967 they began to export to some Latin-American countries and today they export to the United States and Canada. They also began to publish a newsletter where they announced investments, informed about new products and invited clients to visit the city and company.

Currently the company is run by the children of the founder, who remember:

"*It had to be in accordance with everything else that was happening in the world. The founder always wanted to have the newest technologies and best developed machinery and tools. He always reinvested in the company and technology.*

In 2000 the founder said: *The secret of this company is based on being up to date. We do not just spend our earnings*; *everything is put right back in it. Another important factor is that we do not have any debt. We offer services to our clients*; *we design an own conveyor for every bakery*, *assemble it at the client's premises and send them a specialist to train them on the machine*."

(continued)

The equipment has always been designed and developed professionally. Also it incorporates the vision of the industrial design being one of the first companies in Rosaria that had a connection with the Institute for Industrial Design with the National University of Rosario, which in 1963 until today has an exceptional team of industrial designers in the area.

2.1 Immediate Actions During Crises

Most times the turbulences are hard to predict and the companies only realize it when destabilization has already been created. However, the Argentinian SMEs are used to this melee and know how to react to it in the middle of a crisis. There are four immediate actions that the majority of SMEs undertake in these situations and which they consider essential to survive:

Maintain Liquid or Easy to Liquidize Assets
In times of crises it is essential to have liquefiable short-term assets, as you need cash in order to keep the production going, buying raw materials and paying the personnel.

Reduce the Expenses for Production
Although it is one of the first and most obvious means, its convenience does not need justification. It is interesting to point out that in some cases there were not only economic reasons but it was also used to send out signals to personnel with the intention of socializing the perception of crisis severity.

Slow Down or Cut in the Payment Chain
Coinciding with the first point, in order to survive a crisis it is necessary to have liquidity in the company; therefore, companies stop paying suppliers, banks, etc. The only thing they do not stop paying, although a reduction is usual, is the employee; if the company is interested in keeping them. This cut does not necessarily imply damage in the relationship with the creditor. Many companies talk to their suppliers and explain to them the current situation the company is in and the reason why they are not able to pay. Most of the time the suppliers understand as they are often in the same situation.

The risk lies in the fact that a chain reaction might be generated. Consequently, once this process is generated for a high number of companies, the payment chain could become very fragile and harmful. It works to sooth the companies, but the overall effect on the economy is negative, slowing down its recovery.

Conservation of Personnel
All successful companies examined agree that it is very important to maintain the relationship with their employees. After all they are like further clients, clients on the inside. The company should try to keep them during hard times also, in order to still have the most competent workers when the company returns to normal.

However, this is a very difficult task, because not only does the workload shrink, also the employees start feeling useless and insecure of their labor stability. Therefore, new activities should be found in order to make the most of the manpower. This way, the workers will be kept busy and not feel unproductive.

2.2 Actions to Successfully Leave the Crisis

Once the four means previously described are undertaken, a company begins to act the way it should to survive during the crisis. A company does not know how long the crisis will last, but it can perform the following actions with the aim of operating in this instability; and once this period is overcome, redirect the company until they get to the point they were before. In the studied cases it can be seen that the companies carry out one or more of the following actions that will be contextualised after i.

Reduction of the Company
Reducing the company's activity is what most companies do in these situations. When an economic turbulence exists in the market, it affects the company mainly due to the decrease in demand. With the reduction in demand sales decrease and the company has to slow down production in response to the new level of demand.

Production decrease affects the hours of work for the employees. This happens because there is no work due to the decline in demand and there is also no money to keep paying the staff. Either way, the law prohibits the reduction of work hours for a specific period and limited amount; but as previously mentioned, they always try to keep their employees, especially the most competent and loyal ones.

Maintenance of the Relationship with the Stakeholders
In times of crises many of the companies try to maintain the relationship with their stakeholders (suppliers, clients, employees, etc.), independently from the cut in the payment chain.

They keep up the conversation with the groups mentioned explaining their current status in order to search for solutions together. In the same way as they cannot make their payments, they understand that the client cannot make theirs either.

The worst thing in this cases is losing the relationship with the people, as once the crisis is overcome, it is hard to reactivate this relation and grow again.

In this study it could be observed that many companies value the social part, the bond with the people that directly related to the company. When everybody is in a critical situation, people tend to show solidarity. The error that can be committed in these cases is the attitude of being individualistic when everyone is in the same situation.

Anti-cyclical Training
During crises many companies reduce their production levels and consequently have less work to be done. Some companies keep reduced working days for a

certain time, according to the established law, but if the absence of activity lasts too long the situation starts to become economically unsustainable.

That was the case with **company K**; leader in design, sales, installation and maintenance of central air conditioning systems, whose strengths are: being representative of a well-known fabric of refrigerating and heating equipment; and having an efficient after sales service that included maintenance and alterations.

The crises of 2001 began to develop in October, the month where the most important sales of the season are done. The result was a cancelation of many orders and practically the disappearance of all sales. This way, the sales season was lost and only the maintenance operation, which was also highly reduced, remained. Due to the seasonal variation of sales the company was relatively financially prepared, although it could not stay afloat for more than a year without sales.

A mediated plan of training to upgrade skills permits getting round a crisis and taking on the next strong season, having succeeded to notably improve the quality of after sales service, keeping the personnel and improving the relationship with them and the company. In this case the employees could have disassociated themselves from the company and dedicated themselves as technicians on their own without big problems, but with serious consequences for the company. Not only losing their employees but seeing them convert immediately into competitors with knowledge of the clients.

During various months they worked on reduced working journals and took advantage of these moments to revitalize and educate the employees. From this operating mode to the increase of professional value of the employees, they converted into a more competent and efficient company, creating benefits for the future.

This training helped the company to retain employees during this time of reduced work and also involved workers in the project. This was a clear message of confidence in the future for the employees which additionally served to sustain the collective moral, hope and consequently encouraged the presence of the company.

Association Strategy

Companies sometimes use strategic alliances and collaborative associations to supplement their own strategic initiatives and strengthen their competitiveness.

In interviewing the SMEs it was revealed that these alliances are not very common when facing a crisis.

In the literature it is verified, that the company Apache S.A. created a joint company with Gherardi S.A. in order to develop external commerce operations with African countries. It is a company that used to generate a great

(continued)

amount of international sales in its beginnings and the end of the 1980s. Using the named strategy it recouperated the negative effects of years of bad local commerce. This way the company Apache achieved an unsustainable growth in the 1980s, when the internal market depressed significantly (Vicente and Barbero 2009).

3 Conclusions and Management Implications

Generally, it could be observed that most of the companies do not follow one long-term strategy. In contrary, they undertake various basic strategies of different styles which they use to face economic turbulences (cf. Ramiro and Dos Ramos 2002). In order to do this, they combine different competences that alone cannot guarantee their survival, make it easier to survive a crisis if these tools are used correctly.

Concluding, all Argentinian SMEs that have survived turbulences in the last 30 years had highly dynamic management and in many cases used innovation (cf. EUMED 2008). As mentioned before, this means that an evolutionary company can actively become an efficient company able to finally survive turbulent times. In order to do this, the companies undertake the following actions:

The studied SMEs try not to depend on external situations. Therefore, the companies try to offer different products and services to face the crisis. For example, the industrial SMEs. Besides arranging various products, in times of crises they focus more on after-sales services than on sales themselves, which can mean a differentiating element compared to the competition.

Moreover, they try to have various clients for each product so that the benefits obtained do not depend on one specific client, that in case they are affected by the crises themselves it is not passed on to the company. Furthermore, they try to anticipate what is going to happen on the demand side in order to cover the risks.

Another general means is a low level of debt. In many cases it has been seen that the company auto-finances itself as the instability of the national economy leads the SMEs losing trust in banking systems.

Surviving a crisis does not only mean survival for the company itself, but also for the owner and his family as well as any employees and their families. Although in total the whole economy is depressed with smaller individual incomes, companies should try to maintain the company and its employees. This way, if the company wants to revive once the turbulences are over, it can grow again having the most competent employees available.

It is evident that the fact of surviving different crises influences the agility of the company. This is a very important element of the SMEs that have survived during the last 30 years because the turbulences have not ceased throughout this period. The company generates a species of surviving culture, which is suspicious towards any changes that occur in the environment or within the company (cf. Fundación Libertad 2012). This way it becomes easier to face those turbulences that actually endanger the existence of the company.

In conclusion, most of the SMEs studied do not have defined long-term strategies (5+ years). They plan and act short-term and use the great advantage of SMEs, flexibility of adaptation, which provides them with a larger framework of actions to choose from than big companies can enjoy.

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Learning to Cope with Turbulent Situations: A Study of Owner—Managers in Argentine SMEs

Peter Friedrich and Juan Carlos Hiba

Abstract This exploratory study of owner-managers' handling of turbulent situations (TS) in four Argentine SMEs during 2014 gives insight into organizational learning processes. Significant differences between managers are shown in respect to approaching turbulent situations. The development of a cognitive map for turbulent situations, in combination with managers' motivation to engage in turbulent situations; their acceptance of these circumstances as a special task, which can be learned; their understanding of the 'right' time for learning; and, the goal they want to achieve (spontaneous adaptation or embedded intelligence), are discussed as important preconditions to develop learning mechanism for handling TS. This chapter concludes by making suggestions of how SMEs can be supported in TS.

1 The Role of Managers in Turbulent Situations

Emerging economies in Latin America are often described as uncertain environments for business (Bruton et al. 2008; Nordqvist et al. 2014; Sörensen 2010) due to their volatile, fragile and often shifting economic and political circumstances (Hatum and Pettigrew 2006). An uncertain environment is a complex concept to define, not only for researchers but even more for practitioners. Matthews and Scott (1995) observe that multiple definitions of uncertainty have been offered, like lack of knowledge for decision-making (Duncan 1972), lack of knowledge to handle choices (Child 1972), environmental complexity (Galbraith 1973), unpredictability (Cyert and March 1963) and turbulence (Emery and Trist 1965). Banham (2005) describes a range of external threats and change drivers (Table 1). In the presented cases the initial external threats imposed on the Argentine companies in 2013/2014

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Table 1 Change drivers in the business of SMEs. Source: Banham (2005)

External opportunities and threats	
Technological advances	• Availability of new technology • Affordability of new technology
Customer expectations	• Customer expectations for price • Customer expectations for quality • Changing products or services
Supplier requirement	• Major supplier requirement
Regulatory changes	• North American Free Trade Agreement (NAFTA) • Exchange rate fluctuations • Change in government regulation
Increasing competition	• Erosion of profits • Increased competition in marketplace • Export market opportunity • Desire to compete globally

were regulatory changes, both by exchange rate fluctuations and a change in government regulations, related to a stricter control of imports and transfers of revenues.

This contribution describes and analyzes the behavior of managers in Argentine SMEs during the turbulent situation of 2014. Most of the time, the strategic orientation of companies' business operations, building on their external orientation and the managerial style of managers, has a focus on 'normal' business. However, in a turbulent modern industrial environment, a bigger interest in managers' cognitive position in turbulent situations is necessary. Miles and Snow's (1978) classification of four types of manager behavior in a normal situation (reactor, defender, analyzer and prospector) has been adapted for turbulent situations (Table 2). The following question is raised: if and how managers learn that turbulence is different to normal business?

A better understanding of managers' mental representation of turbulent situations, related learning and decision-making will provide evidence for the understanding of what kind of support could help other SMEs in a similar situation in the future. There is research evidence that "*the management style and external orientation of managers appear to be significantly influential in the mode*, *scope and processes of learning*" (Zhang et al. 2006). The strategic orientation of managers is the key to understand learning in small companies and gives input to understand the external orientation of SMEs. This study puts light on the role of managers and the learning and change processes, induced by external turbulent situations.

Managers' openness to their organizational context and their interpretation of environmental signals influences the degree of interaction, the amount of information that flows across organizational boundaries and learning opportunities (Child 1997). Innovative firms are more effective in utilizing external relationships and knowledge to develop new processes and products, which is also linked to more environmental scanning and to a greater willingness of managers to share knowledge with their employees. This proactivity of engaging in the external

Table 2 Differences in the strategic orientation of SMEs in 'normal' and 'turbulent' business

Strategic orientation	Business in normal situation (Miles and Snow 1978)	Business in turbulent situation (our proposal)
Prospector	The value is to be first with new products, markets and technologies.	The value of crises is that they are used as a possibility for new actions.
Analyzer	Seldom first to market, but frequently a fast follower with a more cost-efficient or innovative product.	Crises are thoroughly analyzed without leading to actions.
Defender	Locates and maintains a secure niche by protecting their position in a relatively stable product or service area.	The company is put in a state of hibernation until the worst is over.
Reactor	Responds to market changes when required by environmental pressures.	Learning by acting and continuous adaptation of actions.

Source: Adapted after Miles and Snow (1978)

environment, often mediated through 'trusted contacts' (Taylor and Pandza 2003), minimizes not only the time required to identify potential knowledge providers but it could also be a capability which is important in turbulent situations.

Despite the widespread recognition of the significant role that SMEs play in most economies, there is little research about how SMEs manage to survive, stay competitive and grow in uncertain and dynamic environments (Astrachan 2010; Detarsio et al. 2013; Nordqvist et al. 2014). SMEs are often marginalized as a class of firms that failed to become big (Scranton, 1999; Shuman and Seeger 1986). Later studies showed that certain advantages might also accrue to smaller firms (Woo et al. 1989). Even though the dominant view on SMEs has been their lack of resources, it has also been argued that SMEs possess flexibility to respond to changes in the general business environment, innovativeness to respond with agility to competitor actions and closer interaction amongst organizational employees (Aragon-Correa et al. 2008).

Conclusions about the strength of SMEs (Antony et al., 2008), as "*to flexibly adapt to change*", due to their close integration with customers, their culture of learning and the ability to effectively communicate across organizational boundaries, is very often based on studies of 'normal' situations for SMEs. There might be a need to reconsider these statements for turbulent situations.

Most research about SMEs is done at the level of the organization. Despite the fact that SMEs and managers are not the same entity, there is only very limited research at the level of the manager. It has been shown that due to organizational inadequacies, managers tend to focus on short-term benefits during the decision making process which severely can limit an SMEs ability to respond effectively to turbulent situations (Burnard and Bhamra 2011). Developing business in a chronically unstable socio-economic environment tends to explain the short-term vision of managers (Detarsio et al. 2013).

In a study of 108 SMEs Aragon-Correa et al. (2008) found that companies "*potential to adopt proactive to environmental practices is associated with specific*

organizational capabilities, *based on their unique strategic characteristics of shorter lines of communication and closer interaction* (*in the company*), *the presence of a founder's vision*, *flexibility in managing external relationships*, *and an entrepreneurial orientation*. *These capabilities are shared vision*, *stakeholder management*, *and strategic proactivity*." This should not only be true for proactive environmental strategies but also for handling turbulent situations.

Based on the above discussion about the role of managers in SMEs in turbulent situations, our interest for the working situation of managers has been guided by following questions:

1. What were the main challenges due to the external turbulences that did affect the progress of your company? How did you respond to the turbulent situation?
2. How were organizational processes designed/changed in your company to facilitate learning, knowledge- and competence development for staff and management? (Mode of learning)
3. With whom did you (managers) consult, learn and develop proposals of change? Once the company made a strategic decision to change, how were decisions communicated to staff? How did the staff react to these proposed changes? How were external stakeholders (suppliers, customers, banks etc.) included in this process? (Scope of learning)
4. How would you describe in what way/in what depth organizational learning processes lead to the expansion/enhancement of skills and capabilities of staff and managers? (Depth of learning)
5. How did the new practices and results of organizational learning make the company stronger, more effective or more prepared for future turbulent situations? (Evidence for learning)

2 Organizational Learning in Turbulent Situations

Most of the studies of SMEs in turbulent situations are focusing on how companies survive and analyze what makes the difference between survivors and losers. There are many explanations about what kind of solutions SMEs implement to deal with turbulent situations and when they do it. We understand turbulent situations as an event which can trigger learning. It challenges the organizational status quo and can create crises if managers do not react adequately to environmental 'signals'. Based on Dodgson (1993) we understand that (organizational) learning is stimulated both by environmental changes and internal factors in a complex and iterative manner. It is this complex process on the level of managers which is our focus. We want to highlight if and what managers in SMEs do learn in turbulent situations and then evaluate how they learn. By stating this question we implicitly sustain that handling of turbulent situations is a fenomena, which can be learned. As managers are acting in a context of their company and a business environment (suppliers and customers) we have chosen an Organizational Learning (OL) approach to study these phenomena.

OL is an "*organizationally regulated collective learning process in which individual and group-based learning experiences, concerning the improvement of organizational performance and/or goals, are transferred into organizational routines, processes and structures, which in turn affect the future learning activities of the organization's members*" (Schilling and Kluge 2009, p. 338).

OL is a theory about learning processes, describing how existing knowledge changes and grows in companies with focus on characteristics of processes and their interrelationships, both at the individual level and at the level of groups, teams or departments within the company, and the transfer of knowledge between those levels and the *external environment*.

In our case, we are focused on identifying how these processes of learning evolve as a result of external turbulent situations, affecting businesses and as the preparation for future turbulent situations. Operating routines and dynamic capabilities are two possible outcomes of this learning process. Zollo and Winter (2002) define "*dynamic capabilities as a learned and stable pattern of (collective) activity through which the organization systematically generates and modifies its operating routines to achieve improved effectiveness*". If an organization adapts in a creative but disjointed way to a succession of crises it is not exercising a dynamic capability (Zollo and Winter 2002). Dynamic capabilities are structured and persistent.

Drawing on Zhang et al. (2006) model for learning processes in SMEs, we suggest an adapted conceptual framework of OL processes (Fig. 1). In the chosen model, the trigger for learning 'turbulent situations', is 'filtered' by a phase of 'detection and activation' before the learning process will take place (Burnard and Bhamra 2011). The learning results (evidence of learning) are expected to contribute to the competitive advantage of the SME.

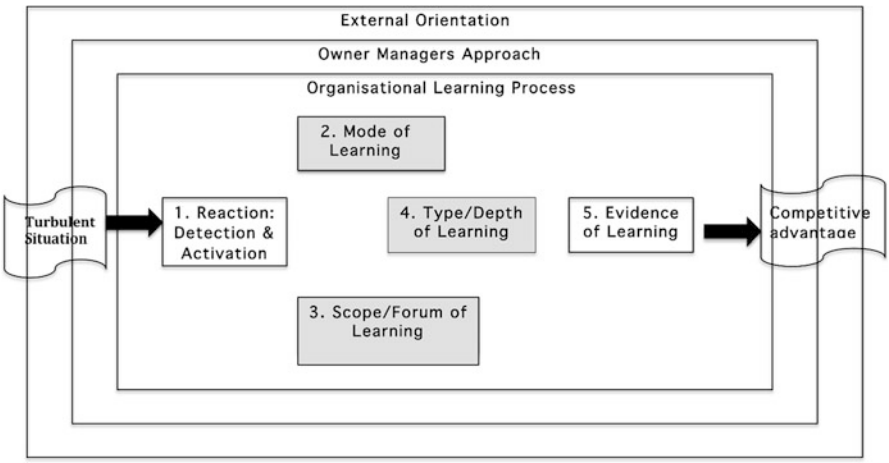

Fig. 1 Conceptual framework for the study of managers learning in SMEs. Source: Adapted from Zhang et al. (2006)

The period of '*detection and activation*' is a critical junction in an organization's ability to handle a turbulent situation. The way a manager is recognizing and interpreting threats is an important stage for the organizational learning process. In this phase the learning process can be restricted by management decisions through shortsighted spontaneous adaptations (Burnard and Bhamra 2011), or not even be thought about. It is obvious that learning does not just automatically happen, but a decision on what to do must be made to start the learning process.

To understand the *learning processes* in organizations (the transfer of individual learning to a collective level) the building blocks mode, type, scope and evidence of learning were chosen (Zhang et al. 2006). This model is our theoretical starting point to embed OL into managerial behavior and their external orientation.

The mode of learning refers to the understanding of how individuals learn in their social context; e.g. experimental by active experimentation, by information processing or by dialogue and interaction. The scope of learning is focusing on the transition from individual learning to organizational learning by distinguishing between different levels of learning: individual, group, intra-organizational and inter-organizational. By asking after the type of learning we get to know the depth of the learning process. Is the goal a continuous adjustment of existing systems, changed behaviors and discourses or is it continuous innovation by constant review and reflection?

Zollo and Winter (2002) distinction between learning mechanisms as passively experiential processes of learning (by doing) and deliberate cognitive processes (including the articulation and codification of knowledge), is another way to describe the depth of learning. *Learning outcomes* (evidence) will be manifest in different kinds of organizational changes.

This model represents the process of learning in SMEs in both normal and turbulent situations. It should be mentioned that the elements mode, scope and type of learning are not discrete, the whole process is more or less a series of iterative and complex interactions between the different building blocks. However, for research purposes we need to make these distinctions.

3 Case Studies in Argentine SMEs

To get more detailed information about managers' behavior when facing external turbulent situations, four Argentine companies (Grupo Consultar, Kretz S.A., Modelar S.A., Defante & Cia S.A.[1]) in the area of Rosario (Santa Fe) were selected for this study. Three of the companies (Modelar, Kretz and Consultar) had been taking part in the study "Learning to Grow" (North et al. 2014) and one company was new (Defante). In the 'Learning to Grow' methodology, learning is understood as a means of developing dynamic capabilities (Teece et al. 1997) and applies a

[1] see acknowledgements.

project-based learning approach (Scarbrough et al. 2004), which differentiates between 'learning-by-absorption' and 'learning-by-reflection'.

The interviews with the owner managers[2] were done in November 2014, which was about a year after the beginning of the Argentine crisis (see box below).

Argentine SMEs in 2014

Contribution to GDP: 40 %; to total employment: 60 % (Fernández Valdovinos 2005). This is similar to figures from Germany but the contribution to GDP (with equal employment) is in Argentina much lower than in Spain, France and Canada.

Mortality rate: 7 % of SMEs survive to the second year of operation and only 3 % to the fifth year (Soriano 2005).

Characteristics of turbulences: (1) Peso depreciation of 20 % in January; (2) annual inflation-rate 30 %, with expected annual inflation of 25 % in 2015; (3) systemic difficulty in importing products and raw materials due to regulations established in 2012; (4) continued scarcity of qualified blue and white collar workers with adequate qualifications and working habits; (5) low profitability; (6) difficulty to export products because of cost increase and delays in recovering payments for exports; (7) increasing costs for raw materials; (8) increasing costs for salaries; (9) late payments from customers.

The semi-structured interviews lasted between 90 and 120 min. In two cases only the manager took part in the interview while in the other two enterprises one or two managers responded. The questions (see Sect. 1) were sent to the companies in advance and the interviews were taped.

The companies have been operating in Argentina for 30–50 years. Three belong to the manufacturing sector (Grupo Consultar, Kretz S.A., Modelar S.A.) and one trades industrial products and provides technical and commercial services (Defante & Cia S. A.). Three of the companies are managed by their founders, and one by a family member. The table in Appendix describes their main characteristics in more detail.

The companies have a long history of turbulent situations (see Table 3). During the last five decades they have experienced no less than ten national crises, including three devaluations of national currency, hyperinflation (1989), defaults and negotiations with international financial institutions and private investment funds and one deep crisis of both political and economic nature (2001–2002). More recently, there has been an inflation rate of between 25 and 30 % annually. During this period no less than 20 general strikes were organized by trade unions.

[2] Owner-managers are shareholders and also directors involved in the day-to-day decision making within the company. Owner-managed companies ... are family businesses controlled by a small number of individuals, in which at least one of the owners also handles the management of the company (Die Stiftung Familienunternehmen, 2015). In the text the term "manager" will be used to describe this position.

Table 3 Experience of crises

	Company A	Company B	Company C	Company D
Long term experiences of crises	Since the 1980s experiences from 6 crises.	Since the 1950s 12 recession periods (worst crises: end 70/beginning 80 and 2001/2002).	Worst crisis 2002 (lack of incoming orders, debts to banks).	During 55 years: 14/15 crises (worst 2001).
Important aspects of the current crisis	Inflation (37 %)	2014: devaluation of peso by 20 %; rate of inflation.	Devaluation of peso makes the company more vulnerable on the Mercosur market.	DJAI
Immediate impacts on business operations	Increase of costs (suppliers) and prices (customers).	a) total stop in business b) increase in raw material costs c) re-negotiation of contracts with suppliers and customers (non-value adding activities) d) difficulties in importing goods (due to DJAI); with irregular delays in governmental authorizations.	Demand remains; however, obtaining input material in time becomes a problem (DJAI).	It takes time to get a decision for DJAI. This endangers the immediate availability of goods.
Consequences of crises	Crises are a possibility for change.	Crises stimulate to change.	More investment in technology.	Permanent evaluation of mission, vision and values of the company.

DJAI = Declaración Jurada Anticipada de Importación (Special Import Affadavit)

4 Results

Interview data were categorized according to the five dimensions of our research model. Overall, 13 issues were raised by the interviewees (see Table 4 column B). Most of the themes related directly to the questions above. In total there were 46 usable statements (column C, Table 4).

The choice of themes (column B) is a way to point out the main content of the managers' answers. This way of analyzing has been chosen to make it possible to get an overview about differences in the content of all interviews.

The clustering of interview-data not only shows where the main focus of the managers was (question 2) but also differences between the companies. The interview-data related to the learning processes (for handling external turbulent situations) are found in questions 2, 3 and 4. These are the questions about learning,

Table 4 Results of the interviews (n = 7 managers in 4 companies)

	Questions (A)	Themes (B)	Statements (C)
1	Immediate reaction to turbulent situation (TS)	• Spontaneous adaptation (including financial action)	5
2	Mode of learning: Organization of learning processes; at which levels?	• Strong focus on internal communication • Organizational solutions for handling turbulent situations	17
3	Scope of learning: Participants/partners in the learning process for change? Externals? Staff?	• Solutions/forum for learning • Employees' participation	10
4	Depth of learning: Which basic preconditions for the business process have been adapted?	• Change in internal cooperation • Rethinking of necessary qualifications/skills	6
5	Evidence of learning: In what way has the company become stronger for the future?	• Importance of the overall cognitive map for turbulent situations • Awareness about and focus on the company's key values as a resource in turbulent situations • More focus on communication with the external world (e.g. external orientation towards sector organizations) • Greater awareness about professionalism as a resource • More focus on knowledge as a resource for the company • Stimulus to evaluate existing business idea	8

organizational learning and preparedness for the future through organizational learning.

The following section describes each of the themes the respondents have discussed.

The adaptation processes described in Table 4 were on one side immediate actions and on the other side activities related to the creation of new or adaptation of existing organizational solutions (see Sects. 4.2 and 4.3).

4.1 Immediate Reactions to Turbulent Situations

As an example of an immediate action during the 2014 crisis, the manager in company A said: "*to face crises it's important to have good cash management. No taxes are paid, the payment of loans to the banks are delayed* (*the argument*

being that there is always enough time to discuss) *and paying suppliers is stopped—but we communicate with them*".

Also during the crisis of 2001, business-processes were dramatically challenged as banks blocked all accounts. Another major problem was how to utilize employees when there was no need to produce. One action proposed by a manager was to involve the employees in cleaning and painting premises as well as undertaking maintenance tasks to machinery and equipment.

Given the 'Special import Affadavit' (DJAI) in force, one of the main problems of the ongoing crisis was to secure the delivery of parts from foreign suppliers. Many creative solutions have been used to overcome the restrictions established by Argentine bureaucracy. Company B selected new import channels (small parts were delivered by DHL) or by finalizing products abroad (no import restriction). Another effect of this was that production planning was not possible as before, so an almost daily re-organization of the production schedule was necessary in this company.

Key insight: Focus on cash management is the outmost immediate action used by managers.

4.2 Mode of Learning: Internal Communication and Organizational Adaptation to Support Organizational Learning

The managers described two different approaches regarding the mode of OL: one focused on the internal communication process; the other one involved developing organizational infrastructure to adapt to external turbulent situation.

Strong Focus on Internal Communication

Internal communication is the action which managers in the four SMEs mentioned the most. For those managers communication was understood as direct verbal exchange with the personnel in the company.

'Improving communication and understanding' is the main lesson learned by all managers during the last crisis. There is a spectrum of solutions to enhance the internal communication process:

- For analyzing problems, meetings are organized with 15 people from different positions in the company. This communication process is permanent now (Company A).
- We use the '*ants approach*'—everybody is communicating with each other in the company and is forwarding/receiving information. We are not organising any general meetings (Company B).
- Managers have to communicate with the production line to give them support and general information about the state of the company facing the ongoing turbulent situation. One of the managers explained the special importance of his speeches to the personnel by focusing on the future: "*Now we are going bad*

but we will be better. These speeches are important to our engineers, who need challenges as they are always ready to tackle new problems as we are always focusing on new products" (Company A & C).

- To improve the communication process between departments (especially supply and sales units) (Company A).
- To give emotional support and information to the sales persons (who are at different locations throughout Argentina) so that they "*feel more safe and secure*". "*We had a special meeting with all of them.*" (Company A).

Key insight: Verbal, direct and immediate communication is the most frequently employed information strategy during external turbulent situations.

Developing Organizational Infrastructure for Handling Turbulent Situations
Company D created a forum for analyzing the effects of the ongoing turbulent situation and company B created one for action-oriented management of the turbulent situation. In the first case, already in the crisis of 2001, five scenarios of potential effects were identified and analyzed in meetings with only a few people. In 2014, the management invited a wider spectrum of personnel who identified ten scenarios.

In company B a special management team was organized, which had to develop solutions/processes. It consisted of four people (production, sales, supply, personal). It was important that those people "*did understand each other, the characteristics of each person, the needs of the other departments, and the whole company*".

Key insight: Implementation of task forces for analysis and planning actions are key organizational changes to handle turbulent situations.

4.3 Scope of Learning: With Whom Do Managers Learn in Turbulent Situations?

By focusing on the scope of learning in turbulent situations, we want to know how and with whom managers develop and improve their competences to handle turbulent situations. Where do they learn and to what extend do they involve their employees in this learning process?

While company B carried out reflection processes with experienced customers or other entrepreneurs, company C involved themselves in local meetings (branch or sector organizations) for increasing their knowledge and developing their insights in the specificities of the crisis. Company B stated that they learned a lot during the crisis from other local entrepreneurs and from an important customer: "*this was a dramatic process but we learned a lot. We made a lot of mistakes but we have always been open enough for reorganizing. We are learning by doing.*"

The support by external consultants is in most companies not reported as necessary. However company D highlighted its importance: "*the intelligent side*

of our company is supported in collaboration with our key external consultant, *who also provides us with personnel screening and selection*".

Company C mentioned that they had an annual plan for training, which is independent from crises. It is based on the use of a matrix of competences. The role of the employees on the shop floor is not mentioned or described as "*employees can't get involved*".

Key insight: Participation/empowerment of shop-floor employees is not seen as a resource to be used in handing the turbulent situation. Reflection with external partners is the main action for learning.

4.4 Depth of Learning: How Far Do Managers Want to Go in Their Learning Processes?

The question here—about the depth of learning is—how thought-provoking is the learning; is it a continuous adjustment of existing thinking, changed behavior; or is it a review, reflection and change of basic assumptions?

Company B mentioned that higher flexibility in turbulent situations is as a key skill for both technicians and workers. A manager in company D described that "*new personnel joined the company with more technical skills*, *informatics and knowledge of foreign languages*".

Managers in company B highlighted their personnel as having an active engagement in turbulent situations but also a precondition for that: "*we need to be flexible and fearless. In some cases fear paralyze people and they do not know what to do*". In company B, 10 of 70 employees had to leave as "*they couldn't stand this unsecure situation*". Company C described the positive effect of personnel reduction (retired people are not replaced) "*as a possibility to enlarge competences and skills for the remaining personnel*".

Management's learning process in company B gave not only more insight into the quality of competences but also reinforced the overall importance of personal resources: "*The most important part in the turbulent situation is people*"; and "*you learn how to manage emotions*, *take decisions and share decisions. Before we were only interested in good results*, *now we are more interested in people*."

Three developments were observable:

- managers learn more about what kind of competences are important in situations of turbulence;
- management becomes more aware of the importance of personnel as a resource in crisis;
- managers learn more about what kind of work- and production-organization is necessary (flexible) in situations of turbulence.

Key insight: There is a need for managers to reflect on whether the chosen organizational solutions for the business process in 'normal' situations are also effective in 'turbulent' situations.

4.5 Evidence of Learning in Turbulent Situations

The following aspects were mentioned: (1) importance of an overall cognitive map for turbulent situations; (2) stronger focus on company key values as a resource in TS; (3) more focus on communication with external stakeholders; (4) greater awareness about professional behavior and methods as a resource; (5) more focus on knowledge as a resource for the company, and (6) evaluation of existing business idea.

Importance of an Overall Cognitive Map for Turbulent Situations ("Outside Is a Tsunami")

One aspect of the learning process is (company B) to accept that in turbulent situations fundamental business operations change; no normal planning on a long time scale, no schedules which can't be changed because "*everything can change every minute*". This is not only important for the management but for all levels in the company; everybody has to accept and act in an environment where everything can be changed during a certain time-period. This also includes that "*each manager has developed a wider picture of the enterprise and not only for their own department*". Each manager has learned to understand how other departments are affected by their own decisions; no independent decisions are possible.

Managers in companies A & C see "*every crisis like a vaccine. If you can survive one, you can withstand the next*". Company A's focus is to create a structure in the company (a set of potentialities/resources, equipment, flexibility, competence and skills, communication technology) to improve preparedness (buffer, flexibility) for the next crisis.

One manager in company B summarized: "*first of all you need to change your mind completely, because everything can change constantly. There are daily changes in production planning. You need to change your mindset to accept that outside there is a tsunami*". One result is a greater awareness about managers' and employees' cognitive map for turbulent situations and its adaptation is important to implement successful actions of change.

Key insight: To develop a company specific cognitive map about turbulent situations is like a navigator tool for managers.

Stronger Focus on the Company's Key Values as a Resource in TS

During turbulent times some of the managers (company A) became more aware of that the survival of their own company depends less on optimizing the 'normal' measurable dimensions (like quality, production costs and time, etc.) but more on the development of abstract intangibles (values), like prestige and trust. "*During*

times of high inflation our strategy is to build on the company's prestige and trust in relation to our suppliers and clients. They rely on that we will pay as soon as we have money and they know we will deliver goods as soon as it is possible".

Managers in company B explained, that the most important behavior during the most critical phase was "*to tell everybody the truth*; *to the customers if there was a delay in delivery*; *to the suppliers if there was a delay in payment*; *to the employees of how serious the overall situation of the company was*".

Key insight: Knowledge and awareness about a company's basic key values, as a base for external and internal relations (company's prestige, trust into the company, and to be trustworthy) is a platform to 'hibernate' during turbulent situations. This prevents ad-hoc actions, which do not improve the basic situation for the company more than blindfolding stakeholders. It helps to find time for undertaking the 'right' activities.

More Focus on Communication with the External World

In turbulent times, management needs to put more effort into explaining and communicating the prevailing situation to both local suppliers and to sellers and distributors. Continuous contact is important even if there are no major changes expected in business conditions.

One outcome of the learning process from crises is to understand, accept and behave in a way which considers the company is embedded in a local environment of suppliers and other production related services, but also into non production related organizations, which are important in the case of turbulent situations. As the manager from company B puts it: "*We do not need experts from Stanford University*, *but we need skills to talk with local authorities. SMEs normally do not have these competences*".

The statements regarding an aversion to be dependent on advice from external consultants, seems to be shared by most managers. For company B it is very important to be understood as a SME in its own right and not be treated as a small company which failed to grow.

On the other side, their membership to and active orientation in branch and sector-organizations is important for them to get open access to data and information about the fluctuations of the economy and the market. Company C mentioned the linkages with two local institutions, like the Polo Tecnológico Rosario (Rosario's Technological Pole) and the 'Asociación de Industriales Metalúrgicos' (Association of metal industries).

Key insight: There are no expectations that external consultants can contribute in turbulent situations. Branch and sector organizations are accepted as help for orientation in turbulent situations.

Greater Awareness About Professional Behavior as a Resource

The learning process shown in company B resulted in a higher standard of professionalism. In one way it relates to business processes: "*everybody in the company now knows what to do* ('*the goals*'), *communicates better internally and there is more focus on results*". In company D a change to recruit staff with higher

qualifications and competences (like different engineering professions: industrial, mechanical, electrical, etc.) could be noticed.

Key insight: Turbulent situations ask for increased professional behavior and methods.

More Focus on Knowledge as a Resource for the Company
Some managers of SMEs have learned to use extra time in turbulent periods (due to less production activity) to develop the knowledge base of the company. To avoid the loss of previously developed knowledge, company A's engineering and design unit started to keep more systematic records of all previous technical developments and draft ideas. The manager in company C puts it like this: "*in the crisis of 2000 we were stopped* (*in production*) *but we did not lose our capacity to think. Our engineers used their time to adapt the enterprise to fulfill the requirements of ISO 9000 standards*".

Key insight: A central issue for managers is to define the important knowledge in the company, which should be systematized. Sometimes it is necessary to get a helping hand from outside the company on this aspect.

Stimulus to Evaluate Existing Business Ideas in Turbulent Times
Management should think about diversifying the core idea of their business. In company D there has been a change from mainly importing and selling CNC-machine-tools to offer technical services for those machines and even to produce (CNC-machines), or a combination both. This enterprise organized a new business unit providing technical advisory services to clients in the process of decision-making. This reorientation of the company was triggered mainly by problems to access foreign currency in a timely (non-bureaucratic) way and the awareness that their staff had developed knowledge, usable for another type of business. The managers in company D summarized this new focus as follows: "*A big problem was to change the mission, vision, and values of the enterprise. First we thought that our company was just selling machinery, then we believed that we offered technology* (*including services*), *now we understand that we provide solutions to different technologies*".

Key insight: Activities towards evaluation of the existing business idea are the first step to prepare for future turbulent situations.

5 Discussion: Managers' Cognitive Map for Turbulent Situations

This section deals with key issues that are relevant for helping managers of SMEs to deal with crises: (1) the development and visualization of a cognitive map for turbulent situations, (2) distinct actions for normal and turbulent situations, and (3) four aspects for capturing the concept of OL as a valid process for contributing

to the survival and growth of their enterprise, in particular under external turbulences affecting their normal work- and production processes.

The section concludes with two reflections about (1) the limits of this study and (2) a proposal for further research that could contribute to a better understanding of the behavior of managers when confronting turbulences.

5.1 Developing a Cognitive Map for Turbulent Situations

The interviews with the managers gave a detailed picture about their learning situation when facing external turbulent situations across a broad range of aspects. In Fig. 2 all this information is integrated into one 'story', as all the answers contribute towards handling turbulent situations in a more effective way. The spiral in the middle shows that some companies have a broader spectrum of activities than others. Some are reasoning about themes 1 and 2, some are focusing on aspects 1–3 and the management of one company is working with all themes (see Fig. 2).

Key insight: Orientation about possible actions in turbulent situations helps managers to avoid blind action.

The answers gathered from the managers are not distributed equal. All companies had information to give for the first (reactions to TS) and the third question

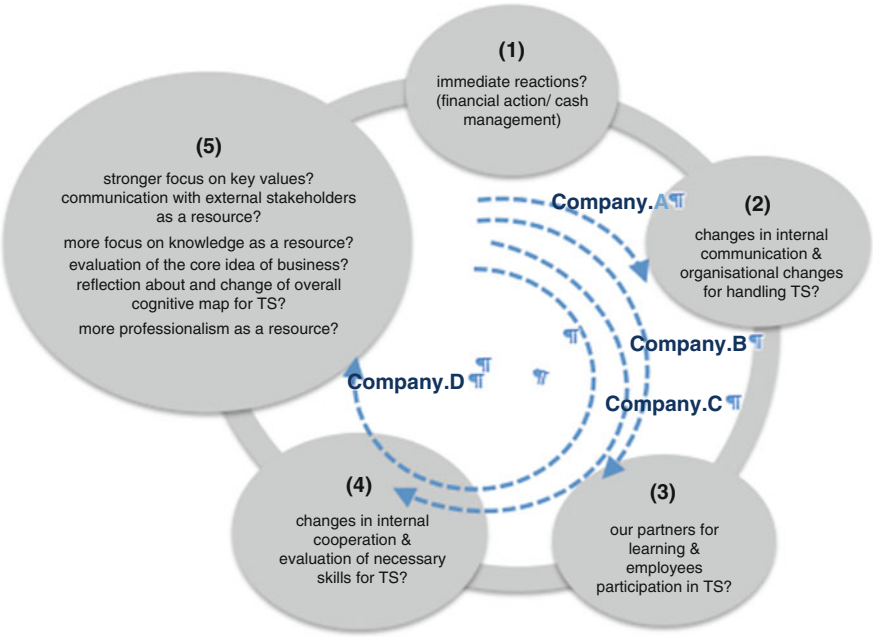

Fig. 2 Results—an overview and an orientation for activities in turbulent situations (TS)

(scope of learning process). Only two companies had relevant information to give to question 2 (mode of learning process) and to question 4 (depth of learning process). Only one company had substantial information related to question 5 (evidence of learning process). Two companies had only minor thoughts about this.

Only in company B the management has given a set of answers, which show that they have been reflecting deeply about the whole process including immediate adaption, organizational solutions for handling TS, changes in business to meet TS, towards learning for sustainable changes for the future.

5.2 Distinct Actions for Normal and Turbulent Situations

The detailed comparison of the behavior of managers in turbulent situations in four companies highlights the importance of following activities:

- to strive after an effective balance between immediate action and the development of sustainable embedded intelligence for turbulent situations;
- to strive after the right balance between activities focusing on internal and external context;
- to understand that the demands on personnel behavior and competences are different in turbulent and 'normal' situations;
- to understand that there is a need for different kinds of organizational solutions in 'normal' situations and in crises;
- to accept the importance to support the development of employees' empowerment in 'normal' situations to be able to make use of those capabilities in situations of turbulence;
- to understand the relation between empowerment and competences/skills. It is not possible to develop adequate skills/capabilities in turbulent situations if empowerment has not already been experienced;
- insight into the quality of communication: verbal communication is more important than nonverbal in turbulent situations; and
- to understand the importance of shared activity in the company in turbulent situation, in between managers, middle management and employees.

5.3 Four Facets How Managers Act and Learn for Crises

In which way managers choose to address turbulent situations, seems to be preconditioned by their overall understanding of and experiences from previous turbulent situations. There are four facets of their understanding, which together have an impact on how managers act and learn for crises:

- **The motivational facet**: What is it in crises that managers experience as conducive for handling?

- **The task-facet**: Do managers experience the handling of turbulent situations (and learning) as a necessary task to be learned?
- **The time-facet**: Do managers think that there is a right time to learn for crises?
- **The goal-facet**: How do managers reflect upon the learning goal on a scale starting from 'spontaneous adaptation' to 'development of company embedded intelligence for turbulent situations'?

The implications of these facets for managers cognitive mapping of turbulent situations is very seldom discussed in both practice and research. It may be obvious to think that turbulent situations motivate managers to act (1); that managers accept handling of external turbulences as a task (2); that managers need to learn before crises happen (3); and that managers have a clear goal when handling crises (4). However there is not enough research available about these questions, so doubts are possible, and they are specified in the following. We are not stating that managers consciously avoid the mentioned aspects but it might be that they are not aware of what they are doing and what they are not doing.

The Motivational Facet: Do Crises Contain Conducive Aspects for Managers
Are there aspects in the uncertainties, created by turbulent situations, which are beneficial enough for a manager to deal with, to learn to handle, or to solve consequences of these uncertainties?

Milliken (1987) describes three different types of uncertainty; state uncertainty (managers perceive the environment as unpredictable), effect uncertainty (inability to predict what the nature of the impact of a future state of the environment or environmental change will be to the organization) and response uncertainty (lack of knowledge of response options and/or an inability to predict consequences of a response choice). It is obvious that any new turbulent situation triggers activities by managers, but it is not clear if the different kinds of uncertainty are known, reflected upon and how they affect activities and the learning process in the company.

The Task-Facet: Is the Handling of Turbulent Situations Accepted as a Necessary Task
The question is, if the handling of turbulent situations involves tasks that a manager wants to invest learning in? Does it happen too seldom, so managers do not want to prioritize this area of learning?

Zollo and Winter (2002) identified important contingencies (learning investment, task features, organizational features and environmental conditions), which need to be considered to understand how costs and benefits for learning vary in different contexts. They show that the relative effectiveness of learning mechanisms depends on the characteristics of the tasks that the organization is attempting to learn and on the operating routines that it is interested in to adjust or to redesign.

There are certain task characteristics which may have an influence on the interest which managers have in learning and adapting operating routines; including, frequency, degree of heterogeneity (how novel the tasks appear each time) and causal ambiguity (derivation of clear indications of what should or shouldn't be done). As turbulent situations have a low frequency, they are different every time and it's difficult to know if any action gives any result, there is a big risk that

managers do not 'accept' turbulent situations as a task they need to deal with and need to invest in for learning.

With this in mind, it might be questionable that 'handling turbulent situations' is perceived as a task which is very high on a manager's list of priorities. This would also have implications for the development of proactive behavior and might lead to think that managers prefer learning by action (when the crisis happens).

The Time-Facet: Is There a Right Time to Learn for a Crises?

There is no doubt that crises have the potential to trigger learning. The question is to understand the relationship between crisis and learning as a dynamic process of practice. The most common approach to crisis and learning is 'learning from crisis' (Hong et al. 2012). We need to further understand how learning and crisis are interrelated. This is not simply punctuating learning at different points in a crisis event (i.e. before, during, after). It is fundamental to understand the mode, type, scope and evidence of learning that occurs in the midst of a crisis.

Crisis is primarily an unfavorable state, which may be followed by the closure of the company, but such a situation could also have positive effects (Dubrovski 2014, p. 348). "*The biggest* '*wealth*' *of the crisis*, *is the acquisition of new knowledge*, *which the company would otherwise find impossible to obtain*".

Based on Antonacopoulou and Sheafer (2013) "*learning* (*in a crisis*) *is not only an emergence of the on-going practising*, *it is also an emergency* (*crisis*) *when learning will give rise to conditions where judgments have to be made in response to the tensions one may experience*", we can follow that there is no 'right' time for learning, it is an on-going process.

The results of the study show that there is a difference between the managers in their time-perspective on activities to handle turbulent situations:

- short-sighted solutions;
- means that can be used to meet future TS but also just for normal rationalization;
- changes/developments which could help to meet future TS and experiences, which have been transferred into values, knowledge etc.

From the outcome of this case studies it seems that companies with more advanced thinking about turbulent situations are working with activities in all three categories at the same time, while others are satisfied when short sighted solutions are implemented. Classifying activities related to turbulent situations might help SMEs to decide upon what is important to focus on, what takes time and what is not automatically developing by just focusing on operating the business.

The Goal-Facet: Spontaneous Adaptation or Embedded Intelligence for Turbulent Situations

Some companies overcome disruptive external events while other fail. Burnard and Bhamra (2011) are proposing that organizations should not only develop emergency management procedures, but also develop the features of resilience to support organizational adaptation during turbulent periods. Action, detection of turbulent situations, environmental scanning are activities in the organizational

system which by organizational learning can contribute to the development of an 'embedded intelligence for turbulent situations', with awareness of both the internal and external system conditions.

Carpenter (2001) shows that the adaptive capacity (resilience) of a system is very much related to the mechanisms for the creation of novelty and learning. SMEs, which are innovative and creative, might have it easier to practice learning in turbulent situations and overcome those external crises.

Learning in Crisis (LiC) is a mode of learning through a state of flux that encourages individuals and organizations to exercise their judgments by questioning deeply held beliefs and deeply embedded norms, reconstructed in the process of their core practices (Antonacopoulou and Sheafer 2013). That is exactly what one of the interviewed managers described as the process they were going through. It is more than simply stating, how these processes are experienced or accounted for (prospectively or retrospectively), which is at the core of how the relationship between learning and crisis has hitherto been understood (Kim 1998).

5.4 Implications for Research

One shortcoming of this study is that only four SMEs with their managers took part. Our literature review and the results of this exploratory study show that there is a need for more studies of SMEs and how managers behave under external turbulent situations. It would be of interest to widen the study to SMEs in other sectors of the economy.

Another point of departure to further develop the OL approach is that organizational learning in turbulent situations in SMEs is happening in the exchange between company and the external environment. In most companies the manager, middle managers and some stakeholders in the external environment are involved in this process. The building of social capital and external networks to access political, human and financial capital is very important for managers to cope with hostile environments (Dyer and Mortensen 2005).

A further aspect of the organizational learning process is the empowerment of employees. In the studied companies, the employees were included only to a very limited level in the process of handling turbulent situations. There is obviously a need to study, if SMEs who use empowerment of employees as a conscious strategy in 'normal' business are more effective in 'turbulent' business periods.

Altogether this study points out a need in research (and practice) to focus more on the individual (learning) situation of the managers when their enterprise is jeopardized by external turbulences and not to study and to treat SMEs simply as a black box. The conclusions above support a more outspoken focus on the question of managers' cognitive map for turbulent situations'. There is not much research done in this area.

6 Conclusions and Management Implications

To help SMEs and their manager be more effective in turbulent situations, they need to learn how to tackle crises, survive and develop in spite of the difficult external circumstances. There is a need to support reflection about their motivation, about their acceptance of the tasks to be done, about their time perspective for and about their goal for handling turbulent situations. These are the preconditions, or the building blocks, for developing their cognitive map of 'their own SME in a turbulent situation'.

Managers' support of the organizational learning process, as it was understood in this study (starting with detection and activation of TS, the building blocks mode, scope and depth of learning, evidence of learning), will help to develop practical solutions. However, there is also a need for guidance through the managers' cognitive map for turbulent situations. This will lower the risk for adopting only spontaneous solutions and support organizational learning with sustainable results.

For SMEs in turbulent situations it is important to support the key feature of their entrepreneurial orientation, their 'organizational flexibility', which allows managers to adapt quickly to changing circumstances. The following recommendations should help managers the opportunity to develop a cognitive map for their thinking (1), to support them in not getting lost in spontaneity and loosing the overview over a wider spectrum of possible solutions (2), to help them to understand that turbulent situations are different to normal situations (3), and to provide help to them to become more aware of their own priorities (4). Our research has shown the importance of understanding both the 'psychological and sociological aspects' of a crisis to help to guide managers in their activities:

1. ***Workshops for managers to reflect and to develop 'A cognitive map for addressing turbulent situations'***.
   In such a workshop following key aspects should be focused on:
   - **Motivation**: Which are the factors of a crisis that managers experience as conducive aspects for handling?
   - **Task**: Do managers experience the handling of turbulent situations (and learning) as a necessary task to be learned?
   - **Time**: Do managers think that there is a right time to learn for crisis?
   - **Goal**: How do managers reflect about the learning goal on a scale from 'spontaneous adaptation' to 'development of the company's embedded intelligence for turbulent situations'.

2. ***Support managers to keep an overview on possible activities during turbulent situations***
   One key aspect of turbulent situations is that companies very quickly head for 'actionism'. Sometimes it seems to be more important to do something fast than carefully evaluate the options. Having different 'action areas' in mind (Fig. 3) makes it easier for the manager to be aware of a portfolio of activities for handling turbulent situations.

Fig. 3 Action-portfolio for crisis

3. ***Help managers to remember* '*Doing the right things in turbulent situations is not the same as in normal business*'**
   It is important for managers to keep an overview of possible ways to handle turbulent situations in a short-, mid- and long-term perspective by being aware of the different order in setting priorities in turbulent situations compared to a 'normal' situation (Studie KMU Analyse, KMU Ratgeber AG). The ideal order of first thinking in strategic terms, followed by operational planning and dispositive tasks needs to be reversed. Immediate actions are followed by a revitalization of the hitherto successful business processes and leading to a strategic re-orientation in the next step.
4. ***Create dialogue-forums for reflection for managers in turbulent situations***
   Managers need meeting-places for their reflective learning in turbulent situations. This is possible by:

   – external cooperation (with customers, suppliers, branch organizations etc.);
   – ownership in other companies;
   – internal meetings with selected personnel.

5. ***Checklist for action-portfolio in turbulent situations***

This checklist (Table 5) builds on the results of this exploratory study and is to be understood as an example of how managers could reflect about what kind of activities they are using to become effective in turbulent situations.

In the column Yes/No the status in the SME is evaluated. In column 'priority' it is evaluated how important this activity is for handling crises (1 = not important, 3 = very important). The idea is to help managers to get their priorities right.

Banham (2010) presented a tool to analyze SME vulnerability to environmental turbulences which could be used as a starting point before using the above checklist, focusing on actions to handle turbulent situations.

The mentioned activities could be organized within the enterprise (with staff and workers) or carried out on an external base (workshops, forums, exchange of info with suppliers and clients, pair assessment activities with other managers, etc.). Many activities could be provided by intermediaries, like universities, employer organizations, development agencies, and governmental agencies.

In spite of the importance of the role that these external institutions and organizations should play to support the survival and growth of SMEs in developing countries, not all of them actually offer that support in practice. Most of their regular portfolios are mainly focusing on workshops and courses about traditional management topics such as effective time management, the benefits of effective communication, productivity and work organization, marketing and logistics, etc. Whilst all these knowledge certainly is needed by

Table 5 Proposal for a checklist to address TS (typical company responses in TS have been used to exemplify)

	Action-portfolio Our status in learning to handle turbulent situations (TS)	Yes	No	Priority	Comp. I	Comp. II	Comp.	Comp. IV
				1-3				
1	We are prioritising immediate actions to handle TS							
2	*Our mode of learning to handle TS*							
2.1	We focus on internal communication							
2.2	We organise task forces to plan for TS							
2.n	.....????							
3	*Our scope/forum for learning to handle TS*							
3.1	We have dedicated platforms to learn for TS							
3.2	Our employees are empowered to participate in learning for TS							
3.n	.....????							
4	*Depth of learning we are going for (change of given understandings) to handle TS*							
4.1	We know the necessary skills & competences for TS							
4.2	We adapt the internal cooperation for TS							
4.n	.....????							
5	*Do we want to develop embedded intelligence to handle TS (also for the future)*							
5.1	We are aware of our overall cognitive model for TS							
5.2	We are aware of key values, which are important in TS							
5.3	Our external stakeholders are resources in TS							
5.4	Our professional methods and practices are applicable in TS?							
5.5	We focus on knowledge as a resource?							
5.6	We have a plan how to rethink our business ideas in TS?							
5.n	.....????							

SMEs, they should also offer subjects related to how to deal successfully with external turbulent situations.

Finally, to work in an integrated way as partners, who are responsible for different aspects of enterprises, jobs and quality of working life, has already been shown to be very effective for keeping SMEs safe and alive.

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Appendix: Description of the Participating Companies

Enterprise				
Aspects	Company A	Company B	Company C	Company D
Year of foundation	1985	1963	1961	1960
Operational structure	Five independent business units developing products and/or providing technical and advisory services	A typical three level organization with departments with assigned responsibilities	A typical three level organization with department with assigned responsibilities	A typical three level organization with departments and business units with assigned responsibilities
Employees	60 (10 focus on innovation)	100 (40 % university-level, 60 % technicians)	27	30 (including partners)
Business and technology areas	Bioengineering, laboratory, IT systems, informatics and education	Development, design, manufacturing and marketing a wide range of electronic scales	CAD 3D for complex forms and for creating surfaces and solids on a single interface. CAM system to create machining programs for 2.5, 3, 4 and 5 axes, highly efficient programming and optimized machining for high-speed technology	Trader of new and second-hand universal and specialized machine-tools

(continued)

Enterprise				
Aspects	Company A	Company B	Company C	Company D
Products/ services	Equipment for biological applications, seed quality control. Technical tests for electrical standards certification. Design, installation, maintenance and repair of electrical networks. Software design.	Different series of scales for weighing and price products and for fiscal purposes used in supermarkets. Scales for laboratories and industrial purposes. Dot matrix printers for tickets.	Pattern models; casting tools; control devices; dies for compression molding and thermoforming; devices for water jet cutting; punch dies; surface digitizing; measurements and control with CNC.	CNC vertical and parallel lathes; grinding, drilling, notching, punching and milling machines. Machines for metal deformation, pliers, sharpening and cutting metal saws.
	Education: design, installation and maintenance of educational labs.			Provision of technical services and sale of original spare parts to the metallurgical industry.
Clients	Public institutions and private sector organizations	Mainly supermarkets and retail groceries.	10 clients.	Enterprises from the metal sector industry in Argentina.
			Supplier for automotive manufacturers and auto parts market, provision of molds and measurement control devices for international car manufacturers (60 %). Agricultural machinery (40 %)	
Exports	5–8 % of sales;	23 % of sales (2011)	20 % during the best years; currently 0 %.	No exports.
	mainly to Latin America, USA.	Latin America (mainly Mexico)	Brazil and Uruguay	Mexico and Chile during (1978–1990) Manufacturing machinery locally.
Imports	Minor (essential) details	Minor (essential) details (75 % of parts from Argentina, 90 % are ARG suppliers)	None	All machinery imported from China (since 1991)

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SME Vulnerability Analysis: A Tool for Business Continuity

Iñaki Garagorri

Abstract This chapter presents the concept of "vulnerability" and a vulnerability analysis for Small and Medium-sized Enterprises (SMEs) to assess the multiple risks firms might suffer from during economic and financial downturns depending on their management systems and financial health. SMEs can be more flexible and react faster than large firms but, unlike their larger counterparts, most of them do not have at their disposal effective management systems and tools to ensure their sustainability. In a context of economic and financial crisis, an emergency plan for vulnerable SMEs has been carried out in the Basque Country, Spain to address this issue using a vulnerability analysis model.

1 Introduction

The global economic and financial crisis we are still suffering from has hit firms in several sectors. Spain has been arguably one of the hardest hit countries in Europe since the onset of the financial crisis. From 2008 onwards drastic austerity measures have been implemented across the country, more than 300,000 companies have disappeared and the unemployment rate has grown to more than 25 %.

The Basque Country (includes the provinces of Araba, Bizkaia and Gipuzkoa) is a region with a population of more than 2,000,000 inhabitants in the north of Spain, bordering the Atlantic Ocean and France. It is one of the wealthiest and most industrialized regions in Spain.

The Basque Country has also been strongly affected by the crisis. The number of firms has been decreasing over the years and contrary to what was happening in Spain or the Basque Country, where SMEs seemed to be suffering less than larger firms, the number of SMEs in the province of Gipuzkoa was reducing at a faster pace than their larger counterparts (Table 1).

Thousands of firms have disappeared and unemployment has risen. Nevertheless, comparing regionally, those of the Basque Country are better than the average Spanish figures (Table 2).

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Table 1 Development of firm numbers in Spain and the Basque country

Firms by region	2007	2008	2009	2010	2011	2012	2013	2014	**2008–2014**
Firms in Spain	3,336.657	3,422.239	3,355.830	3,291.263	3,250.576	3,199.617	3,146.570	3,119.310	**−8.85** %
Firms in the Basque Country	164.431	175.303	172.152	169.782	165.496	159.005	153.709	149.245	**−14.86** %
Firms in Gipuzkoa	59.546	63.569	62.034	60.580	58.456	55.574	53.631	52.042	**−18.13** %
Firms in Spain (>200 empl.)	6,073	6,465	5,375	5,078	4,997	4,923	5,079	5,037	**−22.09** %
Firms in Spain (<200 empl.)	3,330.584	3,415.774	3,350.455	3,286.185	3,245.579	3,194.694	3,141.491	3,114.273	**−8.83** %
Firms in the Basque Country (>200 empl.)	352	362	337	321	314	297	316	298	**−17.68** %
Firms in the Basque Country (<200 empl.)	164.079	174.941	171.815	169.461	165.182	158.708	153.393	148.947	**−14.86** %
Firms in Gipuzkoa (>200 empl.)	102	105	87	81	83	83	97	93	**−11.43** %
Firms in Gipuzkoa (<200 empl.)	59.444	63.464	61.947	60.499	58.373	55.491	53.534	51.949	**−18.14** %

Source: INE-Spanish National Statistics Institute

Table 2 Development of unemployment rates

Unemployment rate	2007	2008	2009	2010	2011	2012	2013	2014
Gipuzkoa	5.36	6.74	9.42	7.67	10.86	13.24	13.80	14.05
Basque Country	5.90	8.48	12.13	10.98	13.16	16.60	16.58	16.60
Spain	8.57	13.79	18.66	20.11	22.56	25.77	25.73	23.70

Source: INE-Spanish National Statistics Institute

During the hardest years of the crisis, the international media highlighted the different impact it was having in different Spanish regions. The Basque Country with its industrial tradition and capabilities was coping with the crisis differently. One of the most well-known Basque corporations, Mondragon, even won the Harvard Business Review and McKinsey & Company held 2012 M-Prize for management innovation and the Drivers of Change category at the Boldness in Business awards, organized by the Financial Times.

Companies and individuals were suffering but the Basque Country seemed to handle the global crisis better. And then, in the end of 2013, disaster struck. Mondragon Corporation's flagship firm Fagor Electrodomésticos (a leading maker of home appliances with more than 5,700 employees) collapsed, unable to face mounting debts.

When Fagor Electrodomésticos filed for bankruptcy protection, the risk of a chain reaction with all its suppliers, most of them SMEs, emerged. A supplier-customer network is based on creditor-debtor relationships and a link effect is inherent: if a firm in a network collapses then firms in its upstream are affected (Boissay 2006; Battiston et al. 2007). Bradley and Rubach (2002) found that entrepreneurs consider non-payment of trade credit as the most important cause for their bankruptcy. Fujiwara (2008) estimated that nearly 20 % of all bankruptcies are due to the link effect and that this link effect grows for larger bankruptcies (like the one from Fagor Electrodomésticos).

In this context, the Regional Government of Gipuzkoa in collaboration with Garapen; the Association of Local Development Agencies of the Basque Country and OPE Consultores, a consulting firm specialized in working with SMEs, launched an emergency plan for vulnerable SMEs from Gipuzkoa called Garaituz ("getting over" in Basque language) from April to October 2014.

The Garaituz emergency plan had different objectives for distinct agents:

- SMEs would receive a vulnerability analysis and an action plan for free; they could be beneficiaries of public funding from the Regional Government of Gipuzkoa to develop the action plans in a second phase.
- The Regional Government of Gipuzkoa would receive a proposal for a public funding program adapted to the reality of vulnerable SMEs.
- Garapen, the Association of Local Development Agencies of the Basque Country, would receive a tested methodology and training for technicians to replicate emergency plans with more SMEs in the future.

105 SMEs from Gipuzkoa took part in the Garaituz emergency plan, which was developed collaboratively between the 11 local development agencies from Gipuzkoa and OPE Consultores.

The average size of the firms was 14 employees. 50 % of the companies had staff of 10 people or less and 80 % of them had 20 or less employees. Only 5 % of the firms employed above 40 workers. The average turnover per company was 1,459.090 €, this means 100.647 € on average per person.

Most of the SMEs (85 out of 105) were from auxiliary manufacturing industries and 58 % of them had been operating for between 10 and 30 years.

2 Vulnerability of SMEs

The vulnerability concept is broadly used in social sciences when relating to citizens, or in biology when relating to flora and fauna. It is not so commonly used in business management literature; however, interest in the business failure research field is growing (Crutzen and Van Caillie 2008). Concepts like vulnerability and evolution are used beyond natural sciences and have reached economic and business research agendas. After all, to ensure survival and sustain competitiveness, SMEs face the challenge to reconfigure their resources and capabilities in accordance with perceived or expected changes in the business environment.

Pretorius (2008) defined a business failure conceptual classification framework as including four sub-domains:

- signs and prediction of decline;
- causes and preconditions leading to decline and failure;
- recovery (intervention actions);
- cognition and learning during failure.

Penrose (1959) defined enterprises as a bundle of internal and external resources, which help them to succeed or fail. Masurel and Montfort (2006) revealed that small firms need to change over the course of their life cycle in order to survive. Sull (1999) coined the term "*active inertia*" to define an organization's tendency to follow established patterns of behavior until they fail, even in response to dramatic environmental shifts. Firms unable to change their strategies, processes, relationships or values are condemned to disappear. It is the flip side of the coin to dynamic capabilities or "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al. 1997). Business failure is the misalignment of the organization to the environment's realities (Sheppard and Chowdhury 2005).

Creative destruction (Schumpeter 1942), disruptive innovation (Christensen and Raynor 2003), or the rise and fall of companies, is an inevitable part of a competitive business context. Various explanatory factors are commonly used to explain SME business failure: business life cycle, other competitors, commercial resources, management style, managers, cost structure, financial resources, innovation, productivity (Scott and Bruce 1987), strategy, organization, characteristics of the enterprise's owners (Freel and Robson 2004), access to finance, cooperation and networking (Franco and Haase 2010), level of debt, capital management, technology, price policy, employee qualification and motivation (Ropega 2011). Ooghe and De Prijcker (2008) define four different types of failure processes based on a

company's maturity and management characteristics and give an overview of causes (mostly related to errors in management) for each failure process. Depending on the configurations of these factors firms are either gaining robustness or are becoming vulnerable in turbulent times.

According to VTT Technical Research Centre of Finland (2002), "the term '**vulnerability**' describes the uncertainty related to risk management that threatens a company's operation". In this context Bhamra et al. (2011) argued: "*It is not only disasters but also small uncertainties or deviations that can cause challenges to organisations. Sometimes when large organisations cannot withstand these challenges, it is essential that sufficient effort is channeled into making small and medium enterprises (SMEs) robust and resilient to withstand these uncertainties and challenges.*"

Measure to overcome vulnerability and ensure the long-term viability of businesses can be seen in the light of Business Continuity Management as defined by BS25999-1:2006, the British Standards Institution's Code of Practice for Business Continuity Management: "A holistic management process that identifies potential threats to an organisation and the impacts to business operations that those threats, if realised, might cause, and which provides a framework for building organisational resilience with the capability for an effective response that safeguards the interests of its key stakeholders, reputation, brand and value-creating activities."

A four-stage process of business failure-turnaround is proposed by Sheppard and Chowdhury (2005), arguing that "*because organizational failure can be avoided even after a decline (rapid or prolonged) the ultimate failure of the organization really stems from a failure to successfully execute a turnaround*".

3 The Vulnerability Assessment Instrument

3.1 Structure of the Instrument

In order to assess vulnerability it is worth learning from experience and by examining past incidents. In this respect, OPE Consultores has dealt with three economic downturns in the Basque Country since it was founded in 1984. During this time it has helped hundreds of SMEs to survive. Based on this experience, 19 potential vulnerability factors were proposed and divided into three types:

- Structural vulnerability factors: those considered critical to manage the business effectively. Without a solution to these factors it is very difficult to deal in change or improvement projects to refocus other possible vulnerabilities.
- Operational vulnerability factors: second in importance, identified and located in areas or business functions of the firm.
- Economic and financial vulnerability factors: results from not resolved structural and operational vulnerabilities. They are usually the symptoms by which the main vulnerability causes are identified, but they are also the first ones to deal with in an emergency plan, so that firms can gain resources and time to implement other changes (Table 3).

Table 3 Factors of vulnerability

Types of vulnerability	Groups of vulnerability	Factors of vulnerability	Description
Structural vulnerability	Strategy	Strategy	The company focuses on the short term and lacks a sufficiently known and shared medium-term vision to build its future as well as the tools to manage it.
	Size	Size	The company's size is too small to compete successfully in its market.
	Societal structure	Continuity	Risk of business discontinuity due to issues related to ownership and management.
	Organization and management	Management	The management model of the company limits its ability to successfully implement improvement, change, adaptation, development or innovation projects.
		Managers	The managers are not able to successfully implement improvement, change, adaptation, development or innovation projects.
		Organization	The company does not have an organizational structure that ensures proper identification and management of critical processes and functions to compete in its market.
Operational vulnerability	Commercial	Customer concentration	The high concentration of customers and/or sectors represents a high level of risk.
		Internationalization	A low level of internationalization carries a risk of market concentration, as well as a lower level of development of the company's capabilities (sales, product, management . . .).
		Commercial resources	Scarce resources for commercial management make it difficult to address risk diversification or to counteract the decline in traditional markets.
	R&D&I	Innovation	The lack of innovation in products/processes/services . . . can represent a lack of adaptation to new market needs and a serious threat in the medium term.
	Production	Production	Production resources and/or the organization of production are inefficient and generate a competitive disadvantage.
		Purchasing	The dependence of purchases and suppliers can significantly limit the company's ability to generate profits.
		Quality	Product/service quality problems can jeopardize the relationship with customers.

(continued)

Table 3 (continued)

Types of vulnerability	Groups of vulnerability	Factors of vulnerability	Description
Economic-financial vulnerability	Economic and financial	Added value	The addition of value to the product/service is not enough to ensure customer loyalty and continuity of sales. The company is a dispensable player that basically competes on price.
		Finance	The financial structure of the company hampers its profitability and the possibilities to invest in new projects requiring external funding.
		Short-term finance	The difficulty of meeting payment obligations in the short term jeopardizes business continuity.
		Costs	The cost structure is inadequate to safeguard the competitiveness of the company in its markets.
		Wages	Excessive wage costs can jeopardize the ability to compete and business continuity.
		Equity	Failure to comply with certain legal requirements with respect to the equity of the company can be a risk factor for business continuity.

Source: OPE Consultores

The formulated model has some similarities with the integrative model of the business failure process proposed by Crutzen and Van Caillie (2008) and is based on three types of vulnerabilities in order to have a broader view and go beyond economic and financial vulnerability. It is an attempt to differentiate the symptoms of vulnerability from the reasons or root causes of vulnerability. By the time a firm detects problems from an economic and financial perspective, it can be too late to save it. Operational and structural vulnerabilities are defined as the root cause of most economic and financial vulnerabilities and, therefore, measuring and monitoring them is critical for timely detection and reaction.

4 Firm Selection and Data Collection

The public presentation of the Garaituz emergency plan combined press releases, contact with influencers (banks, lawyers, tax, accounting and consulting firms) and public conferences. SMEs interested in taking part of the plan had to apply to Local Development Agencies to be selected. A general set of criteria was defined to help technicians select the firms but no vulnerability pretest was conducted. This could

lead to non-vulnerable SMEs taking part of the plan but luckily only one case was identified.

Data collection was performed in three steps:

1. Technicians from Local Development Agencies collected predefined raw data (quantitative and qualitative) from firms using an online tool to get measures and indicators.
2. Consultants reviewed the data and wrote a draft report. Each of the 19 vulnerability indicators was measured from 0 (not vulnerable) to 100 (absolutely vulnerable). Most indicators were automatically measured based on predefined criteria over collected data, but consultants always had the option to modify the final measures based on their knowledge and experience. Consultants selected the most relevant vulnerability factors with no quantity limits (from 0 to 19) and their weights (100 points between the selected factors).
3. Consultants compared and validated the reports, the measures and the action plans with the managers of the firms.

5 Results of the Vulnerability Analysis

Each company was evaluated regarding all of the vulnerability factors, thereby obtaining an accurate diagnosis of what were the factors that, in the short term, primarily affected their viability and what was the relevance of each factor.

Three out of four firms had strategy related vulnerabilities and nearly two thirds had vulnerabilities related to commercial resources. On the other hand, only two firms had quality related vulnerabilities. These results are coherent with the global evolution of Basque firms and their need to go beyond past stages where quality was the key competitive factor by implementing new strategies to face the changes happening in the current competitive landscape (ORKESTRA 2013).

Figure 1 shows a ranking of vulnerability factors based on the number of firms with that vulnerability and the average relevance of the factor for the firms. For instance, 67 firms had vulnerabilities related to commercial resources and the average relevance of this factor was 17.5. More firms (79) had strategy related vulnerabilities, but with a lower average relevance (14.4). On the other hand, the average relevance of equity related vulnerabilities was the highest of all (20) but only 12 firms showed vulnerability in that factor.

Industrial SMEs are, on average, more vulnerable in production, added value and costs than the rest of firms. On the contrary, fewer industrial SMEs have, on average, vulnerabilities related to management, commercial resources and wages.

From a size point of view, strategy, management and commercial resources are the main vulnerabilities for firms under 20 employees, whereas production, purchasing and cost related ones are more frequent for firms over 30 employees. This indicates that smaller SMEs have more structural vulnerabilities and larger ones have more operational vulnerabilities.

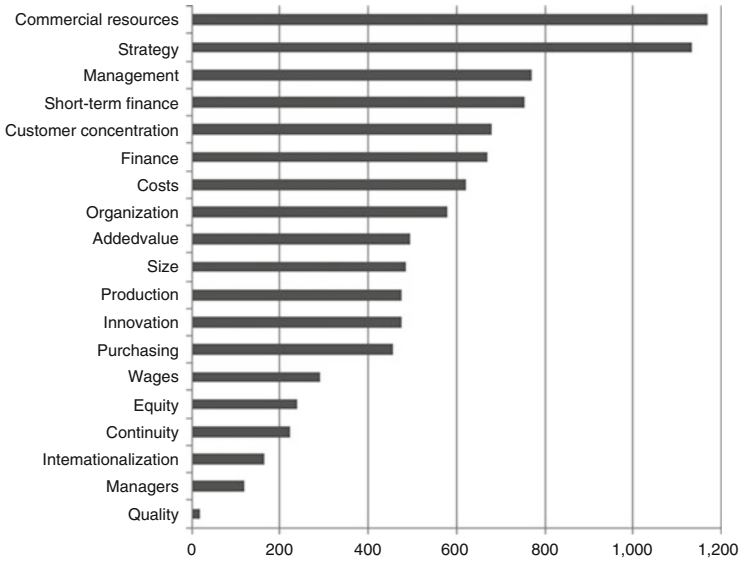

Fig. 1 Frequency ranking of vulnerability factors

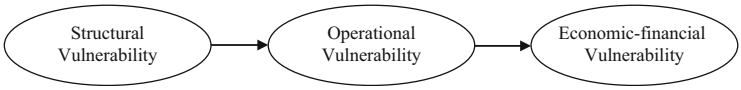

Fig. 2 Conceptual framework

5.1 Evaluation of the Vulnerability Assessment Instrument

In order to reach a broader view, relevance-based vulnerability factor prioritization has been left aside and the research has been carried out with all the vulnerability measures from all firms.

As previously explained, the applied vulnerability model has been built based on consulting experience rather than previous research. The formulated conceptual model is simple yet comprehensive (Fig. 2). The following hypotheses have been formulated:

H1: *Structural vulnerability positively affects operational vulnerability*.
H2: *Operational vulnerability positively affects economic and financial vulnerability*.

Scope of the research: the research has been developed under an exploratory approach. The applied vulnerability model has been developed using practitioner-based rather than academic-based knowledge roots and the purpose of the research is to gain familiarity with a non-clearly defined problem.

Research technique: a Partial Least Squares (PLS) structural equation modeling approach has been used to analyze the data. The PLS technique works in two stages:

1. The assessment of the reliability and validity of the measurement model.
2. The assessment of the structural model.

This sequence ensures that the constructs' measures are valid and reliable before attempting to draw conclusions regarding relationships among constructs (Barclay et al. 1995).

Population and sample: there were 51,949 firms with under 200 employees in Gipuzkoa at the end of 2014. The sample size of 105 SMEs is not representative but it is large enough to carry out a statistical study based on PLS structural equation modeling approach (Chin and Frye 2003).

Evaluation of the measurement model: the individual item reliability results for the 19 original indicators show diverse outcomes. The reflective indicators that did not meet the criterion of individual reliability were removed from the model and the tests for the remaining ten indicators show satisfactory results. See Annex for more details about composite reliability, convergent validity and discriminant validity.

Evaluation of the structural model: H1 is accepted and H2 is rejected. Structural vulnerability is a key element to explain operational vulnerability, but operational vulnerability does not significantly influence economic and financial vulnerability. For more details see Annex.

6 Conclusions and Management Implications

Firms—larger or smaller—are born, they mature and they die. It's nature's law. Nevertheless, some business failures can be avoidable and a vulnerability assessment tool has been developed and used to ensure business continuity of a group of Basque SMEs. It's main aim is to detect structural and operational vulnerabilities before economic and financial vulnerabilities make impossible a successful turnaround.

Garaituz emergency plan for vulnerable SMEs was very successful in meeting its objectives: 105 Basque SMEs received a complete vulnerability analysis. The Regional Government of Gipuzkoa, the Association of Local Development Agencies of the Basque Country Garapen, OPE Consultores and, most importantly, the SMEs showed great satisfaction for the obtained results. A good sign of it is that 99 SMEs decided to continue in a second phase to implement the recommended action plans.

This success; however, must be critiqued with the results of this research. The vulnerability analysis model used in the emergency plan should be improved for future implementations through the following:

a. A sampling framework could be defined and used to select the firms taking part in the emergency plan based on their level of vulnerability.

b. Most of the vulnerability factors were helpful to measure partial and global vulnerability but this research has demonstrated more demanding and better standards and criteria are required. Nine criteria were removed from the original model due to their lack of reliability.
c. The conceptual validity of the model and its hypotheses (H1: structural vulnerability affects operational vulnerability and H2: operational vulnerability affects economic and financial vulnerability) is in doubt. The first hypothesis is confirmed but the second not; indicating a reformulation of hypotheses or change in theoretical assumptions is needed.

The results show that vulnerable industrial SMEs from the Basque Country don't have remarkable product/service quality problems but they are focused on the short term, lack strategic management and have scarce resources for commercial management. Future research should be done to strengthen this study taking samples from other regions or countries.

The results show that smaller SMEs may have more structural vulnerabilities, whereas larger ones may have more operational vulnerabilities. Considering that only 10 % of the firms from the research sample have more than 30 employees, an analysis of a bigger sample would enable a stronger, further reaching analysis.

At the time of writing this document, 99 SMEs were implementing the recommended action plans. Once the plans are finished, measuring the level of vulnerability of these SMEs again using the same analysis model would contrast the real impact and effectiveness of the steps taken.

Annex: Evaluation of the Measurement and the Structural Model

Evaluation of the measurement model

The normal criteria in order to accept an indicator as part of a construct is that it possesses a greater loading than 0.707, which implies that the variance shared between the construct and its indicators is larger than the error variance (Carmines and Zeller 1979). However, some authors believe that this rule should not be so strict and loads of 0.5 or 0.6 can be acceptable in the early stages of scales development (Chin 1998) or when the scales are applied in different contexts (Barclay et al. 1995).

The first results for the 19 original indicators show diverse outcomes. According to Diamantopoulos and Winklhofer (2001), reflective indicators are essentially interchangeable and; therefore, their removal does not change the essential nature of the underlying construct. Given the initial values obtained, some reflective indicators that did not meet the criterion of individual reliability were removed from the model. This situation was not unexpected due to the nature of the model. Without a more in-depth analysis, some of the removed indicators did not seem to be as representative as others and could be somehow redundant. Economic and financial indicators could also have been separated in two constructs following the failure process proposed by Ooghe and De Prijcker (2008).

The tests for the remaining ten indicators show satisfactory results:

Constructs	Indicators	Table 4. Individual item reliability	
		Original indicators	Remaining indicators
Structural vulnerability	Strategy	0.7326	0.7166
	Size	0.5920	0.6151
	Continuity	0.0923	Removed
	Management	0.7357	0.7180
	Managers	0.6810	0.6896
	Organization	0.7075	0.7198
Operational vulnerability	Customer concentration	0.3870	Removed
	Internationalization	0.5739	0.6202
	Commercial resources	0.8103	0.8228
	Innovation	0.5023	0.6047
	Production	−0.1808	Removed
	Purchasing	0.1259	Removed
	Quality	0.3497	Removed
Economic-financial vulnerability	Added value	0.0525	0.5110
	Finance	−0.1851	Removed
	Short-term finance	−0.3504	Removed
	Costs	−0.9055	Removed
	Wages	−0.5685	Removed
	Equity	0.3171	0.8360

Composite reliability measures construct reliability. Values starting from 0.7 are accepted in early stages of research but values higher than 0.8 would be preferable (Nunnally 1978). The first and second constructs are more reliable than the third one, which, not by much, but does not meet the standards.

AVE or Average Variance Extracted measures convergence validity or the amount of variance of the construct which is due to its own indicators. Recommended values for AVE should be greater than 0.5 (Fornell and Larcker 1981). The results show that none of the constructs meet the standards, but they are close to them.

Table 5. Construct reliability and convergent validity	Structural vulnerability	Operational vulnerability	Economic-financial vulnerability
Composite Reliability	0.822	0.727	0.636
Average Variance Extracted	0.480	0.476	0.480

When examining discriminant validity for PLS models the accepted method is to show that the square roots of the average variances extracted (diagonal values) are higher than the inter-construct correlations. In this case, the test shows satisfactory results.

Table 6. Discriminant Validity	Structural vulnerability	Operational vulnerability	Economic-financial vulnerability
Structural vulnerability	0.6928		
Operational vulnerability	0.550	0.6899	
Economic-financial vulnerability	0.211	0.164	0.6928

Evaluation of the structural model

In order to assess the research hypotheses, path-coefficient levels and the contribution of the exogenous constructs to the amount of variance explained in endogenous constructs (R^2) have been measured, multiplying path and correlation coefficients. Values starting from 0.2 are accepted in early stages of research but values higher than 0.3 are preferable.

A t-statistic was used to check the significance of path coefficients. Any value greater than 1.6479 is likely to be significant ($p < 0.1$).

In addition, the predictive power of the model has been tested using the Q2 Stone-Geisser statistic. Cross-validated redundancy (Q) higher than 0 means the model has predictive relevance.

As we can see in Table 7, structural vulnerability is a key element to explain operational vulnerability, but operational vulnerability does not significantly influence economic and financial vulnerability.

Table 7. Structural model evaluation	Path	T-Statistic	Correlation	R^2 (amount of variance explained)	Q^2 (cross-validated redundancy)
H1: Impact of structural vulnerability on operational vulnerability	0.550	8.3492	0.550	30.25 %	0.0185
H2: Impact of operational vulnerability on economic-financial vulnerability	0.164	1.2645	0.164	2.69 %	−0.4431

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Knowledge Risk Management in Turbulent Times

Susanne Durst and Helio Aisenberg Ferenhof

Abstract This chapter presents a knowledge risk management framework. In turbulent times organizations of all sizes are required to be even more prepared to make necessary changes in their business strategies. Access to knowledge that is relevant and up-to-date is critical in meeting this challenge. Knowledge however is not always positive, i.e. something of value, but has a negative side as well. This situation can be tackled with a knowledge risk management approach that addresses knowledge from a holistic point of view. Therefore this approach supports companies in better managing their critical knowledge to master present and future business challenges. The aim of this chapter is to introduce knowledge risk management and its contribution to meeting these challenges. Regarding Knowledge management tools refer to the following chapter.

1 Introduction

The contribution of knowledge to develop and sustain competitiveness is generally accepted. One can also acknowledge that knowledge management (KM) has itself been established as a field of study. Yet, taking a closer look at the previous body of literature, it seems that knowledge is mainly discussed as something of value, i.e. an asset or a skill. Potentially negative aspects, like knowledge as a liability, seem to be underestimated. Consequently one can determine that our discussion on knowledge is rather unbalanced. Yet companies that fail to properly manage their critical knowledge to secure its value-creation potential undergo significant risks, for example, loss of expertise or reinvention of knowhow. Therefore, the need to

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carefully manage the downside risks of knowledge is high too. Managers and entrepreneurs cannot afford to neglect knowledge risks even though they might be more familiar with financial capital and the risks related to this asset category. Given the resource constraints many small and medium-sized enterprises (SMEs) are exposed to, an integration of a risk management approach in knowledge management approaches is particularly relevant for this category of firms.

Indeed, SMEs are exposed to a number of knowledge risks:

- risks related to human resources (e.g. owner/managing director and staff) which can be the consequence of both voluntary and involuntary turnover and (long-term) absence because of illness or injury (Durst and Wilhelm 2011);
- relational risk, which is the probability and consequence of having dissatisfactory cooperation and/or opportunistic behavior by partners (Delerue 2005). Relational risk also comprises the risk of knowledge sharing, which may end in the strengthening of the partner at the expense of the SME's own competitive standing (Coras and Tantau 2013);
- risks related to decision making of new strategies, markets, products as well as other important business issues (Marabelli and Newell 2012);
- risks related to knowledge gaps (i.e. a mismatch between what a firm must know, and what it actually does know), which may hamper the firm in meeting its objectives (Perrot 2007);
- risks related to outsourcing of business functions, such as accounting or human resources management (Durst et al. 2015).

Against this background, the aim of this chapter is to address this challenge by introducing knowledge risk management and its contribution to corporate development. The discussion will be conducted from the viewpoint of SMEs.

The chapter is structured as follows. In the first section, the authors focus on the theoretical background relating to knowledge risk management and its implications for competing in turbulent business environments. In the following section, a practical case will be presented that highlights the application of knowledge risk management in a SME. The chapter will terminate with a conclusion and practical implications.

2 Knowledge and Risk Management in SMEs

The aim of this section is to introduce to knowledge risk management in SMEs. In order to do so it will commence with a brief introduction to knowledge management and risk management in SMEs to establish the necessary foundation for integrating the two fields.

2.1 Knowledge Management in SMEs

There are many different perspectives as how to define **knowledge management** (**KM**). One of the practical definitions is to see KM as a systematic way of creating, sharing and leveraging knowledge within and around organizations (Bounfour 2003). This definition illustrates the long-term orientation of KM. KM practices, such as knowledge creation, knowledge dissemination, knowledge storage and knowledge application are expected to support a continued development of an organization's knowledge that is up to date and relevant. KM is targeted at both large companies and SMEs. Hardly surprising, the actual implementation of KM shows differences between these categories of firms. A significant difference can be found in the management approach. The owners' or managing-directors' centrality often found in SMEs (Bridge and O'neill 2013) indicates that particularly these persons are responsible for the recognition of the benefits related to KM. Additionally, day-to-day operations require high attention, very often resulting in the situation that time to identify and recognize the benefit of KM as well as other managerial issues is missing (Hofer and Charan 1984). This often results in situations in which knowledge is being kept in the heads of the owner and some key employees rather than physically stored (Wong and Aspinwall 2004). On the other hand, there are some SME specific characteristics that indicate KM implementation in SMEs. For example, employees and owners are usually close, a fact that can facilitate the flow of knowledge (Desouza and Awazu 2006). Additionally, informal communication represents the main basis for knowledge transfer (Durst and Wilhelm 2012).

The empirical studies on KM practices in SMEs have indicated that they are less advanced when dealing with the topic. For example, SMEs are less likely to employ ICT systems that are specifically designed for KM, consequently, the likelihood of losing of knowledge is rather high (Nunes et al. 2006). The study by Beijerse (2000) showed that not a single SME had a knowledge management strategy in place. Furthermore, it appeared that the companies use a variety of instruments to evaluate, acquire, develop, and share knowledge. Yet, these tools are often not considered as instruments for KM. Desouza and Awazu (2006) found that SMEs have a tendency to put knowledge generated immediately into practice instead of storing it. Moreover, their study stressed that smaller firms make themselves less susceptible to knowledge loss if it does not reside in the brain of only one employee. Hutchinson and Quintas (2008) investigated knowledge practices in SMEs. They found that within SMEs certain processes and measures are available which indicate that they are doing KM, but it happens mostly in an informal matter. Among the few firms having established formal KM, the authors found that those interviewees themselves used the term knowledge management for their activities. Durst and Wilhelm (2012), who studied how a medium-sized enterprise copes with the danger of knowledge attrition due to personnel turnover or long-term absence, showed the influence of a precarious financial situation on activities related to knowledge management and succession planning. Even though the

individuals concerned are aware of needs for improvement, their actual scope of action is centered on the execution of current orders.

2.2 Risk Management

Risk management basically consists of four steps, which are:

1) identification of risks;
2) quantification and thus evaluation of risks;
3) management and control of risks; and
4) continued reporting on the development of risks (see Vaughan and Vaughan 2001).

Over the years the requirements for risk management approaches have increased significantly and calls for broader and more integrative approaches have been made (Kallenberg 2009). Already in 1996, Smallman proposed a holistic risk management that is characterized by three main aspects: 1) A continuous monitoring of all sources of risk; 2) a combination of qualitative and quantitative techniques on risk assessment and risk monitoring; and 3) organizational learning where one learns from past errors and disasters and where a culture allowing for a positive approach to dealing with mistakes and does not punish employees for mistakes is established in the company.

The significance of risk management approaches is also stressed in quality standards such as ISO-9000, ISO-12207/ISO-15504, Capability Maturity Model (CMM) and Capability Maturity Model Integration (CMMI). Table 1 highlights risk management activities that are covered by different standards.

The new ISO 9001:2015 also underlines the relevance of incorporating approaches to knowledge and risk management in a firm's quality management system in order to master current and future business challenges. The importance of knowledge management is highlighted in a new clause #7.1.5, which stresses that firms should identify, manage and make available all knowledge that is necessary to ensure process results that are in line with quality and conformity requirements (ISO 9001 REVISION 2015).

As regards risk management, the ISO 9001:2015 revision requests firms to establish an end-to-end process for risk management and once it is installed, to execute the process consistently, carefully and widely (ISO 9001:2015: Update Series 2015).

2.3 Knowledge Risk Management

Consequently, the knowledge risk management as discussed and highlighted in this chapter is not only timely, but already goes one step further.

Table 1 An overview of risk management processes

Activities	Process			
	ISO-9000-3	ISO-12207/ISO-15504	CMM	CMMI
Risk management planning	Plan the development of the project	Definition of risk management scope	*Not mentioned*	Determine the origins and categories of risks, set parameters and establish a strategy
Risk identification	Identify risks	Identify risks	Identify risks	Identify risks
Risk analysis	Analyze potential problems	Analyze and prioritize risks	Project risk analysis by prioritizing the risks according to their impact	Prioritize, estimate and classify risks; evaluate and rank each risk
Plan risk responses	Set contingency plans	Setting the strategy for risk management	Definition of contingency plans for identified risks that cannot be deleted	Develop plans to reduce risks
Risk monitoring	Check the implementation of the procedures of the project development plan	Define metrics for risks; implement risk management strategy; evaluate the results of the risk management strategy; take corrective action	*Not mentioned*	Implement plans to reduce risks
Risk control	Monitoring; implementation of the project	*Not mentioned*	*Not mentioned*	*Not mentioned*
Risk communication	Implicit communication	Implicit communication	Implicit communication	Implicit communication

Source: De Gusmão and De Moura (2004), translated by the authors

Even though companies should focus on all risk types (i.e. financial and non-financial risks) and their management, it seems that firms still prefer to focus on financial risks, and thus quantitative approaches, because of greater experience. Additionally, risk management should look into the impact of risks on one another (Kallenberg 2009). As regards SMEs, having a proper risk management at hand is argued to be one way of helping them to better cope with their resource constraints (Smit and Watkins 2012) and the issues of survivability and growth (Islam et al. 2008).

The current debate around the issue of knowledge conveys the impression that knowledge is mainly associated with something of value, i.e. an asset or a skill. Apart from a few exceptions, potentially negative aspects seem to be

underestimated (e.g. knowledge as a liability). Consequently, knowledge risk management (KRM) is in its infancy (Massingham 2010). In order to address this situation, Massingham proposed a conceptual KRM model that calculates a risk score and a knowledge score. The addition of the latter is considered as a way of gaining deeper insights into the real nature of organizational risk.

Besides this promising move forward, one can determine that our discussion on knowledge is rather unbalanced. Yet companies that fail to properly identify, evaluate, manage and control their critical knowledge to secure its value-creation potential undergo significant risks, for example it could lead to a loss of expertise. Therefore, the need to carefully manage the downside risks of knowledge is high too. Owners and managing-directors of SMEs cannot afford to neglect knowledge risks even though they might be more familiar with financial capital and the risks related to this asset category (Brunold and Durst 2012). Taking into consideration the significance of knowledge to SMEs and their sustained development, an integration of a risk management approach in knowledge management activities should be strived for, with particularly relevance for SMEs (Durst 2012).

Possible areas of knowledge risks are outlined in the following.

Knowledge Loss

Knowledge loss can be the result of personnel turnover, e.g. a company loses a key organization member (i.e. those ones who are experienced and tenured). Facing such a situation can put the company in a very vulnerable position. This applies to SMEs in particular and in the worst case puts their survival at risk (Durst and Wilhelm 2011).

In the context of turnover, especially the tacit knowledge is at risk if there are no measures implemented that are intended to retain critical knowledge (Durst and Wilhelm 2012). Knowledge loss can also occur as a result of the dissolution of well-established teams. Additionally, the outsourcing of business functions can increase the danger of knowledge loss, as it may result in the company losing its capability to run those business functions itself. The outcome of this knowledge loss may cause a loss of competitiveness and ultimately the collapse of the company (Brito et al. 2012).

A system crash and the theft of data are further examples that can lead to a loss of documented (explicit) knowledge.

Against this backdrop, knowledge loss can be defined as "the decreased capacity for effective action or decision making in a specific organizational context" (Delong 2004, p. 21).

Knowledge Leakage

Knowledge leakage may be considered a sub-form of knowledge loss and can be defined as "the extent to which the focal firm's private knowledge is intentionally appropriated by or unintentionally transferred to partners" (Jiang et al. 2013, p. 984). This definition clarifies that knowledge leakage is mainly the outcome of knowledge sharing. Knowledge leakage can present itself in two different manners: (1) knowledge and capability shortage; and (2) knowledge exposure (Durst and Ferenhof 2014). The former is primarily associated with turnover. Whereas the

latter normally occurs when firms enter into collaborative agreements (e.g. strategic alliances), contract consultants, or outsource some of their business functions. The risk thereby is that the other party acquires and uses the shared knowledge and then turn into being a competitor.

At this point it is worth highlighting that the difference between knowledge leakage (in the form of knowledge exposure) and knowledge loss is in the qualities of the risk. In the case of knowledge leakage, the risk is that an individual not only moves to another organization but also uses the critical knowledge of the previous company in the new one; making this form of knowledge leakage more harmful to the business.

Knowledge Waste

Knowledge waste can be understood as not using existing knowledge or not supporting the use of the full knowledge capacity. It is defined as any failure in the process of knowledge conversion, better known as the spiral of knowledge creation as proposed by Nonaka and Takeuchi (1997). Thereby knowledge waste can take different forms, which are reinvention, lack of system discipline, underutilized people, scatter, hand-off, wishful thinking (Ferenhof 2011).

Transferred to the SME context, one may think of the following example. A company has existed for some years, i.e. it has a past, and many decisions were already being taken. Without discipline the firm may waste explicit knowledge generated over the years, which could be a consequence of missing procedures to document and keep track of knowledge. This situation can also increase the danger of reinvention. Things that were already done right in the past cannot easily be replicated without being documented, specifically the more complex a project was. Additionally, the managing director or other staff could take decisions based on their gut feeling (i.e. knowledge waste through wishful thinking). This waste of knowledge can be reduced with a systematic proceeding to knowledge capture and storage the organization members should turn to before taking decisions.

3 Framework for Knowledge Risk Management in SMEs

Bringing together the discussion above, Fig. 1 displays a framework which outlines the fundamental elements of knowledge risk management in SMEs. The framework highlights the process that seeks to mitigate knowledge risks. The left section of Fig. 1 depicts possible areas of knowledge risks (i.e., knowledge loss, leakage and waste) and the knowledge risk management process which is composed of four activities: 1) risk identification, which is designed to continuously detect the risks the SME in question is exposed to, e.g. risk of losing human capital and relational capital due to ownership and/or management succession or risk of unintentionally losing knowledge through conversations with suppliers; 2) qualitative and quantitative analysis, the risks identified in step 1 are analyzed according to their risk level (i.e. probability of occurrence). Given the nature of knowledge, managing-directors

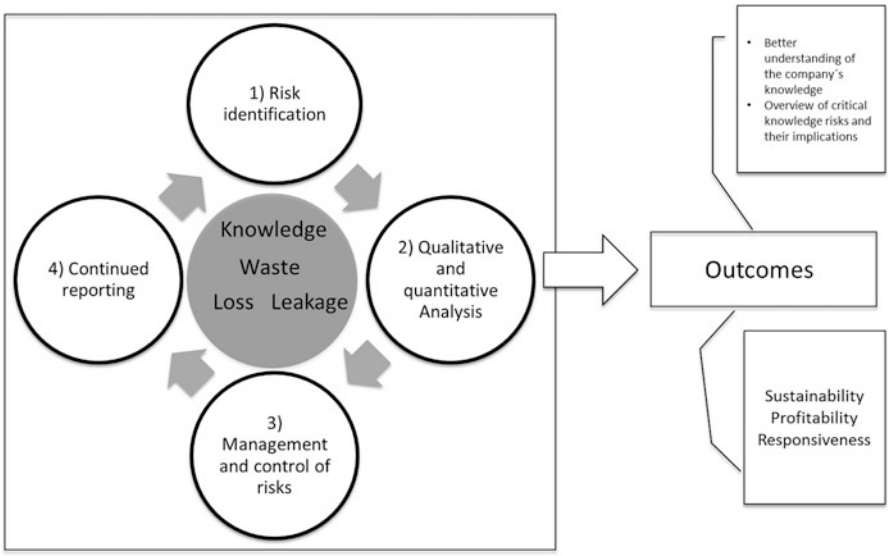

Fig. 1 Framework for knowledge risk management in SMEs

of SMEs have to be prepared to include measures that are based on a non-monetary denominator as well; 3) management and control of present and future risks, this sub-process deals with the development and implementation of actions to deal with the critical knowledge risk. This means that these activities should contribute to a reduction of risk probability. Additionally, this process guarantees that all activities are being executed properly; 4) continued risk reporting, this process reports the risks identified, the measures taken and the outcomes achieved, thus it keeps the SME informed about its knowledge risk management activities. Taking into consideration time constraints as well as the intention to produce reports that are actually read and used, the reports should be short and straightforward, i.e. a maximum of two pages. The connection of the different sub-processes are underlined by the arrows, the latter also stand for the requirement of having a long-term and systematic approach to knowledge risk management to make sure that the SMEs survive in the long-run.

The right section of Fig. 1 shows the outcomes of these knowledge risk management activities. It underlines that a proper approach does not only contribute to the SME's competitiveness, profitability and responsiveness, but also to a better understanding of the firm's knowledge base as well as current and future knowledge risks and their implications on the company's well-being.

The framework may assist SMEs to be more resilient and better prepared for the challenges that present themselves in turbulent times. Once the SMEs have a better understanding of the areas of knowledge loss, knowledge leakages and knowledge waste, they also have improved insights into what is critical to the company from a knowledge-based perspective. The SMEs will understand the possible impacts of

those risks on the company and its operations and thus are in a better position to develop and execute actions to deal with them. During turbulence the length of time that a company takes to react is considered key, to both SME success and survival (Silverblatt and Korgaonkar 1987). Consequently, knowledge risk management process can contribute to a faster response time.

Knowledge Risk Management in SMEs: A Practical Illustration

To give a concrete example of how knowledge risk management could take place in practice, in the following a practical illustration is presented, taking the case of a small consulting company.

Step 1: Risk Identification

In order to identify possible risks, SMEs could take advantage of tools/techniques that are recommended in the guide to the Project Management Body of Knowledge (PMBOK). The guide presents a set of standard terminology and guidelines for project management.

The SME could use brainstorming or conduct interviews with different stakeholders or experts in order to identify possible risks. Diagram techniques are another instrument that can assist this step. Process or system flowcharts, for example, can help to visualize the number of elements of a process that are interrelated. They also provide insights into the mechanism of any causality.

In the given example three risks are specified. Each is assigned to an identification number (for the matter of codification) and provides some short information about its nature (i.e. area of knowledge risk and assessment (positive or negative)).

a) Excessive turnover of consultants (negative) [Knowledge loss]
   SMEs that are characterized by high personnel turnover are not only required to train the new consultants in internal procedures and processes but also the external processes (e.g. the company's way of doing its business) over and over again. In addition, the knowledge gained (e.g. from clients) is lost if no knowledge retention measures are implemented. Furthermore, the relational capital between the clients and the company will suffer from such a situation. As most SMEs are short of resources (human and financial) such a situation will cause serious harm. In fact, the time and cost needed to train a consultant to be ready for work can be a determining factor for the competitiveness of the firm.
b) Knowledge reuse (from knowledge database) (positive) [Knowledge waste]
   Knowledge reuse is the process of accessing and retrieving explicit knowledge that is captured in the company's knowledge database. This database should, for example, record lessons learned from earlier projects and provide information about best practice. This knowledge is ideally captured timely and reused when the consultants need that knowledge. Having involved such a quick and continued system gives certain benefits. For example, the company earns the trust of the clients because the latter recognize that the consulting company knows its business, which enables it to solve certain projects and tasks better and faster.
c) Decision taking through wishful thinking (negative) [Knowledge waste]

Instead of taking decisions under the inclusion of historical information (e.g. from the knowledge database, reports, surveys, news and other analyses), the decision makers allow their decisions to be influenced by personal wishes/motives. This situation is often found in SMEs because private and business objectives overlap. If these decisions turn out to be wrong the consequences can be very painful for the SME.

Step 2: Risk Analysis

For the risk analysis PMBOK (2013) recommends different tools and techniques as well, such as Risk Impact and Probability Assessment; Risk Data Quality Assessment; or Probability and Impact Matrix, which is based on a combination of tools.

Risk Impact and Probability Assessment: This technique investigates the probability of occurrence of every specific risk and the potential effect (impact) of the risks on the company. It include positive aspects (opportunities) and negative ones (threats). The probability and the impact can be assessed in meetings or through interviews with participants that are familiar with the issue in question.

Risk Data Quality Assessment: "... is a technique to evaluate the degree to which the data about risks is useful for risk management. It involves examining the degree to which the risk is understood and the accuracy, quality, reliability, and integrity of the data about the risk" (PMBOK 2013, p. 331).

Probability and Impact Matrix are produced based on the data from interviews or other techniques (conducted in step 1). The number of risks can be prioritized for quantitative and qualitative analysis. Risk scores which support in guiding the risk responses are generated.

The following outlines a practical implementation of this technique.

First, the impacts as seen by the managing director will be determined (Table 2). Thereby, each firm will have to establish its own range of impacts, i.e. beginning from a range of three to five or even more, depending on the company's perceptions. In the present sample a range of three was chosen. Next, the objectives of impact have to be addressed as outlined in the table.

Table 2 Company impact view

		Impact		
		Low	Medium	High
Objective	Cost	Change in cost from 5 to 10 %	Change in cost from >10 to 20 %	Change in cost -> more than 20 %
	Time	Change in time less than 10 %	Change in time from >10 to 20 %	Change in time from 20 to 40 %
	Scope	Change in less important areas	Change in sensible areas	(Almost) complete change of scope
	Quality	Difference in less critical applications	Difference in critical applications	(Almost) total change of quality

Table 3 Probability view

Probability	Low	Moderate	High
Description	Probability of occurrence from 5 to 10 %	Probability of occurrence from >10 to 20 %	Probability of occurrence more than 20 %

Table 4 Probability versus impact matrix

		Impact		
		Low (1,0)	Moderate (3,0)	High (5,0)
Probability	High chance of occurrence (0,90)	0,90	2,70	4,50
	Medium chance of occurrence (0,70)	0,70	2,10	3,50
	Low chance of occurrence (0,20)	0,20	0,60	1,0
Classification		Acceptable	Alert	Critical

Once the impact reference table is produced, the probabilities of occurrence as expected by the managing director need to be specified (Table 3).

Once the probabilities are defined as well, the matrix can be produced. This happens by merging the information and defining a classification, as can be seen in Table 4.

Having produced the matrix, in a next step the risks that were identified in step 1 can be assigned to the probability and the impact related to them. In the present example three risks are placed. One is considered a positive risk (opportunity), 1.2, and two are assessed as negative risks (threats), 1.1 and 1.3. As can be seen in Table 5, the risks 1.1 and 1.2 are assessed as critical and 1.3 as acceptable and will be managed based on the company's priority.

Now it is time to make a quantitative analysis of the impact of the risks. The calculations were run on the basis of exemplary figures (Table 6).

Table 6 highlights the significance of each risk in monetary form. As many SMEs are short of financial resources, the information provided should give reason for taking action.

Step 3: Management and Control

This sub-process is dedicated to develop and implement risk response plans, to continuously monitor the risks, and to evaluate the effectiveness of the implemented measures. It also comprises the implementation of corrective actions in case the measures do not work as expected.

Table 5 Probability vs impact matrix with risk identified – qualitative analysis

		Impact		
		Low (1,0)	Moderate (3,0)	High (5,0)
Probability::	High chance of occurrence (0,90)			1.3 (-)
	Medium chance of occurrence (0,70)		1.2 (+)	1.1 (-)
	Low chance of occurrence (0,20)			

Classification:	Acceptable	Alert	Critical

Table 6 Quantitative analysis of risks

1.1 Excessive turnover of consultants	
Change in time:	15 days
Change in cost:	$ 18,010.00
Tasks concerned:	Recruitment, selection and training
Probability of occurrence:	20.00 %
Expected monetary value:	$ 3602.00
1.2 Knowledge reuse (from knowledge database)	
Change in time:	None
Change in cost:	−$ 1500.00
Tasks concerned:	Time to develop, test and implement
Probability of occurrence:	70.00 %
Expected monetary value:	−$ 1050.00
1.3 Decision taking based on wishful thinking	
Change in time:	3 days
Change in cost:	$ 8400.00
Tasks concerned:	Re-plan using historical data
Probability of occurrence:	20.00 %
Expected monetary value:	$ 1680.00

PMBOK (2013) recommends different instrument to meet this sub-process. For example, risk reassessment (which frequently results in the identification of new risks), is about the reassessment of current risks and the closing of risks that are no longer relevant; risk audits, which examine and document the effectiveness of the risk responses as well as the effectiveness of the risk management process; and meetings. The idea behind the latter is that risk management becomes a fixed component of the firm's periodic meetings.

Step 4: Continued Reporting

This step highlights the importance of having continued reports about the status quo of risk management in the company. Periodical meetings should take place in which

the main actors of the SMEs discuss the status quo. The reports should address the number of risks, their significance and the measures taken to address them. The reports should also provide a comparison between target and actual conditions. The reports need to have a dynamic character and should reflect any new risks as well as new objectives of the company.

Finally, this step should provide insights into any potential for improvement of the overall risk management process.

4 Conclusion and Management Implications

The aim of this chapter was to introduce to knowledge risk management and its contribution to address the challenges of turbulent times. As resource knowledge is even more critical in turbulent times, SMEs have to be assured that they can take advantage of relevant and up to date knowledge. Thus the management of knowledge is fundamental. However, it is important not to limit the perception of knowledge to something positive, something of value, but to also take into consideration situations in which knowledge can be at risk. Knowledge risk management can support SMEs in addressing this and thereby providing an improved and holistic understanding of knowledge. As shown in this chapter, knowledge risk management consists of four sub-processes (risk identification, qualitative and quantitative analysis, management and control, and continued reporting). These processes aim at coping with current and future knowledge risks therefore bringing SMEs in a better position regarding any business challenges ahead. Installing a proper knowledge risk management contributes to different aspects. It helps SMEs in better understanding their knowledge and more relevantly, the impact of different types of knowledge on business operations. Based on that SMEs can better manage their critical knowledge, for example they can introduce measures to retain and protect this knowledge in a timely manner. This in turn can positively contribute to SME competitiveness and thus survival. To make sure that SMEs keep their flexibility and do not unnecessarily tie up scarce resources, any efforts towards knowledge risk management should be implemented in existing risk management approaches or other systems.

Based on the discussion presented above the authors have developed a checklist that may support SMEs in their efforts regarding knowledge risk management. More precisely the purpose of the checklist is to provide a set of guidelines for knowledge risk management in SMEs.

1) Our company is aware of the two different natures of knowledge; i.e. being something positive and negative.
2) Our company has implemented a risk management approach.
3) This risk management approach does also consider risks related to knowledge.
4) Our company has defined critical knowledge for itself.

5) Based on that our company identifies critical knowledge risks thereby taking a long-term perspective.
6) Depending on the type of critical knowledge (explicit or tacit knowledge) the company introduces different measures to cope with these risks.
7) Our company continuously monitors the outcomes of the measures introduced and takes countermeasures in the case the measures do not perform as expected; i.e. do not meet the objectives set (e.g. reducing the danger of business disruptions due to turnover).
8) The company reports the critical knowledge risks, their management and development of time and thereby learns to better cope with a multitude of different kinds of risks.
9) The knowledge risk management process in laid down in the company's day-to-day business operations.

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Knowledge Management Tools for SMES

Klaus North and Renia Babakhanlou

Abstract This chapter presents selected Knowledge Management (KM) toolkits and individual tools that have been developed to provide structured ways of acquiring, creating, sharing, using and protecting knowledge resources. Endowed with scarce resources small and medium sized enterprises (SMEs) have to manage tacit and explicit knowledge efficiently to survive and grow in a rapidly changing business environment. Managing knowledge is a prerequisite to developing dynamic capabilities. While it is widely accepted that knowledge is a key factor for success, companies need tools and routines to manage their knowledge assets adequately in practice. The 12-Point-Programme at the end of the chapter provides guidance on how to develop KM practices for enhancing competitiveness in turbulent situations.

1 Managing Knowledge to Create Dynamic Capabilities

Knowledge is a key resource for SMEs to survive, grow and remain competitive in turbulent times. Creating, sharing, using and protecting knowledge efficiently allows for the research of new market opportunities, the increase in productivity and helps develop competitive advantage, which consequently leverages business success (Mathew 2008, p. 29–30; North and Gueldenberg 2011).

Knowledge management (KM) enables individuals, teams and entire organisations as well as networks, regions and nations to collectively and systematically create, share and apply knowledge to achieve their strategic and operational objectives. Knowledge management contributes to increasing the efficiency and effectiveness of operations on the one hand and to change the quality of competition (innovation) on the other by developing a learning organisation (North and Kumta 2014).

Managing knowledge is closely linked to developing dynamic capabilities (see Chap. 2). Pavlou and El Sawy (2011) argue that dynamic capabilities are based on a

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sensing, learning, integration and coordination capability. In the following we will explore how these capabilities are related to knowledge management and what are the specific challenges for SMEs.

Sensing capability: Continuously gather information on the business environment, market and technology trends and customer needs, interpret this information with the available knowledge, and draw conclusions. As in SMEs this "sensing" is mainly done by the owner/manager, the challenge here is to communicate internally what is changing and create a shared understanding of what this means for the firm.

Learning capability: In turbulent environments new business opportunities and threats to existing business arise, which require new knowledge and skills to offer new or revised products, services or change business models. The challenge here is to integrate learning into daily operations and business development (see chapter "Learning to Grow: A Methodology to Sustain Growth Capabilities of SMES").

Integration capability: Integration focuses on building an overall sense-making and understanding through the organization. Shared tacit knowledge is at the core of an integration capability. New or changed ways of doing business require the ability to combine individual knowledge into new operational processes of a team or a unit. The challenge here is enabling everybody to quickly assume his or her new role in the "game".

Coordination capability: Coordination focuses on orchestrating individual tasks and activities. This includes maintaining the acceptance of change, establishing monitoring systems and assuring the availability of financial and human resources. For SMEs the challenge lies in empowering employees who need to develop the knowledge and competences to decide, monitor and act in an entrepreneurial spirit while owners/managers need to learn how to delegate.

To meet these challenges SMEs have developed KM practices often without calling them "knowledge management". Based on a literature review on KM in SMEs Durst and Edvardsson (2012) state that most SMEs have no explicit policy targeted at strategic KM and tend to treat KM on an operational level – at the level of systems and instruments (see also Handzic 2006). SMEs also tend to place more emphasis on management of tacit knowledge than larger firms. Durst and Edvardsson (2012) also argue that most SMEs adopt short-term unstructured ways towards organizational learning and managers in smaller firms tend to prevent the outflow of knowledge from the company, thereby blocking knowledge sharing. Research by Hutchinson and Quintas (2008) revealed that small firms do indeed manage knowledge informally as part of their normal activities, without the use of the terminology and concepts of KM. However, contrary to expectations, on occasion some also engage in formal KM (see also De Souza and Awazu 2006).

Bearing this in mind, the question arises of how to develop efficient practices to manage knowledge resources in SMEs. Geisler and Wickramasighe (2009) state that knowledge is related to employees, their skills, expertise, competencies, ideas, commitment, and motivation. In order to intelligently capture that knowledge and to deliver it to the right people at the right time, there exists a wide range of practices which are increasingly codified as tools, methods and strategies for organizations (Mathew 2008, p. 31–32 and Young 2010, p. 1–2). Based on Ruggles

(1997), a KM tool can be described as a device to generate, codify and transfer knowledge within and across organizations. The application of KM tools allocates resources efficiently and facilitates the accomplishment of KM tasks (cf. Mårtensson 2000).

Instead of "tool" the term "KM instruments (KMI)" is also used. "A KMI is: (1) a collection of organizational, human resources and ICT measures that are aligned; (2) clearly defined; (3) can be deployed purposefully in an intervention into an organizational knowledge base in order to achieve knowledge-related goals; (4) target contextualized information as an object of intervention; and, (5) are not dependent on any particular knowledge domain" (Maier et al. 2009, p. 2). In their classification of knowledge management methods and techniques Wiig et al. (1997) refer to a method "as a well defined set of procedures that can be applied by its user without much additional support", which makes sense in particular for SMEs that require practical instruments.

The use of KM tools will be only effective if the culture of the SMEs promotes knowledge sharing and collaboration (Servin 2005). In an empirical study covering 26 SMEs in the U.K. Wong and Aspinwall (2005) investigated critical success factors for KM adoption in SMEs: the top three factors according to the SMEs were "senior management support and leadership", "a knowledge-friendly culture" and "a clear strategy for managing knowledge".

2 Selected Knowledge Management Tools

Different organizations and consulting firms have developed Knowledge Management (KM) toolkits which provide a collection of methods and techniques in order to support structuring, representation, visualization of knowledge as well as to facilitate interaction between people for capturing tacit and explicit knowledge. Additionally, these tools enable communication between participants within and outside the company (Grau 2004, p. 3–5). In order to assure a successful implementation of a KM toolkit, the firm has to make sure to choose the right tool for the selected KM process (identifying, creating, storing, sharing and applying knowledge). Hence, it might be useful to get a clear idea about that company's goals, the most efficient strategy to reach these goals, the knowledge that is needed (tacit or explicit) and the requirements for linking the knowledge to the business process.

Online Resources to Learn About Knowledge Management Tools and Practices for SMEs
Videos on KM tools

In the project "Dynamic SME" six videos (each available in English, Spanish and Portuguese) have been produced by a team from Wiesbaden

(continued)

Business School, Universidad Nacional de Rosario, UFSC Florianopolis at the Distance Learning Lab (LED) of Universidade Federal de Santa Catarina (UFCS). In a dialogue of the entrepreneur "Victor" with his fellow SME manager Paula Dinamica each KM tool or practice is discussed.

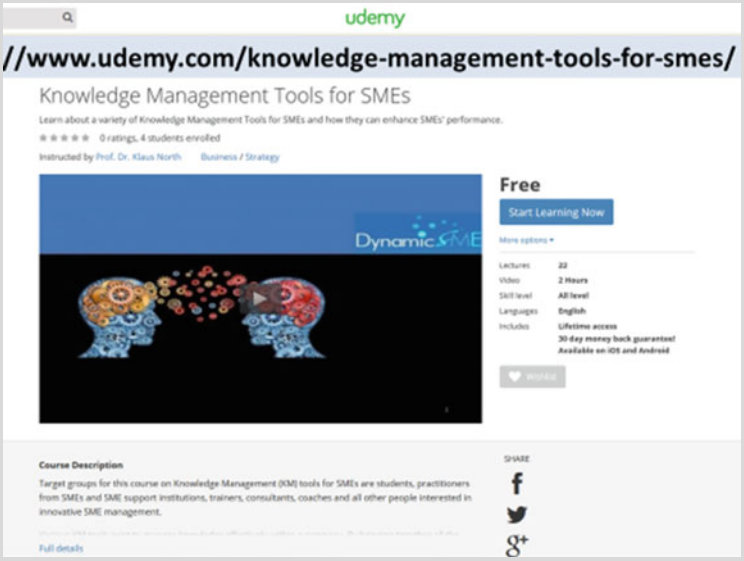
The videos are published by the **YouTube Channel "Dynamic SME"** https://www.youtube.com/channel/UCiBV_MUbzW1zDNdqBFlXbUQ

And cover the following topics:

Business Intelligence, Internal Communication, Competence Matrix, Lessons Learned (After Action Review), Knowledge Market and Idea Competition.

MOOC on KM tools

Based on the videos and additional material a massive open online course (MOOC) has been produced and is available on the platform "udemy".



As a result of an extensive literature and internet research, Babakhanlou and North (2016) have been able to identify 16 KM toolkits in English, Spanish, Portuguese and German languages. Each toolkit differs from the other by the number and type of tools it contains, the target group and the focus in the KM cycle. Also, each toolkit provides a different description method of the tools. Some toolkits give only a short explanation, while others supplement it with illustrations and examples. In Annex I of this chapter a list of those toolkits is provided, which

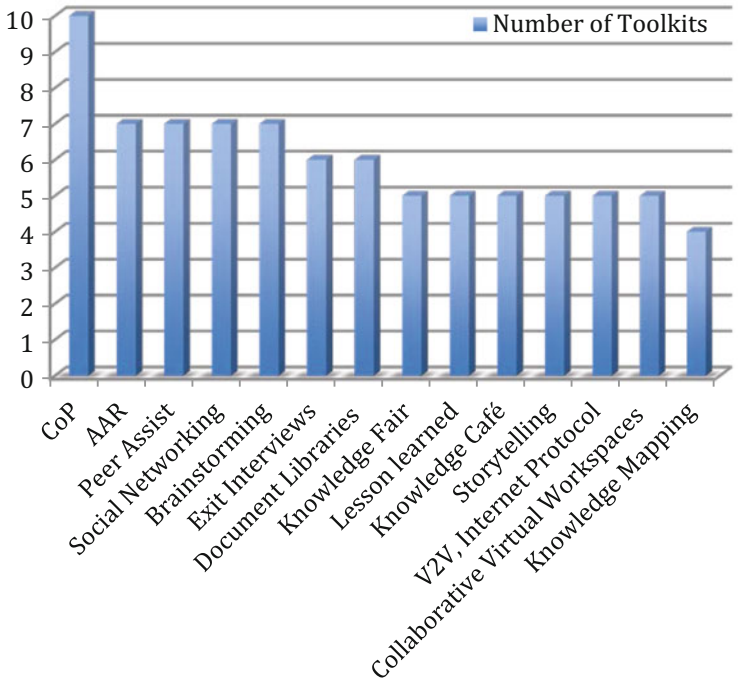


Fig. 1 Coverage of KM tools in the analysed toolkits. Source: Self-developed chart based on the investigation

are of particular relevance for SMEs. While some toolkits cover a wider range of business issues *the KM toolkit of the Asian Productivity Organization (APO)* compiled by (Young 2010) focuses specifically on the knowledge management cycle of SMEs (see also Tiwana 2000). In addition, a KM casebook and a web-forum are provided.

Analysing how often a specific tool is covered by the toolkits can establish a "hit list" of KM tools. This; however, does not mean that in practice these are the most used tools. Figure 1 shows the most frequently suggested tools and techniques.

10 out of 16 toolkits suggest **Communities of Practice.** Groups of employees meet and interact regularly to share their knowledge about a common desire or concern (see Wenger et al. 2002). For SMEs this tool is very effective because it allows the knowledge flow across teams and units at a low investment costs (Young 2010, p. 35–38). However, depending on the size of the firm, SMEs might have difficulties to staff several communities. SMEs would benefit rather from extending their communities to clients and suppliers, for example by creating joint working groups or holding periodical client forums or supplier days.

An **After Action Review (AAR) or "Lessons Learned" exercise,** each suggested by seven toolkits, is a simple process used by a team to capture the

experiences and lessons learned from past successes and failures, with the goal of improving future performance. It is an opportunity for a team to reflect on a project, activity, event or task so that they can do better the next time. It can also be employed in the course of a project to learn while doing. AARs should be carried out with an open spirit and no intention to place blame. AARs are of particular value in a fast changing business environment to review which changes (for example in sales processes) are needed for adaption to new competitive challenges.

Peer Assist is a tool similar to AAR, but differing from it in that the learning and knowledge sharing take place "upfront" before beginning a project. The project team has the opportunity to get assistance from a peer and gain information and knowledge before making a decision. This activity is beneficial for both the team and the peer while also being part of their objectives to successfully carry out a project and simultaneously share knowledge and experiences. The advantage of this tool is that by talking to qualified peers, the project team avoids the same mistakes and thus, saves money and time. Moreover, it improves open communication of the participants (Ramalingam 2006, p. 60–61).

A useful tool is **Exit Interviews** often combined with **a debriefing or hand-over session**. When employees leave an organization, an interview is conducted to know the reasons for their leaving, what they liked or disliked about the organization and their personal suggestions about improvements. Also relevant experiences, contacts and information are documented to ease the integration of a successor. This tool is especially useful for SMEs, rarely implementing a structured procedure of handing over tasks. The organization can use this information for improvements, reduction of turnover and avoidance of making the same mistakes with the new employees. Exit interviews are conducted quickly and at low cost.

Document libraries and managing information in a consistent manner are a challenge for most SMEs. There are a number of approaches and tools for storing, retrieving and organizing the workflow of documents. The use of file servers, document management systems, interaction with clients and suppliers via internet based solutions are only some aspects of data and information management. A good document management system should offer resources that allow employees to communicate and send documents using the same platform without having to resort to other systems for it.

A **knowledge fair or market** (North and Kumta 2014) relates offers and demands of information and knowledge and enables contacts and transfer between buyers and sellers. Knowledge markets operate over the internet or an intranet or on a physical knowledge marketplace (buyers and sellers are in a room). A knowledge market can be organised within units, across units and also open up a firm to the outside (e.g. knowledge market with customers or suppliers). It provides a different way of experience exchange than the traditional slide presentation and discussions. The knowledge market helps resolve problems using the "wisdom of the crowd" and good practices are made public. Colleagues find that they are working on similar problems and have similar interests. A knowledge market can be a start of a community or serve as a forum for experience exchange-groups. Market participants also learn to present their knowledge and ask precisely.

A **Knowledge Café** derived from the original format of a "world café" is a means of bringing a group of people together to have an open, creative conversation on a topic of mutual interest to bring to the surface their collective knowledge, to share ideas and insights and to gain a deeper understanding of the subject and the issues involved. A knowledge café, for example with people from different units of an SME or with customers, might deal with future customer needs or new product and service ideas. The value of the café is in the conversation itself and the learning that each individual takes away. In some circumstances though it makes sense to capture things from the café depending on its purpose and there are ways of doing this that interfere minimally with the dynamics of the conversation. A good idea is to have a paper table cloth and tables on which participants can write, draw, create mind maps and then compile solutions. For more information refer to: http://www.gurteen.com/gurteen/gurteen.nsf/id/run-kcafe

Storytelling is a powerful way to share and transfer knowledge, especially experiential and tacit knowledge (Brown et al. 2005). The act of telling a story is a deceptively simple and familiar process, a way to evoke powerful emotions and insights. In organisational settings stories aid reflection, build communities, transfer practical learning or capitalise on experiences. Storytelling transfers the tacit part of knowledge because it conveys much richer contexts through stories than other means of KM, storytelling by a vastly-experienced person in any field has the power to transfer his or her experiential knowledge. A story, for example, of how an SME overcame the last crisis can convey confidence and a tacit understanding how to tackle the next crisis.

A further interesting aspect is that KM toolkits adapt to the technological changes and offer tools, such as social networking, video conferences and internet protocols. Hence companies increasingly adopting an "enterprise 2.0" approach to leverage the advantages of communicating, capturing and sharing information and knowledge with other employees, suppliers and customers. Classical KM Tools such as brainstorming and knowledge mapping are also part of most toolkits.

In addition to the tools covered frequently by the toolkits, there are at least three further tools which have proven to be very effective in SMEs, yet only covered in a few toolkits.

The **skill or competence matrix** is a widely proven and suitable method for structuring, evaluating and visualising the distribution of skills or competences in a unit or a firm (North and Kumta 2014) and is easy to apply to SMEs. The matrix shows where skills/competences are lacking or are unevenly distributed and thus helps in assessing training needs. Based on the recruitment matrix of new staff (in which is asked what competences and skills we need) succession planning is supported. Also, in times of rapidly changing business environments a wider skill/competence distribution (multiskilling) increases the flexibility of the organisation (Fig. 2).

Ensuring competitiveness in turbulent times requires continuously looking for improved or new products, processes and services. This task should not be limited to the owner, who should rather actively seek ideas from all sources of ideas. An **idea competition** is a well-focused way to access innovative ideas and solutions

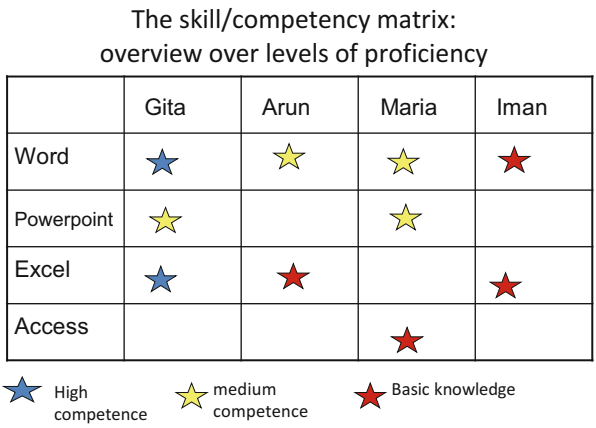


Fig. 2 Example of a skill matrix

from employees, users and potential clients. Contrary to traditional suggestion schemes the quality of ideas increases exponentially when participants are given a clear and focused challenge question. Idea competitions build on the nature of competition as a means to encourage participation in an open innovation process, to inspire their creativity, and to increase the quality and focus of submissions. When the contest ends, submissions are evaluated by an expert panel. Those whose submissions score highest usually receive a bonus or an award.

Many firms experienced that tapping ideas from "the crowd" of users or other people outside the organisation has a huge value creation potential. Idea competitions create a spirit of interaction and challenge current practices and wisdom (for more information see: http://www.dynamic-sme.org/es1/sites/default/files/Idea%20Competition.pdf).

To ensure quick responsiveness to external threats and opportunities, SME owners/managers have to ensure that everybody (or at least the key employees) understands the "game" and knows what customers expect what are own strengths and what competitors do better. A **Strategic Knowledge Analysis** is a simple approach to define knowledge and competence needs for the future and develops answers to the questions below. A workshop with employees across hierarchies and departments helps to unify perceptions and create a joint vision where the organisation stands and needs to go.

1. Which capabilities/competences do our **customers** expect in the next 3 years?
   (a) What should we do to develop these capabilities?
2. What are we doing better than our competitors?
   (b) How can we fortify these strengths?
3. What are our competitors doing better than us?
   (c) What can we learn?

3 Conclusions and Management Implications: A 12-Point Programme

The above explained KM tools serve a purpose: to enhance knowledge flows within and between the business's boundaries, learning and targeted competence development of SMEs for sustained competitiveness in an ever quicker changing business environment. Therefore, KM tools are part of the practices to be developed in a firm. As a results of a pilot project with 13 SMEs in Germany (www.ihk-lahndill.de/share/wissen/index.htm or Spanish version: http://north-online.de/es/projects/index.htm) a *12-point programme was formulated of how to implement knowledge management practices over time*. Under a mid-term perspective firms should complete all twelve points one by one. The *12-point programme* can be used also as a checklist to examine the current status of knowledge management of your company.

1. **Sensitise** your employees for knowledge management and carry out a problem analysis: where are we falling short of knowledge? Where could we avoid errors through a better flow of knowledge? How could we improve our innovation performance?
2. Derive **knowledge strategies** from the organisational strategy. Which competences do you want to develop in the coming years?
3. Create **enabling conditions** that encourage creation and exchange of knowledge, e.g. through incentive systems, knowledge criteria in employee appraisals or employee agreements on teamwork
4. Make arrangements for **knowledge flows and learning from external sources**, i.e. from customers, suppliers, competitors, universities, research centres or other external experts. This can also be done by creating technology teams and customer forums. Cooperate with other companies.
5. Pay attention to targeted **competence development** of your employees. For instance, create a competence profile and control the results of development measures.
6. Enable **knowledge transfer across employee generations** so that the company does not lose any valuable know-how. This is possible through godparent model following the motto "*employees train employees*" or checklist for orientation of the successors.
7. Encourage **creativity and innovation** of your employees by introducing non-bureaucratic employee suggestion schemes, idea competitions, making small improvements immediately beforehand or initiating competitions of ideas for new products.
8. Support the **learning process within and across projects** by after action reviews, debriefing (neutral persons document the project experiences of employees) and through project discussions and lessons-learnt databases.
9. Integrate knowledge management in your **business processes**. The key question here is: how can we make process knowledge transparent and accessible?

10. Create opportunities for **facilitating personal exchange of knowledge**. This can be done by regular meetings, departmental breakfast, info zones of knowledge markets.
11. Bring **structure to your documents**, databases and intranet. Create guidelines on documentation and define precisely which employee is responsible for which content. Give incentives to your employees for actually using the systems.
12. Provide for an **open and trustworthy atmosphere** of teamwork so that the employees are ready to share their knowledge with others.

Annex I: Selected Knowledge Management Toolkits

Toolkits	Target group	Number of tools	Web links
Toolkits in English			
APO Toolkit	SMEs	26	www.apo-tokyo.org/00e-books/IS-44_Practical-KM-Guide-for-SME-OwnerManager.htm
Knowledge Sharing Toolkit	All organizations	Over 30	http://www.kstoolkit.org
DBA Toolkit	Companies in design practices	7	http://www.usablebuildings.co.uk/Pages/Unprotected/SpreadingTheWord/SharingKnowledge.pdf
IDEA Tools and Techniques	Local governments	8	http://www.idea.gov.uk/idk/aio/8595069
ODI Toolkit	International agencies	30	http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/188.pdf
SDC Toolkit	SDC partner countries	23	http://www.sdc-learningandnetworking.ch/en/Home/SDC_KM_Tools
UN CPR	UNDP offices	15	http://www.undp.org.ye/reports/Knowledge%20Management%20Toolkit%20for%20the%20Crisis%20Prevention%20and%20Recovery%20Practice%20Area.pdf
Toolkits in Spanish and Portuguese			
Bain & Company—Ferramentas de Gestão	Enterprises	25	http://www.bain.com/offices/saopaulo/pt/Images/Management_tools_2009_POR.pdf
Guía Rápida y Herramienta de Apoyo (Santiago Rivero Rodrigo)	SMEs	60	Rodrigo S.A., *Guía Rápida y Herramienta de Apoyo para la Gestión del Conocimiento en las PYMES*, 2009, El Consejo

(continued)

Toolkits	Target group	Number of tools	Web links
			Económico y Social. Comunidad de Madrid, Madrid/Spain
Infomipyme	SMEs	8 Tools + Basic Business Tools	Infomipyme, (n.d.), *Caja de Herramientas,* http://www.infomipyme.com/Docs/GENERAL/Offline/GDE.htm
OIT Toolkit	Government, employers and workers	32	OIT, Organización Internacional del Trabajo, (2011), *Caja de herramientas para compartir conocimientos* http://www.ilo.org/public/spanish/support/lib/knowledgesharing/tools.htm

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Learning to Grow: A Methodology to Sustain Growth Capabilities of SMES

Klaus North, Manfred Bergstermann, and Thomas Hardwig

Abstract In this chapter you will get to know a successful methodology to foster growth of SMEs. The "*Learning to grow*" methodology draws on deliberate learning as a means of developing dynamic capabilities and applies project-based learning closely linked to business challenges. Based on a 3 year action research project with 124 SMEs in Germany, drivers and obstacles of growth have been identified and the methodology "Learning to grow" has been developed and successfully applied in further learning networks of SMEs in Germany, Spain, Argentina, Brazil and Peru. This methodology puts in to evidence the effectiveness of project based learning to sustain and develop growth capabilities of SMEs. Aligning the learning of teams with business challenges creates measurable short-/mid-term results as well as enhancing organizational capabilities to sustain growth. Chapter "How Brazilian Textile Enterprises Learn to Grow" reports results of the application of the methodology in Brazilian textile enterprises.

1 Introduction

To sustain growth in turbulent environments SMEs face major challenges due to their limited human, organizational and financial resources and capabilities. Owners/managers are overloaded by daily business, are pressed to delegate work and integrate new employees (Van Bruystegem et al. 2008). While striving to cope with current business, SMEs tend to lose grip on future development and thus deplete resources while growing in an often uncoordinated manner. On the other hand periods of growth can be quickly followed by periods of decline. Hence the need to adapt to turbulent environments (Detarsio et al. 2013, see also www.dynamic-sme.org)

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How to reconcile learning and growth (Macpherson and Holt 2007) in order to sustain competitive advantage (Barney 1991) of SMEs in turbulent environments is a vital yet widely unsolved question in theory and practice. Wiklund et al. (2009, p. 351) argue that "despite substantial increase in research volume, recent reviews of the literature on small firm growth suggest that little is still known about the phenomenon, and conceptual development has been limited." Macpherson and Holt's (2007) literature review on knowledge, learning and small firm growth also reveals deficits in research on the concrete mechanisms of learning and their relation to growth of SMEs.

To deepen our understanding of learning and growth of SMEs and subsequently develop and test learning formats to support growth of SMEs a 3 year action research project was carried out between 2009 and 2011 in three German regions (Baden–Württemberg, Sachsen and Berlin-Brandenburg) with 124 SMEs which had above average growth rates. Out of these, 26 SMEs were selected to develop the "*Learning to grow*" methodology (Hardwig et al. 2011). In the action research Wiesbaden Business School cooperated with "RKW" the German government supported consulting service for SMEs.

Following a review of our empirical results on learning and growth of SMEs the main focus of this paper is to present the "*Learning to grow*" methodology which draws on deliberate learning as a means of developing dynamic capabilities (Zollo and Winter 2002) and applies project-based learning (Scarbrough et al. 2004) closely linked to business challenges.

2 Obstacles and Drivers for Growth of Innovative SMES

2.1 Survey of Growing SMEs

To learn more about the obstacles and what drives company growth, above average growing and innovative SMEs were examined. In three German regions companies known to the RKW advisors were selected that had: (a) a growth rate above average of their sector and; b) a high innovation capacity as demonstrated by product and process innovations in the previous 3 years as well as maintained regular research and development activities. Two thirds of the selected firms realized a growth in sales of more than 10 % per annum in the years 2005–2007.

The 124 SMEs were surveyed (Bergstermann et al. 2009) using 2 h consultations with the owner or a top manager of the enterprise. A three-part instrument was used. It contained a standardized questionnaire about the barriers and drivers of growth, an interview about the current competitive situation and perspectives of company development, as well as a self-assessment of the management quality.

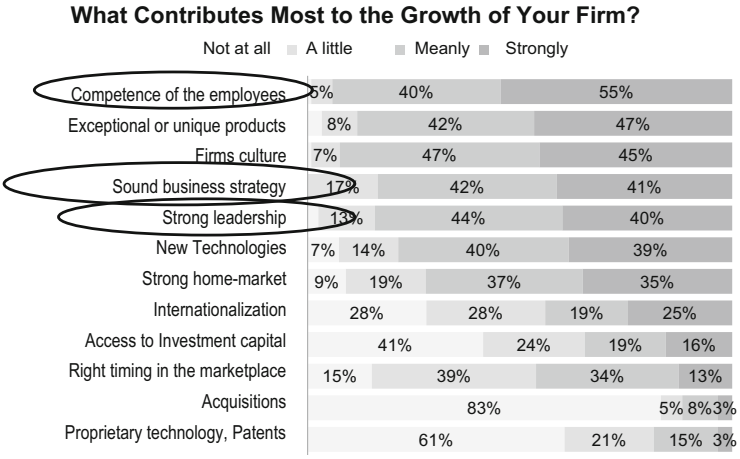

Fig. 1 Contributions to growth from the owner/manager's point of view (base: 124 SME owners/managers interviewed in 2008)

During the sifting of the empirical data it became evident that enterprises in growing markets achieve higher growth-rates than enterprises in stagnating or shrinking markets. 17 % of the surveyed SMEs were however able to achieve an increase in turnover of more than 20 % annually, although they acted in stagnating markets. This supports our assumption that unfavorable environmental conditions are less influential on the success of an enterprise than the quality of the management, which is consistent with Macpherson and Holt's (2007) literature review.

Managers/owners of the surveyed companies were further asked to give explanations for several factors contributing to growth as well as gauge their relative importance. The three factors "competence of the employees", "sound business strategy" and a "strong leadership" marked in Fig. 1 were not only relevant in the subjective assessment of the company decision-makers, but also had a statistically high impact on the strength of an enterprise's growth.

Those three factors are closely linked. Owners/managers who cited leadership as a relevant contribution to growth also mentioned strategy and competencies of the employees as highly related to growth. We will call this connection of a strong leadership and a sound business strategy which values the contribution of employee competencies "competence-based management".

To test the hypothesis, if competence-based management is a decisive factor to explain growth of SMEs, we employed a factor analysis (Oneway ANOVA). The independent variable was turnover growth in the years 2005–2007 (compound annual growth rate).[1] Dependent variables were ones relating to the structure of

[1] Growth of turnover is highly correlated with the growth in number of employees.

the enterprise,[2] its environment of competition,[3] its growth strategy,[4] as well as its innovativeness.[5] All these factors are possible sources of growth.

The analysis shows that apart from "competence-based management", only 2 of the 16 variables checked had statistically significant correlation with the strength of growth in turnover of these enterprises. The two other factors are "threat of substitutes" (highly significant) and intensity of "process innovation" (weakly significant). Both factors have, like competence-based management, an impact on the strength of growth, whereas all the other factors showed no statistical relationship.

This supports the hypothesis that the quality of the management to a large extend explains the strength of growth in our sample. This result is consistent with newer research on determinants and dimensions of firm growth (Zhou and De Wit 2009), where mostly internal factors are held accountable for growth.

2.2 Higher Performance by Activating the Employees

The results of the survey also show that those SMEs, whose representatives named competence-based management as a strong contribution to growth (Fig. 1), displayed higher growth than the other SMEs from our sample. At the same time, there are further indicators showing a better economic performance of those enterprises:

- Better profitability (improvement in the last 3 years and in self estimated comparison to competitors);
- Indicated less problems with the staff (motivation and willingness for accomplishment of the staff; conflicts within the staff and conflicts within the company management);
- Stronger innovation activities (more process innovations in the last 3 years; more social innovations within the company; fewer problems within the organization while realizing innovations).

Higher performance could be a result of a stronger activation of the employees. Owners/managers following a competence-based management agreed more often to the statements displayed in Fig. 2, describing a stronger engagement of the employees for company goals, than leaders of SMEs not explicitly practicing a competence-based management.

[2] Industry, size (employees), age of the enterprise, level of independency, the relations of property, and staff qualifications.

[3] Porter's five forces: supplier power, threat of substitutes, buyer power, barriers to entry, degree of rivalry.

[4] The product/market orientation and the regions of market activity.

[5] Intensity of product and process innovations, expenditure of research and development.

Activating Employees through Competence-based Management

Indipendent Variable: „Competence-based Management" - (Factor analysis, Oneway ANOVA)

Statement	Significance	
„Our employees show in their daily activities, that they support firm's aims of growth and innovation."	0,000	Highly
„Our firm is characterized by the ambition to continouus improvement and looking for new solutions"	0,001	Highly
„The relations between the members of our firm are characterized by mutual respect and trust."	0,001	Highly
"Our employees share the firm's visions."	0,009	Highly
„Our employees engage strongly for the needs of our customers"	0,018	
„Employees in our firm are strongly success- and achievement-orientated."	0,028	
„We realize improvement based on ideas of our employees all the time."	0,039	Weakly
"Transfer and sharing of knowledge goes well even between departments and different professions."	0,054	Weakly
„Our firm is characterized by entrepreneurial thinking and action of employees."	0,078	Weakly

Fig. 2 Owners/managers who practice a competence-based management confirm statements describing the engagement of employees to a greater extent than those not explicitly practicing this management approach

The results of our investigations point to the fact that a competence-based management leads to a higher performance by activating the competences of the employees. Essential features of SMEs practicing a competence-based management approach are more encouraged and empowered employees acting with responsibility, the ability to exchange knowledge and learn, as well as realizing changes within the organization. Thus responsiveness to external changes and dynamics in society, including technology or markets, is increased. In this respect a competence-based management approach contributes to the development of "dynamic capabilities" (Teece 2007). Several empirical studies have shown that dynamic capabilities contribute to performance and growth of SMEs (He and Wong 2004; Lubatkin et al. 2006 and Protogeru et al. 2008). They have an indirect impact on performance by adjusting the company's core competences: "Dynamic capabilities seem to support and enhance the reconfiguration and development of new marketing and technological competences which in turn lead to higher competitive performance in terms of market share and profitability" (Protogeru et al. 2008, p. 27).

What are the implications of the survey results for the development of a learning format to enhance growth of SMEs? The approach to be developed has to closely link business challenges and learning, it should activate potentials of employees and enable them to take up responsibilities within a framework of strong leadership. In operational terms the empowerment of employees should free the manager/owner from day-to-day business in order to devote more time to strategic issues. In

addition, only a minimum of external assistance (consultancy/coaching) should be needed by the companies to implement the learning format.

3 The "Learning to Grow" Methodology

3.1 Key Features

Following the survey phase an initial group of 13 SMEs distributed over the three regions were selected. They represented different sizes and sectors (particularly manufacturing and services) and were willing to join an action research "experiment" to develop a learning format to enhance growth capabilities. This initial group participated for more than 9 months to develop the methodology. In a subsequent second consortium of 13 firms the methodology was further refined. In the mean time, "*Learning to grow*" has been applied in learning networks of SMEs in Germany, Spain (UGGASA 2013); Brazil (North et al. 2013) and projects in Peru and Argentina are being conducted (cf. Dynamic SME project 2011). Up to now approximately 70 SMEs have made their learning journey to enhance growth capabilities using the methodology.

In a nutshell "***Learning to grow***" consists of the following steps: Based on a structured analysis of growth capabilities and deficits by means of a "wheel of growth", the owner/manager supported by a "growth coach" defines a strategic growth project that has a short to medium term impact on business performance and in parallel serves to develop/sustain growth capabilities. To this effect the project is delegated by the owner/manager to a team of employees who define their learning objectives to be accomplished and carry-out the project conceived as a learning journey over a period of 6–9 months. The whole process is supported by a coach (approx. 12 half days of intervention) who has been trained in the methodology. Normally the "*Learning to grow*" methodology is used in a network of about ten SMEs whose teams meet to exchange experiences and run joint learning sessions. In the following the methodology will be explained in more detail.

3.2 The Wheel of Growth: Diagnosing Growth Challenges and Capabilities

To develop the "*Learning to grow*" methodology we classified interview results and thus identified four typical challenges of SME growth. Nearly all the 127 SMEs involved could be assigned to one of the four challenges (98 %):

- Many firms were in a situation demanding them to sense new growth potentials (19 % of the SME's).

- For others the challenge was defining a growth strategy to orientate the enterprise towards capturing market potentials (22 %).
- Further enterprises discussed seizing growth potentials by motivating and empowering their employees to exploit available possibilities for growth by consequent action (20 %).
- The strongest group of the survey (36 %) included enterprises which had grown successfully over a period of time and were now challenged to cope with the effects of growth. Such organizations had to adjust their processes and organisation or had to cope with problems of supply of the most important resources (e.g. the lack of qualified employees and financial bottlenecking).

In linking these survey results to theory it became evident that the challenges named by owners/managers matched quite well with Teece's (2007) "Sensing", "seizing" and "transforming" trilogy of dynamic capability development: "For analytical purposes, dynamic capabilities can be disaggregated into the capacity to: (1) sense and shape opportunities and threats; (2) seize opportunities; (3) maintain competitiveness through enhancing, combining, protecting and, when necessary, reconfiguring the business enterprise's intangible and tangible assets. Dynamic capabilities include difficult-to-replicate enterprise capabilities required to adapt to changing customer and technological opportunities" (Teece 2007, p. 1319).

Merging theory and practice we constructed a ***Wheel of Growth*** (Fig. 3) to analyse growth capabilities. It comprises the four central challenges and two "growth levers" for each challenge:

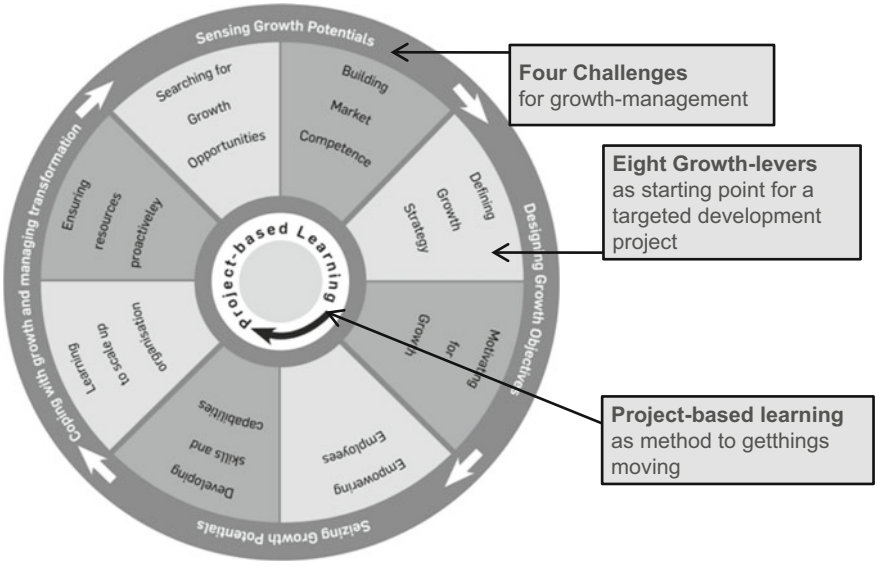

Fig. 3 The wheel of growth

1. Sensing growth potentials (searching for growth opportunities, building market competence);
2. Designing growth objectives (defining growth strategy, motivating employees for growth);
3. Seizing growth potentials (empowering employees, developing skills and capabilities);
4. Coping with growth and managing transformation (up-scaling the organization, ensuring resources proactively).

The two "growth levers" defined for each challenge constitute fields of action to leverage growth capabilities of the firm. The growth levers were derived from our analysis of 124 SMEs based on the interviews with owner/managers.

To use the wheel of growth as self-analysis tool, two key statements for each lever have been formulated. They are rated according to the capability level reached (using a three-point traffic light scaling) and in a second rating the relative importance for sustaining competitiveness is assessed in order to derive priority areas of action. Statements for the lever "searching for growth opportunities" for example, are: "Our company observes and recognizes systematically new possibilities and trends in relevant markets and learns from competitors, clients, suppliers, partners" and "Our company encourages and effectively uses the ideas of the employees".[6]

The self-analysis is usually carried-out in a dialogue between owners/managers of an SME and the external coach, taking about 2 h. The 4 challenges, 8 levers, and 16 key questions are the starting point of targeted innovation and learning projects.

3.3 A Learning Project Impacting on Business Performance

Based on the wheel of growth, the external coach assists the owner/manager to define a learning project which on the one hand will have a measurable short to medium term business impact and on the other hand is well suited to improve growth capabilities.

For example, past projects have focussed on topics such as improving competitor analysis, implementing an idea competition for new products and services, expanding to new markets, improving internal organisation, creating a continuous improvement process, developing a participative strategy process, establishing a second management level, etc.

The development of growth capabilities starts with the identification of the actual relevant challenges faced by an enterprise during the process of growth. In practical terms, the coach assists the manager/owner to define a learning project. The manager/owner selects members of a project team considering in particular competence development potentials and needs (e.g. preparing staff for middle

[6] The wheel of growth with the 16 questions can be downloaded from www.dynamic-sme.org

management position, learning cooperation across units, preparing technical staff for sales support). In a briefing session the project is handed over to the team. Subsequently the owner/manager acts as a client of the team. This requires the owner/manager to trust in the team and not to interfere (which is also a learning process for the owner/manager).

The team supported by the coach develops a project plan containing not only the business objectives but also detailed learning objectives for the team as a whole and for individual members. Often a competence matrix (North and Kumta 2014) is used to visualise current and desired competence distribution of the team. After approval by the manager/owner, the project is carried-out step by step supported by the coach. There are regular meetings scheduled with the "client", the team organises its self-learning and, if necessary, task related training is provided by the coach.

The "**growth coach**" acts as process consultant following Schein´s (1999) concept of building a helping relationship. By understanding that the consultant/coach can only help the clients to solve their problems consultation becomes a matter of establishing a supportive relationship in which the client is guided to understand the need and opportunities for change. The growth coach is to facilitate the project and the learning process, ensure communication between project team and manager/owner, and periodically reflect with team and manger/owner on the process.

Many owners/managers of SMEs have mixed feelings of employing external consultants and normally would expect an expert consultant to solve their "technical" problems. Therefore the growth coach has often to overcome resistance to process coaching in SMEs and cautiously support a cultural change. In order to train "growth coaches" a 20 h training course is offered to participants with consultancy and coaching experience. In order to qualify for a certificate as growth coach candidates have to successfully accompany a "Learning to grow" project and submit a report to the originators of the methodology. Coaches are invited to participate in a supervision process.

Experience exchange and peer pressure in an SME network is an integral part of the "Learning to grow" methodology. Usually a "Learning to grow" network consists of 7–10 SMEs in a region who are not competitors. One rationale of the network is to act as a pacemaker to ensure that projects at firm level keep on track. Furthermore the network agrees on training needs and runs joint training sessions (on topics such as project management, internal organisation, effective team work, active sales management). Three "Learning to grow" workshops are carried-out over a duration of on average 6 months, where SMEs share their project advances and difficulties, and in each session focus on a relevant topic from the wheel of growth (e.g. delegation and empowerment of employees). There is always time for networking between project teams, which in some cases leads to intensive bilateral interaction.

4 Triple Value: Results of "Learning to Grow" Projects

This methodology puts in evidence the effectiveness of project based learning to sustain and develop growth capabilities of SMEs. Aligning the learning of teams with business challenges creates measurable short/mid-term results as well as enhancing organizational capabilities to sustain growth.

During the development process of the methodology, periodic interviews and reflection sessions were carried-out by the researchers with managers/owners, project teams and consultants acting as growth coaches. A number of case studies were written to document the project process at firm level (RKW Deutschland 2012). In the Basque (Spanish) SME "*Learning to grow*" network storytelling was used to provide evidence on results achieved UGGASA (2013). In the mean time, a standard questionnaire is in place for both managers/owners and project teams to evaluate results of the project; which has so far been applied in two "*Learning to grow*" networks.

These evaluations demonstrate that there is a triple benefit of the learning projects.

Firstly, projects led to significant business results (e.g. conquering new markets, adding new services to products, improving processes, productivity and quality). This is relatively easy to measure related to the "business objectives" of the project.

Secondly, learning projects have contributed to enhanced organisational capabilities, amongst which are improved team work, better problem solving, enhanced communication, freeing of owner-manager from daily routine tasks, development of leadership capabilities of middle managers, as well as entrepreneurial thinking of employees. The learning projects have also raised the awareness about the unused potentials of employees. *While at the beginning of the project some manager/owners stated:* "*I doubt that my people are able and qualified to carry-out such a project*.", *in the reflection session at the end of the project the same managers/owners stated:* "*I was not aware what my people are able to do*." *or* "*I have learned to trust in the capabilities of my people*." The demonstration of what teams are able to achieve led also to a different communication and delegation behaviour. Asked about the effects of the project on team performance at the end of a 6 month learning journey, the 9 owner/managers of the Basque "*Learning to grow*" consortium (UGGASA 2013) particularly valued the increased capacity to reflect, self-organise and orientate towards firm objectives. The perception of project results by 46 members of 7 projects teams of SMEs in lower Saxonia (Hardwig 2012) is shown in Fig. 4. More than 50 % of the respondents agreed that there had been a substantial improvement of internal communication and that new processes, procedures and structures had been introduced, ensuring a better use of employee potentials and thus making the organization more flexible and adaptable to change.

A third benefit of the *Learning to grow* methodology is derived by creating a network of participating firms allowing exchange of experiences with the methodology, for discussing solutions to similar problems (e.g. internal communication, delegation of responsibilities, improving sales) and pooling resources for training

Fig. 4 Perceived changes by project team members (46 members of 7 projects teams of SMEs in lower Saxonia, 100 % = 46 answers, Hardwig 2012)

on topics of mutual interest. The joint workshops were seen as an important pacemaker and exerted peer pressure to advance in-company projects.

As the workshops usually are hosted by one of the participating enterprises this also gives the chance to get to know the host and establish business links. While in Germany there is a long tradition of SME cooperation, in Spain and Latin America SMEs tend not to actively cooperate. Therefore in these countries the barrier to open itself and share insights with other SMEs still needs to be overcome.

5 Conclusions and Management Implications

There is an abundance of programmes worldwide aiming at an improvement of SME performance by providing external advice. Programmes vary widely in their approaches and effectiveness. The experience with currently about 70 projects demonstrates that the *Learning to grow* methodology is an effective way of developing capabilities relevant to sustain growth in SMEs. Combining business objectives with a learning journey addresses the desire of owners/mangers for measurable short/midterm business results and introducing changes of attitudes and behaviours towards a more participative management. Employees gain confidence in their capabilities and learn how to evaluate and develop their competencies.

The major challenge resides in ensuring continuity after the end of the first "*Learning to grow*" project in the firm. Usually the cost of the external coach is funded by a regional development agency or another SME assistance programme. Once the first project is over SMEs would need to continue either by themselves or pay for the coach and organize between themselves to continue the "*Learning to*

grow" network. While a significant number of SMEs continued work with their coach to support implementation of the first project or start a second one, the majority of firms who participated in a funded *Learning to grow* initiative have not continued with an external coach even though they expressed their satisfaction with project results. This is a common phenomenon of SME assistance programmes.

Therefore, in recent "*Learning to grow*" initiatives emphasis has been put on the training of internal coaches who will execute a first project with an external coach and then should be able to run a second project without or only a minimum of external assistance.

Furthermore, an evaluation is planned to assess if changes initiated in a "*Learning to grow*" project have taken root in the participating SMEs. Based on occasional contacts we know that instruments like the project charter or the competence matrix are used on a regular basis in a number of firms.

Our vision is that *Learning to grow* projects become a routine exercise to sustain change in turbulent environments.

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Case: Herradep: A Double and Intelligent Strategy to Grow—Improving Worker Knowledge and Competences Through Self-Managed Short Term Projects

Pilar Abelli and Juan Carlos Hiba

This paper describes how the owner and manager of an argentine SME could, after attending a workshop on the methodology "Learning to grow", implement a low cost strategy to empower his workers through a combined process of learning and doing undertaking a series of short, concrete and controllable projects to improve work organization and working conditions with a positive impact on motivation and productivity.

1 Customization and High Quality as Competitive Strategy

Herradep is an Argentinean company founded by Antonio and Adrián Demasi. This small company is based in Rosario, an industrial hub located in the centre of the country.

Antonio and Adrián started as young entrepreneurs originally manufacturing openings such as windows and doors of iron, but times were changing and they saw aluminum was the future. It was 1993 and the construction industry was growing strongly, as a consequence demand for openings was increasing steadily. They took advantage of the context and launched a new series of products made of aluminum; it was the beginning of Herradep.

Through the years they evolved as manufacturers of highly crafted windows (awnings, casements, sliding ones), doors, ceilings and aluminum window screens. Nowadays they work exclusively for individual clients and architects. Their strategy: place emphasis on quality rather than quantity. Because of a highly fragmented sector, the brothers decided to focus in manufacture customized products: any window or door which has custom requirements, Herradep build them to order. Their employees concentrate on building one window or door at a time, so they can create custom-built products for even the most challenging designs.

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Since 2008 economic world crisis, Argentinean economic environment also changed. Construction industry currently presents no more a steady demand and sales levels have been decreasing. Suppliers give no long credits and costs have increased since Argentina is going through a steady inflation process from the last 6 years. Given that turbulent situation, it was time to start a renovation in Herradep in order to continue being competitive, but from where to start? Antonio stated: "*The context requires us*, *how can we be better with what we have*? *How can we develop the competences of our employees*?"

In the middle of this situation Antonio came across with the Learning to Grow Methodology. It was an opportunity to start innovative projects in Herradep in order to increase worker's autonomy and competences, with the possibility of working with an external coach who provides support through all projects development. Antonio didn't hesitate: he and two workers (middle managers) attended a 3 day workshop based on that methodology that was organized in Rosario. During that course Herradep filled up the Growth-Wheel Tool and was able to recognize both its strong and weak points. Also the tool was helpful to strategically decide what projects to kick-off first.

As result of the diagnosis Herradep became aware that they were neither using well their own resources nor the staff their hidden competences: the company was not able to systematically enthusiasm and inspire employees regarding the goals of the company and employees, including middle managers, weren't thinking and acting with entrepreneurial spirit, therefore not assuming a high degree of commitment.

Antonio says: "*With the help of the Growth-Wheel Tool in a few minutes I confirmed our strengths and detected the key points that must be improved. These last points were transformed into two simultaneous strategies to innovate and grow*".

Accompanied by an external coach that works with the methodology in Rosario, Antonio and his team developed an 8 month programme with the objective of improving knowledge and employees competences.

The programme consisted in two strategies: first, through short training courses he managed to develop new competences of middle managers. Themes were selected strategically: time and motion studies, productivity and production processes analysis and improvement. Courses were taken on line and lasted 4 weeks.

On the other hand for the second strategy, he proposed employees to organize small teams to design and implement short projects with the objective of revise production processes and improve working conditions, doing the work more effective and productive. Through these projects middle managers could apply the new techniques and skills learned in the training courses and spread the new knowledge through all employees, working all together in what Antonio named after "short, concrete and controllable projects".

Employees formalized the projects writing contracts, in which responsibilities for undertaking each project were established. These internal documents included, for each team: the project leader, the team members, and the aim of the projects and deadlines of the different tasks. This was the first time employees and managers

agreed and signed a contract formalizing the work to be done in each project. It was a very helpful tool for them to keep tracking and finish each project on time. Pedro Zampol, production manager, declared "*It was important to see the progress of what was planned at the beginning of the project. To realize that actually what was written and planned, turned out into real facts*".

At least three teams of workers were organized simultaneously to carry out the projects related to process and production. They were:

- Re-organization of raw material and spare parts (aluminum and glass) and products that go to stock.
- Construction of a device to improve the process of assembling window screens (one of the most sold products and that take a long time to manufacture).

The output of the projects implemented made it possible to achieve an overall **improvement of labor productivity of almost 30 %**. With the first project Herradep obtained a reduction of 40 % in the stock of raw material. In turn, among other innovations, this achievements lead to: (1) an improvement of 20 % of the working space, (2) corridors and aisles are now free from production process parts and are delimited by yellow lines, and (3) new shelves were made to take better advantage of vertical space.

The construction of the device reduced in 15 % the working time involved in the assembly process of windows screens, because all necessary elements and tools are now at hand.

Figure 1 shows some first sketches of the device drafted by employees.

At the end of the production innovation programme, a final workshop with all the staff involved was organized. It included a lesson learned exercise. The question the coach put forward was: what did you learn? One employee, Cesar Carello answered: "*the methodology allowed me to lead and manage a project with other people, with a clear goal and carrying it out in time and shape. It showed me how simple it is to form work teams and involve people from all the company to obtain the same goal. Consequently, with this approach we could capture the knowledge of the methodology to use it in future projects*".

Another team leader, Pedro Zampol declared: "*What I learned? A new methodology of work and its implementation with unknown tools for me, the possibility of listen to each other. To listen to the employee that is the one who makes the same*

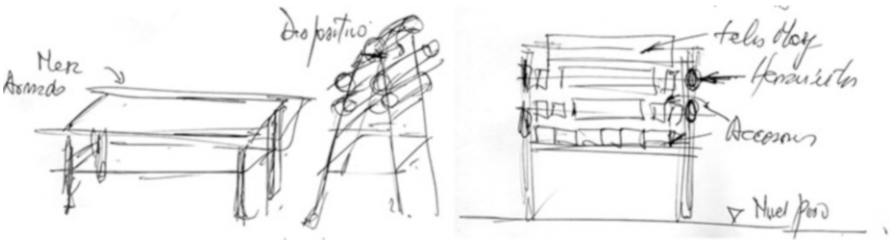

Fig. 1 Sketches of the device

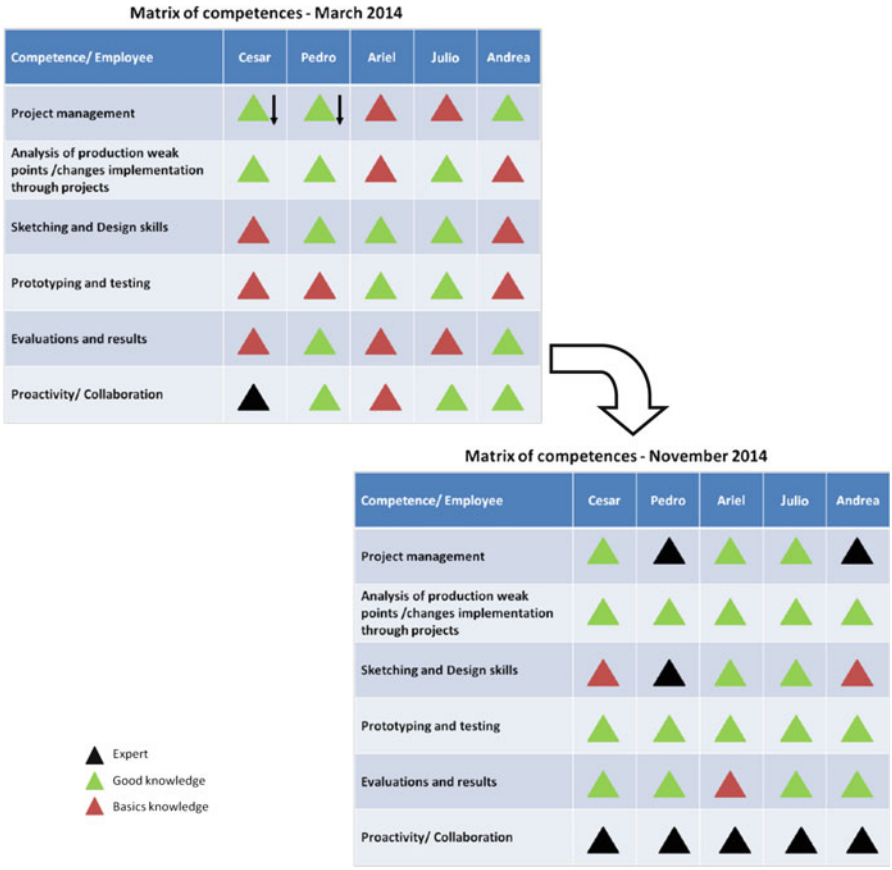

Fig. 2 Matrix of competencies, before and after

tasks day after day and knows the trickeries of the job. That means a lot because we can detect things that otherwise one cannot notice and identify. To realize that the methodology is simple to learn and to carry out: not only me but all the people involved in these projects ended up learning it."

In Fig. 2, we can see the impact the programme had in employees when it comes to competences and skills regarding projects.

Finally both Demasi brothers concluded: "*We have now more time in our hands to think more deeply in business strategy or in sales; our employees have now more knowledge in their hands and know how to use it. They are now starting their own new projects by their own without our help, we are just providing support and directing. It is very important that confidence between us and our employees and also among themselves have improved*".

How Brazilian Textile Enterprises Learn to Grow

Guillermo Antonio Dávila, Klaus North, and Gregorio Varvakis

Abstract This chapter shows how the methodology "Learning to Grow" contributed to sustaining competitiveness by improving the innovative capabilities of 11 SMEs of the textile sector in southern Brazil. In addition, the chapter discusses the critical success factors for the implementation of the methodology and provides a transfer model for its implementation in new contexts.

1 Introduction

Brazilian textile and fashion enterprises, mostly SMEs, are significantly impacted by imported products from China and Far East countries; and consequently, are under high pressure to defend their competitive position (Vieira Junior et al. 2014). This requires constant increases in operational effectiveness and innovation in products and processes. Hereby SMEs face a number of challenges: obtaining resources to finance operations and new initiatives at the same time, attraction and retention of qualified professionals as well as efficient management and planning (Deloitte 2011; North et al. 2013). In a similar way, the research of McAdam et al. (2014) points out that in developing countries, the limited capacity to access and share knowledge makes innovation in SMEs a real challenge.

To defend themselves against strong foreign competition, SMEs have to learn to cooperate and tap the knowledge of employees, suppliers and customers to improve processes and products.

Therefore, to strengthen textile SMEs the project "Dynamic SME" teamed up with the regional initiative "Moda Catarina" to transfer the "Learning to Grow" methodology from Europe to Brazil. The Brazilian macro-project "Moda Catarina" (Catarina Fashion), headed by the Supporting Service for Micro and Small

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Companies—State of Santa Catarina (SEBRAE/SC), in partnership with the Association of Micro and Small Companies of Brusque and Region (AmpeBr), aims to promote the strengthening of the fashion industry of the city of Brusque and its neighboring cities, through the implementation of integrated training and development actions. The project was developed between 2014 and 2015, working with a scope of 70 SMEs.

As described in chapter "Learning to Grow: A Methodology to Sustain Growth Capabilities of SMEs", this methodology integrates the execution of a strategic project with training and learning processes within and across firms. Consequently, the methodology helps companies to develop the ability to reconfigure their skills at any time and situation, improving innovation and value creation for the customer (Hardwig et al. 2011).

Considering this, "Learning to Grow", was integrated as a pilot application in the Catarina Fashion macro-project in Brusque. It had a double objective: (i) to promote "growth" and develop skills in the participating companies; and (ii) to be a test pilot for an adaptation of the methodology and a subsequent application in other companies in Brazil. The project was managed by SEBRAE/SC—Brazilian development agent with focus on SMEs, in partnership with the consultant SOCIESC/Joinville, Universidade Federal de Santa Catarina (UFSC) and the Association of Micro and Small Companies of Brusque and Region (AmpeBr), as shown in Fig. 1.

SEBRAE/SC is a Brazilian development agent which, through partnerships with the public and private sectors, acts as an inductor of entrepreneurship with the aim of increasing innovative capabilities, competitiveness and income of SMEs.

Consequently, it is evident that the objectives of the methodology "Learning to Grow" are aligned with SEBRAE/SC objectives, mainly in two aspects: innovation

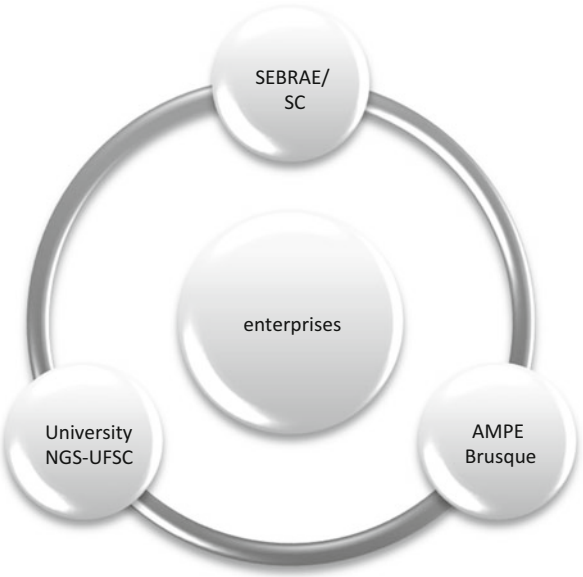

Fig. 1 Configuration of the project partners

and competitiveness. For this reason, within the macro-project Catarina Fashion, 11 micro and small enterprises were selected to participate in a pilot project using the methodology "Learning to Grow" during a period of 6 months.

The Ampe-BR is the local small business association that provides training and other services to SMEs and aims to encourage the growth of associated companies.[1] The third actor, the Knowledge Management Research Lab of Universidade Federal de Santa Catarina (NGS-UFSC[2]), is a multi-disciplinary research laboratory which conducts research for public and private organizations for improving performance, using a set of tools and methodologies based in process management and knowledge management areas.

There was a clear convergence in the objectives of the three partners: promoting the development of SMEs in the region. The partners worked in an integrated and coordinated way, in an environment with teamwork and intensive exchange of knowledge. This configuration is named in the literature as the "triple helix", explained by Etzkowitz and Leydesdorff (2000, p. 112):

> This network of relations generates a reflexive sub-dynamics of intentions, strategies, and projects that adds surplus value by reorganizing and harmonizing continuously the underlying infrastructure in order to achieve at least an approximation of the goals.

The role and responsibilities of each partner were:

SEBRAE/SC (Leader)
- Develop the overall and project communication plans.
- Provide financial resources for the implementation.
- Lead key processes: selection of companies, workshops, technical visit.
- Provide the facilitators (outsourcing SOCIESC/Joinville) and track the implementation of the method in enterprises.
- Follow the work of the facilitators.

NGS-UFSC (Scientific collaborator)
- Transfer to the Facilitators (using training) the knowledge about methodology and key content learned from Germany.
- Provide relevant knowledge that supports companies in the implementation of their projects.
- Identify opportunities for improvement in the methodology.

AMPE Brusque (Client)
- Help in the selection of 11 participating companies.
- Assist in the dissemination of activities and results.

SMEs involved in the project were selected according to the criteria defined in the "Learning to Grow" methodology: the financial situation of the company, the

[1] http://www.ampebrusque.com.br/

[2] www.ngs.ufsc.br

Table 1 Profile of participating companies

Company	Main products	Number of collab.	Foundation year
A	Men's social shirts	48	1991
B	Fitness fashion: top, leggings, bermuda, shorts	74	1994
C	Women's dresses and striped blouses	7	1994
D	Dresses, blouses, pants and sets for babies and children	11	1991
E	Women's fashion	14	2010
F	Children's fashion	33	1989
G	Children and adults clothes	12	1996
H	Trousers, shorts & half-pants for children	25	1990
I	Polo, jeans	65	1995
J	Women's fashion	8	2008
K	Women's blouses, chemisette, pants and dress	5	1999

entrepreneurial attitude of the leader and the willingness to invest the time and money needed to run the growth projects. The profile of participating companies is presented in Table 1.

Just a few participating SMEs were direct competitors because, although all of them were from the same industry, most of them had a particular target market in terms of gender, age and habits.

From the start, the methodology "Learning to Grow", which had been already applied successfully in German and Spanish SMEs, was regarded by SMEs as an important venture in their search for sustainable growth. Another motivating factor for SMEs was a scheduled technical visit from European SMEs which implemented the methodology previously in order to do process and result benchmarking.

Conversely, SMEs raise doubts in the project due to the lack of previous implementation experiences in Brazil; especially in the southern region. People here are characterized by Hofstede et al. (2010, p. 347) as: "European and prosperous, more hierarchical, less formal, more individualist, and more masculine (achievement-oriented)". People in this region look for results in any action they start and they show initial distrust about methods or technology which has not previously demonstrated productivity in their context.

The length of time to run the growth projects in each SME posed another challenge. Six months was allocated, a third less than the 9 months spent on average in German and Spanish SMEs. In this context the 11 Brazilian SMEs began to develop their growth projects.

2 Transfer and Implementation Process

The "Learning to Grow" implementation in Brazil can be characterized as a transfer of managerial practices from a European to a Brazilian context.

This transfer has to take into account that people, technology and processes have different maturity levels in various countries, regions and socio-economic contexts. These aspects are relevant to the application of a methodology that brings about changes in management practices, communication and behavior. These aspects have been addressed in several studies including Kedia and Bhagat (1988) and Hofstede (2001). Hofstede (2001) analyzes and quantifies differences in average behavior of citizens from many countries in terms of long-term orientation, horizontality in interaction, risk acceptance and other behavioral elements. Therefore, the characteristics of the Brusque region in Brazil demanded an adaption of the methodology "Learning to Grow", previously applied in Germany and Spain.

According to Narteh (2008), the transfer of knowledge from SMEs in developed countries to developing countries has some key elements to be considered (Fig. 2).

Firstly, regarding knowledge sources, Narteh (2008) recognizes the importance of external knowledge sources because "The foreign partners are likely to blend different sources of knowledge to be transferred to their alliance partners" (p. 80).

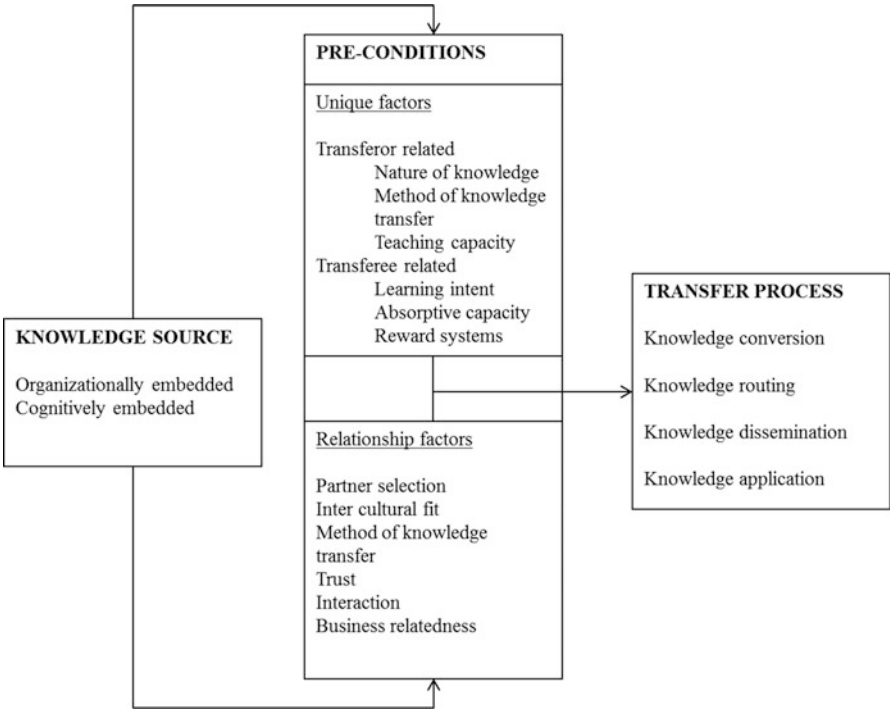

Fig. 2 Knowledge transfer model. Source: Narteh (2008, p. 80)

Secondly, he also identifies some pre-conditions related to the transferor (i.e. nature of knowledge, method of knowledge transfer and teaching capacity) and related to the transferee (i.e. learning intents, absorptive capacity and reward systems). Finally, other preconditions related to relationship factors like partner capabilities, cultural fit, trust and quality of interactions were identified by Narteh (2008). These three factors enable knowledge conversion, routing, dissemination and application processes.

In the same line of thinking, Vieira Junior et al. (2014) identified some critical success factors for the effective management of international technology transfer projects by analyzing some cases in the Brazilian textile industry. The main ones are: Firstly, previous and past experience with the basic technology is relevant, in other words, knowledge bases shouldn't have so different. Secondly, visits to local and international trade fairs and enterprises need to be scheduled for improving the communication between transferor and transferee. Finally, a direct involvement of directors for obtaining quick and direct decisions, recognizing also that centralization of tasks for the directors is non-beneficial for the performance.

Keeping this factors in mind the "Learning to Grow" implementation started with a **facilitators' training,** carried-out by researchers form NGC-UFSC who had learned the methodology during their secondment to Germany and Spain where they had participated in a facilitators training at UFSC. Different from a traditional "expert" consultant, the facilitator supports a client´s learning of how to manage and resolve future problems effectively, based on the assumption that only the client knows which the current problem is and which form of corrective intervention is appropriate. He "promotes" solutions which appear from inside the system and is the communication bridge between the project team and the entrepreneur to ensure harmonized decisions (Schein 1969, 1987; Hardwig et al. 2011).

The next step was to **define the growth projects** of each SME. Initially, growth opportunities and their relevance were identified in each SME, through the application of the "Wheel of Growth" during a meeting in which the facilitator and the entrepreneur participated. After this, some ideas to take advantage of existing opportunities were identified and evaluated with the entrepreneur, using feasibility, maturity and financial analysis, among other criteria. The resulting growth projects for each company are displayed in Table 2.

Each SME defined a **leader and a work team to execute its growth project**. In the case of Brazil, nine companies had their own entrepreneur as part of the team, although the described methodology in chapter "Learning to Grow: A Methodology to Sustain Growth Capabilities of SMES" suggests that the entrepreneur is not part of the working team.

Across the seven steps of the methodology, the facilitators monitored the execution of the projects in each company using nine visits on average. Similarly, as set out in chapter "Learning to Grow: A Methodology to Sustain Growth Capabilities of SMES", **four workshops** were developed for stimulating SMEs to share relevant knowledge about the problems addressed, solution plan, advances in implementation, and results of the project.

Table 2 Growth projects

Company	Project
A	Controlling stocks of materials and finished products using manufacturing planning and control (MPC) foundations supported by IT systems.
B	Creating a communication plan, a marketing plan and showcase for the product line "New Product D".
C	Controlling 100 % of the products in the expedition; considering feasibility of deployment of a computational tool for supporting this.
D	Structuring the commercial unit to increase direct sales by 50 % in 6 months.
E	Enhance the development of new collections' processes, for launching two new collections in sixth months.
F	Developing MPC practices for reducing delays by 50 %.
G	Reducing the pieces of a collection without losing potential revenue; improve the quality of the remaining pieces.
H	Improve and automate the current MPC process to reduce delivery time in 25 %.
I	Reducing the lead time from 60 to 50 days.
J	Developing a sales department and improve sales skills in one collaborator to achieve more direct sales.
K	Restructure the commercial unit to increase direct sales.

The high intensity of knowledge sharing during execution of growth projects had a significant influence on the final results in each company. According to CEN (2004), sharing knowledge means delivering knowledge at the right time, in the right place and with the right quality, consequently, in the right context.

During growth projects, the most relevant sharing tools were the workshops as well as follow-up sessions between the facilitator and project teams, which also served as a bridge for developing trainings and coaching.

The second workshop was the inflection point at which entrepreneurs realized the great advantage of the "Learning to Grow" methodology in comparison with other solutions received previously. The solutions were not "brought" by the facilitator, but were developed by each SME team considering two aspects: their own definition and construction of the solution; and, the identification of competency gaps.

After the second workshop, due to the increased confidence generated by entrepreneurs with their project team's capability and with the methodology, an increased dynamic was observed in the sharing knowledge process between SMEs and within the relationship entrepreneur-Facilitator-team inside each SME.

In that context the international study visit of the Brazilian entrepreneurs to European SMEs which had previously applied the methodology took place. This was undertaken as it was believed that any exposure to an environment of innovation and knowledge sharing would be relevant to the results of growth projects and also to SMEs' performance. 85 % of participants (based on a survey containing 13 questions) believed that the visit met or exceeded their expectations and nearly 95 % pointed out the main result was the acquired knowledge about new technologies and management practices. In particular, reference was made to the focus on

people, the need for a strategy before embarking on any growth project, the need to always crystalize learning by producing a method or a product, the acknowledgment that a variety effective solutions to a problem can exist and the importance of collaborative creativity.

The international visit, commanded by SEBRAE/SC, exceeded expectations and the confidence in the methodology was consolidated, stimulating even more knowledge sharing in the project. This manifested in a greater employee participation in workshops 3 and 4 where progress, risks and results of implementation of the growth projects in each SMEs was shared. Solutions applied in one SME during the execution stage constituted *insights* that have been applied by other SMEs in solving problems with the same structure.

3 Results of the Project

This first implementation of the "Learning to Grow" methodology in Brazil generated results in terms of growth and effectiveness of SMEs, strengthening the skills of employees and entrepreneurs, along with social benefits.

At the end of the project, the results were assessed through a questionnaire given to each entrepreneur and a team member was randomly selected. From a set of 22 questionnaires, 18 questionnaires were sent back with complete answers, where 9 were from entrepreneurs and 9 from employees. The answers related to products were confirmed by facilitators and project records.

Firstly, through the growth projects, SMEs obtained, important **business results**:

- Increased sales by 40 % in 3 months by increasing the number of collections (from 2 to 4).
- Increased revenues by 14 % through improving quality and reducing inventories by 15 % because of the re-design of the collection (went from 170 to 130 parts).
- Reduced delivery time from 60 to 45 days, with a 95 % accomplishment of service level agreement.
- Commercial business units were created, facilitating the obtainment of new customers and management/contact of past ones (why they didn't buy more?).
- Automated inventory control of raw materials, which generated more efficiency in the process: The delay in first step of production was eliminated; Costs of raw materials were reduced through better planning of purchases.

Secondly, growth projects enabled **learning capabilities** in each SME and consequently, the ability to address future problems and capitalize on opportunities for growth was improved:

- Employees developed the ability to communicate, work in teams, create solutions and implement them.
- Employees act proactively rather than reactively; more time spent managing inventory and process, not solving problems.

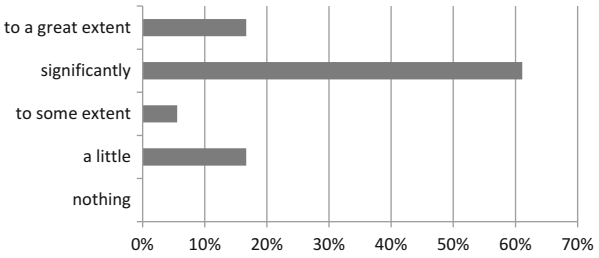

Fig. 3 Participant perception about the project "Do you think the project was successful?"

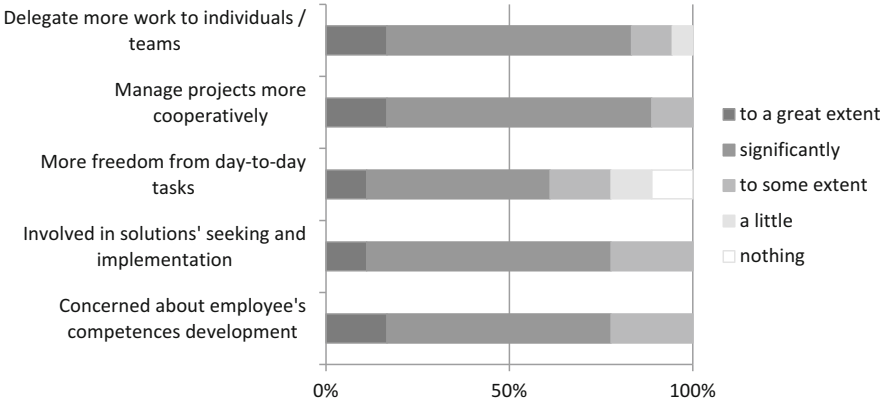

Fig. 4 Behavioral and managerial-style changes in the entrepreneur

- Employees developed their entrepreneurial spirit, as well as the ability to lead new growth projects.
- Entrepreneurs have learned to delegate and conduct monitoring. Partially releasing them from the "day to day" business activities.
- Developed a participative and collaborative leadership that improved decision-making in an environment of mutual trust and enough commitment.
- Entrepreneurs are partners rather than competitors, grow and learn together through the exchange of experiences (issue, solution, method).

Thirdly, there was also a social contribution during the first "Learning to Grow" project in Brazil. There were four jobs generated over the 6 months of project.

In general, entrepreneurs and team members had a positive perception about project success, as shown in Fig. 3.

In addition, changes in style and managerial behavior were identified. Items more developed throughout the project were delegation capability and collaborative leadership, as shown in Fig. 4.

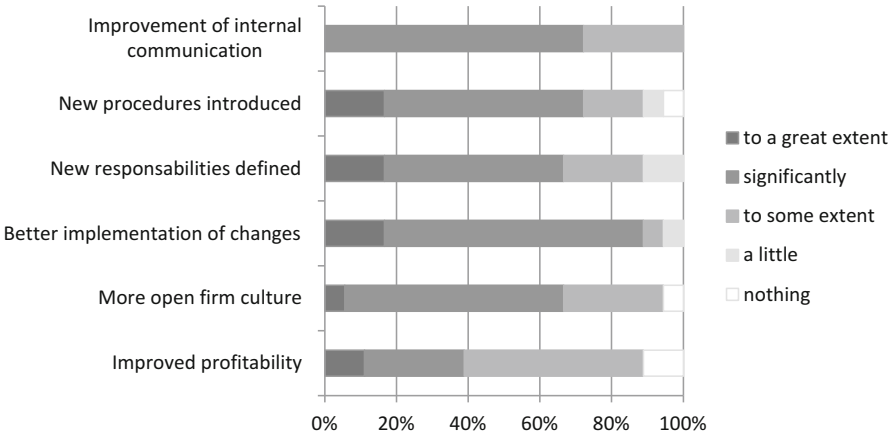

Fig. 5 Aspects that have changed in SMEs

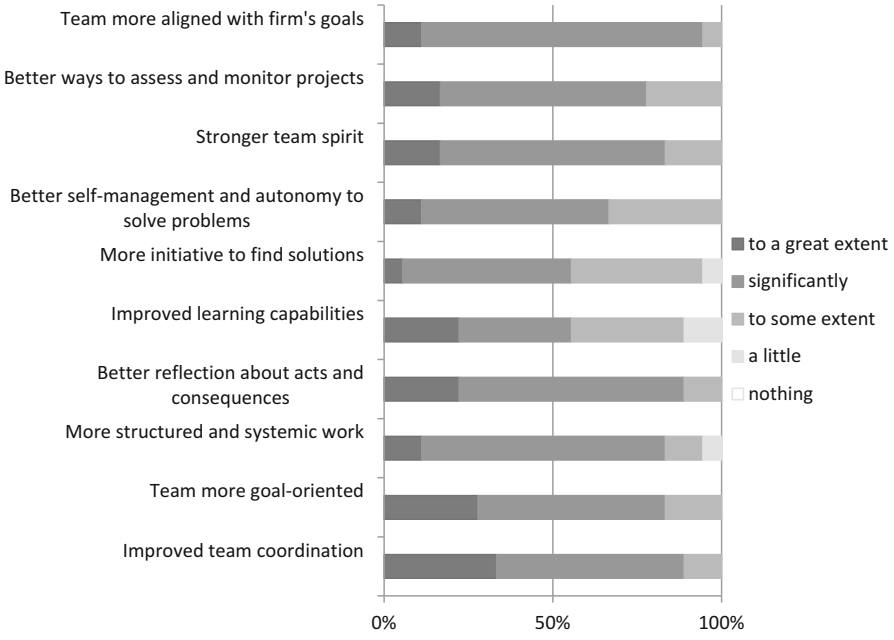

Fig. 6 Project contribution to improving teamwork

Other kinds of important changes in SMEs were observed, in terms of internal communication, new methods and procedures, defining new responsibilities, relational capital, innovation and profitability, as shown in Fig. 5.

Finally, improved teamwork capability was another of the key results of the project, while at the same time it was one of the elements which had been effective in achieving or exceeding the planned business results. Figure 6 presents the impact of the project on various elements of teamwork.

Both the products and the participants' perceptions indicate a hit on the "Learning to Grow" pilot project in the region of Brusque in Santa Catarina, Brazil. From the results obtained are inferred some important conclusions about the methodology and its application in different contexts.

4 Conclusions and Management Implications

The "Learning to Grow" pilot project in Brazil, a form of technology/knowledge transfer process from Europe to Latin-American SMEs, had a successful application. The overall list of critical success factors, in accordance with Narteh (2008) and Vieira Junior et al. (2014), and a brief explanation about how they were managed are shown in Table 3.

This successful implementation of "Learning to Grow" in Brazilian SMEs shows that the methodology can be applied in a different cultural and social settings to deliver SMEs results in two dimensions: Performance and Learning. Critical success factors need to be identified and managed in order to maximize earned value obtained during the implementation process.

The results observed in Brazilian SMEs were higher when compared with SMEs in Germany and Spain. Evidence of these three experiences allow the conclusions that the smaller the degree of an organization's maturity, the greater the potential result achievable in this growth project. As a result, it is expected that the first actions of the methodology in an SME have the greatest impact in terms of performance when compared to subsequent actions, because the organization is gaining maturity with each action.

An alternative methodology for a company which perceives a small marginal result after participating more than once in a growth project, is to define new projects that focus on the development of new products, channels and/or markets.

Based on results explained in this chapter, some "golden rules" that should be considered to run the methodology in your organization are listed:

1. Develop a network of interested companies;
2. Identify and manage constantly the critical success factors;
3. Search for or develop a facilitator trained in the methodology;
4. Apply the Growth Wheel, set goals based on your business strategy;
5. Identify your employees' skills and arrange a successful team;
6. Delegate responsibilities and trust in people, communicate, be creative and open;
7. Share knowledge with network companies, develop relations for "win-win" outcomes in managerial and operative levels;
8. After a growth project, reapply the Growth Wheel in order to identify new goals, then repeat the process.

Table 3 Critical success factors in the "Learning to Grow" project

Dimension	Critical success factor	Comments
Transferor related	Nature of knowledge	It was a managerial knowledge, a form of meta-knowledge for developing innovative capabilities, problem-solving and other soft-skills at the individual, group and organizational level. It was proved that this knowledge allowed SMEs to face global competition in a better way, by increasing performance and dynamic capabilities.
	Method of knowledge transfer	The relevance and suitability of the methodology "Learning to Grow", which uses principles and techniques such as the "Growth Wheel", the role of the facilitator and the double objective (business results and learning). A systemic view, participative approach and creativity were used believing that the best solution can emerge from inside the organization.
Transferee related	Partners skills	High proficiency of the partners involved in the implementation and a positive relationship between them. SEBRAE/SC, Ampe-BR and the NGS-UFSC worked together guided by the objective of promoting the growth of SMEs involved.
	Learning intent	Since the beginning, SMEs recognized knowledge acquisition as a main goal, and they allocate the adequate resources (human and financial) to reach this goal.
	Absorptive capacity	The SME selection process assured each SME had a reasonable knowledge base for implementing the "Learning to Grow" methodology. Also, the facilitator gave SMEs extra skills needed to maximize earned value from external knowledge.
	Reward systems	Similar to Spain and Germany, in Brazil the financial rewards were not major incentive. New responsibilities, opportunity to present the project results to the Director and other companies were the main motivating factors identified.
	Director commitment	As shown in Fig. 4, this factor resulted in a more collaborative style of working, featuring higher levels of delegation in SMEs. Directors participated in key decisions during the project and allocated the resources needed, but solutions were mainly developed and implemented by employees.
Relationship factors	Cultural fit	"Learning to Grow" methodology was customized before being applied in the Brazilian context.[a] Some variables reviewed were the methodology of participant selection, number of facilitator hours required for the follow-up to growth projects and the structure of workshops and meetings.
	Benchmarking activities	Benchmarking made against German and Spanish SMEs which had applied the methodology increased the level of

(continued)

Table 3 (continued)

Dimension	Critical success factor	Comments
		confidence in the methodology. It also enabled SMEs to acquire knowledge about relevant new technologies and management practices.
	Trust	A high level of trust and a collaborative culture was developed. According to Goh (2002, p. 30), trust also made it possible to "increase the propensity of employees and teams to share relevant knowledge and information."
	Quality of interaction	According to Gray (2006), knowledge sharing is fundamental for SMEs working in clusters. A positive spiral of knowledge sharing was possible due to the practices provided by the methodology and the trust existing between the participating members that enabled a learning network internally and between SMEs.

[a]This work was done during Dynamic SME Project, visit http://www.dynamic-sme.org/

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Virtual Enterprises: Strengthening SMES Competitiveness via Flexible Businesses Alliances

Ricardo J. Rabelo, Fabiano Baldo, Omir C. Alves-Junior, and Christian Dihlmann

Abstract This chapter presents some results of the implementation of the Collaborative Networks / Virtual Enterprise approaches in a group of mold-maker SMEs in the South of Brazil as a means to enhance their competitiveness. Working in collaboration more formally and intensively with each other leverages SMEs to better handle variable, on-demand and larger customer requests, thanks to the larger scale and wider pool of competences that companies get when working together. Those approaches allow SMEs to share resources, knowledge, risks, costs and benefits. This article also stresses the main obstacles and issues that have to be dealt with when implementing this strategy as well as good practices from a number of equivalent examples all over the world.

1 Introduction

Small and Medium sized Enterprises (SMEs) have faced enormous difficulties to remain sustainable in today's highly globalized and increasingly competitive market. Demands from the market are more and more complex, unpredictable and instable, which requires higher and higher quality, innovation and efficiency on the one hand, and lower costs and shorter delivery times on the other (Dekkers and Luttervelt 2006).

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Several SMEs have invested in new equipment, in more qualified people, in better manufacturing methods and other "operational" measures to face that reality. However, studies have been showing that this is not enough, as they do not pave companies' strategic growth for longer-terms (Westphal et al. 2010). One of the reasons is that companies keep trying to work too individually in their businesses. As a result, they lose many opportunities due to their intrinsic limitations (Vallejos et al. 2007).

Strategic alliances are one of the directions that have been pointed out as a powerful strategy to cope with that reality (Porter 1998). Actually, most of SMEs use to have some partnerships. However, they are often established sporadically, with pre-defined and very well-known partners, for given and *a priori* known businesses. This method is not sufficient to fully address the challenges of the modern business environment. Many works have highlighted the competitiveness boosting benefits of SMEs in getting more involved in larger and dynamic alliances (Vallejos et al. 2007).

Working in alliances is not a new strategy. Porter (1998), for instance, has established foundations about clusters since the 1990s. Collaborative Networks represents a wider vision upon strategic alliances that are grounded on alliance and cooperation. It embraces clusters, supply chains and industrial districts, among other types of alliances. In spite of their values, they are limited in providing companies with another dimension of scalability, flexibility and agility to cope with market needs (Camarinha-Matos and Afsarmanesh 2005).

More recent types of alliances have been proposed and implemented to overcome those limitations. Regarding the purpose of this paper, two of them are of particular importance: *Virtual organization Breeding Environment* (VBE) and *Virtual Enterprise* (VE). They are in fact complementary to each other. In general, they leverage companies to have larger production scale and access to larger pools of competences that companies would likely never have if they worked alone. Thanks to the intense collaboration enabled via these alliances companies can share resources, knowledge, risks, costs and benefits. This all increases the significance as VBEs and VEs are by far mostly composed of SMEs, which are often very limited in terms of finance, human resources, knowledge and technology.

Nevertheless, working collaboratively and so being empowered to reach those mentioned competitive advantages, requires a deep change in SMEs' working mindsets. In this scenario collaboration becomes a fluid, seamless and integrated routine activity applied to almost all businesses, rather than occurring only on the exceptional basis. There are many obstacles and issues to be dealt with in making this working method routine.

This paper aims at describing a Case of implementing the VBE and VE concepts in the *Moldmakers Association*[1] as well as at presenting some of the achieved results. It was conducted essentially as an action-research, qualitative, applied and

[1] For privacy reasons a trading name has been used in this article.

mostly inductive investigation, mixing a strongly grounded review of literature, case study and participative methodological technical procedures.

This paper is organized as following. Section 1 introduces the main problem and motivation for the proposed approach. Section 2 describes the *Moldmakers Association*. Section 3 presents a brief explanation on Collaborative Networks. Section 4 depicts the general methodology used to prepare companies and to implement the VBE and VE concepts. Section 5 focuses on the business processes modelled to represent the entire VE life cycle as well as on the software prototype developed to help SMEs in managing their VE-related businesses. Section 6 discusses about the results and best practices related to the implementation of VBEs and VEs. Section 7 presents final considerations of this work.

2 The Moldmakers Association

Moldmakers Association is a Brazilian network of mold maker SMEs placed in the Joinville City, south of Brazil. These manufacturing companies supply molds and tools mostly to automotive, electro-electronics and home appliances industries, mainly from Brazil. It was established 20 years ago and its members are completely independent to each other, being some members competitors of one another. Since 2011 *Moldmakers* started an initiative to work under the VE strategy having two main strategic goals: enlarging business possibilities (via larger production capacity) and maximizing resources utilization.

In its daily business, *Moldmakers* is used to receive a "package" (a set of) of molds. In very general terms and applying the VE approach, when a given package is contracted, the most suitable *Moldmakers*' members are duly selected (from the VBE) to manufacture it and then a group is created. Therefore, these are the members of the VE related to this given package. After being selected, these members become responsible for a single or set of molds, part of it, or for some specific manufacturing operations. This strategy of "collaborative division and work" is also communicated to the involved customers, who then know which members are involved with which mold. Following the rules defined in each VE's governance model, partners can be replaced in the case of severe problems during the production of given molds or when their performance becomes too low. *Moldmakers* members' performance is continuously measured and managed.

3 Collaborative Networks

Collaborative Networks (CN) is a general concept that embraces the diverse manifestations of collaboration-grounded alliances among disparate organizations. This involves the structure, behavior and evolution dynamics of networks of autonomous entities that collaborate to better achieve common or compatible

goal (Camarinha-Matos and Afsarmanesh 2005). As mentioned in the introduction, the VBE and VE types were used as the main basis for this work.

A VBE (*Virtual organizations Breeding Environment*) consists of a long-term alliance of autonomous companies—mostly SMEs—which have the willingness and minimum level of preparedness to collaborate intensively with each other so to operate more efficiently together. It can include competing companies as well as companies and service providers from one or more sectors. Companies can be very heterogeneous and largely distributed and they can belong to other networks (Afsarmanesh et al. 2008).

The ultimate objective when establishing a VBE is to create a trustful basis to breed and to more quickly launch VEs to attend given business opportunities. Afsarmanesh et al. (2008) stresses some of the other benefits a VBE provides to its members, including for example certifications, sharing of costs and resources, common and standardized policies, and access to best practices.

A VBE has a governance model, bylaws and code of conduct (Romero et al. 2010) and may be legally established. A VBE member loses part of its autonomy (but not its independence) since it has to follow some globally agreed rules.

A VE (Virtual Enterprise) is a dynamic, temporary and logical aggregation of autonomous, heterogeneous and geographically dispersed enterprises that cooperate with each other to better handle a given demand. Its operation is achieved via a coordinated access over partners' competences, resources, information and knowledge, mostly enabled by computer networks. It allows companies to offer a group of services as if they were an only single organization, sharing risks, costs and benefits. Once a VE is created, it works as a collaborative *network* of companies (manufactures, logistic operators, services providers, etc.), each one having an explicitly and legally settled set of rights and duties, both to the own network and to the involved customer. A VE dismantles itself after finishing all its legal obligations (Rabelo et al. 2004).

Figure 1 illustrates a VBE and a given VE which would emerge from it to cope with a given business. The dashed line indicates that customers start conversations with a VBE (or with some of its members directly) and then with the formed VE once the business becomes an official request.

Lifecycles of both VBE and VE are shown in Fig. 2. They are independent from each other but deeply inter-related. The success of both implementations fundamentally depends on how their processes are properly deployed (Vallejos et al. 2007).

The VBE lifecycle is generally composed of seven main phases.

– *VBE Analysis & Design*: strategic discussions and decisions about how to implement the desired VBE, the steps, timing and required resources, taking into account existing conditions (of several natures) and strategic objectives. This phase also includes the design of VBE's architecture, namely its components, types of actors, roles and relationships, infrastructure requirements,

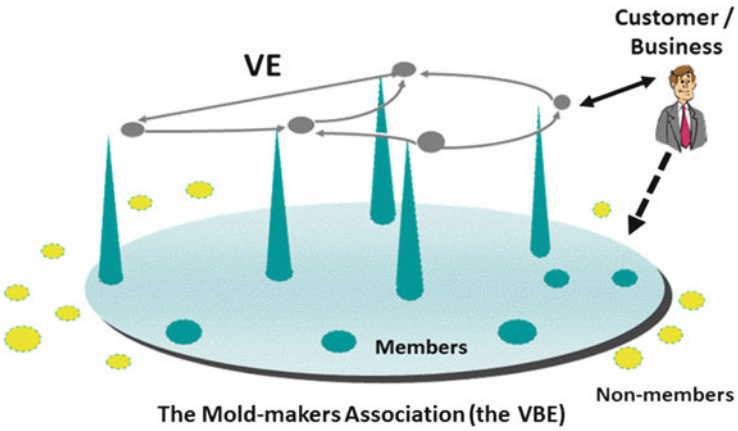

Fig. 1 The VBE and the VE creation

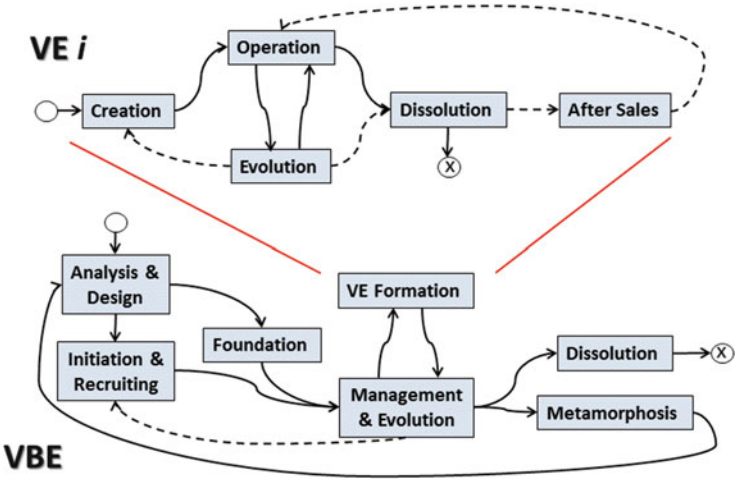

Fig. 2 The VE & VBE lifecycles. Source: Authors, adapted from Rabelo et al. (2014)

governance, operating and business models, bylaws, code of ethics, and mechanisms to attract members.

– *VBE Initiation & Recruiting*: the initiation phase refers to all legal preparations to launch the VBE and to be able to recruit members. Recruiting refers to advertising, selecting and transforming the approved companies into VBE members. Every company should be empowered with basic knowledge on how to work in a VBE, which includes many aspects, such as trust, governance and ICT infrastructure.

- *VBE Foundation*: this phase refers to the official VBE foundation. Depending on the deployment model, this can involve its legal establishment. Other actions may include hiring administrative staff, creation of visual identity, etc.
- *VBE Management & Evolution*: this includes management activities of the VBE and covers two levels: the implementation of the VBE itself and the management of the VBE's daily operations. VBE management acts more at the operational level (financial, organizational, technological, governance and personnel), including the performance and behavioral management of members, the inclusion and exclusion of members. VBE Evolution corresponds to tactical and strategic level management, coping with its sustainability. Actions to perform in this phase include handling changes in the VBE in terms of policies, marketing, customer relationship, governance rules and actors' roles, actors' feedback, business models, etc.
- *VE Formation*: the VE formation encompasses activities devoted to initiate new VEs once new collaboration opportunities are identified.
- *VBE Metamorphosis:* Occasionally the VBE's mission or profile should radically change as a consequence of a new strategic direction and of high impact internal or external factors which create the need for major changes in the VBE.
- *VBE Dissolution:* this phase refers to handling the closure of the VBE. A number of "drastic" factors can lead to this, such as the VBE's poor medium- to long-term outcomes or loss of commitment from crucial VBE actors.
- The VE lifecycle is generally composed of five main phases.
- *VE Creation*: it incorporates the activities to support the creation of a VE for a business. It includes issues like selection of the most suitable SMEs (based on a proper set of criteria), development of the governance model, setting up related performance indicators and metrics, identification of risks, setting up the VE as a project to be managed, contracts signature, and launching the VE.
- *VE Operation*: this refers to the daily VE operation management. It is constantly monitored to ensure the collaboration is on track, the involved processes are being correctly performed, and the performance metrics and SLAs are being fulfilled.
- *VE Evolution*: this handles the problems that happen during the VE Operation (e.g. inability of a partner to execute its task in time, the need to increase the workload, etc.). These problems usually lead to the addition, exclusion or replacement of a partner; changes in business' specifications and contracts; or even the business cancellation in very serious situations.
- *VE Dissolution*: this embraces activities involved with all the organizational, technical, financial, legal and regulatory aspects related to the VE ending. This can happen either when the associated business has been properly accomplished (i.e. VE partners delivered the service's solution as contracted) or when the VE did not succeed due to major problems.
- *VE After Sales*: this last phase involves processes related to, for example, maintenance, warranty, devolution and new extra services if the related business requires. This also refers to a set of concrete actions that VE partners should carry out after the "product" (in a broad sense) has been delivered (dissolution

phase), assuming that the VE has accomplished the business requirements successfully.

4 *Moldmakers* VBE Implementation Methodology

Implementing a VBE and creating VEs involve several aspects, which make this a complex and long process regarding the number of technical and non-technical aspects to embrace. Practice has shown the importance of applying a supporting methodology to decrease project complexity, costs, time and mainly, risks of failure (Romero et al. 2013).

In this work a methodology was developed, building upon two other works. The first one refers to ARCON (*A Reference Model for Collaborative Networks*). ARCON is a generic and abstract model used to understand and capture all the involved CNs entities and the relationship among them, both into the CN (the so-called *Endogenous* subspace) and between the CN and external elements and actors (*Exogenous* subspace) (Camarinha-Matos et al. 2008). Therefore, it is a model which allows the description of any kind of CN (e.g. VBEs and VE).

However, ARCON is an abstract representation, not being directly convertible into processes (i.e. in concrete steps through which a given VBE can be modeled and its processes defined). In order to tackle this issue, the work of Romero and Molina (2009) was used. It is a kind of generic representation of ARCON in the form of processes and their relationships, which are identified and modeled along the VBE and VE lifecycles.

In order to be ready applied, such reference model and processes should be *instantiated*. By instantiation it is meant the transformation of abstract concepts into real entities, i.e. instances, which in turn should be customized to a given particular case. In this sense, it can be said that the work being presented in this paper is an instantiation of Romero's model to the *Moldmakers* case and complemented with its deep characterization using the ARCON model structure and elements.

This section describes the methodology used in this work for deploying a *VBE* considering the *Moldmakers* case. The next section has the equivalent goal, but it is directed to the *VE* creation step of the whole methodology.

ARCON demands that the many aspects about the CN (that is going to be created) should be known in advance so as to serve as the input for deriving the particular model. In this sense, a set of preparatory actions had to be carried out to make a comprehensive analysis about the *Moldmakers* case. Such actions are actually related to the *VBE Analysis & Design* and part of the *VBE Initiation & Recruiting* phases (see Sect. 3). The following steps were executed (Baldo and Rabelo 2010):

1. *VBE Model Specification*: analysis and selection of the key-elements of *Moldmakers* that should be considered for implementing it as a VBE (Table 1).

Table 1 *Moldmakers* members' characteristics for preparedness assessment

Business process	Organization structure	Resources (human and ICT)	Organization culture	Market
– Production planning process – Production control process and data collection (for performance assessment) – Purchase process – Suppliers election process (enterprises and logistics operator) – Budget specification process – Raw material quotation process – Financial management process – Work power hire process – Third-part hire process and production control – Software acquisition, deployment and maintenance process	– Departments well-defined and structured – Functions and responsibilities defined – Low accumulation of functions per employee – Flexible structure and with few levels – Methodology for performance measurement and assessment well-defined and deployed	ICT – High utilization of ICT – Enterprise resource planning system – Internet resources – Internet utilization, systems via Web – Collaborative systems utilization (e-mail, chat skype, wflow, forum, etc.) – Enterprise website & Intranet service – CRM system – CAE/CAD/CAPP/CAM systems – Budget specification system – History record system – Systems for production control and data collection – Logistics system – Inventory management systems Human Resources – Qualified employees – Employees with good education (including other languages)	– Resource utilization optimization – Quality prioritization – Pro-activity – Standards and norms utilization – Partnership stimulation (interns and externs) – Process and conducts documentation – Group working – Creativity motivation – Employees satisfaction – Participation in events with other enterprises – Exchange enterprises with other enterprises – Sharing of information with service providers – Record of past experiences – Past knowledge utilization – Work with enterprises or customers from abroad	– Target market well-defined – Market strategy well-defined – Customer interaction (post-sales) – Post-sales – Product advertisement (Marketing) – Brand enrichment – Long-term planning – Co-creation of products (i.e. with customers)

(continued)

Table 1 (continued)

Business process	Organization structure	Resources (human and ICT)	Organization culture	Market
		– Employees adapted to work with technology – Employees with flexibility for changing Equipments – CNC machines – Industrial networks – Data collectors	– Participation in any type of strategic alliance	

2. *Assessment Characteristics Definition*: definition of the assessment elements that should be considered to evaluate the partners' preparedness level so as to better prepared to indeed be able to work as a VE. It considers the ARCON model's elements as well the analysis performed in Step 1. Table 1 shows part of the mentioned characterization of *Moldmakers* after Step 2.
3. *Preparedness Analysis*: assessment of the companies based on the elements defined in Step 2, identifying their weaknesses and strengths of the potential VBE members. It was done by applying questionnaires regarding the characteristics defined in Step 2.

   This questionnaire was composed of 45 questions related to and distributed over five categories: *business process, organizational structure, resources, organizational culture a*nd their *market/customers*. The questionnaires were distributed to six companies, selected by their own group as to better represent their variety in terms of size, organization and technology level. The responsible researcher for this task has assisted each manager in their filling. Answers were mapped using a *Likert Scale,* from 0 to 4, where 0 meant that the company basically didn´t support the given aspect or issue, and 4 that it strongly supported it. The questionnaire covered questions related to the aspects listed in Table 1.

   After analyzing all answers, the average value was 2.26 (2.28 for *business process,* 2.63 for *organizational structure,* 2.39 for *resources,* 2.15 for *organizational culture,* and 1.87 for *market)*. This global value was not considered good at all. Thus, *Moldmakers'* managers started to promote meetings with consultants to improve the most critical aspects and members, regarding their priorities and existing conditions.

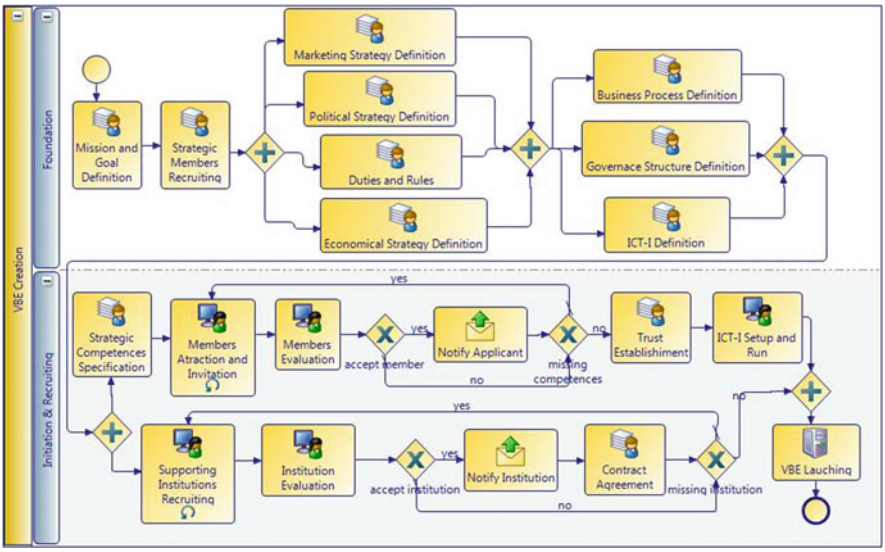

Fig. 3 *Moldmakers* implementation methodology; creation phase

4. *Implementation Methodology Specification*: this step refers to the definition of the actors, activities and all relationships related to these two elements taking into account the analysis done in Step 3. The underlying rationale of this step refers to the feasibility of the VBE implementation regarding members' preparedness, which is seen crucial for the successful creation of VBEs (Afsarmanesh et al. 2008). This step was carried out by instantiating the Romero's reference processes model for the *Moldmakers* case.

   Figure 3 shows part of this methodology instantiation, modeled using BPMN.[2] For conciseness the description of each process will be not be provided in this paper. It is assumed here that readers can have a rough idea about the processes by names, which are self-explanatory. Refer to Baldo and Rabelo (2010) for a detailed explanation. This instantiation is not a mere definition of "how to do" within every single reference process in each VBE lifecycle's phases. Instead, it involves a number of adaptations, new processes, the splitting of processes into subprocesses to deal with very specific issues of *Moldmakers* regarding its culture, working methods, decision-making points and general reality.

[2] BPMN—Business Process Modeling Notation language—http://www.bpmn.org/

5 *Moldmakers* VE Implementation Methodology

This section depicts some other phases of the VBE lifecycle, paying special attention to the VE creation and launching.

In the same way that it was done in the *VBE Analysis & Design* and *VBE Initiation & Recruiting* phases (Sect. 4), adaptations were also introduced in the VE reference processes to cope with the particularities of the case. Figure 4 shows the part of the conceived methodology related to the VBE management and VE creation phases. Again for conciseness it is not possible to explain the involved processes. They are described in more details in Baldo and Rabelo (2010).

The first task performed was the selection of a pilot group with eight members that were in charge of defining the VBE's mission and goals, marketing, political and economic strategies, and duties and rules. After that, they were involved with the definition of *business process, governance structure, performance indicators* and *ICT related issues*.

Concerning *business processes*, seven macro processes were designed covering the entire VE lifecycle. Each process comprises a set of steps expressing how the given process should be executed in the *Moldmakers* VBE. Figure 5 illustrates the modeling of one of those processes (*product testing*) within the *VE dissolution* phase.

Governance in networked enterprises can be defined as "the specification of rules, criteria for decision-making, responsibilities, and boundaries of actions and autonomy for the involved actors" (Roth et al. 2012). A governance model is

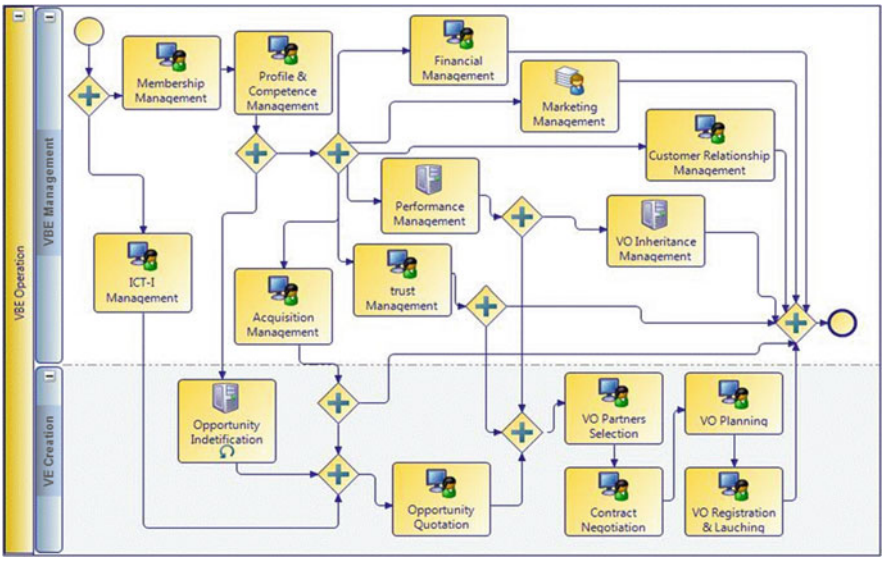

Fig. 4 *Moldmakers* implementation methodology; operation phase

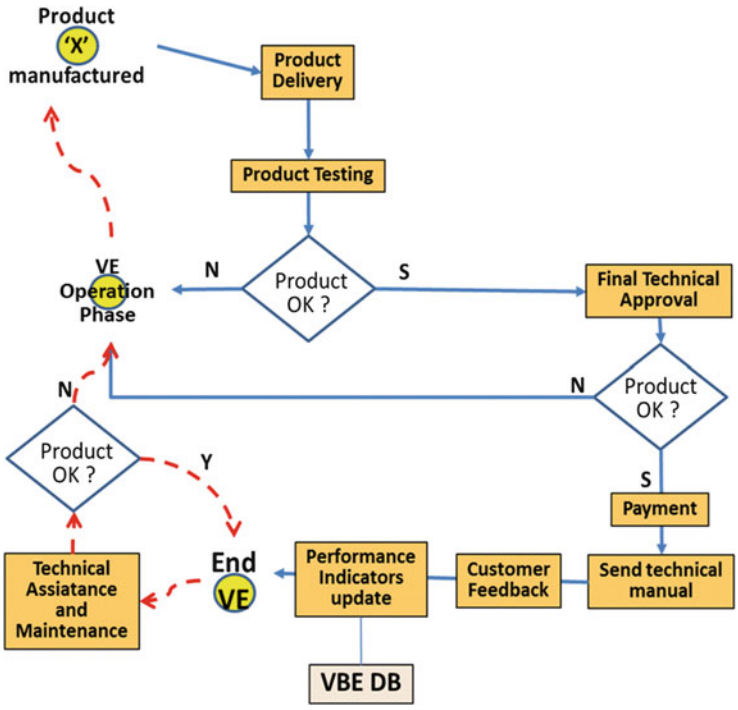

Fig. 5 *Moldmakers* VE dissolution process

fundamental for avoiding conflicts among partners, for speeding up decisions, and hence to mitigate VE failures.

A governance model for the *Moldmakers* VBE and VE were devised (Rabelo et al. 2014), comprising 54 rules to be followed by the different kinds of intra and inter-organizational identified actors that can be involved in each VE lifecycle phase's processes. Rules were expressed using the 5W2H technique (Koa 2013), mainly due to its clarity and simplicity to be understood, documented, consulted and maintained by SMEs. As such, all rules contain the following information and structure: *what* the rule specifies; *how* and *why* it is specified; *when* and *where* it is applied; *who* applies it and *how much* this is going to cost. A set of rules was designed to every single macro process (e.g. as the one showed in Fig. 5). Figure 6 shows an example of a rule to be applied in the VE creation phase when a given partner decides to subcontract another company to make a specific operation which any of the other members are capable of.

During the VE execution conflicts among partners often occur and they should be solved to guarantee the VE success. Considering that partners are geographically

What	Rule: Right – Supervision - Operational Remove a given mold from VE Member <i> when serious problems are in place.
Who	***Inter-organizational Actor:*** *Customer*
	Intra-organizational Actor: *VE Coordinator, VE member <i>*
Why	*A very serious technical or ethic problem happened related to a given package's mold produced by VE member <i>*
When	*When the customer consider that the way a given mold is being produced or was delivered by VE Member <i> is not correct regarding the specifications.*
Where	*Not applicable.*
How	*VE certifies the problem and notifies VE member <i> about the problem, grounded on the contract's clauses.*
How much	*According to the contract's clauses.*

Fig. 6 Example of the governance model's rule

dispersed, this can be helped by a web-based distributed decision support system, as the one developed by Drissen-Silva and Rabelo (2011).

Performance indicators have a critical role in a VBE and VE and should reflect operation and strategic goals. Partners are continuously evaluated as well selected to VEs through performance indicators. Following the implementation methodology and in order to define the list of such indicators, the main competences to be fulfilled by the VBE members were identified. This list is composed of 87 competences classified into the follow categories: *design, machining* and *injection*. All this was transformed into operation and strategic (KPI) indicators, which in turn were categorized into three levels: VBE level, VE level and organization level. The conception of the indicators has used the frameworks of Baldo et al. (2009) and Alves-Junior and Rabelo (2013), which in turn is based on SCOR.[3] Examples of indicators devised for *Moldmakers* generally include: increasing of orders fulfillment, decreasing of lead time, increasing of equipment utilization and increasing of customer satisfaction.

In terms of *ICT*, a system prototype was developed to support *some* of the designed VBE and VE processes and lifecycles. It has 42 functionalities (*use cases*). Figure 7 shows one of the several user interfaces provided by the system. It lists the Gantt diagram of one of the members of the VE identified as *VE Tower with 16 cavities*, where one of the package's molds is under responsibility of a given VE's member. Important to mention that this information can be accessed on-line by the respective customer as well as by the VE Coordinator according to what would have been specified in the contract and VE's governance model. Equivalent functionalities in the system allow companies' managers and VBE managers (if this is configured in the VBE's governance model) can go through the VEs already

[3] SCOR—The Supply Chain Operations Reference model http://www.apics.org/sites/apics-supply-chain-council/frameworks/scor

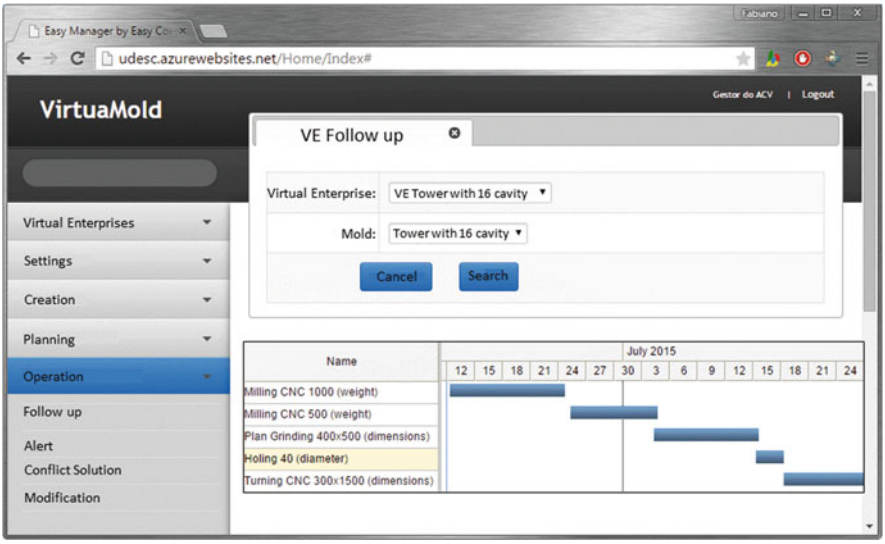

Fig. 7 A screenshot of the VBE & VE software prototype

created for e.g. historical purposes, performance comparisons, identification of common members, etc.

The ICT issue can become very complex in VBE and VE environments, especially due to the need of integrating and interoperating members' legacy systems to the VBE/VE high-level management systems. In Rabelo (2008) this issue is extensively analyzed.

6 General Assessment

This project is still ongoing. Reports have pointed out that some changes and effects of the implementation of the VBE and VE concepts in companies can only be perceived after many years; however, other results start appearing sooner.

In order to provide more useful and appropriate analysis (specifically on the *Moldmakers* case), a wider panorama of results is presented. It covers many initiatives on VBE and VE from many other cases and countries, and includes some of the already observed results of this case. Therefore, this can be seen as best practices and lessons learned on real VBE and VE implementations.

Three sources of information have been considered for best practices. The first one gathers results from the European ECOLEAD project[4] which studied nine VBE-like alliances, ending in 2008.

[4] http://ecolead.vtt.fi/

The second one joins the experiences of 18 VBE-like alliances collected from their presentations in the PRO-VE Conference (*IFIP Working Conference on Virtual Enterprises*) in the years of 2009, 2010 and 2011 (PRO-VE). The reports include 12 networks from Europe, 4 from Brazil, 2 from Mexico and 1 from Australia, which have been created over the last 15 years. Fifteen networks are composed of 7–30 SMEs, created with the core objective of joining efforts to gain some competitive advantage. Three networks were created within large companies with a focus on open innovation.

The third one considers *ad-hoc* readings of reports, blogs and conference papers that have analyzed VBE-like and VE-like alliances. It also included a special issue journal dedicated to describing the real implementations of VBE cases (Romero et al. 2013).

The analyzed networks are from the following sectors: engineering services and consultation, mold makers, lift industry, education, aerospace, textile, wine, construction, home appliances, traffic management, software, food and paper.

Implementing the VBE and VE concepts is complex, takes time and provokes many internal impacts in the involved companies during its implementation. Only with adequate methodologies the expected results can be achieved in way to solidly support the VBE evolution and sustainability. However, in spite of all these difficulties, SME managers have given some testimonies about VBE and VE implementation such as:

- *"We increased the closed deals in 30 % and the global VBE profit in 25 %";*
- *"The major challenge was building the trust among the members. However, having clear rules and governance mechanisms elaborated by all members helped to gradually create an environment with trust and greater collaboration";*
- *"The technological problem was the far less complex. The major problems were related to the change of the organizations' culture";*
- *"The level of interaction—even informal—among the members has increased immensely, which helped not only in the discussions about technical issues (e.g. in the exchange of experiences) but also in the trust building process";*
- *"The collaboration with competitors was less problematic in some cases, and it has even generated concrete synergy in certain businesses";*
- *"We have reduced the training cost in 35 % by creating larger groups with common interests";*
- *"All members have improved their general operational performance when their indicators were gradually exposed and compared one to another. However, there were cases where members left the VBE as they could not absorb the collaborative model at the expected level";*
- *"Some important results have showed up right in the first year of the VBE implementation, while other results only appeared about five years. Is it a gradual and continuous process of companies' improvement and collaboration reinforcement".*

In order to decrease the risks and to successfully implement a VBE and VE, the following main lessons can be highlighted in terms of being avoided or considered:

- Underestimation of cultural and trust problems.
- Overestimation of immediate business results and full collaboration operation;
- Network members cannot be just associates. They need to have a good and quite equivalent level of preparedness.
- There are few software applications in the market to support the additional collaborative business processes' requirements.
- Lack of commitment of all members. They both kept looking at their own businesses and didn't have an idea about what working collaboratively means.
- Lack of leadership within the network.
- Difficulty to have access to reliable information from different companies (and from their legacy systems) to the VE management and to further do benchmarking.
- Lack of longer-term and strategic plans for the VBE evolution.
- There are many new (collaborative) business processes to be added and/or modified.
- Changes should be implemented gradually as people become more used to collaborating, supporting methods (and ICTs) are prepared, and the processes are indeed understood and modeled.
- Lack of governance model, including power distribution, comprehensive decision-making and conflict-resolution actions, revenue practices and punishment rules. However, it is very difficult to reach a consensus on aspects like code of conduct, business policies, common methods, tools, norms and standards as well as the timing for their adoption.
- Governance model is not static and should evolve along with the VBE. However, some partners consider changes as inappropriate when they affect their companies.
- Difficult to set up the most adequate legal framework for VEs.
- Training people for collaboration is just the initial step. This should be permanently reinforced and managed.
- Difficulty of partners to share their best practices and their market "differential".

As an overview, when SMEs consider implementing Collaborative Networks (CN) model as a competitive strategy (and in more particular VBEs and VEs) to augment their competitiveness, it is important to have in mind that:

- CN is a still emerging area. More solid foundations and real case studies are required.
- Working as a CN is a strategic decision. There are pros and cons, risks and costs.
- CN implementation takes times. It is a long and gradual process.
- Working collaboratively should measurably prove its competitive advantages to its participants, including customers.
- Collaboration is difficult to put in practice and requires deep changes in people's working mindset.

- Most SMEs don't realize the potentials of CNs, but the ones that start first will be better prepared to "play" when the "near future" arrives.
- Additional processes and performance indicators are required to measure collaboration and its results.
- These processes are mostly automated, which requires adequate software tools and big system integration efforts, including with the other partners' systems.
- CN both leverages new business inside the network and helps SMEs to be better prepared to work with large companies in more profitable global value chains.

7 Conclusions and Management Implications

Working as a CN deeply impacts the way and the supporting conditions SMEs operate, including a higher level of organization, standardization, professionalism, systems integration, good practices and methods, processes modelling and auditing.

This paper presents current results of an ongoing project describing the process of transforming an existing small mold-maker cluster into a VBE and hence to support the creation of VEs out of it.

In this work a top-down approach to derive comprehensive instances of VBEs based on CNOs reference models has been applied. This standardized support facilitates further VBE scalability and evolution as the VBE model was conceptually created considering most of the aspects related to a generic and reference VBE model. The model and methodology are generic enough to be used as a guideline to transform classic industrial clusters into a VBE/VE.

The deployment of this methodology should consider the particularities and preparedness of the SMEs that are planned to be included in the VBE. The methodology's steps can present different levels of complexity depending on the existing local conditions (in terms of legal frameworks, financial availability, level of heterogeneity of partners, etc.), which has a direct impact in the implementation time. On average, and including the issues involved with the VBE foundation and launching, the creation of the first VE applying the adopted methodology can take from 3 to 5 years to be achieved.

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Glossary

Agility is the ability of a system to rapidly respond to change by adapting its initial stable configuration. In a business context, agility is the ability of an organization to rapidly adapt to market and environmental changes in productive and cost-effective ways.

Business continuity management a holistic management process that identifies potential threats to an organization and the impacts to business operations that those threats, if realized, might cause, and which provides a framework for building organizational resilience with the capability for an effective response that safeguards the interests of its key stakeholders, reputation, brand and value-creating activities.

Business excellence models see Management Excellence Models.

Business Process Modeling Notation (BPMN) graphical representation language for specifying business processes.

Collaborative networks (CN) a network consisting of a variety of entities (e.g. organizations and people) that are largely autonomous, geographically distributed, and heterogeneous in terms of their operating environment, culture, social capital and goals, that collaborate to better achieve common or compatible goals, and whose interactions are supported by computer networks.

Creativity entails some variation-selection process (or set of such processes) that generates and winnows out numerous conceptual combinations.[1]

Dynamic capabilities a company's ability to adapt to changing environmental conditions by continuously acquiring and applying new knowledge for restructuring the role of resources and capabilities.

Dynamic SME is a small social collectivity with a well-developed sensing, learning, integration and coordination capability. These capabilities become

[1] Simonton, D. K. (1997). Creative productivity: a predictive and explanatory model of career trajectories and landmarks. *Psychological Review*, 104(1), 66–89. http://doi.org/10.1037//0033-295X.104.1.66

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manifest in an agile, resilient and innovative behavior leading to sustainable competitiveness in turbulent environments.

Innovation action and effect from innovate. The embracement of new products, processes or services, management methods introduced into markets or commercially developed, not just invented, and new business models and social practices which brings new solutions for existing or even new challenges

Intangible assets non-physical resources, generally knowledge-based in action and capabilities, providing an organization with value.

Intellectual capital a set of intangible resources and capabilities related to different categories of knowledge (individual- explicit and tacit-, social or organizational and inter-organizational), integrated in principal components or "capitals", which provides the firm with a competitive advantage.

Intellectual capital report (ICR) it displays the situation of the firm's Intellectual Capital, by showing relevant information to be quantified regarding each element, variable and component to be reported on the development of the identification process of the critical intangible assets in order to set up value in the organization. It will be compiled in the relevant Synthetic Index at the reference moment.

Intellectus model of intellectual capital model for identification, measurement, reporting and management of intangible assets in organizations. Structured into six principal components or capitals: Human, Organizational- Structural, Technological-Structural, Business-Relational, Social-Relational and Entrepreneurship & Innovation.

Key Performance Indicator (KPI) type of indicator usually applied at strategic level to measure the company's performance from diverse perspectives.

Knowledge management (KM) enables individuals, teams and entire organisations as well as networks, regions and nations to collectively and systematically create, share and apply knowledge to achieve their strategic and operational objectives. Knowledge management contributes to increasing the efficiency and effectiveness of operations on the one hand and to change the quality of competition (innovation) on the other by developing a learning organisation

Knowledge governance models, processes and tools for creation, development, transference, sharing and management of knowledge in organizations.

Knowledge risk is the potential of losing knowledge intended to stay with the company.

Knowledge risk management systematic process of applying tools and techniques to identify, analyze and respond to risks associated with the creation, application and retention of organizational knowledge.

Management Excellence Models more frequently called Business Excellence Models aim at developing and strengthening the management systems and processes of an organization to improve performance and create value for stakeholders. Business Excellence Models are frameworks defining criteria for "excellence" of enablers such as leadership, strategy, customer focus, information management, people and processes and business results (customer

satisfaction, employee satisfaction, impact on society, financial results). Business Excellence Models—first called Total Quality Management Models—are now used in around 90 countries as a key mechanism to help businesses to improve.

NTBFs **N**ew **T**echnology-**B**ased **F**irms—firms recently established by a group of entrepreneurs, based on exploitation of a technological innovation and characterized by analytical knowledge base and strong reliance on explicit and tacit knowledge as their basis for competitive advantage.

Organizational learning OL is a collective learning process in which individual and group-based learning experiences concerning the improvement of organizational performance and/or goals are transferred into organizational routines, processes and structures, which in turn affect the future learning activities of the organization's members.

Reference Model for Collaborative Networks (RCON) it is an abstract model to understand and capture all the involved CNs entities and the relationship among them, both into the CN and between the CN with external elements and actors.

Resilience is the ability to maintain the functionality of a system when it is perturbed or the ability to maintain the elements required to renew or reorganize if a disturbance alters the structure or function of a system.

Risk management systematic process of identifying, analyzing and responding to different types of risks. It also includes the reporting of these risks.

Supply Chain Operations Reference (SCOR) management tool, spanning from the supplier's supplier to the customer's customer, supporting process modeling, performance measurements and best practices.

Turbulent Environment an environment in which uncertain and unpredictable external phenomena combine to form disruptive changes.

Virtual organization Breeding Environment (VBE) long-term alliance of companies with the willingness to collaborate towards mainly creating Virtual Enterprises/Organizations.

Vulnerability this describes the uncertainty related to risk management that threatens a company's operation.