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Systemic Intervention to Manage Complexity in Mexican SMEs to Last Over Time

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by

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Abstract

The purpose of this research is to develop a new methodology based upon ideas on managing complexity from the Viable System Model. The context for the research is Small and medium-sized enterprises (SMEs) in Mexico. Worldwide, SMEs represent the segment of the economy that contributes the largest number of economic units and employees, both in industrialised countries and in those that are less developed. However, the astonishing rate of change today influences most human activities, including business organisations, and, therefore SMEs. Organisational complexity continues to grow as organisations are forced to address more issues and greater diversity in their operating environments. So, the current challenges imposed by modern-day complexity suggest to think about new ways of approaching managementpractice. The research aims to adopt systems thinking approaches applied on daily life as an ongoing process, based on a learning system which aims to increase the ability to manage complexity in SMEs to last over time. The research design is based on an action research approach developing a single case study intervention, based on Yin's work, in a Mexican SME in order to provide the empirical data. To do so, this work presents a novel model (ModK+) and multi-methodology (MetK+) as a way of thinking and acting, respectively, to perform a systemic intervention, linking the philosophical, methodological and practical levels. Finally, and based on the sources of evidence, the researcher realised two main findings. First, the MetK+ facilitated the adoption of systems thinking approaches in the daily practice of organisational management: it helped managers to identify and to overcome their main challenges and it enabled them to better manage their complexity. Second, the researcher identified the positive impact of building a learning system because it helped managers to refine their learning cycle to manage complexity; however, despite having such a learning system it was clear that managers would still require further accompaniment after the systemic intervention to overcome inertia in their busy daily agenda.

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Chapter 1: Introduction

Introduction

This chapter introduces the context and approach of this research. The chapter contains three sections: sector, focus and scope. The section on sector offers a working definition of small and medium-sized enterprises (SMEs). The section on focus presents the research problem identified, the research questions and the theory and propositions considered. The final section addresses the scope of the work for this research. The chapter ends with a summary.

1.1 Sector

1.1.1 Definition of an SME

According to the Organisation for Economic Cooperation and Development (OECD) (2008), there is no single agreed definition of an SME. A variety of definitions are applied among OECD countries whereby SMEs are generally considered to be non-subsidiary and independent firms which employ fewer than a given number of employees that varies across countries. For instance, in the European Union, the most frequent upper limit designating an SME is 250 employees, while the US considers the upper limit to be 500. Small firms are mostly considered to be those with fewer than 50 employees, while micro-firms have at most 10. For this research, the researcher employs a definition of an SME using two sources: first, the characteristics of a firm for it to be considered an SME; and second, the Mexican criteria used to identify SMEs.

The definition of an SME in the *Dictionary of Economics* (1998) lists the following characteristics: an SME is a firm managed in a personalised way by its owners or part-owners, it has only a small share of its market and is not sufficiently large to have access to the stock exchange in raising capital. Given that, SMEs typically have little recourse to institutional sources of finance other than the commercial

banks and rely heavily upon the personal savings of the proprietors, their families and friends. The long-term growth in taxation on income and wealth is believed by some economists to have inhibited the growth of the small firm sector. SMEs play, however, an important role in the worldwide economy and promote new jobs. A few SMEs even grow to challenge existing large firms, change and renewal being essential features of the free market economy.

In the Mexican context, the basis for the current criteria for considering an enterprise an SME is the Mexican *Official Journal of the Federation*. In this journal, and based on the Law for the Development and Competitiveness of SMEs, the Ministry of Economy issued the last agreement about such criteria on 30 June 2009. The criteria are based on number of employees and annual sales. The criteria for Mexican SMEs are shown in Table 1.

Table 1: Criteria for the categorisation of Mexican SMEs (Source: OECD, 2013)

Size	Sector	Range of number of workers	Range of amount of annual sales (MXN million)
Micro	All	To 10	Up to 4
Small	Trade	From 11 to 30	4.01 to 100
	Industry and services	From 11 to 50	4.01 to 100
Medium	Trade	From 31 to 100	100.01 to 250
	Services	From 51 to 100	
	Industry	From 51 to 250	100.01 to 250

For the purposes of this research, Mexican SMEs are those that meet the above characteristics and the Mexican criteria.

1.2 Focus

The purpose of this research is to develop a new methodology based upon ideas on managing complexity from the VSM. In order to do this, an action research approach based on Checkland´s work (1985, 1999, 2000, 2012), including ideas from Yin´s (2009, 2014) case study method, has been adopted. A single case study intervention in a Mexican SME has been used to provide the empirical data

for the action research. In order to develop such intervention, the researcher needs to establish a research design that supports the deployment of a way of thinking (the model) and acting (the methodology) in the practice of SMEs' everyday life. The cornerstone to steer such ways to think and act start with the research focus. Thus, this section presents the focus of research considering: the research problem to be addressed, the research questions to be answered and the theory and propositions to be tested. So, having in mind the research questions, the researcher states the intellectual framework through a model which also considers the research gaps. Based on this model and considering the SMEs' challenges as the specific context for the research, the researcher integrates the methodology for the intervention. Having declared the model and methodology, the researcher enter into real-world situation to take part in it with all the people involved. Through the action in the situation, the researcher and people involved could develop different sources of evidence to be able to reflect on research questions, theory and propositions, based on data to summarise the conclusions.

1.2.1 Research problem

This section first addresses the context in which the problem is identified, followed by an explanation of the main perceived challenges in this context, and concludes with the identified problem.

SMEs play an important role in the world's economy and remain an important economic, social and political pillar, particularly in emerging economies such as Mexico. However, despite the particular significance of SMEs in emerging economies, the standard of the competence of the managers is low (Palacios, 1998). In addition, the researcher, as a reflective practitioner (Schön, 1991), has confirmed several types of managerial challenges faced in Mexican SMEs that influence their growth and development over time. The first type of challenge is related to managers' understanding of the relation between organisational culture and their organisation's performance (Fuenmayor, 2001, 2012a); the researcher has come to realise the necessity of understanding the key cultural characteristics within organisations that influence their current and future complexity management. The second type of challenge is related to the necessity

for managers' systemic understanding of their organisation, as this influences their perceived reality in order for them to act using a holistic approach (Ackoff, 1981, 2006; Palacios, 1998). Within this category, the researcher has observed the following aspects in Mexican SMEs: first, limited understanding of the environment in which organisations exist and one that is based on a few individuals; and second, poor understanding of an organisation as a whole system, whose nature, purpose and boundaries extend beyond the internal actors. The third type of challenge is related to managers' understanding of the key external and internal organisational variables that directly influence the management of complexity in organisations and have a direct impact on their capacity to respond appropriately to their environment (Espejo & Reyes, 2011). In addition, failure to identify the correlation between internal and external key variables and the balance between them affects perceptions of the complexity of a whole system when looking to improve its performance (Beer, 1995). The final type of challenge is related to managers' skills and their abilities to execute agreed actions in a coordinated way - via a team - based on a learning system that allows people to improve relevant skills and abilities over time (Checkland, 2006).

Finally, based on the above challenges, the identified problem in professional practice focuses on the lack of awareness that exists among SME managers in taking complexity management into account as a key aspect of the management agenda and how this could be improved by using systems thinking approaches (STAs) in practice. According to Beer (1995), it is not enough just to consider the four M's: Men, Materials, Machinery and Money: "Today, the stuff of management includes the four Ms, but is best denoted as: Complexity" (p. 31). It is necessary for managers to use daily, and in the field, systems thinking approaches in a much more complex environment than before. In daily practice, however, they need to manage complexity as a core business process using a continuous learning system in order to improve their skills over time. In summary, SMEs need to adopt complexity management as part of their internal culture across the entire organisation in order to enable stakeholders to address the challenges that the modern world presents in an increasingly complex environment.

1.2.2 Research questions

The focus of this research is to build a methodology to promote the use of an ongoing process of complexity management. This process will be adopted by regarding an SME as a system with a formal and continuous learning process. The understanding and management of complexity should help SMEs to last over time, achieve stronger financial results and develop their organisational culture.

Based on the above-stated problem, the researcher developed one main and two secondary research questions. The main research question is:

- How can Mexican SMEs increase their ability to understand and manage complexity in order to last over time using the systems thinking approaches in their daily practice?

The secondary research questions are:

- How can a systems thinking methodology be developed for organisational management in SMEs to be used in daily practice in order to manage complexity?

- How can a continuous strategic process be developed as a learning system to manage complexity in Mexican SMEs in order for them to coevolve with their environment?

Therefore, the aim of this research is to design a practical approach to managing complexity in SMEs, based on a systemic methodology as the foundation for a learning process that will help people to enhance their skills and abilities to face increasing complexity currently and in the future.

1.2.3 Theory and propositions

Even when research questions focus research, Yin (2014) recommends developing a theory and propositions in order to refine the research focus. A

theory and propositions are based on the research questions and serve as a context because the theory should have a specified and clear set of circumstances within the propositions which are believed to be true. Furthermore, the theory and propositions are useful in the future in determining whether the propositions are correct or whether some alternative set of explanations might be more relevant. In addition to a theory and propositions helping to focus research, they could also help at the end of a piece of research in analysing the generalisation of the lessons learned. Therefore, the research questions, a theory and propositions are very useful in bringing attention to factors that should be developed during the research and help in structuring the final discussion and conclusions.

From the above research questions, the researcher developed the following theory:

- The adoption of systems thinking approaches (STAs) applied on a daily basis increases the ability to manage complexity in SMEs in order to last over time.

In order to support the above-stated theory, the researcher developed the following propositions:

- A systemic multi-methodology intervention (with methods, techniques and tools to apply it) specifically designed for SMEs will be very helpful in order to facilitate the adoption of an STA in the daily practice of SMEs' organisational management.

- Today, an ongoing strategic process to adopt a systemic methodology is necessary in order to increase the ability to manage complexity in SMEs.

In summary, the research questions, theory and propositions stated above point to two key aspects: first, the need for a methodology to apply systems thinking approaches to manage complexity; and second, a need for an ongoing strategic

process to adopt such a methodology in daily practice as a learning system in order to enhance managers' skills and abilities to work as part of a team.

1.3 Scope

1.3.1 Scope of work

The scope of the research is aimed at Mexico as an emergent economy. Within the Mexican context, this research will focus on SMEs due to their high level of importance to that country. In addition, and according to Adizes' Lifecycles (1994, 1999), most of these kinds of enterprise are located between the "Infancy" and "Go-Go" stages, with characteristics such as flexible organisation, high demand from the market, lack of management systems and being based on individuals instead of working systems. According to Bonilla (2010), this kind of characteristic distinguishes Mexican SMEs. Finally, this research is oriented to the manufacturing sector due to new trends in the Mexican Government offering support programmes to SMEs, which are discussed later. The characteristics of the scope of the research are summarised in Table 2.

Table 2: Scope of the research

CHARACTERISTICS	SCOPE
Country	México
Size	Small and medium organisation
Employees	10-250
Maturity level	Between Infancy and Go-go stage
Profile	Manfacturing sector, innovative and entrepreneurial culture.

This research is oriented first towards Mexican SMEs due to their significance to the country. However, there is no doubt that SMEs are a current key element in worldwide economies and share many similarities (Palacios, 1998). In the future, this work could be adapted to other countries.

1.4 Structure of the thesis

In order to address the focus and scope of this research, the researcher presents an outline of the thesis.

Chapter one presents the introduction to this research through three related aspects: the enterprise sector where this research will be developed, the research focus based on the research questions, theory and propositions to be tested and finally, the scope of work for this research. From the very beginning, the researcher defined these aspects in order to steer his research.

Chapter two introduces six key aspects to be considered as the context for this research: the meaning of ‘organisation’ related to its social role, the significance of SMEs worldwide and within the Mexican context, the world’s increasing complexity and its impact on SMEs, the SMEs' challenges in this complex environment, the review of how to address such SMEs' increasing complexity using a new way of thinking and acting based on systems thinking approaches and finally, the identified gaps in the literature considering a new approach.

Chapter three describes the research approach linking three topics. The first topic is about the research orientation, reviewing the philosophical, methodological and practical levels to frame this research. The second part is related to the process of building the model as a way of thinking about systemic intervention and finally, the third aspect presents the process of developing the methodology for the intervention and the research design in order to deploy this work.

Based on the research approach, the researcher presents the research results in chapter four using a case study narrative based on the same structure as the intervention design: from the stages through their phases, sub-phases and themes. The researcher also develops the narrative considering the guidelines of the selected multi-methodology approach.

Chapter five discusses the findings, defining at first the strategy for discussion and based on analysis of the case study’s sources of evidence. The researcher presents the discussion considering the focus of research developed in chapter

one. Thus, the researcher analyses the performance of the multi-methodology approach and the effect of the ongoing process on people involved and their learning improvement.

This thesis ends with chapter six, which presents the conclusions considering six topics: the achievement of research focus, the achievement of the challenges and gaps identified for the research, the uselfulness of methodology for research and intervention and concludes with the contributions to knowledge and the next steps for research.

Summary

The inspiration for this research comes from the researcher's reflective process, developed from field observations of change processes in organisations of different sizes, industries and organisational maturity levels (Adizes, 1994) with different challenges. During this process of reflection (Schön, 1991), the researcher has been able to identify the effect of increased complexity and, at the same time, the impact of systems thinking approaches on the field, in order to address such challenges.

Professional practice is a constant process of problem-solving (Schön, 1991), which can be used as the basis of a reflective process to generate useful implicit knowledge. However, this reflective knowledge is required to be grounded, integrated and theorised in order to replicate its benefits for most organisations, which is precisely what the researcher has tried to do with his work in order to generate useful knowledge.

Chapter 2: Literature review

Introduction

In this chapter, the researcher explores six aspects related to the research questions with the aim of clarifying the context of SMEs in managing complexity, in order to build an appropriate and robust methodology capable of dealing with the research problem. The first aspect to be considered is related to the social role of an organisation, not only as an instrument of a capitalist society, but also as a community in which human beings can develop and grow (Ackoff, 2006). The second aspect to be considered is related to the worldwide economic significance of SMEs and their social impact. The third aspect concerns the increasing complexity in the world and its effect on the SME sector. The fourth aspect is related to SMEs' challenges in the light of such increasing complexity. The fifth aspect involves the necessity for a different way of thinking and acting in order to face these challenges. The final aspect to consider is the current state of this new way of thinking for managing complexity in SMEs using a practical approach. This chapter ends with a summary.

2.1 The meaning of ‘organisation’

2.1.1 Introduction

In this section, the researcher aims to explore the meaning of ‘organisation’ for us as a society and particularly in Latin American societies. First, the researcher states a definition of organisation, followed by a historical analysis of the evolution of the concept of organisation through time. Finally, the researcher presents an analysis of the meaning that we ascribe to organisation in our society, followed by core aspects to be considered in order to recover the social meaning of organisations seeking the common good.

2.1.2 Social role

Epstein (1977) argues that, from the 1970s, there have been several indicators of increased explicit concern about an enterprise's social responsibilities. Social responsibility emerged, not simply as a matter of conscience for the socially motivated, but as a continuing undertaking by an enterprise which is subject to an increasing range of expectations by the stakeholders in an 'advanced industrial society'. However, Hiller (2013: 287) warns us as a society:

> In the wake of the most recent financial crisis, corporations have been criticized as being self-interested and unmindful of their relationship to society. The corporate form has been called "ailing," or "broken," "social technology" (Metcalf and Benn 2012; Sovacool 2010) and an entity with "legal personality, but presumably no interest in humanity" (Munch 2012, p. 170). Indeed, the blame is sometimes placed on the legal form, to the extent that it has been argued that, "the corporate form now threatens human survival" (Metcalf and Benn 2012).

As human beings, we have a dichotomy in our society: although we promote the social role of enterprise, at the same time, it seems that we are more centred upon our own benefit and less upon society.

According to Fuenmayor (2001), the idea of 'organisation' is related to a human activity system designed under a certain order to fulfil a predetermined and explicitly predefined purpose. This definition aims at understanding an organisation, not only as a physical entity located in space and time, but also as a human construct i.e., as a shared abstract conceptualisation. Today, an enterprise is defined as an organised system with a purpose: the key point is that the purpose depends on the human beings participating in the enterprise. Checkland (1999) argues that the history of human affairs is crucially important because it determines, for a given group of people, both what will be noticed as significant and how what is noticed will be judged. It reminds us that in working in real situations we are dealing with something which is both perceived differently by different people and is continually changing. Thus, there are different perspectives of an enterprise to understand and perceive.

Ackoff (1981) states that our understanding of enterprises has evolved over the last two centuries. In the era of the Industrial Revolution (from the late 18th to the

early 19th century), organisations were conceptualised as machines, whose function was to serve their creators in achieving earnings. The aim was simply to produce profits; employees were treated like replaceable machines and their personal aspirations were not important to their employers. The concept of an organisation as an organism emerged after the First World War (1914-1918). Under this approach, the enterprise had its own life and purposes in surviving and growing. Profits were considered as 'oxygen' but not as the rationale for existence. The management was considered as the brain and the employees the organs. Under this approach, labour conditions were improved and evolved. The Second World War (1938-1945) accelerated this change: the level of training was increased, labour conditions were improved, and technical specialisation increased exponentially. In these conditions, employees could easily move to another company and, as a result, their personal aspirations became important to their employers.

The main issue for managers was to work with people. Thus, a new concept of an enterprise as an organisation emerged and, under this concept, both the company and its employees pursue certain purposes. An organisation became an entity related to different stakeholders: employees, suppliers, customers, investors, debtors and the government. Thus, the organisation became a social entity whose social purpose was drawn up based on the relationships with the stakeholders, and not only to earn profits. An organisation has, therefore, a social responsibility. Even from the business perspective, an enterprise's economic role in society is to facilitate consumption in order to create and distribute wealth without degradation of life quality, both within itself and in terms of its environment. The main purpose of an organisation is to develop itself and, at same time, facilitate and enable the development of its related stakeholders. However, evolution continues and Ackoff (1981: 49) states: "As societies develop, their tolerance to poverty diminishes"; it is necessary to become a highly productive society again, searching for low costs and high quality but in an more complex and chaotic environment, which enhances the instrumental meaning of an organisation rather than its social one.

Fuenmayor (2012, 2012c) argues that the impoverishment and fragmentation of meaning in today's world means impoverishment and weakness in our collective

history upon which each phenomenon is drawn i.e., it is a problem of the impoverishment of our historical and cultural background from which the form of anything is drawn. However, Fuenmayor (2012c, 2015) also states that the most important distinctive feature of the human condition is 'to make sense' of everything. This making sense constitutes the holistic unity of everything, whatever the case. As human beings live in communities, organisations play a fundamental role in our modern societies. Organisations are a key element of our culture. However, for us as a society: What is the meaning that we attribute to an organisation? Is it just a simple way to achieve wealth? Or, is it a social system in which the human beings involved can grow and develop? Fuenmayor (2012, 2012b) also states that the holistic condition of something is related to its meaning to us. In that case, what is the holistic condition of an 'organisation'? Human beings attribute meanings to the world based on their historic-cultural background or culture. The meaning of something always requires a context for such a meaning or an interpretive context.

Regarding our historic-cultural background as Latin Americans, Fuenmayor (2001c: 14) argues:

> …our present historical conditions in the west are such that the notion of humanity is rapidly losing its meaning and moral force…it simply means that it is not fashionable any more… "humanity" is losing its moral force because it is losing its meaning and it is losing its meaning because it is losing its moral force. In other words, humanity is losing its importance in relation to constellation of concepts and notions which give meaning to our present life.

One problem is that, in Latin America, we live in modern instrumentalist societies (Fuenmayor, 2012, 2012b). According to Fuenmayor (2012), this instrumentalism has three forms: the first is one that aims to understand anything as a means to achieve a predefined and unquestioned goal; the second is constituted by what he calls "the socio-cultural omni-presence of technology" (Fuenmayor, 2012: 5), which gradually appears in our thinking path; the third is more sophisticated and has lain at the heart of modern science since its birth i.e., this is an instrumentalism that appears as reductionism, or the non-systemic condition of the way of thinking and behaving within modern science. Fuenmayor (2012: 7) argues:

> Indeed, by different tracks in the field of research that we were ploughing, we came to the conclusion that the reductionism and premature analysis that characterizes science (against which we offered a systemic onto-epistemology), and which explains the neglect of the holistic meaning of phenomena via dualistic-reductionist science, is just a cultural consequence of a much larger problem that is eating away the marrow of western culture. We live in "westernized" societies which are those that became from the imposition of some form of Western culture on another culture that was originally non-Western. In the midst of our perplexity, it was becoming apparent that life in present western and "westernized" cultures is characterized by the impoverishment of the meaning of whatever takes place and by the fragmentation of the meaning of collective and individual life.

On the other hand, the systems thinking approach was driven by an 'instrumental interest' in the efficient organisation of means to given ends, independently of the moral nature of such ends. Fuenmayor (2012: 3) also points out:

> Indeed, we saw with concern, that the practice of systems engineering was being aimed at a very different purpose than to holistically understand human activities organizations in order to direct them towards the common good. By contrast, engineering and systems science, in their day to day practice, were emerging as tools to design and maintain complex organizations of which it would never be asked for their meaning or social role and how they would contribute to the common good.

This instrumental interest was far from the original intentions of seeking the common good. Fuenmayor (2012, 2012b) states that instrumentalism, beyond being a trend, is a cultural way of being which seriously threatens the ability to make holistic sense of whatever takes place in our current culture. The deterioration of holistic sense is not only present in the practices of science and technology, but in the everyday life of those who live in 'westernised' cultures. 'Westernised' societies are characterised by the gradual impoverishment and fragmentation of the meaning of everyday life and this impacts directly upon what we mean by organisation. The holistic sense is the basis for seeking the common good as a society. In order to recover our holistic sense, it is first necessary to recover our ability to experience the world and to take account of it. Fuenmayor (2012: 3) argues that

> the deterioration of the basic possibility of holistic sense was not

> restricted to science and technology, but was undermining the daily lives of those who live in western and “westernized" cultures. This observation brought about a shift, or rather a leap, from our interest in the holistic study of human activity organizations to a more general interest: the possibility to recover a holistic sense in everyday life.

However, how is it possible to recover a holistic sense in our modern societies and thus inside organisations? According to Fuenmayor (2012c: 2), a core aspect lies in our relation with the world, with regard to which he states:

> If you experience yourself as an open, ephemeral being, always being towards whatever-is-the-case, you do not possess, you belong; you belong to happening; you belong to the continuous process of unconcealing, enduring and perishing of what takes place; you belong to a world that is like a living being in a continuous process of self-generation. The ethos of this belonging is thankfulness and indebtedness; and its expression is care.

In our current society, this is quite difficult to understand, because what is presented in our lives is just the opposite of “thankfulness”. As a society, we try to use the world for personal gain and examples of this proliferate around us (Espinosa and Walker, 2011); i.e., we, as human beings, need to experience ourselves in such a way that we do not possess things or other people; we just need to take care of them, of their disclosure. However, our current being is defined by possession and it has become more a ‘having’ than a ‘being’. The problem is that having or possessing is something we take as the normal condition of life, while not-having is regarded as a diminished condition of life; even as abnormal. Therefore, we are not grateful for the gifts of life; we are only angry when we do not have them because we feel that our basic being has suffered a diminishment. On the other hand, the act of experiencing the world moves us to be part of the world; to belong to it not only as an actor, but also as a member of a community called an organisation. The belonging sense moves us to feel gratitude and indebtedness to the world and the organisation and to take care of them, in order to find a holistic sense in daily life and to search for the common good (Fuenmayor, 2012c, 2015). As a society today, how are the stakeholders experiencing organisations in order to belong to them and to feel gratitude and indebtedness in taking care of them and thus improve the holistic sense by searching for the common good? Fuenmayor (2012: 7) states:

> Evading the holistic understanding of the meaning of phenomena is not an exclusive attitude of reductionist science; it is, rather, the fundamental manifestation of the final crisis of western culture in the present epoch acutely manifested in some of those "westernized" cultures whose traditional cultural forms were destroyed without replacing them by the cultivation of modern European culture in their soils.

However, making sense is not just a thinking activity i.e., it is not a rational activity. Making sense involves acting, feeling, loving, intuiting, thinking, speaking and any other form of communication, which are ways to both harmonise with the world and to help to express its process of unfolding respectfully and discretely. These ways of harmonising and expressing come together under the form of caring. Our mission as the human race is to take care of the world and of whatever is disclosed in it and by it. Thus, making sense is intrinsic to such caring. However, harmonising with and expressing the world is not a one-day activity. On the contrary, it is a never-ending process, a life quest, in which it is possible either to keep to the right or wrong track. Keeping on the right one is only attained by persistence of the will; otherwise, straying takes place. For instance, both crafts and arts are involved in the quest for excellence i.e., for harmony and artistic expression. The craftspeople's aim is not simply to produce necessary goods; they perform their activity as well as it is possible. They are embedded in a continuous process of improving the quality of their crafts in terms of the harmony and expression of the whole (Fuenmayor, 2012c).

Espinosa and Walker (2011) state that it is necessary to re-establish our connection with the ecosystems in which we live and that this involves a different understanding of both our societies and of ecosystems as large, complex, dynamic and interactive socio-ecological systems. Espinosa and Walker (2011: xii) argue:

> The new paradigm concerns our place in a world of exploding complexity, and how we reinvent our enterprises and institutions to create a society which can thrive not only in the present, but in such a way which allows our children and grandchildren to live their lives in a similar fashion.

2.1.3 Summary

The concept of enterprise has evolved over time. For this research, an enterprise is considered to be a social organisation that represents a human activity system designed with a certain order to fulfil a defined purpose related to the stakeholders involved, but, in the end, based on human conceptualisation. As human beings, however, our historic-cultural background influences this conceptualisation. The role that we ascribe in our society to an enterprise is based on this background. The Latin American societies are losing their identity and they are trying to adopt a 'westernised' one, in which an enterprise is almost an instrument. In order to reverse this trend as a society, we at least need to recover a holistic sense by seeking the common good (Fuenmayor, 2012c). Therefore, for this research, it is important to promote the search for the common good among stakeholders in order to share the organisational purpose of facing complexity in organisations.

2.2 The significance of SMEs

2.2.1 Introduction

In today's society, enterprises are classified in many ways, one of which is related to size. In general terms, and according to their size, there are micro, small, medium-sized and large enterprises. As an enterprise is one of the most recognised organisations in modern society (Ackoff, 2006), the researcher needs to explore which classification has the most social and economic impact. This is done in the following section.

2.2.2 The worldwide impact of SMEs

SMEs are of great importance in an economy and in employment nationally and regionally, both in industrialised countries and in those that are less developed. Worldwide and from an economic perspective, SMEs represent a segment of the economy that contributes the largest number of economic units and employees (OECD, 2013). In the international context, 90% or more of total economic units are made up of SMEs. SMEs generate more than half the employment but

smaller fraction of gross domestic product (GDP). In addition, the OECD (2013) notes that, generally speaking, SMEs contribute between 15% and 50% of exports and between 20% and 80% of SMEs are active exporters. In many countries, SMEs represent the most dynamic sector of the economy, playing an important role in competition, as well as providing ideas, products and new jobs (National Institute of Statistics and Geography; or, in Spanish, the Instituto Nacional de Estadística, Geografía e Infomatica [INEGI], 2011). For instance, the OECD (2012) points out that the SME sector accounts for 99% of enterprises between OECD members (34 countries worldwide) and 50-75% of the value added across these countries.

Micro and SMEs are an essential component of Latin American business and there are various indicators that support their importance in the region: the proportion of all businesses that are SMEs, the number of jobs they create, and, in some countries, even their contribution to GDP. However, there are several contrasts between SMEs' contribution to GDP in Latin America and in OECD countries. In Latin America, large firms produce around 70% of GDP, while in OECD countries large firms contribute only 40%, with the rest produced by SMEs. While SMEs provide many jobs in Latin America, they contribute little to production. This reflects their heterogeneous production structure, their specialisation in low-value-added products and the small contribution SMEs make to exports (less than 5% in most countries). As a result, the productivity gap between Latin American and OECD countries tends to persist over time. In summary, these gaps in productivity and export capacity are caused by the highly diverse economic structures in the region (OECD, 2012).

2.2.3 The impact of SMEs on Mexican society

In general, the worldwide and Latin American patterns in terms of the significance of the SME sector are quite similar to those in Mexico. According to the OECD (2007), the size and employment distribution in Mexico in 2007 was as shown in Figure 1.

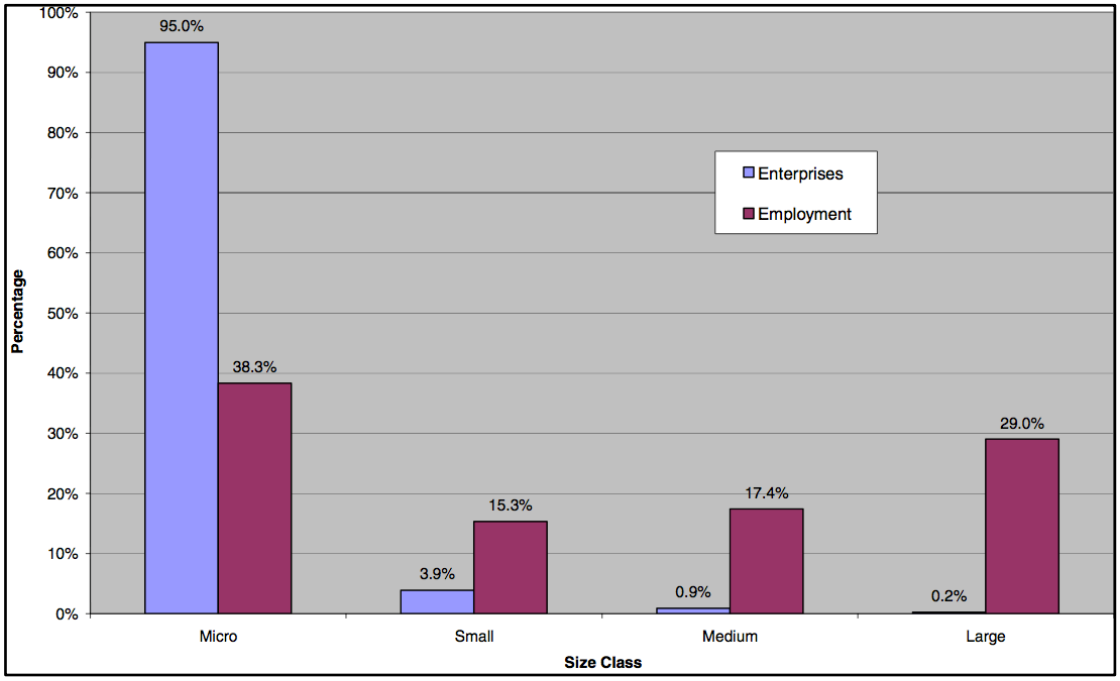


Figure 1: Distribution of employment and enterprises by firm size (Source: OECD, 2007)

One year later, the proportion is quite similar. According to the Economic Census for 2008, Mexico had 3,643,982 firms, of which only 5,944 were large companies (i.e., 0.2%). The rest of the firms, classified as SMEs, represented 99.8% of all enterprises, the same trend as in 2007. In more recent data, the trends were more or less the same in 2012: according to Promexico (2013), Mexico had approximately 4,015,000 economic units, of which 99.8% were SMEs that generated 52% of the GDP and 72% of the employment in the country. Finally, according to the OECD (2013), the Mexican SME population in Mexico was 4.1 million in 2010, accounting for an estimated 52% of GDP and 78.5% of total employment. Table 3 and Table 4 compare the size and employment distribution, respectively, in Mexico and various countries as a percentage of total enterprises.

In addition, Mexico has a high proportion of micro-enterprises, shown in Figure 2 as a percentage ordered by firm size. Of the 35 countries shown, Mexico has the third-highest proportion. However, Mexico appears to suffer from a dearth of medium-sized enterprises (OECD, 2013).

Table 3: Size distribution of enterprises (Source: OECD, 2013)

	Micro	Small	Medium	Large
Brazil	66.4	26.6	5.7	1.3
United States	76.9	19.9	2.0	1.1
United Kingdom	87.9	10.1	1.6	0.4
Spain	92.6	6.5	0.8	0.1
France	93.0	5.9	0.9	0.2
Mexico	**94.5**	**4.4**	**0.9**	**0.2**
Portugal	94.5	4.7	0.7	0.1
Greece	96.7	2.9	0.4	0.1

Table 4: Employment distribution of enterprises (Source: OECD, 2013)

	Micro	Small	Medium	Large
Brazil	7.3	19.7	21.7	51.3
United States	11.1	23.0	13.2	52.7
United Kingdom	21.5	17.4	15.2	45.9
France	24.3	20.4	15.8	39.5
Spain	38.3	24.5	14.8	22.4
Mexico	**39.5**	**16.2**	**16.7**	**27.6**
Portugal	41.8	23.0	16.4	18.9
Greece	58.2	17.5	10.7	13.6

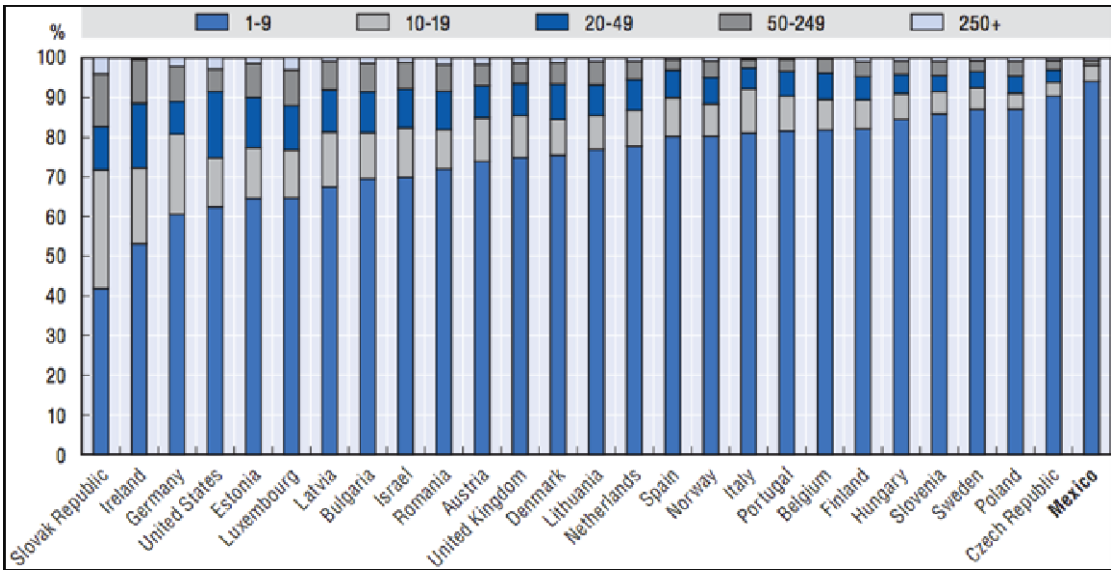


Figure 2: Enterprises by size class, 2008 or latest available year (Source: OECD, 2013)

Table 5 shows the evolution of Mexican SMEs by sector. Although the highest percentage of growth of economic units comes from the services sector (35%), the trade sector has more economic units and the same pattern is shown when reviewing the number of employees. A comparison between 2003 and 2008 shows the trade sector with the highest number of economic units and employees. According to INEGI (2011), service sector economic units account for 36.7% of the national total, a percentage that ranked second in the nation, after trade. In the same sector, total employees represent 36.5% in first place. Finally, the total gross output of the service sector represents 21.7% of the national total. In Mexican SMEs, the service sector also has the largest participation with 47% of the total, after the trade sector with 26%, manufacturing with 18% and the rest that operate with other activities with only 9% (CNN Expansion, 2013). Based on the last Mexican Economic Census (INEGI, 2011), we can also see that the service sector was the sector with the largest growth, both in economic units and the number of people employed.

Table 5: SME growth by sector (Source: INEGI, 2011)

	Economic Units			Employed persons		
Sector	2003	2008	Percentage of growth	2003	2008	Percentage of growth
Services	1,009,149	1,361,945	35.0%	3,462,240	4,953,780	43.1%
Trade	1,576,872	1,854,197	17.6%	4,170,778	5,250,051	25.9%
Manufacture	325,667	433,618	33.1%	2,003,966	2,345,817	17.1%

However, the OECD (2013) argues that the size structure of enterprises can be affected by the sector composition of the national economy. The predominance of manufacturing micro-enterprises in Mexico relative to other countries is shown in Figure 3. This sector in Mexico represents 94% of the total and is the highest among the 27 benchmarked countries.

The Mexican Ministry of Economy created the National Institute of the Entrepreneur (in Spanish, the Instituto Nacional del Emprendedor [INADEM]). INADEM aims to implement, execute and coordinate national policy in order to support entrepreneurs and micro and SMEs by promoting innovation, competitiveness and projection in the national and international markets to

increase their contribution to economic development and social welfare. In order to review the main concern of the Mexican government regarding the development of SMEs, the researcher requested an interview in 2014 with Dr Alejandro González Hernández, who was the General Coordinator of Strategic Planning, Monitoring and Evaluation of INADEM. Dr González confirmed the relevance of the manufacturing sector to the Mexican SME development strategy. He explained to the researcher the national policy regarding SME sector development and commented on the importance of the work in the case study to the manufacturing sector in terms of the future application of this research.

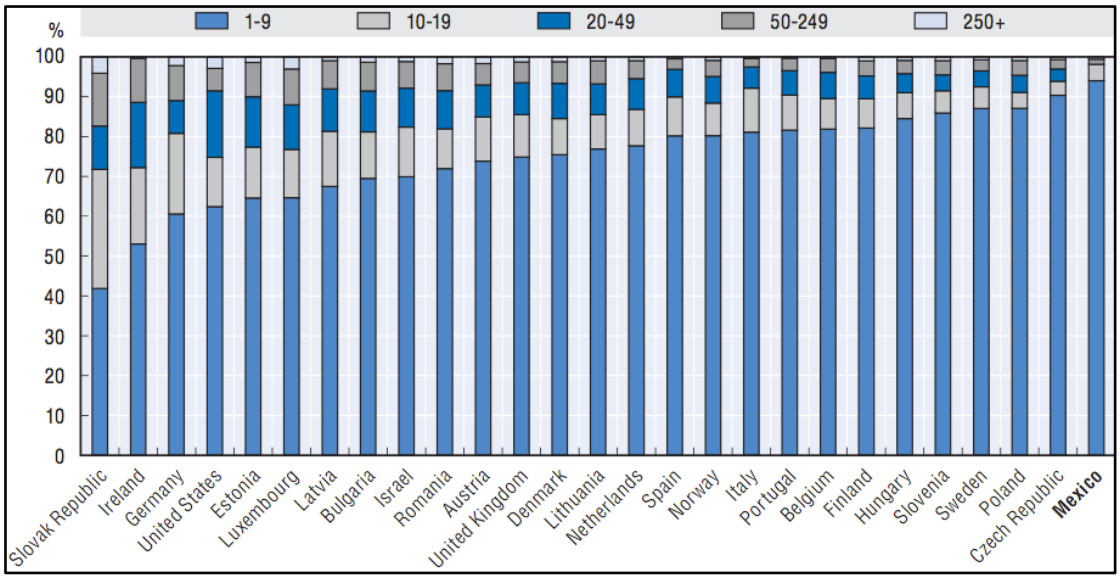


Figure 3: Manufacturing enterprises by size class (Source: OECD, 2013)

2.2.4 Summary

This research focuses on the SME sector as comprising the most important organisations for social development. The relevance of SMEs follows the same patterns worldwide in Latin America and in Mexico in terms of both economic and social impact. However, in Latin American countries and in Mexico, it is necessary to consider how to improve the productivity and export capacity of the SME sector in order to enhance these abilities so that these organisations can face the current challenges of the global economy. In Mexico, manufacturing is the largest SME sector and deserves the main focus based on its relevance to Mexican development.

2.3 The world's increasing complexity

2.3.1 Introduction

As stated, we need to recover a holistic sense of seeking the common good in our most influential organisations: enterprises. In today's society, the most influential enterprises worldwide are SMEs. However, although SMEs have a major impact as organisations in modern society, they also face increasing complexity. In the following sections, the researcher presents the key definitions of complexity and a brief analysis of increasing complexity and its effects on SMEs.

2.3.2 Key definitions

In order to address the increasing complexity of enterprises, we need to understand two aspects: what is complexity, and how can it be measured? According to Beer (1995), the management is the task of managing complexity. Beer (1995: 31) also argues that complexity

> is the net result of social and technological change. Small things have become larger. Simple things more elaborate, slow things faster…Typically, all these changes are increasing their rate of change. Then, on the top of everything, the nature of the changes is such that separate things increasingly become connected together.

Thus, ultimately, complexity is the result of the way systems behave and interact. Ashby (1956) defines complexity as the potential of a system to exhibit different states or behaviours. For the point of view of this research, complexity is the net result of the increasing social and technological change of a system which interacts with other systems, and this condition has an impact on the potential of such a system to exhibit different states. In addition, a new concept has emerged to measure complexity: variety. Espinosa and Walker (2011: 13) argue:

> Ashby introduced the term "variety" as a measure of perceived complexity; both in mechanical and in social dynamic systems. It refers to a repertory of potential behaviours, which is normally fuzzier, more subject to interpretation and less predictable in social systems.

2.3.3 The increasing complexity in the world

Beer (1995: 3) states: “The basic unit of complexity is any one possible state of the system. For, as the number of possible states increases, the complexity rises – to very alarming proportions, because the rise is exponential”. In today's world, the astonishing rate of change also has a large influence on most human activities. Enterprises are a formal key component of the development of different human activities systems. Therefore, SMEs are also influenced by this rate of change and the complexity associated with it. The researcher presents below two variables that have an impact on increasing complexity, in order to gauge the meaning of the exponential growth that affects society and thus SMEs.

According to DSS Research (2011), the world’s population has grown exponentially in the last century, as shown in Figure 4. The world’s population surpassed 1 billion people in the early 1800s. Almost one century later, around 1930, the world’s population surpassed 2 billion people. After reaching this point, the world’s population shows marked exponential growth: in less than 30 years, the world’s population had topped 3 billion by 1959; however, it took less than 15 years to exceed 4 billion in 1974. From this point, the world’s population shows the same pattern: 13 years to reach 5 billion in 1987, 12 years to reach 6 billion in 1999, and 13 years to achieve 7 billion in 2012. Current projections estimate that it will take at least 14 years to reach 8 billion people. According to Howell (2015), although our ancestors are known to have been around about six million years in the past, the modern form of humans only evolved about 200,000 years ago. However, civilisation as we know it is only about 6,000 years old and the industrialisation era only started in the 1800s. Our population exploded from the industralisation era to the present day. Even if we just consider human civilisation over the last 5,800 years, the world’s population was below 1,000,000 and, in just 3% of this time, the world’s population grew by almost eight times. The first time the world’s population doubled took almost one century, but the next time the world doubled its population only took around 40 years.

If complexity refers to the possible states that a system can show, have you ever imagined the impact over time of the human race on the world's possible states, growing at the rate it did in the last 3% of the duration of our civilisation?

Unfortunately, we do not need to imagine; every day we need to cope with this increasing complexity (Espinosa & Walker, 2011). The problem is that the world's increasing complexity has not only been affected by population. Many variables that have an impact on our society have grown in parallel, such as technological development, transportation and communications. The impact on our society due to the recombination of these variables is evident every day and in many possible ways.

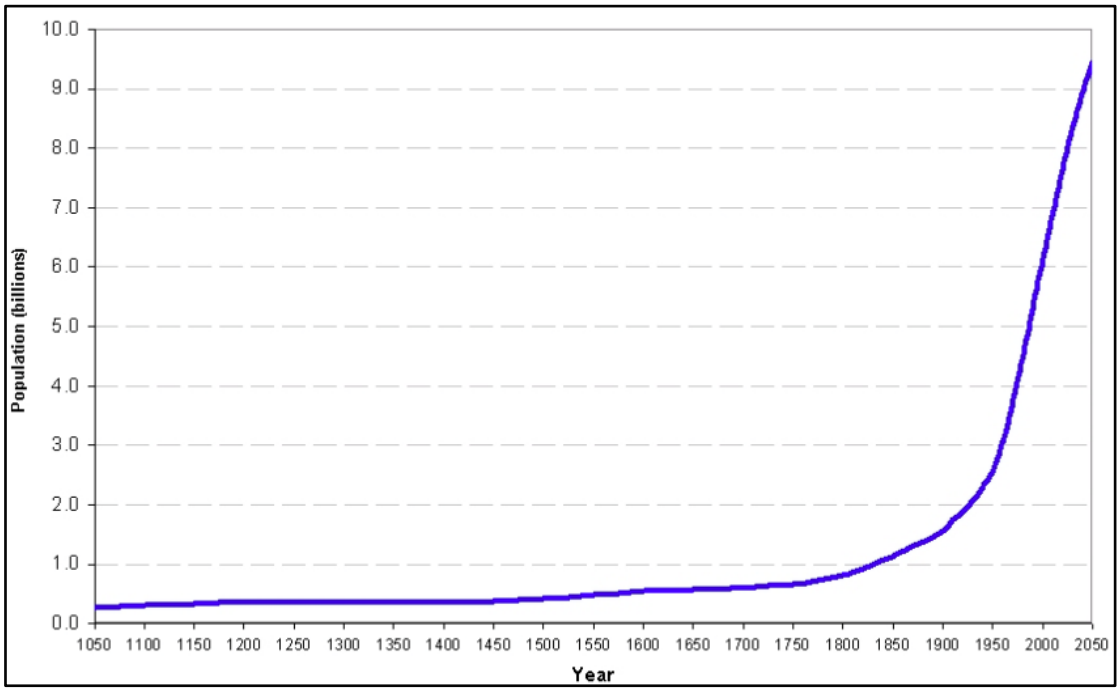


Figure 4: World population growth trend (Source: DSS Research, 2011)

As a metaphor, if the world has had one year of existence, the human race has only been around for five seconds (Braga et al., 2014). Regarding technological development, it is important to gauge that in the past significant technological breakthroughs, such as the printing press and the telegraph, occurred hundreds of years apart, while significant inventions now occur even within the same decade (Emerging Technology Advisors, 2014). Figure 5 shows the exponential rate of significant inventions through time.

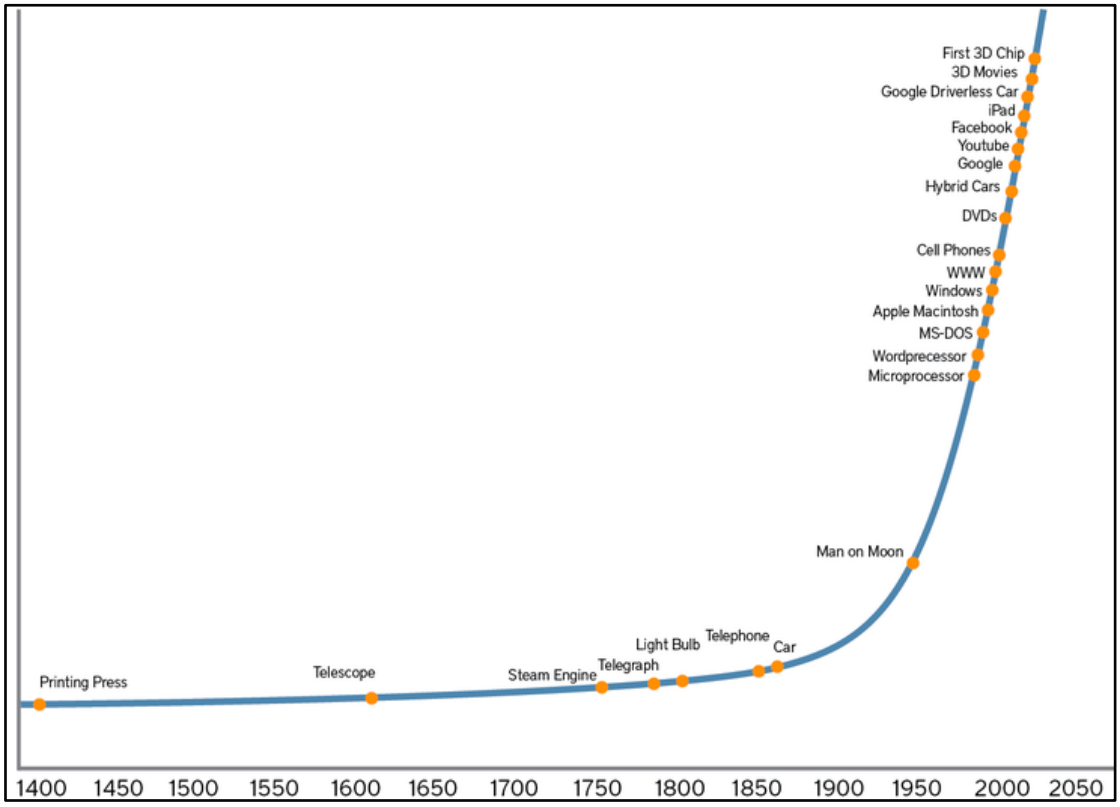


Figure 5: Accelerating growth in technology (Source: Emerging Technology Advisors, 2014)

Espinosa and Walker (2011: xii) state:

> The massive increase in population, the extraordinary advances in science and technology, and the adoption of an organising principle that says "economic growth is good" have resulted in an explosion in the complexity of our human systems. The result is an increasingly complex global network.

We, as human beings, are forgetting the common good and we are exploiting resources and even ourselves in such a way that we are strongly pushing ecological systems towards a tipping point, with severe changes in our society. Espinosa and Walker (2011: 3) emphasise that "The problems we face as a species are the result of our inability to deal with the exploding complexity of our social and ecological interactions at the local, regional and world levels".

Hoverstadt (2008: 4) argues that

> organisational complexity continues to grow as organisations are forced to address more issues and greater diversity in their operating environments. Technology proliferation, globalisation, market fragmentation and other macro-level changes force organisations to

> operate in increasingly complex ways and with increasingly complex structures.

All these problems are of our own making: they are a direct consequence of the way that humanity has conducted itself since the Industrial Revolution (Espinosa & Walker, 2011). As a society, we have two main aspects to consider: our mindset in understanding our relation to the world and how this impacts on the solutions we try to implement. Despite our way of thinking regarding the common good, organisations continue to be based upon a set of theories, methodologies and methods that are hopelessly inadequate for dealing with the challenges imposed by modern-day complexity. As Hoverstadt (2008: 4) points out,

> The reason the old models are failing is that the problem is not just organisational complexity or the rate of change. It is the combination of the two and the dynamic that these have together. The rate of change drives organisational complexity and it drives up the rate of change. Organisations are locked into this reinforcing cycle.

Since the traditional way of managing change also fails in an overwhelming number of cases, far from enabling organisations to adapt and prosper in this fast-changing environment, the traditional approaches actually prevent adaptation (Hoverstadt, 2008).

We now live in globalised and more open worldwide markets, which demand increased competitiveness, innovation and flexibility and these in turn demand more adaptive structures. In this context, contemporary complexity theories that inspire managers with ideas about self-organisation are in demand. New paradigms are necessary in management science to address emerging unprecedented challenges in our current world. These new paradigms need to explore organisations as complex systems. According to Bohorquez and Espinosa (2015: 21):

> Studying social organisations as complex systems had became more relevant over the last few decades, mostly as a result of strong critiques to the traditional mechanistic paradigm in which organisational theory was originally based, and of related questions about the lack of effectiveness of hierarchical control associated with it.

Self-organising systems are those that operate autonomously, and coevolve among themselves through transitions between disorder and order. These types of system have been studied by different schools of thought which can be classified as complexity sciences and complex adaptive systems (CAS) that study natural and artificial complex systems, such as ant colonies and the internet; meanwhile, organisational cybernetics focuses on self-organisation in businesses and social organisations (Bohorquez & Espinosa, 2015). These approaches provide a firm and scientifically anchored foundation to explore and understand human organisations immersed in current complexity by using a holistic approach (Maguire et al., 2011). Classical science ontology is based on isolated objects, but complex systems approaches consider the ontology of connected entities, resulting in a network that has links that change, nodes that change internally, and capabilities that develop and change over time. These approaches not only offer a new view of the world, but also new methods for studying and generating knowledge about it (Maguire et al., 2011).

Maguire et al. (2011) also argue that while complex systems approaches and their use in modelling organisational phenomena are in some ways revolutionary, it is important to underline that systems approaches to understanding organisations and the construct of complexity each have long and respected heritages within management and organisation studies. Indeed, Reed (1985; as cited in Maguire et al., 2011) argues that systems theorists dominated management and organisation theory from the 1930s to the 1970s.

Espinosa and Walker (2011: 8) argue that at the

> core to the development of needed new holistic approaches, was the appearance of cybernetics, defined at the beginning as “the science of communication and control in animals and machines” (Wiener, 1965)… Cybernetics is about how a system governs, or regulates itself not the way it can be controlled from the outside. Therefore, cybernetics is about how systems regulate themselves, evolve and learn. Cybernetics has also been defined as “the theory of complexity” (von Hayek, 1972) and Beer defined it as “the science of effective organisation” (Beer, 1979).

SMEs in Mexico and worldwide are subject to the reinforcing cycle between the rate of change and organisational complexity in this interconnected world

(Hoverstadt, 2008). For the purpose of this research, it was important to focus on complexity science in order to find a way to manage complexity in SMEs.

Increasing organisational complexity affects, and will affect even more in the future, all human beings and their organisations. Beer (1995: 31) states:

> Management at every level, from our management of ourselves through every sort and size of aggregation to the management of the Earth is itself "complexifying" – and it receives complexifying interference from every other level too. Thus complexity proliferates; and it has become virtually unmanageable with existing managerial tools.

2.3.4 The impact of complexity on SMEs

The entrepreneurs and SMEs of today are acting in a world marked by major transitions. The process of developing and growing SMEs is a far more complex undertaking today than just a few decades ago. At the same time, in many parts of the world, the economic perspectives consider SMEs as vehicles of growth in a complex and chaotic environment; the same is associated with the potentialities of entrepreneurial ventures. It is necessary to gain improved insight into the logic of how SMEs can be managed in times of high complexity and chaos. As a result of the nature of the changes in which separate elements become increasingly connected, new challenges for SMEs are emerging in new scenarios: globalisation, internationalisation, innovation networking and institutional entrepreneurship, both for entrepreneurs and for enterprises (Christensen & Poulfelt, 2006).

2.3.5 Summary

Complexity is a net result of change in a networked environment that boosts the potential of a system to exhibit different states which are measured using variety. Today's society is immersed in a global race, in which different variables contribute to an exponential increase in complexity, such as in population growth, technological development and mobility. This complexity directly affects organisations such as SMEs, moving them towards a globalised environment that

demands internationalisation, innovation and networking. In this research, it was important to consider how to face the increasing complexity in a globalised world.

2.4 The challenges for SMEs

2.4.1 Introduction

International organisations have conducted in-depth periodic studies on the SME sector. In a study conducted in conjunction with the Ministry of Economy in Mexico, the World Bank observed the following challenges for SMEs: funding as a major challenge, lack of business advice, poor administration, the low qualifications of human resources, lack of markets, lack of technologies and poor organisation (Kuznetsov & Dahlman, 2008). The OECD (2007) also pointed out in a report that the main weaknesses of SMEs are as follows: insufficient know-how, low-level technology and limited access to financing. If these groups of challenges are reviewed during the history of SMEs worldwide, the patterns are the same (Committee of Inquiry on Small Firms, 1972). However, despite the Mexican government's efforts regarding these challenges, the fact that only one in every five SMEs survives its first year is still the same (Duarte, 2008; Flores, 2013). Based on this finding, some questions emerge: Are these real challenges for Mexican SMEs in order to be viable through time? Should we think differently about these challenges based on a different perspective? Are we facing these challenges appropriately? Do we need new ways of understanding and facing them? Thus, the following section starts to analyse the evolution of the challenges for SMEs to better understand them in this research as a specific context that influences the management of complexity in SMEs.

Instead of reviewing different studies related to the challenges for SMEs, the researcher preferred to follow the path of an international and specialised organisation such as the OECD. The OECD works with governments to understand what drives economic, social and environmental changes and analyses and compares data to predict future trends. The mission of the organisation is to promote policies that will improve the economic and social well-being of people around the world, and Mexico has a close relation with the OECD

as a member of this community and particularly in the issues related to the SME sector, in which Mexico works and follows the OECD's guidelines closely (OECD, 2013). Through specialised teams, the OECD develops periodic worldwide studies on the SME sector. By reviewing these periodic studies, the researcher could trace the trends in this sector over time in order to understand the evolution of the challenges to the SME sector and clarify the challenges that should be considered in this work.

2.4.2 The challenges' approach

SMEs and entrepreneurs are critical to ensuring economic growth in a sustainable and inclusive way. However, start-ups and small firms continue to face significant obstacles to fulfilling their potential to innovate, grow and create jobs (OECD, 2014). As micro-enterprises and SMEs account for a large share of the employment in Mexico, policies to foster entrepreneurship are at the centre of the reform agenda of the Mexican government. The framework conditions for SMEs and entrepreneurship have improved in recent years through reforms such as regulatory simplification, expansion of the national loan guarantee programme and the integration of the micro-enterprise sector. Nonetheless, the share of SMEs in Mexico's total value added remains lower than in other OECD countries, suggesting that there is much potential for relying on SMEs as a powerful driver of growth in this country (OECD, 2013).

Almost 12 years ago, the Mexican government started a concerted policy effort to support the SME sector and stimulate new firm creation in order to accelerate economic growth, create jobs and reduce poverty. In the period between 2001 and 2006, the Mexican government boosted the Under Ministry of Small and Medium Enterprises within the scope of the Ministry of Economy, in order to promote and coordinate policies, establish a central budget in an SME Fund, and create SME programmes that focus on access to finance and innovation. Since then, the effort has been strengthened. The programme's support to SMEs has been extended to include nascent entrepreneurship and micro-enterprises, and new intermediary organisations are involved in delivering SME fund programmes. Business service structures for policy delivery to entrepreneurs have been enhanced, such as a doubling of the number of business incubators. These

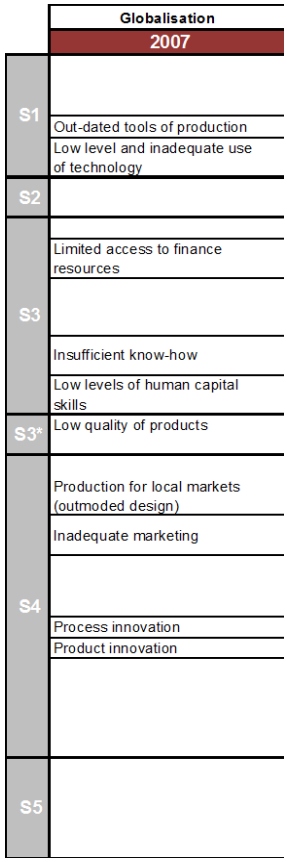
policies are bearing their fruits in Mexico, with one of the highest business birth rates among OECD countries and in the Latin American region. Favourable macroeconomic conditions have been installed, burdens on starting a business have been reduced, investments in human capital and technology transfer have increased, and financial markets have been developed (OECD, 2013).

However, despite these efforts, the failure rate for Mexican SMEs is still the same (Duarte, 2008; Flores, 2013). In the following sections, the researcher analyses the challenges experienced by SMEs outlined in OECD studies. In addition to assessing these studies, the researcher will summarise the analysis in a table, which will help to build a graphical image of these challenges over time in order to have a systemic view of the business context of SMEs and its implications for facing increasing complexity.

2.4.3 SMEs' challenges over time

In its study on "SMEs in Mexico: Issues and policies", the OECD (2007) points out the following fundamental weaknesses in the SME sector. First, insufficient know-how and the low level of technology mean that Mexican SMEs often produce exclusively for local markets. The products for these markets generally suffer from outmoded design, outdated tools of production, low quality and inadequate marketing. SMEs also suffer from low levels of human capital skills, inadequate use of technology and limited access to financial resources. In contrast, in the same country, there is a small segment of internationally competitive SMEs, mainly located in metropolitan areas, which have modern equipment and a strong culture of innovation. The technological gap is mainly related to weakness in product and process innovation, reflecting insufficient research and development efforts. Second, the lack of financing at reasonable cost. SME financing in Mexico is marked by asymmetries. While large companies in tradable sectors have access to bank credit, SMEs rely mainly on suppliers. For instance, in 2005, this kind of credit represented two-thirds of the finance for SMEs (OECD, 2007). Table 6 presents a summary of the perceived challenges in 2007, grouped by the systems (S1, S2, S3, S3*, S4 and S5) of the Viable System Model (Beer, 1995) for future analysis:

Table 6: Summary of 2007 challenges



The internationalisation of SMEs in developing countries and transition economies has attracted increased attention in recent times (Ibeh & Kasem, 2011). In 2008, the OECD published a study titled “Removing barriers to SME access to international markets”. In this study, the OECD emphasises the relevance of the internationalisation of SMEs within a global context. SMEs were subject to the pressures of globalisation and the entrepreneurial response required by businesses in order to deal with increased competition (Ibeh & Kasem, 2011; Kim & Mauborgne, 2005). In spite of the debate surrounding the negative impact of globalisation on the internationalisation of SMEs due to increasing competitive pressures, SMEs have found opportunities in the global economy. The internationalisation of SMEs is even developing at an increasing rate (OECD, 2008). In its 2008 study, the OECD reported the outcomes of two surveys: one from the OECD member countries’ perspective and the other from SMEs’ perspective. The top 10 barriers from the members’ perspective and from a range of 24 internal barriers and 23 external barriers are presented in Table 7.

Table 7: Top 10 barriers to the internationalisation of SMEs (Source: OECD, 2008)

Rank – weighted factor	OECD 1997 classification	Description of barrier
1	Capabilities	Inadequate quantity of and/or untrained personnel for internationalisation
2	Finance	Shortage of working capital to finance exports
3	Access	Limited information to locate/analyse markets
4	Access	Identifying foreign business opportunities
5	Capabilities	Lack of managerial time to deal with internationalisation
6	Capabilities	Inability to contact potential overseas customers
7	Capabilities	Developing new products for foreign markets
8	Business environment	Unfamiliar foreign business practices
9	Capabilities	Meeting export product quality/standards/specifications
10	Access	Unfamiliar exporting procedures/paperwork

Despite these perceived barriers, Figure 6 shows that 53.8% of government support programmes focused on barriers related to market access, 47% on financial support, 35.9% are oriented to developing internal capabilities, and only 9.4% addressed barriers within the external business environment.

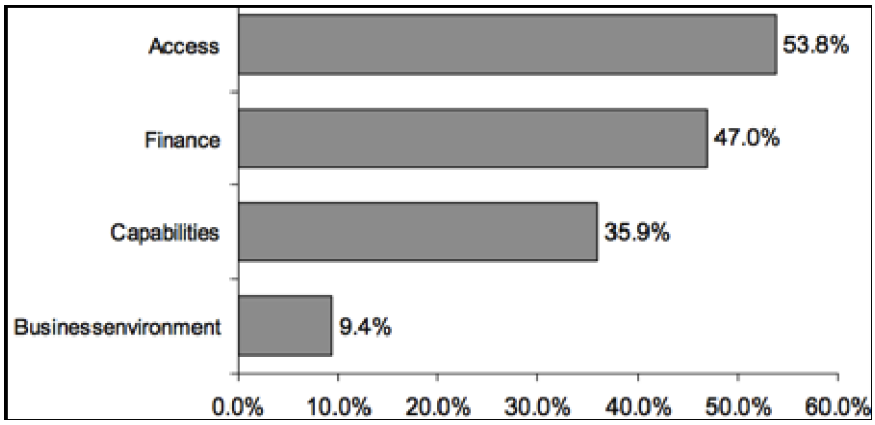


Figure 6: Government support programmes (Source: OECD, 2008)

However, the second survey was issued to obtain SMEs' perceptions of the most significant barriers to internationalisation. The results of this survey are presented in Figure 7. The top 10 barriers from SMEs' perspective are enclosed in a red box.

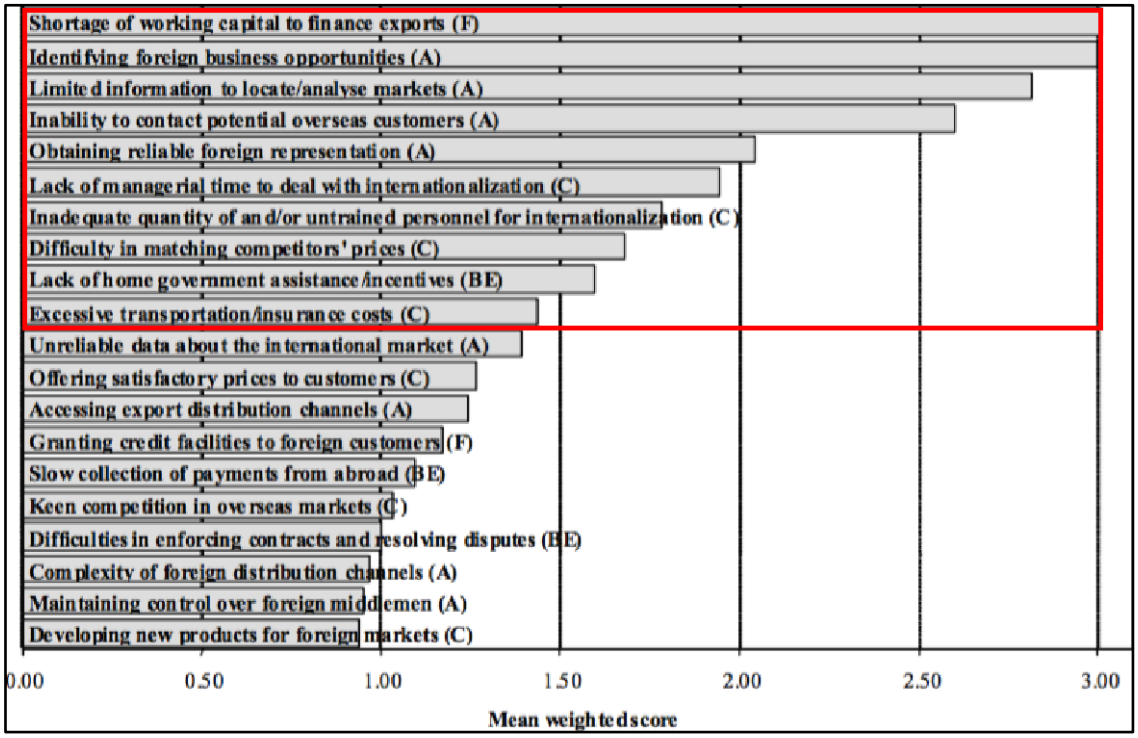


Figure 7: Barriers ranked by SMEs (Source: OECD, 2008)

The top 10 barriers among the members' and SMEs' perspective are quite similar. In summary, there is close agreement between policy makers and SMEs as to the key barriers holding SMEs back from entering international markets. Both groups identified the following six barriers: shortage of working capital to finance exports; lack of ability in identifying foreign business opportunities; limited information to locate/analyse markets; inability to contact potential overseas customers; lack of managerial time to deal with internationalisation; and finally, an inadequate quantity of trained personnel for internationalisation. However, the SMEs perceived as more critical the barriers related to the business environment, rather than those related to internal capabilities. Table 8 presents a summary of the 2007 and 2008 perceived challenges.

Table 8: Summary of 2007 and 2008 challenges

	Globalisation	Internationalisation
	2007	2008
S1	Out-dated tools of production Low level and inadequate use of technology	
S2		
S3	Limited access to finance resources	Shortage of working capital to finance exports
	Insufficient know-how	Inadequate quantity of and/or untrained personnel for
	Low levels of human capital skills	
S3*	Low quality of products	
S4		Identifying foreign business opportunities
	Production for local markets (outmoded design)	Inability to contact potential overseas customers.
	Inadequate marketing	Limited information to locate/analyse markets
	Process innovation	
	Product innovation	
S5		Lack of managerial time to deal with internationalisation

In another study, issued in 2009, titled “Top barriers and drivers to SME internationalisation”, the OECD considered that SMEs’ internationalisation and their international entrepreneurship were an issue of considerable relevance, principally due to the observed growth effects of cross-border experiences and the capacity of SMEs to drive economic development at national, regional and global levels. In order to investigate barriers to SME internationalisation, several surveys were undertaken by private individuals and public organisations in the OECD. Table 9 presents the studies in the countries concerned, the authors and the top barriers identified by country. The top identified barriers for internationalisation were: shortage of working capital to finance exports (1), The inability to identify foreign business opportunities (2), limited information to locate/analyse markets (3), inability to contact potential overseas customers (4), and lack of managerial time, skills and knowledge (5).

Table 9: Recent research findings on barriers to SME internationalisation (Source: OECD, 2009)

Country	Barrier*	Author/s
Australia	1, 3	EFIC, 2008
Canada	1	Riding et al., 2007
Finland	1, 5	Ojala and Tyrväinen, 2007
Ireland and India	1	Terjesan, O'Gorman and Acs, 2008
Korea	5	Suh et al., 2008
Spain	1	Lopez, 2007
Sweden	1	Rundh, 2007
Turkey	1, 4	Ozkanli, Benek and Akdeve, 2006
UK	4	Barnes et al., 2006
UK	4, 5	Crick, 2007
UK	4	Kneller and Pisu, 2007
USA and Canada	5	UPS, 2007
China	1	Zhang, Sarker and Sarker, 2008
India and USA	5	Smith, Gregiou and Lu, 2006
India	5	Vivekanandan and Rajendran, 2006
Indonesia	1	Wengel and Rodriguez, 2006
Russia	1, 4, 5	IBF/GDSI, 2008
South Africa	1,5	AMSCO, 2006

Based on the table above, it is possible to observe that barriers 1, 4 and 5 are the ones that appear most often. The working capital to finance exports is the first repeated barrier, but, at the same time, the second is the inability to contact potential overseas customers. Although the one placed last is the lack of managerial time, skills and knowledge, this may be related to the previous two barriers. This 2009 study reinforces SMEs' focus towards internationalisation. Table 10 presents a summary of the 2007, 2008 and 2009 perceived challenges for SMEs.

In their study on "SMEs, entrepreneurship and innovation", the OECD (2010) argues that one of the major developments in innovation was the increasing

Table 10: Summary of 2007, 2008 and 2009 challenges

	Globalisation	Internationalisation	Internationalisation
	2007	2008	2009
S1			
	Out-dated tools of production		
	Low level and inadequate use of technology		
S2			
S3	Limited access to finance resources	Shortage of working capital to finance exports	Shortage of working capital to finance exports
	Insufficient know-how	Inadequate quantity of and/or untrained personnel for internationalisation	International entrepreneurship skills
	Low levels of human capital skills		
S3*	Low quality of products		
S4		Identifying foreign business opportunities	
	Production for local markets (outmoded design)	Inability to contact potential overseas customers.	Inability to contact potential overseas customers.
	Inadequate marketing	Limited information to locate/analyse markets	Limited information to locate/analyse markets
	Process innovation		
	Product innovation		
S5			
		Lack of managerial time to deal with internationalisation	Lack of managerial time to deal with internationalisation

importance of networks. By tapping into the knowledge of networks and the open innovation methods between participants, enterprises were using a wider variety of knowledge inputs from a broader range of sources, and these enhanced interactive learning throughout the network. The OECD (2010: 25) argues:

> The innovation process of the 21st century is radically different to that of the preceding one. Perhaps the most important difference is the new or renewed importance of new and small firms. The change can be resumed as a shift from the "Managed Economy" to the "Entrepreneurial Economy" (Thurik, 2009; Audretsch and Thurik, 2004). In the former, science and systematic large firm R&D were the key. In the latter, entrepreneurship is one of the foundations of innovation.

SMEs have become critical innovation players because of their ability to recognise and exploit commercial opportunities emerging from technological, competitive and market changes. The economies of scale in research and development are no longer the barriers they once were to SMEs' participation in innovation. Instead, innovation now tends to be carried out by networks of key partners (OECD, 2010). This renewed role of SMEs has occurred for a number of reasons. First, as incomes have risen, consumers have developed an increasing taste for variety and this opens multiple emergent market niches that SMEs are quick to fill. Second, the rate of changing markets, whereby increased competition and new technologies have reduced product lifetime, demanding the more rapid creation of products. These trends have favoured SMEs and removed the main advantages that large firms enjoyed in the past. Thus, a major force in the emergence of the "Entrepreneurial Economy" referred to above has been a reduction in the standardisation approach that was the force of large firms in the middle of the 20th century. In addition, new information and communications technologies also have a key role by reducing the transaction costs and so the importance of coordination by hierarchies. All this has been associated with what has been termed 'flexible specialisation', referring to the capacity of organisations to specialize and produce output for niche markets, at the same time as being flexible and adapting their output rapidly as markets change. Thus, in the current economy and rapid changes in our environment, SMEs still play a key role. The OECD (2010: 16) argues:

> The environment for innovation has changed; the importance of new and small firms to the innovation process has increased. Increasing incomes, more "niched" market demand and changing technologies have reduced the structural disadvantages of small firm size stemming from their more limited economies of scale. In addition, the knowledge economy, more open and distributed innovation, globalisation, a shift to non-technological innovation, the emergence of the "Silicon Valley Business Model" and a new imperative for social innovation and social entrepreneurship have all given rise to a new "entrepreneurial economy", as opposed to the "managed economy" of the past.

The main consequence of a systemic approach to innovation is that entrepreneurship and innovation performance not only depend on SMEs' internal capacities, but also on their relationships with external organisations. There is a strong link between cooperation and innovation expenditure, which points to a

potential virtuous cycle between innovation through external linkages and innovation through internal investments in research and development (OECD, 2010). The OECD (2010: 15) states:

> Innovation is not just science and technology; it is also the creation of a multitude of new products and services in all sectors of the economy, new marketing methods and changes in ways of organising businesses, in their business practices, workplace organisation and external relations. In this framework, new firm creation through entrepreneurship (which typically generates new SME entities but occasionally also "born large" firms) and innovations in existing SMEs play an important role.

The 2010 OECD study shows a major shift in the challenges to SMEs working in an internationalised global network towards specialised market niches. Table 11 presents a summary of the perceived challenges for SMEs from 2007 to 2010.

In 2012, the OECD and the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) published a study titled "Latin American economic outlook 2013". In this study, it was argued that the combined forces of globalisation, technological progress and growing market demand had created a new type of innovation: one that is widespread across many agents, sectors and open possibilities. It is in this kind of context that new firms, SMEs and entrepreneurs are key players in the process of innovation because they can all bring new ideas to the market. For economic growth and adaptation, it is vital to have incremental innovation in the SME sector; however, this process is often lacking in the sector. There are barriers to innovation in the SME sector: little access to finance, the lack of qualified personnel (scientific and managerial), and, finally, the streams of knowledge, whereby SMEs innovate not only by themselves, but also in their networks. Thus, it is important to connect SMEs to global knowledge flows (OECD, 2012).

Table 11: Summary of 2007, 2008, 2009 and 2010 challenges

	Globalisation	Internationalisation	Internationalisation	Networking
	2007	2008	2009	2010
S1	Out-dated tools of production Low level and inadequate use of technology			Flexible specialisation
S2				
S3	Limited access to finance resources	Shortage of working capital to finance exports	Shortage of working capital to finance exports	
	Insufficient know-how	Inadequate quantity of and/or untrained personnel for internationalisation	International entrepreneurship skills	Use of information and communications technologies.
	Low levels of human capital skills			
S3*	Low quality of products			
S4		Identifying foreign business opportunities		Emergent market niches
	Production for local markets (outmoded design)	Inability to contact potential overseas customers.	Inability to contact potential overseas customers.	
	Inadequate marketing	Limited information to locate/analyse markets	Limited information to locate/analyse markets	
				Networking with the environment
	Process innovation			Key role of innovation process
	Product innovation			Need of rapid cration of products
S5		Lack of managerial time to deal with internationalisation	Lack of managerial time to deal with internationalisation	

Latin America could have relatively strong growth in the short term; however, the picture for the medium term is more complex: external demand has declined and this exposes the limitations of the current growth pattern, which is based on low added value and on exports of natural resources. Latin American SMEs become key players for necessary structural change and productivity growth. In order to face the main challenges in Latin American SMEs, the OECD recommended focusing on the following main areas: first, access to finance is one of the principal barriers that limit the development of SMEs; second, the incorporation of knowledge and the use of new technologies in SMEs; third, improving workforce skills, connecting the education system and the productive sector; and, finally, production, clusters and global value chains in order to improve competitive performance and create a dynamic and innovative business environment (OECD,

2012). Table 12 presents a summary of the perceived challenges in SMEs from 2007 to 2012.

Table 12: Summary of 2007, 2008, 2009, 2010 and 2012 challenges

	Globalisation	Internationalisation	Internationalisation	Networking	Innovation
	2007	2008	2009	2010	2012
S1	Out-dated tools of production Low level and inadequate use of technology			Flexible specialisation	Productivity growth
S2					
S3	Limited access to finance resources	Shortage of working capital to finance exports	Shortage of working capital to finance exports		The access to finance
	Insufficient know-how	Inadequate quantity of and/or untrained personnel for internationalisation	International entrepreneurship skills	Use of information and communications technologies.	The streams of knowledge to use new technologies
	Low levels of human capital skills				Improving workforce skills
S3*	Low quality of products				
S4		Identifying foreign business opportunities		Emergent market niches	
	Production for local markets (outmoded design)	Inability to contact potential overseas customers.	Inability to contact potential overseas customers.		
	Inadequate marketing	Limited information to locate/analyse markets	Limited information to locate/analyse markets		
				Networking with the environment	The netowrking-Global value chains
	Process innovation			Key role of innovation process	
	Product innovation			Need of rapid cration of products	
S5		Lack of managerial time to deal with internationalisation	Lack of managerial time to deal with internationalisation		

In 2013, the OECD (2013: 63) stated:

> One of the main priorities for the Mexican economy is to encourage larger numbers of innovative start-ups and raise the innovative capacity of SMEs. This will be favoured by effective national and local innovation systems consisting of networks of private firms, higher education institutions, research institutes, technical consultants and so on, from which SMEs can draw innovation inputs and supply innovation outputs.

Mexico has developed different efforts in order to strength the SME sector. In 2001, the Mexican government created the Under Ministry of Small and Medium Enterprises (UMSMEs). In 2013, the OECD published a study on “Mexico: Issues and policies”, which evaluated UMSMEs’ developments over time and also assessed UMSMEs’ achievements and offered advice to SME and entrepreneurship policy makers and other stakeholders on how to respond to

challenges. In this study, the OECD pointed to two main objectives pursued by the SME pillar in the Economic Sectorial Programme, based on a comprehensive support system for facing challenges. The first objective was to contribute to the creation of jobs by promoting the establishment of new businesses and the consolidation of existing micro and SMEs. The second objective was to encourage the creation of more and better jobs in the population of low-income entrepreneurs by promoting and strengthening productive projects.

In summary, SMEs and entrepreneurs are fundamental drivers of innovation, economic growth and job creation; they also play an important role in fostering social development and cohesion (OECD, 2013). These directions have guided the Ministry of Economy with regard to SME and entrepreneurship support programmes over time. Important internationalisation opportunities for Mexican SMEs have been opened up by the multilateral and bilateral international trade agreements signed by the Mexican government i.e., the North American Free Trade Agreement (NAFTA). However, whilst Mexico generates substantial exports, these are dominated by a few hundred large enterprises, while the SME sector makes a small contribution. Mexican SMEs face distinctive challenges when engaging in export activity. In particular, Mexican SMEs tend to be relatively high-cost producers compared with foreign SMEs and larger Mexican enterprises. However, there is strong potential for the internationalisation of Mexican SMEs through accessing global value chains as suppliers to international companies, particularly within the context of a manufacturing base for the NAFTA region (OECD, 2013).

In addition, the SME and entrepreneurship sector in Mexico has a number of important strengths. The SME sector is a large one in terms of the numbers of firms and their contribution to employment. There are positive attitudes in society towards entrepreneurship. There has been significant growth in self-employment activity and the female entrepreneurship rate matches that of men. The business birth rate is one of the highest in the OECD area. There has been substantial growth in the stock of SMEs and in value added and output. There is also an upward trend in productivity among SMEs above the micro-firm size threshold (OECD, 2013). Table 13 presents a summary of the perceived challenges for SMEs from 2007 to 2013.

	Globalisation	Internationalisation	Internationalisation	Networking	Innovation	Innovation	
	2007 (México)	2008 (Global)	2009 (Global)	2010 (Global)	2012 (LATAM)	2013 (México)	
S1						**Operations capacity:**	
						Attracting SMEs to the centre of supply chains through supplier support mechanisms	Focused Operations
	Out-dated tools of production			Flexible specialisation		Strengthening the productive capacity of social enterprises	
	Low level and inadequate use of technology				Productivity growth	Strengthening the productive projects of low-income entrepreneurs through support for management.	
S2							
S3						**Finance:**	Focused Metasystem
	Limited access to finance resources	Shortage of working capital to finance exports	Shortage of working capital to finance exports		The access to finance	Improving access to finance schemes	
						Designing and supporting seed and venture capital schemes.	
						Strengthening the national system of guarantees	
						Trainning:	
	Insufficient know-how	Inadequate quantity of and/or untrained personnel for internationalisation	International entrepreneurship skills	Use of information and communications technologies.	The streams of knowledge to use new technologies	Promoting entrepreneurship education in schools	
	Low levels of human capital skills				Improving workforce skills	Providing specialised training to enable micro-enterprises to consolidate as a companies	
S3*	Low quality of products						
S4		Identifying foreign business opportunities				**Commercial:**	Focused Environment
	Production for local markets (outmoded design)	Inability to contact potential overseas customers.	Inability to contact potential overseas customers.	Emergent market niches		Developing models of commercial modernisation	
		Limited information to locate/analyse markets	Limited information to locate/analyse markets			Developing new distribution and marketing channels for micro-enterprises	
	Inadequate marketing					**Networking:**	
				Networking with the environment	The netowrking-Global value chains	Promoting a greater number of productive partnerships among micro-enterprises (Networking)	Strategic agility
						Strengthening the national system of business incubators	
						Innovation:	
	Process innovation			Key role of innovation process		Developing models of technological innovation	Value Innovation
	Product innovation			Need of rapid cration of products		Establishing technology parks to speed up technological innovation	
S5						**Consulting:**	Focused Business
		Lack of managerial time to deal with	Lack of managerial time to deal with			Providing consulting to enable micro-enterprises to consolidate as a companies	
						Establishing a national one-stop shop system for access to SME support services through specialised centres.	
						Supporting fast-growing enterprises with business acceleration and franchise programmes	

Table 13: Summary of 2007, 2008, 2009, 2010, 2012 and 2013 challenges and their patterns

Figure 8 provides information about the factors that influence the performance of businesses in Mexico and the main obstacles perceived by their managers. This figure presents the top 10 constraints identified by businesses, both large firms and SMEs, benchmarked against the average for Latin America (OECD, 2013).

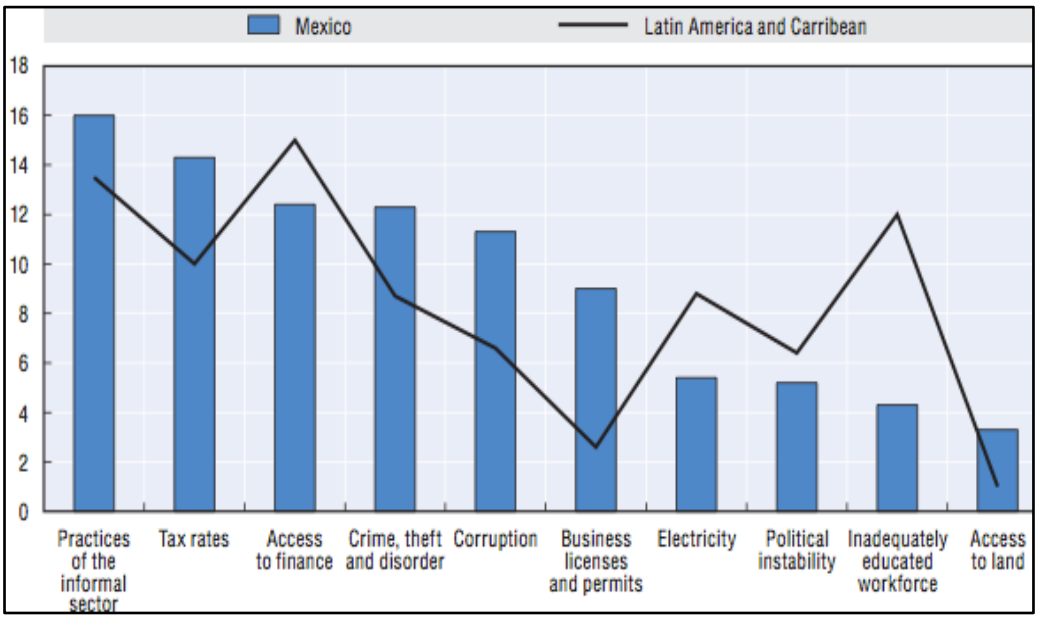


Figure 8: Top 10 constraints for all businesses in Mexico (Source: OECD, 2013)

2.4.4 Pattern analyses of the challenges

On the right-hand side of Table 13, the researcher has identified six patterns of challenges for SMEs. Most of these patterns are related to the need to focus efforts in order to enhance interaction between an SME and its environment. The SME needs to improve its ability to understand how to develop the market in order to generate more demand. The first pattern to consider is the “Focused environment”. Reviewing this pattern, it is possible to observe a constant trend since 2007 in developing new forms of commercialisation in SMEs, such as: looking for foreign business opportunities and overseas customers, seeking information to locate/analyse markets, searching for market niches, and developing new distribution channels. All these challenges require the development of the ability to explore, identify and develop new globalised demand in order to be viable over time. The second pattern is “Strategic agility”, which appeared in 2010, aiming to enhance the ability of SMEs to work as a

network instead of as isolated enterprises. This allows SMEs to become more agile in our globalised world because they can integrate in their own business strengths drawn from the network to which they belong. The last pattern in this group is “Value innovation”. This pattern appeared in the 2007 study and emphasises the need to develop the capacity for process and product innovation in order to bring differentiated products and services to the market, also using the network concept for innovation.

In order to face the challenges outlined above, SMEs need to focus their operations on specific value attributes to the market. In 2007, the challenges related to operations demanded an update in production in order to modernise. However, from 2010, studies show an emphasis on flexible specialisation, operations networking and productivity growth in order to be viable in a global economy. These challenges demand more focus on operations in order to bring added value to the market in a differentiated economy. Thus, the next pattern is "Focused operations".

In order to better support the operations of an SME, the management also needs to focus more. Thus, the next pattern is the “Focused meta-system”. This pattern shows consistency over time in two topics in the studies. The first topic is the need to improve access to finance schemes with government support. The second is the need to develop or reinforce skills in SMEs that are more oriented to internationalisation and the better use of information and communications technologies. Although the studies show mainly these patterns in management, Palacios (1998) argues that most of the problems in SMEs are related to the managerial practices in such organisations. It is necessary to improve the managerial practice within SMEs, and not only finance and human resources management.

The last pattern named “Focused business” is related to the ability of SME managers to lead change. In 2008 and 2009, the studies point out the need to address internationalisation in SMEs and find a way to enable companies to consolidate through the support of SME networking. However, this pattern goes beyond management skills because it is related to the ability to lead change in a complex and changing environment. Palacios (1998) developed a specific

analysis of the challenges in the Mexican context. He argues that the inability to grow is the most significant factor in SME failure due to the management team's ability to manage further growth. In addition, another aspect to be considered is the lack of vision in SMEs because of the over-concentration by managers on operational matters, instead of having a more strategic approach and, therefore, a lack of management competency to drive change.

2.4.5 Summary

In summary, the major influence on the challenges for SMEs over time is the effect of the globalised economy on their business model. Over time, the six patterns referred to above are quite similar but their orientation is influenced by the need for internationalisation in a networked and globalised world. However, a Mexican SME does not have six independent challenges, but one major challenge: how to last over time. The six challenges identified above could appear simultaneously and could influence the performance of the whole system. Thus, the problem is how to understand the way in which challenges interact in order to improve the performance of an SME as a system. Thus, the next question is: What kind of mindset is necessary to face complexity in SMEs? Because, when SMEs treat each challenge as an independent effort, the results are the same i.e., the same SMEs' mortality rate: only 20% of the SMEs are moving towards to the second year of operations (Duarte, 2008; Flores, 2013).

2.5 Facing complexity in SMEs

2.5.1 Introduction

SMEs are facing the same environment as the larger enterprises, which pushes them to new challenges. It is, therefore, necessary to review how these enterprises have developed their ability to cope with the increasing complexity and rate of change. In the following sections, the researcher argues the need for a new way of thinking that promotes a new managerial approach. This approach demands the exploration of systems and complexity sciences and their

derivations in order to seek approaches to be used in SMEs and the status of these approaches in the current literature.

2.5.2 A new way of thinking

In today's world, the increasing rate of change and the complexity associated with it have had an influence on SMEs. Human activities face the effects of this complexity because we are unable to deal with the rapidly expanding complexity and all the problems associated with it. These problems are of our own making: they are a direct consequence of the way human beings have conducted themselves over the last 300 years since the Industrial Revolution (Espinosa & Walker, 2011). However, organisations continue to be based upon inadequate approaches to deal with increasing complexity. On the other hand, the Mexican government has, for some years, been promoting the SME sector as one of the drivers of economic growth. For instance, the Mexican government created INADEM to support, specifically, entrepreneurs and SMEs by promoting innovation, competitiveness and projection to the national and international markets to increase SMEs' contribution to economic development and social welfare. In order to achieve its purpose, INADEM developed five complementary sets of programmes to support SMEs: strategic sectors and regional development programmes to enhance business performance; business development programmes to promote innovation development; entrepreneurial and financing programmes to offer financial support; programmes for micro and SMEs that provide consulting and technological services; and defence programmes to enable SMEs and entrepreneurs to access legal support. All these programmes and an entrepreneurial network across the country are part of a national effort to promote a business development culture (INADEM, 2015).

Although different efforts have been developed regarding how to support SMEs to grow over time, SMEs' failure rate is still high: worldwide, almost 80% of new SMEs cannot move towards a second year. In Mexico, many authors have reviewed the SME failure rate. For instance, Duarte (2008) argues that only 20% of SMEs move towards a second year of operation; the remaining 80% fail in their first year. Flores (2013) states that in Mexico the SME failure rate shows the same pattern as that worldwide i.e., 82.5% of the country's SMEs disappear before two

years of operations because they are not profitable. INEGI, which is an autonomous agency of the Mexican government dedicated to coordinating the national system of statistical information for the country, has developed a specific study called “Life expectancy in business”, in order to review key factors that explain enterprise failure in Mexico. INEGI found that only 64% of Mexican SMEs reach the end of their first year and their life expectancy is just 7.7 years (INEGI, 2015). Morales (2011) states that 65% of SMEs disappear before two years of operation, 50% go bankrupt during the first year, and 30% during the second. In the tenth year since their creation, only 10% of those that begin survive, so the rate of decrease is around 22.6% per year.

In summary, the failure rate of Mexican SMEs is quite similar to Latin American patterns, in which 70-80% of SMEs close before one year and of the remaining 30% only 70% achieve five years of business. Despite the differences between these data, the facts are: a high SME failure rate and a short life expectancy after the second year of operations. Despite all the Mexican government’s efforts, these have not been enough. The aim is not only to start SMEs, but also for them to be viable over time, which means their being able to cope with the increasing environmental complexity and rate of change.

According to Morales (2011), of the 130,000 Mexican enterprises that fail during their first two years, 66% are occasioned by bad managerial practices and lack of financial support. High SME failure is of concern as it occurs in the first two years of life, where government programmes have not yet penetrated into the business management and the allocated resources do not have a chance to make a return. The Mexican government has wasted resources without concrete benefits to society. As Morales (2011: 7) points out,

> The SMEs do not survive because they fail to solve three basic problems: insufficient technology and innovation, low organisational level, and the lack of funding. The impacts of the first and second problem are significant because they not only express a structural fragility of the SMEs and their ability to face the market, but also break its ability to leverage because if they were corrected could be two valuable intangible assets to access the funding.

Ultimately, the three problems referred to above are also related to managerial practices. What is the problem with managerial practices? What kind of managerial practices are used? How can they be developed?

As stated earlier, the concept of an enterprise has evolved from that of a 'machine' to an 'organism' and from there towards the 'organisation' we know today (Ackoff, 2006). This change in conception has its origins in a change in managers' mindset. Churchman (1979) states that human beings have the capability to solve problems of poverty, health, education, etc. However, if humans have the capability to do all these things, why do they not do it? He asks (1979: 4):

> Is there some perverse streak that runs throughout the human race that makes one human being indifferent to the plight of another? Are we essentially faced with a type of moral degradation that permits us to ignore our neighbour for the sake of our own good? Or, is there some deeper and subtler reason why, despite our enormous technological capability, we are still in no position to solve the major problems of the world?

Is the SME failure rate a world economic and social problem? As discussed in the first section of this chapter, this concerns the relation between our sense of belonging to the world and seeking the common good and by this enhancing our holistic approach to face problems. This approach demands that we first focus not at the level of tools, but at the level of our mindset to cope with social problems.

According to Midgley (2000), the first development in 20th-century thinking was the mechanistic approach, in which all objects in the world, including people, were seen as 'clockwork toys' i.e., that the world was predictable. However, chaos and complexity theorists argued that what really happens in the real world, far from being predictable, is actually unpredictable. Unpredictability is an inherent characteristic of our world and thus a utopia of perfect explanations has vanished (Maguire et al., 2011). However, the mechanistic approach has underpinned so much of our thinking in the last three centuries that it is very difficult to imagine alternatives. Checkland (1999) argues that systems engineering was not enough to cope with problems of managing and it was necessary to develop a different

approach. Midgley also states (2000: 4) that “we find ourselves at the end of one epoch, and on the threshold of entering a new one whose contours, as far as I can see, are not fully visible”.

Systems thinking approaches have offered an alternative to the mechanistic approach since the mid-20th century. Hard approaches assume the world contains systems the performance of which can be optimised by following systematic procedures with clear objectives to achieve maximum efficiency and efficacy. However, hard approaches are usually much less significant in terms of what happens in areas of social concern (Jackson, 2004). This led to a view of systems thinking as a response to difficulties that confronts the method of natural science when it faces phenomena of great complexity, notably those of the social world. This in turn led to consideration of the unsolved methodological problems of the social sciences. Checkland (1999) states that the normal scientific method is inadequate as a way of inquiring into human situations. Moreover, systems thinking is a holistic reaction against the reductionism of natural science; i.e., principles traditionally used in scientific investigation of natural phenomena would not adequately support investigation of social phenomena (Checkland, 1999). Thus, it is necessary to have a different methodology; that is to say, a different set of guidelines or principles to work with human situations.

Given the above, new paradigms are needed in management science to address the emerging unprecedented challenges in the modern world. New systems and complexity approaches have been developed to face these challenges and provide a firm foundation to explore and understand human organisations by using a holistic approach (Maguire et al., 2011).

2.5.3 Complexity science

SMEs in Mexico and worldwide are subject to the reinforcing cycle that operates between the rate of change and organisational complexity. In order to face complexity in SMEs, it is important to explore complexity theories with the aim of finding new possibilities for managing complexity.

It is first necessary to define the term ‘complexity’ and to explore the meaning of complexity science. According to Espinosa and Walker (2011: 12),

> Ashby explained the idea of complexity as the potentiality of a system to exhibit different states (behaviours); a “self-organising” dynamic system is one that starts with its parts separate (each one’s behaviour is independent of the others’ behaviours) and whose parts then act so that their behaviour changes and forms connections of some type. He considered that every isolated determinate dynamic system obeying unchanging laws will develop self-organised “organisms” that are adapted to their environments.

Ashby also introduced the term ‘variety’ as a measure of complexity, both in mechanical and social dynamic systems. The potential states (behaviours) of a system are more subject to interpretation and less predictable in social systems (Espinosa & Walker, 2011). To summarise, we can understand complexity as the potential (interpreted by human beings in social systems) of a self-organised dynamic system (whose parts act as a whole) to exhibit different states.

On the other hand, in simple terms, Espinosa and Walker (2011) state that complexity science is one that offers ways to model and understand the dynamics of interacting networks of complex systems. Complex systems are those composed of a number of elements which demonstrate the following: the interaction of elements in a dynamic and non-linear way, path dependence, unpredictable behaviour, coevolution with their environment, emerging properties and being capable of self-organisation.

Maguire et al. (2011) argue that complexity is the science of organisation and is, therefore, the natural framework for considering an organisation and its connected entities. Complexity science not only offers a new view of the world, but also new methods for studying and generating knowledge about it. Furthermore, Luhman and Cunliffe (2013) state that complexity science is a theory that focuses on how dynamic systems behave in non-linear, unpredictable and chaotic ways. They also argue that complexity science is a new way of understanding our world (physical and human) and thus a new way of understanding organisations. Complexity science starts with the presupposition that all systems, in both the natural and human worlds, are ever changing. The

application of complexity science in organisations begins with an understanding that all systems adapt and evolve over time.

In summary, complexity science focuses on ways to model and understand how dynamic systems behave in non-linear, unpredictable and chaotic ways as networks of complex systems that are ever changing in order to adapt and evolve over time. Thus, complexity science could help model and understand how SMEs, looking at them as participants in networks of complex systems, can adapt and evolve with their environment over time.

In the field of management and organisation studies, the application of complexity science has grown dramatically over the past two decades. Maguire et al. (2011: 4) argue that

> the ideas from what would eventually be termed complexity science began to be introduced in the 1980s. A recent review of the field of complexity and management identified a sequenced movement of complexity concepts into organisation studies: self-organisation, dissipative structures and order out of stochastic chaos appeared earliest; then deterministic chaos was attended to; finally, the complexity science.

The above review is summarised in Table 14. Throughout the 1990s and into the following decade, much of the literature addressing complexity and management was devoted to what was referred to as ‘introductions’ to complexity science, as well as related topics such as chaos theory and non-linear dynamics. From this review, it is possible to observe that almost 50% of the references are directly related to the fields of management and organisation theory.

However, Maguire et al. (2011: 6) also argue that “The vast majority of this work was descriptive, presenting complexity science terminology and stylized facts about complex systems but rarely developing formal theories or models”. Although complexity science could be useful in modelling and understanding SMEs, it is also necessary to find an approach that has been developed at the levels of methodology and practice, and not only at the level of philosophy

Table 14: Research introducing complexity science and drawing implications for management (Maguire et al., 2011)

Reference	*Introduction of*	*Implications drawn for*
Allen and McGlade (1986, 1987)	Evolutionary systems modelling	Natural resource management
Kiel (1989)	Non-equilibrium theory	Public administration
Priesmeyer and Baik (1989)	Chaos	Planning
Daneke (1990)	Advanced systems theory	Public administration
Zuijderhoudt (1990)	Chaos and self-organization	Organizational structure
Kiel (1991)	Nonlinear paradigm of dissipative structures	Social sciences
March (1991)	Complex systems modelling	Management
Smilor and Feeser (1991)	Chaos	Entrepreneurial processes
Reed and Harvey (1992)	Complexity; new science	Realist social science
Drazin and Sandelands (1992)	Autogenesis; self-organizing systems theory	Organizing
Gregersen and Sailer (1993)	Chaos theory	Social science research
Begun (1994)	Chaos and complexity theory	Organization science
Johnson and Burton (1994)	Chaos and complexity theory	Management
Levy (1994)	Chaos theory	Strategy
Dooley et al. (1995)	Chaos and complexity	Total quality management
Smith (1995)	Chaos	Social science
Stacey (1995)	Complexity	Strategic change processes
Stumpf (1995)	New science theories	Leadership development
Thietart and Forgues (1995)	Chaos theory	Organization
Glass (1996)	Chaos; nonlinear systems	Day-to-day management
Overman (1996)	Chaos and quantum theory	Administration
Wheatley and Kellner-Rogers (1996)	Chaos and complexity	Organizations
Lissack (1997)	Chaos and complexity	Management
McDaniel (1997)	Chaos and quantum theory	Strategic leadership
Mendenhall et al. (1998)	Nonlinear dynamics	International human resources management
Anderson (1999)	Complexity theory	Organization science
Cohen (1999)	Complex systems theories	Study of organization
Morel and Ramanujam (1999)	Complex systems theory	Organization theory
Mathews et al. (1999)	Complexity sciences	Social sciences
Duffy (2000)	Chaos theory	Career-plateaued worker
Arndt and Bigelow (2000)	Chaos and complexity theory	Health services management
Colbert (2004)	Complexity (with resource-based view)	Strategic human resource management

(Midgley, 2000). Following this discussion, it is important to find a path inside complexity science which can help us develop these three levels. Espinosa and Walker (2013) state that Stafford Beer was the first cybernetician to develop a complete theory, model, methodology and methods for managing complexity in the management field. Much of this work is represented in Beer's Viable System Model (VSM) and its principles. The VSM, which originated in the 1950s, was conceived by Beer as a generic blueprint for the organising structure of any autonomous system (Merali & Allen, 2011). Therefore, when studying complexity management in organisations, it is necessary to look at the development of

organisational cybernetics, which offers a robust model for managing organisational complexity with a practical orientation. Cybernetics development had its origins as a science of complexity based on several works during the Second World War. Norbert Wiener coined the term ‘cybernetics’ from kybernetes (steersman) (Espinosa & Walker, 2011).

In addition, Maguire et al. (2011) state that although complexity science is used to model organisational phenomena in a revolutionary way, it is important to underline that systems approaches and complexity science each have long and respected heritages within management and organisation studies. Despite Reed (1985; as cited in Maguire et al, 2011) arguing that systems theorists dominated management and organisation theory from the 1930s to the 1970s, Richardson et al. (2007: vi) offer another perspective: “At the end of the day, it is important to the vast majority of those working with complexity and systems ideas that they are able to make a positive difference in people’s lives”. This is the cornerstone of this research: the search for complementarities, not differences. Thus, it is important to explore both systems and complexity approaches when searching for an approach that could help cope with increasing complexity.

2.5.4 Systems thinking approaches (STAs)

Jackson (2003) argues that today’s managers are expected to cope with increasing complexity, change and diversity but that complexity stems from the nature of problematical situations which are not individual but related to other problems; these are described by Ackoff (2006) as ‘messes’. In today’s world of increasing complexity and change, managers are required to face much greater diversity problems. Flood (1988) argues that it is possible to distinguish two kinds of complexity: one which can be attributed to the ‘system dimension’, in which there are a significant number of parts and relationships; and a second one, which can be attributed to the ‘people dimension’, in which interests, capabilities, perceptions, etc. are considered.

The tendency in the managerial domain is, however, to cope with complexity by looking to ‘quick-fix’ solutions, which tend to fail because they are not holistic in essence i.e., they concentrate on the parts of the organisation rather than on the

whole. In doing this, managers miss the interactions between parts. Here is where systems thinking makes sense in order to cope with increasing complexity and change because it focus on the whole before the parts, as systems thinking is holistic rather than reductionist. As a result of the growing popularity of systems thinking, there is now a rich spectrum of different systems approaches within the systems sciences. Flood (1988: 125) states:

> It is generally accepted that systems science is concerned with the management of complexity. The main activities of a systems scientist incorporate at least one of investigating, representing, or intervening in, complex situations.

In order to understand the systems thinking approach, Reynolds and Holwell (2010) argue the relevance of first exploring how conventional thinking can be counterproductive in resolving complex issues, because many aspects of this thinking confuse a mess with a simple difficulty. Some of these aspects are: interconnections can be ignored, a single cause may be assumed, it may be assumed that an individual is to blame and, finally, there may be a focus on outcomes and thus only on what can be measured. This last feature of traditional thinking has widespread relevance in Western societies blighted by the culture of targets, performance indicators and 'best' practice without considering the essence of human beings. Ultimately, the traps of non-systems thinking lie in two dimensions: first, when people forget the inevitable interconnectivity between variables, which means falling into the trap of reductionism; and second, when people work but do so based on a single unquestioned perspective, which means the trap of dogmatism.

Systems approaches have shown a new way of thinking and acting upon phenomena as if they were wholes and not mere sets of parts. From the very beginning, systems approaches appeared as a counter-approach to another non-systemic approach, which thinks of and acts upon things as if they were mere aggregates of parts. Fuenmayor (2012: 2) also warns us:

> the systems approach was offered as a way to study and act under the "holistic" premise that the whole transcends the sum of their parts. However, by that time, it was not yet an already established "way to study and act"; it was rather a project to develop such a way. The project was founded on an attack on the strong reductionist-analytical

> emphasis of current scientific and technological practice. The anti-reductionist and anti-analytic argument of the systems approach could be summarized in the following terms: “to isolate a phenomenon from its context (reductionism) and begin its study by a separation of its parts (a-priori analysis) means losing sight of the holistic condition of any phenomenon”. As a result of this systemic or holistic intention systemic methods for the study of human activities organizations - favourite object of the new discipline - began to appear.

Midgley (2000) also states that STAs appeared as a replacement for the mechanistic approach. In STAs, the concept of identity is directly related to another core idea of the STAs: the boundary concept, because everything is directly or indirectly connected to everything else and where boundaries (inclusion and exclusion) are placed in any analysis becomes crucial; and so, the STAs involve the concept of emergent properties when system boundaries are placed. Ultimately, the STAs pursue the ideal of comprehensiveness, which is the theme common to all forms of STAs. Systems approaches have been concerned with complex and general problems related to general welfare, such as poverty, health, education, war, justice and human freedom (Fuenmayor, 2001a, 2001b, 2001c, 2012). Drawing on Churchman, Fuenmayor (2001a, 2001b, 2001c) states that a main justification for systems approaches was to cope with so-called ‘world problems’; they were the aim of this new trans-disciplinary approach. Checkland (2000) argues that systems ideas can help in tackling the messy problems of ‘management’. In addition, Fuenmayor (2012b: 3) argues that in the

> original call from the sixties and seventies, one can find (among other things) a call for holistic understanding and acting which pretended to counter the multiple pressures of a fragmented and fragmenting world. It was a call for making holistic sense - finding the meaning of things, happenings, situations, within a totality - and acting for the global good in accordance to that sense - acting so that human action could harmonize with a fair and legitimate totality. It was, I must insist, a call to constitute a revolutionary force, a critical endeavour, against fragmentation; against the short-sightedness derived from specialization. It was a plea to see things from a non-specialized perspective and for the sake of the “whole” (call it as you like: humanity, justice, freedom, God). It was a call for people to regain their being as human beings above that of specialists, or sellers, or clients. It was then a call for men and women, members of humanity, not a call for managers.

Systems approaches have a rich historical tradition of promoting holistic views

concerning human beings and their relation to a non-human nature. This can be traced back to the ancient spiritual traditions of Hinduism, Buddhism, Taoism, Sufi-Islam, ancient Greek philosophy (particularly Hericles and Aristotle), and through the oral traditions of many indigenous tribes around the world (Reynolds & Holwell, 2010). Today, there are many different schools of systems thinking and different perspectives on how to group them. With such a large number of systems approaches, it is not surprising that there are several ways of thinking about how they relate to each other and doing this produces different typologies. The typologies represent particular perspectives on organising the interrelationships between different entities, each associated with a particular purpose. This section presents a brief summary of five perspectives in order to explore systems approaches and present the one chosen for this research (Reynolds & Holwell, 2010) but viewing it with different 'lenses'.

The first perspective is based on systems thinking traditions. Perhaps the most widely used categorisations in the systemic approaches are 'hard', 'soft' and 'critical' (Jackson, 2004). The distinction is one that builds on Peter Checkland's earlier distinction between hard and soft systems. Checkland (1999, 2000) suggests that the systems thinking prevailing at the time rested on an unspoken assumption that systems exist in the real world. Checkland's questioning, and subsequent abandonment, of this 'hard' systems assumption paved the way for an extensive and influential programme of 'soft' systems action research based on the position that systems are epistemological constructs rather than real-world entities. Meanwhile, Werner Ulrich and others, including Mike Jackson and his colleagues at Hull University, identified the need for a distinct third systems thinking strand. Critical systems thinking (CST) shares the same epistemological shift as the soft systems tradition but addresses some of the perceived inadequacies in both hard and soft systems thinking, most notably the inadequate consideration of power relations. Table 15 is an example of grouping systems approaches using this schema.

Based on the above perspective, Midgley (2000) and Andrade et al. (2000) use three traditions to describe the historical evolution of current ideas of systems thinking and practice as evolving through a series of three 'waves' of inquiry,

Table 15: First perspective based on systems thinking traditions (Source: Reynolds and Holwell, 2010)

Systems 'type'	Selected systems approaches
Hard systems	General systems theory (Bertalanfy 1956)
	Classical (first order) cybernetics, 'mechanistic' cybernetics (Ashby 1956)
	Operations research (Churchman et al. 1957)
	Systems engineering (Hall 1962)
	Socio-technical systems (Trist et al. 1963)
	RAND-systems analysis (Optner 1965)
	System dynamics (Forrester 1971; Meadows et al. 1972)
Soft systems	Inquiring systems design (Churchman 1971)
	Second order cybernetics (Bateson 1972)
	Soft systems methodology (Checkland 1972)
	Strategic assumption surface testing (Mason and Mitroff 1981)
	Interactive management (Ackoff 1981)
	Cognitive mapping for strategic options development and analysis (Eden 1988)
Critical systems	Critical systems heuristics (Ulrich 1983)
	System of systems methodologies (Jackson 1990)
	Liberating systems theory (Flood 1990)
	Interpretive systemology (Fuenmayor 1991)
	Total systems intervention (Flood and Jackson 1991a)
	Systemic intervention (Midgley 2000)

each related to a particular focus of the systems field which brought with it a new set of methods. The first wave is useful when there is agreement on the nature of a problem situation and takes a quantitative applied scientific line on systems. The first wave gained great popularity in the 1950s and 1960s and was shaped by approaches such as socio-technical systems thinking, systemic family therapy and systemic operational research (OR). Socio-technical systems thinking is mainly oriented by two core concepts: first, the concept of semi-autonomous work groups which take collective responsibility for completing tasks; second, the core idea that organisations have both social and technical components to be considered. Systemic family therapy points to conversational patterns for the 'larger system' exerting control over the individual. These two approaches emphasise the human dimension over the scientific method; and third, systemic operational research is centred on mathematical modelling techniques. The most representative approaches of this kind are: system dynamics, systems engineering, systems analysis and the VSM. The VSM facilitates the diagnosis of organisational problems through comparisons between real organisations and the model is derived from cybernetics and systems theories.

The approaches of the first wave were, however, criticised for viewing human beings as objects which can be manipulated by a larger system, instead of individuals with their own aspirations. The criticisms of the first wave led to a

significant paradigm shift in systems theory and its application to intervention. With the second wave, ‘systems’ were no longer seen as real-world entities but as constructs of the human mind. These approaches embraced the idea that people are most productive when they join to develop solutions, rather than executing solutions given to them by experts, and that the ‘best’ solution emerges from within people. This wave gained popularity in the 1970s and 1980s and its best-known authors are Churchman (1979), Checkland (1999) and Ackoff (2006). Some examples of the systems approaches of the second wave are as follows: strategic assumption surfacing and testing (SAST), interactive planning, soft systems methodology (SSM), and developments on systems dynamics as a device for improving communication between stakeholders on complex issues; a new wave of operational research that focused on facilitating debate rather than just modelling; and finally, a parallel movement in action research. However, critics of the second wave appeared and pointed out that participative methodologies did not account sufficiently for power relations, so reinforce the vision of change mainly promoted by the holders of authority.

The third wave of systems thinking emerged in the 1980s and beyond. Two main characteristics distinguished the approaches of this wave: the discussion of the limitations of the earlier approaches mainly in the way of managing power relations and coercion; and second, the use of a great variety of methods in pluralist intervention practice. This wave emphasised the value of both approaches and shifted attention to how choice between the great variety of systems methods could be exercised in a critical and systemic manner. Methodological pluralism was challenged and there was a move towards multi-methodology approaches. At the end of the 1980s, the third wave began to be known as critical systems thinking and favoured methodological pluralism.

From the point of view of this research, it is necessary to argue that, despite all the systems thinking history and approaches, the key point is not to understand or use all the previous methods, but to consider how to learn to use them in the management practice of SMEs. Looking through all these systems traditions, and in order to cope with the increasing complexity and challenges of SMEs, it would seem necessary to use a variety of methods rather than a single one. From this perspective, it is important to consider the third wave of critical systems.

Systems approaches can also be categorised using a second perspective: looking at how practitioners in different situations can be guided in order to use the range of systems approaches available. For this purpose, Jackson and Keys developed a system of systems methodologies (SOSM) in 1984, which, drawing on the three traditions, helps to identify how to choose and use systems methodologies in specified problem situations (Jackson, 2003). The important shift in focus here is towards the situations in which systems approaches can be applied. Table 16 shows Jackson's (Reynolds and Holwell, 2010) matrix for classifying systems methods according to two dimensions: the level of complexity of the problem situation (simple or complex) and the relationships that can exist between those concerned with the problem context: a unitary (hard) one with similar values, beliefs and interests; a pluralist (soft) one, where basic interests are compatible but not values and beliefs; and, finally, a coercive (critical) one, in which the stakeholders have few interests in common and conflicts in values and beliefs. This last dimension uses metaphors as guiding principles: a machine for the 'hard', a living organism for the 'soft', and a prison for the 'critical' situations (Reynolds & Holwell, 2010).

Table16: Second perspective based on the use of systems approaches (Source: Reynolds and Holwell, 2010)

		Participants		
		Unitary 'hard' systems based on machine metaphor	Pluralist 'soft' systems based on organismic metaphor	Coercive 'critical' systems based on prison metaphor
'Systems' i.e., problem situations	Simple	Simple unitary: e.g. systems engineering	Simple pluralist: e.g. Strategic assumption surfacing and testing	Simple coercive: e.g., critical systems heuristics
	Complex	Complex unitary: e.g., systems dynamics, viable systems model	Complex pluralist: e.g. soft systems methodology	Complex coercive: (non available)

However, Reynolds and Holwell (2010: 26) argue:

> There are two significant difficulties in using this model. One is in assuming from outset that a problem situation can somehow be easily identified as constituting one of the six "problem situation" types depicted in the cells of the matrix. Another difficulty is in the "fixing" or pigeonholing of particular systems approaches as being only suitable

> for specific types of situation. There may be different opinions on where different systems approaches “fit” based upon actual experiences of using the approach. Many approaches though understood as having roots in particular traditions could be used for different purposes. So for example, whilst some may classify VSM as a “hard” approach - in the tradition of classic first order Cybernetics - others would describe the VSM as an interpretivist or even an emancipatory approach.

Based on the above perspective, it is difficult to define SMEs’ problem situation as simple or complex because it depends on certain factors, for instance: approaching SMEs as an individual entity or a network node. It is very difficult to identify the types of relationships in SMEs. From a holistic point of view, each SME has its own context, which shapes the complexity of the problem situation and the relationships within it.

The third perspective shows some of the key relationships between different systems approaches and other related traditions. Figure 9 illustrates different spheres of influence both with respect to other approaches outside the traditional systems toolbox and to other situations of interest.

Figure 9 shows the different traditions of systems thinking and names some of the key researchers associated with them. Recent cybernetics approaches have been moved from ‘first-order' cybernetics or ‘hard’ systems methods to second-order or ‘soft’ systems (Reynolds & Holwell, 2010). First-order cybernetics is concerned with feedback loops, control, and mathematical models of communication, and conceptualises systems as 'things' that exist in the world. Second-order cybernetics sees systems as devices or ‘holons’ articulated by observers' purposes in a system-sub-system-environment relationship (Ison et al., 1997). However, according to Reynolds and Holwell (2010), there are some difficulties arising from this perspective: first, there are only one-way influences, whereas influences tend to be more dynamic; second, whilst this illustration shows a wider net than prevailing perspectives, some

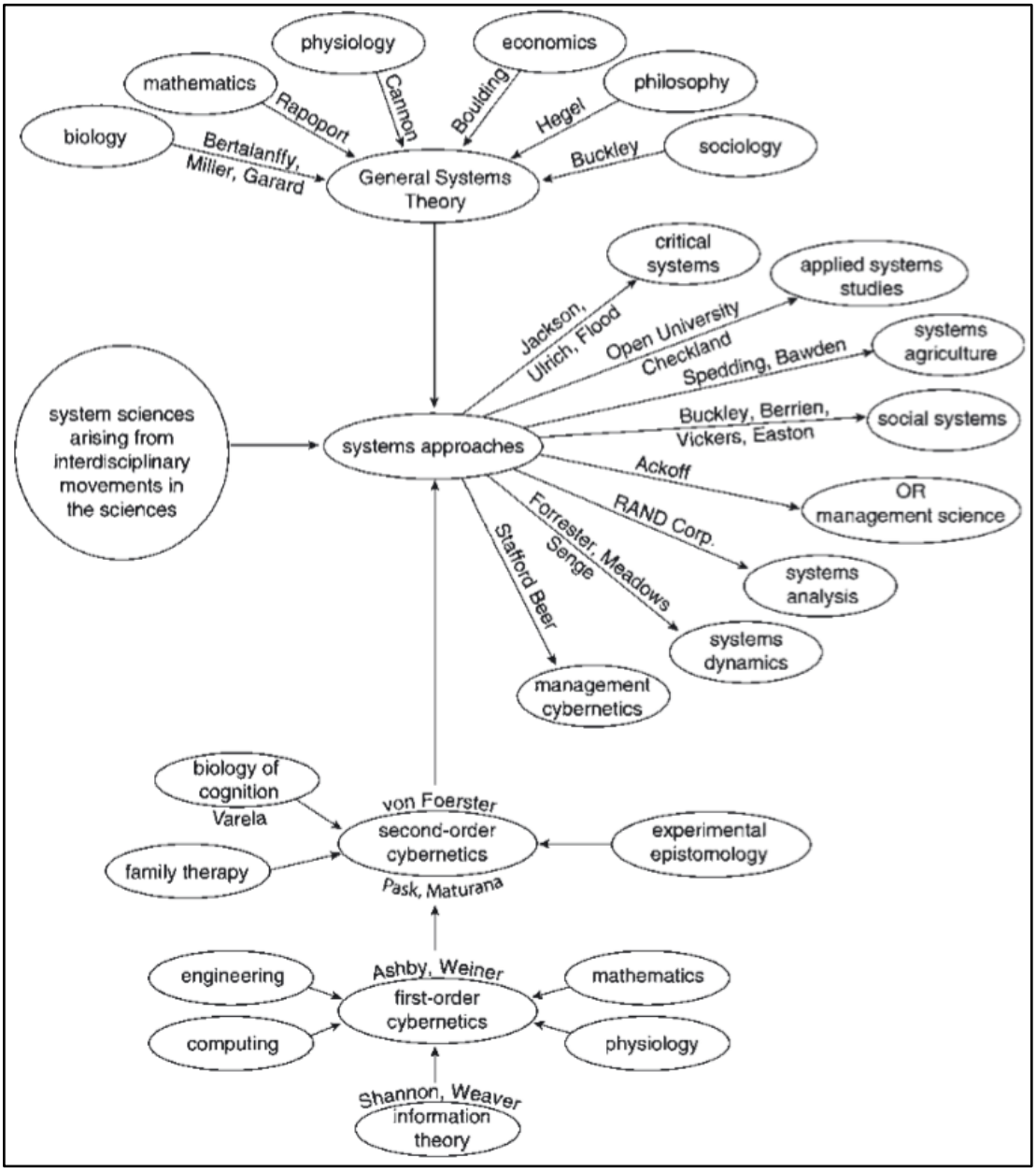


Figure 9: Third perspective based on relationships between systems approaches (Source: Ison et al., 1997)

significant contributors are not present. Within this perspective, a key question remains unanswered: How could systems practice develop synergies with other practices in different domains in order to raise its use to face complex situations?

A fourth perspective was built based on the contextual influence of individual systems practitioners. Ramage and Shipp (2009) developed this perspective, which focuses on the life and work of individuals behind the systems approaches rather than the systems approaches themselves; for this reason, their work was controversial. They presented the information in Figure 10 based on three criteria, whereby systems thinkers: explicitly identified themselves with one or more of the

major traditions in systems thinking; presented advanced systems concepts through their application of systems concepts; and finally, expressed their ideas in print. According to Ramage and Shipp (2009), there were two major schools of thought that acted as a starting point in systems thinking. First, general systems theory (GST), founded by Ludwig von Bertalanffy and the movement of the Society for General Systems Research in 1956. According to Midgley (2000), GST is based on the idea that it is possible to offer a common language for all the various scientific communities in order to gain a more comprehensive understanding of the phenomenon under study. The other major school is cybernetics, founded by Norbert Wiener and boosted by the Macy Conferences between 1946 and 1953. These two major schools are consistent with the third perspective, in which GST and cybernetics influence systems approaches. However, there were a few schools of thought within systems thinking development that cannot be explicitly traced back to these traditions. It is possible to identify seven categories by grouping representative authors within specific schools of thought, such as system dynamics, or within connected ideas, such as learning systems. Figure 10 illustrates these seven categories.

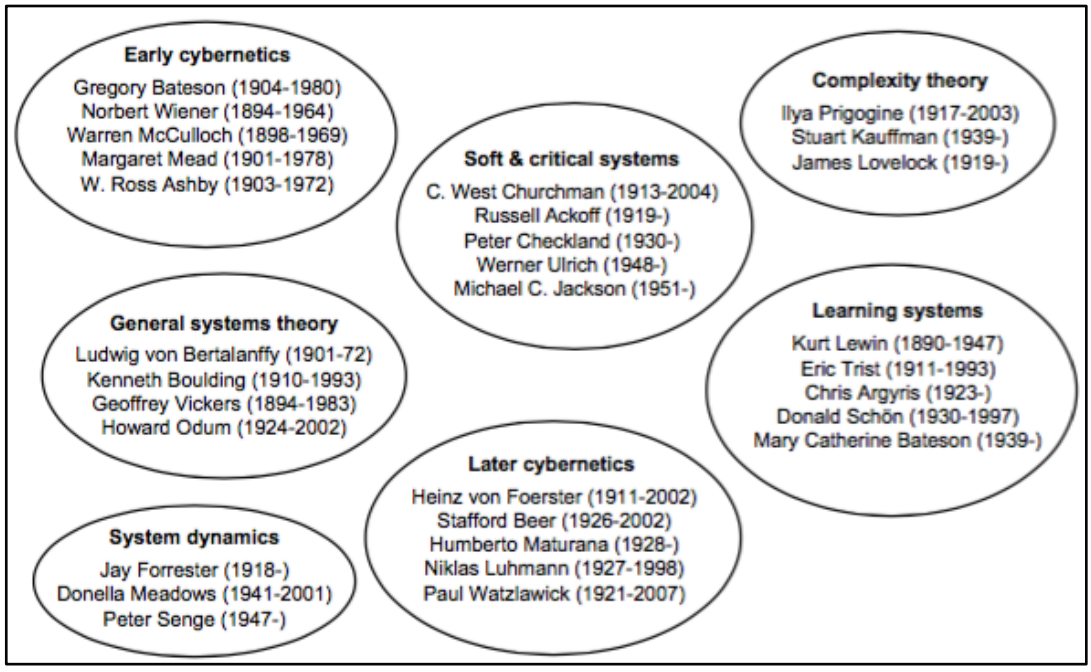


Figure 10: Fourth perspective based on the contextual influence of individual systems practitioners (Source: Ramage and Shipp, 2009))

In order to deal with the complexity of real-world situations in a manageable manner, it is possible to create a complex way to understand how to use systems

approaches. Moreover, it may also, at the same time, be complicated to know how best to use systems thinking to solve problematical situations (Reynolds & Holwell, 2010).

Finally, the fifth perspective is based on the purposes pursued. Jackson (2004) argues that the most useful holistic approaches to management differ in the purposes pursued, the metaphors employed and the paradigms embraced. Thus, systems approaches can be classified into the following four types. First, systems approaches for improving goal seeking and viability, such as: hard systems thinking, systems dynamics, organisational cybernetics and complexity theory. Second, systems approaches for exploring purposes, such as: strategic assumption surfacing and testing, interactive planning and soft systems methodology. Third, systems approaches for ensuring fairness, such as: critical systems heuristics and team syntegrity. Fourth, systems approaches for promoting diversity, such as postmodern systems thinking. The various systems approaches cannot be used all at once, but they can be used creatively and together to promote improvement in a human activity system, which is the essence of ‘creative holism’. It was becoming apparent in the 1980s and 1990s that something was necessary in order to realise the potential of systems thinking for such a purpose. Being ‘holistic’ in the managerial domain means using systems thinking in order to understand and intervene in problematical situations. Being creative holistically means the creative use of systems thinking in combination with different ways of being holistic. This new trend was known as critical systems thinking (a philosophy and theory) and, within this trend, different approaches arose, for instance: total systems intervention and critical systems practice (meta-methodology). Table 17 presents a summary of this discussion. In order to cope with increasing complexity, SME managers need to be creative holistically to improve viability over time.

All the above methodologies can be used in different contexts and applications, but they can also be used in an integrated way to solve problems more systemically.

Table 17: Fifth perspective based on the purposes pursued (Source: Jackson, 2003)

Systems Approaches	*Type A*	*Improving Goal Seeking and Viability*	Hard Systems Thinking
			System Dynamics: The Fifth Discipline
			Organizational Cybernetics
			Complexity Theory
	Type B	*Exploring Purposes*	Strategic Assumption Surfacing and Testing
			Interactive Planning
			Soft Systems Methodology
	Type C	*Ensuring Fairness*	Critical Systems Heuristics
			Team Syntegrity
	Type D	*Promoting Diversity*	Postmodern Systems Thinking
Creative Holism			Total Systems Intervention
			Critical Systems Practice

Maguire et al. (2011: 9) state:

> Actually, in carrying out the project, reflecting on complexity and reading other scholars' contributions, the dilemma was diminished somewhat: it became clear that there is no single best way of approaching complexity which, by its very nature, is constituted by competing descriptions from multiple perspectives.

In order to cope with complexity in SMEs, this research needed to focus, not only on ways of understanding it, but also on ways of acting upon it. As stated, the third wave of systems approaches emphasised the value of choosing between the great variety of systems approaches in a critical and systemic manner. The point is not to achieve a comprehensive coverage of each of these approaches, but to engage in a continuous process of learning and reflection, building new skills over time to cope with complexity. Within the third wave, Midgley (2000) proposes the concept of systemic intervention, which refers to intervention oriented by purposeful action boosted by an agent to create change in relation to reflection on the boundaries of problematical situations. This kind of intervention embodies the pursuit of the ideal of comprehensiveness. However, Midgley (2000: 103) warns us that

> absolute comprehensiveness is impossible; an adequate methodology for systemic intervention must facilitate considerations of issues of inclusion, exclusion and marginalisation by promoting reflection on boundaries. It should also allow for theoretical and methodological pluralism.

An adequate methodology for systemic intervention should be explicit about three aspects: first, agents who reflect critically upon, and make choices between, boundaries (critique); second, agents who make choices between theories and methods to guide action with a focus on theoretical and methodological pluralism (judgement); and, finally, agents who take action for improvement depending on temporal and local contexts (action). These three activities are inseparable.

On the other hand, two of the most prominent developments derived directly from systems and cybernetics approaches to managing complexity are the works of Jay Forrester and Stafford Beer in system dynamics and the Viable System Model, respectively (Merali & Allen, 2011). According to Espinosa and Walker (2011: 11), cybernetics has been defined by von Hayek as the "theory of complexity" and, by Beer as the, "the science of effective organization". Beer understood complexity as a core topic of cybernetics discourse (Espinosa & Walker, 2011). Pickering (2002) argues that Beer's primary concern was the application of cybernetics to the real world for managing organisations of all scales. Beer was the founder of a field called 'management cybernetics' and wrote several books on it. Thus, for the reasons presented above, within the broad spectrum of the systems thinking approaches, this research will explore the use of critical systems to frame a systemic intervention in SMEs and organisational cybernetics to address their complexity.

2.5.5 Cybernetics – the science of effective management

Espinosa and Walker (2011) argue that cybernetics was a core development of new holistic approaches. Cybernetics was developed during the Macy Conferences, held from 1946 to 1953 (Espinosa & Walker, 2011). The multidisciplinary membership of the Macy group included Wiener, von Neumann, McCullough, Mead and Bateson (Merali & Allen, 2011). These pioneers produced many of the seminal works on cybernetics. The first cyberneticians created the basis for a new understanding of cognition, servomechanisms and self-

regulation; this work had a significant influence in an innovative way on more traditional disciplines. The early cyberneticians also provided scientific explanations for the physiology of the autonomic and central nervous systems and the human brain and even developed the first mathematical model of neural networks. They also explained the nature of the reflexive and homeostatic mechanisms in the brain and the way in which closed cycles exist in the architecture of the nervous system, and that such mechanisms are at the core of solving problems related to memory, recall and foresight. Other cyberneticians applied these insights into other fields, such as equating communication and control in terms of feedback loops as distinct from teleological mechanisms. Teleology then becomes a recursive operation in such cycles and loops (Espinosa & Walker, 2011). Espinosa and Walker (2013) state that Stafford Beer was the first cybernetician to develop a complete theory, model, methodology and methods to manage complexity in the management field. Much of this work is represented in Beer's VSM.

Beer's work was based on Ashby's findings in order to develop a generalised model of viability with special applications to social systems. Beer used Ashby's Law of Requisite Variety, which states that only variety can absorb variety. According to Espinosa and Walker (2011: 12),

> the variety of a system which is attempting to control another system must be at least as large as the variety of the system that it is trying to control. Thus the controlling system must have "requisite variety" compared to the variety of the controlled system.

Espinosa and Walker (2011) argue that, with the VSM, Beer developed a new way of thinking and new tools which enable us to understand the relation between living organisations coevolving with their environment, seeking viability. Using the VSM, the focus of analysis is to observe the ability of an organisational system to handle the complexity of the tasks required of a highly complex changing environment in order to fulfil its purpose in this context. According to Beer, in order to deal with excessive complexity and thus become more viable, it is necessary to set proper structures in place, neither centralised nor decentralised, but with the right balance for dealing with environmental variety. Beer understood complexity as a cornerstone of cybernetics discourse. According to Beer, a

system is an agreement between human beings regarding the conventions of its nature, boundaries and purpose (Beer, 1995); the system is viable if it can survive in a particular environment (Espinosa & Walker, 2011).

Beer's primary concern was the application of cybernetics to organisational management: what he originally called management cybernetics and which later became known as 'organisational cybernetics' (Jackson, 2003). According to Beer (1995), the success or failure of an organisation is a function of its capability to cope with its environment and the outside world is what he classified as an 'exceedingly complex system', meaning that it is not exhaustively knowable (Pickering, 2002). Beer's VSM was also founded on the original suggestions from McCulloch of neural networks and, according to Espinosa and Walker (2011) and Espejo and Reyes (2011), this is key to the understanding of complex systems. In relation to the challenges faced by SMEs in Mexico, the work of Stafford Beer was selected in this study for three main reasons: first, it is a systemic model for managing complexity in organisations; second, it is oriented to managing the balance and relation between an organisation and its environment; and third, all the theoretical foundations and practical evidence behind VSM interventions worldwide give strong support and confidence to this research.

For the researcher, organisations are highly complex systems working in highly complex and changing environments. As Espinosa and Walker (2011: 14) state, "a complex system has been described as an open system whose unpredictable behaviour is affected by positive and negative feedback loops and co-evolves with its environment". It is normally the case that an environment demands more of what the organisation can offer and so organisations need to decide the environment in which to deal. The researcher decided to use the VSM as the backbone for this research precisely because of the possibility of working on the complexity of SMEs by focusing on the balance between an organisation and its environment based upon a robust grounded theory (Hoverstadt, 2008). The VSM was used with other systems and non-systems methodologies to solve problems in a systemic manner in SMEs to help them to last over time. The VSM was also the basis of the research because the model can be used to explore the world with a very well-structured methodology that allows integration with other methodologies to build a process to manage complexity in SMEs.

2.5.6 The Viable System Model

According to Espinosa and Walker (2011: xiv),

> This approach [VSM] offers a meta-language that allows us to talk about complex organisations without being trapped in their own complexity. It offers both a theory and a set of tools to model complexity and to design versatile structures, which have a better chance of adapting to a rapidly-changing highly complex environment. The model is based on the ongoing co-evolution of a system with its environment.

Hoverstadt (2008) states that there exist four rationales for using the VSM. The first rationale is that the VSM has a strong theory behind it, i.e., a whole body of systems and cybernetics thinking. Hoverstadt (2008: 6) argues that "Having some theory behind your method does give some guidance as to why it might work when it does, and therefore where it might be helpful, and where it will not". When Stafford Beer first developed the VSM, he was seeking to encapsulate a set of fundamental laws and principles as the science of organisation. The second rationale is the resonance of the VSM. According to Hoverstadt (2008), the VSM should change the way of looking at strategy, change management, the meaning of governance and the practice of performance management, and should connect all of these together into a coherent picture, in which they each make sense in a completely new way. The third rationale is practicality: using the VSM helps us to reach pragmatic, quick and robust solutions. The final rationale is what Hoverstadt (2008) calls the "Aha" moment, i.e., the moment when you see a familiar problem or experience in a new way and say to yourself 'oh, so that's why...'. The researcher had not previously heard of the VSM and, the first time he read about it, he experienced his 'Aha' moment.

2.5.6.1 The foundations of the VSM

The VSM is a useful model for improving the goal seeking and viability of organisations. It seeks to help design complex systems of all kinds and to make them viable in rapidly changing environments. According to Hoverstadt (2008), the VSM sets out the necessary functions of implementation, coordination, control, intelligence and policy that must be present in any viable organisation and suggests what information systems have to be in place to support viability.

Beer (1985) developed his VSM on the basis of understanding the behaviour of the human body. The first level of this model consists of three basic elements that interact with each other: Environment (E), Meta-system (M) and Operations (O). Figure 11 is a graphic representation of the model, in which System 1 (1a, 1b, 1c) is the Operations, Systems 2, 3, 3*, 4 and 5 are the Meta-system, and 'E' is the Environment. The key point is the balance between the Meta-system and the Operations in coping with challenges in the Environment.

The main components of the three elements (M, O and E) of the VSM are described briefly here (Espinosa & Walker, 2011). The Operations are the primary activities. The Operations, also called System 1 (S1), is responsible for doing what is necessary to meet the defined organisational purpose, i.e., S1 is oriented to what the system does as a whole. Each S1 conforms again within with the same three elements: O, M and E, through the concept of recursion, which relates to the presence of one or more VSM in each S1 as part of the larger Operations system.

The O in turn interacts directly with the E (customers, suppliers, competitors and public institutions) with which it needs to develop its purpose. In summary, S1 is necessary for implementing an organisational purpose and has the following drivers: first, it must be aligned with the whole; second, it is necessary to work on S1 to achieve enough variety to cope with the variety in the environment; third, S1 can act as a 'black box' to manage its variety; fourth, S1 produces itself; fifth, it needs enough autonomy to bring an effective response, i.e., its own internal control, its own aims and its own interaction with its environment.

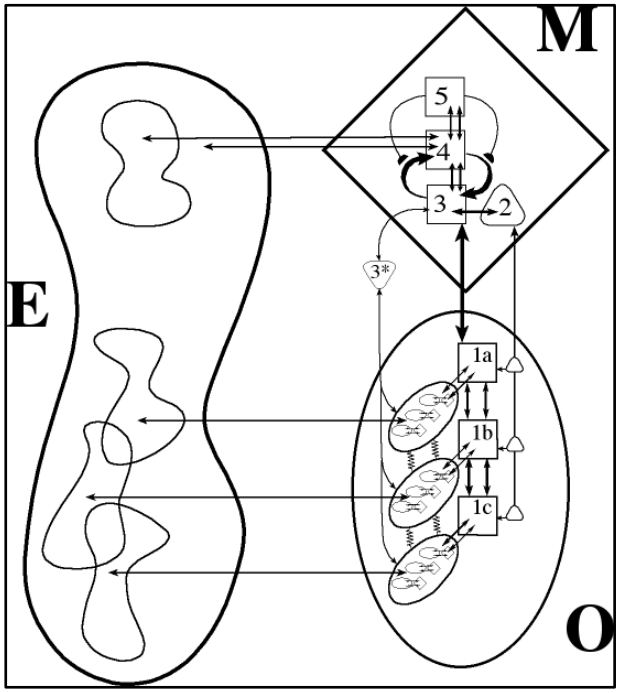


Figure 11: Diagrammatic representation of the VSM (Source: Espinosa & Walker, 2011)

The Meta-system (M) is integrated in turn with the four following systems. System 2 (S2): the role of S2 is to ensure the proper management of conflicts of interest in S1 in order to avoid unnecessary oscillations in it and the larger system of which it is part. S2 mainly has an anti-oscillatory function. S2 has the following drivers: first, S2 dampens oscillations, it is not a command channel; second, S2 ensures harmony between different S1s and S2 is at the service of the S1s, dealing with conflicts of interest and tensions; third, S2 helps to attenuate vertical variety between S1s and the M, using: shared languages, communication protocols and carrying information from S1s to the M; fourth, S2 also helps to attenuate horizontal variety between the O and its E, using rules and regulations to give cohesion, together with information tools and technical standards.

System 3 (S3) is aimed at optimising the interactions of the S1 units. It works to increase synergy and improve the performance of S1 units for the benefit of the viability of the entire system. S3 has the following drivers: first, S3 ensures that the criteria for the decision-making of the S1s are consistent with the strategic criteria of the M, due to its synoptic systemic viewpoint; second, S3 may constrain the freedom of S1s only if it is necessary to benefit the whole; third, S3 bargains over financial, physical and technological resources looking for synergistic advantages in S1s; fourth, S3 is the command channel for S1s based on legal

and corporate norms and policies; fifth, S3 is in charge of services management, activating relevant support networks when this is necessary; sixth, S3 also helps with knowledge management by promoting synergy between S4 and S1s; seventh, S3, through S3*, works as an accountability channel for the operational control of S1s because it also has the power to review information directly to audit operations if it is necessary for the proper functioning and balance of the entire system.

System 4 (S4) has the aim of ensuring that the entire system can survive in an environment of constant change. Thus, it is responsible for addressing and monitoring what happens in the outside world i.e., threats and opportunities, for the longer term of the entire organisation. However, S4 also needs to have full understanding of the internal capabilities of the organisation in order to manage its viability. For this, it is necessary to have effective interaction between S3 and S4 through a continuous exchange of information. S4 has the following drivers: first, S4 needs to work in an integrated manner on all development efforts to improve the focus of the whole; second, S4 works on environmental scanning and on a model of the environment by searching a range of possible futures; third, S4 is also the innovation generator by acting as a filter between S5-policies and S3-capabilities; fourth, S4 works to ensure long-term viability.

Finally, System 5 (S5) is responsible for organisational closure, identity and ethos. S5 is the final authority in the interaction between S3 and S4 to preserve the identity of the whole system. S5 has the following drivers: first, S5 is the overall context and makes sure everyone is pulling in the same direction; second, S5 articulates shared identity and purposes; third, S5 ensures that everyone works within policy constraints; fourth, S5 gives confirmation of local accountability; fifth, S5 helps in making decisions regarding the balance in investments between the long term (S4) and the short term (S3) based on the requisite variety of the whole system; sixth, S5 provides second-order control, mainly between S4 and S3, by providing a meta-systemic language between members; seventh, S5 can intervene in extreme circumstances e.g., when norms or policies are being ignored, when S4/S3 ignores core rules and when something is out of control at a local level.

The above overview of the VSM is helpful in understanding the model and the shape of the interactions between all its systems in coping with complexity as a whole. It is also, however, necessary to consider the VSM principles in depth to better understand the guidelines that drive such interactions.

2.5.6.2 The principles of the VSM

The interactions between the three elements and the five systems of the VSM are ruled by a set of principles and axioms regarding the viability of a system. In addition, and based on the social role of SMEs seeking the common good, the researcher realises that the starting point must be aiming to the ethos of the system. Normally, a starting point aims to answer the question: What is the system? However, could we start with: Why must the system perform the previous ‘what’? Currently, in our modern society the 'why' is more oriented to an instrumentalist vision of SMEs, instead of their social impact. For this purpose, the researcher introduced some guidelines related to 'why' based on interpretive systemology, in order to complement the set of principles (Fuenmayor, 2012, 2012a, 2012b, 2012c).

From reviewing the literature of many of the authors regarding the VSM and interpretive systemology (Beer, 1981, 1984, 1985, 1995; Espejo, 1981; Espejo & Kuropatwa, 2011; Espejo & Harnden, 1989; Espejo & Reyes, 2011; Espinosa, 2014, 2015a, 2015b; Espinosa & Walker, 2011, 2013; Espinosa et al., 2008; Fuenmayor, 2001, 2001a, 2001b, 2001c, 2012, 2012a, 2012b, 2012c; Hoverstadt, 2008; Jackson, 1992, 2003; Leonard, 1992, 2009; Midgley, 2000; Schwaninger, 2000, 2004, 2006a, 2006b, 2006c), the researcher identified and integrated the core laws, principles, aphorisms, axioms, theorems and guidelines. He had the aim of building a graphical summary of the core principles to ease understanding of them when designing a systemic intervention to improve the viability of SMEs. In addition, a second purpose was to build a ‘transitional object’ (Midgley et al., 2013) in order to use it to structure people’s engagement with the principles and provide a focus for the dialogue between them, seeking the easy understanding of these principles.

First here are considered two laws. Organisational cybernetics considers the law

of requisite variety, or Ashby's law, which states that only variety absorbs variety. For this work, also the Pareto´s law, was considered, it states that, for many events, roughly 80% of the effects come from 20% of the causes (Beer, 1995).

The VSM uses three principles: requisite variety, channel capacity and transduction. These are necessary tools in the establishment of a dynamic equilibrium around the loops that connect sub-systems together. The first principle states that: "Managerial, operational and environmental varieties, diffusing through an institutional system, tend to equate; they should be designed to do so with minimal damage to people and cost" (Beer, 1995: 97). The second and third principles are related to the management of information. The second principle states:

> The four directional channels carrying information between the management unit, the operation and the environment must each have a higher capacity to transmit a given amount of information relevant to variety selection in a given time than the originating sub-system has to generate it in that time (Beer, 1995: 99).

Finally, the third principle of organisation states: "Wherever the information carried on a channel capable of distinguishing a given variety crosses a boundary, it undergoes transduction; and the variety of the transducer must be at least equivalent to the variety of the channel" (Beer, 1995: 101). The operation of the first three principles must be cyclically maintained through time, and without hiatus or lags (Beer, 1995).

Organisational cybernetics considers two aphorisms related to management based on the concept of black boxes and mostly based on experience. The first regulatory aphorism is: "It is not necessary to enter the black box to understand the nature of the function it performs" (Beer, 1994: 40). The second one states: "It is not necessary to enter the black box to calculate the variety that it potentially may generate" (Beer, 1995: 47).

The VSM considers three management axioms: first, "the sum of horizontal variety disposed by *n* operational elements equals the sum of vertical variety disposed on the six vertical components of corporate cohesion"; second, "The variety disposed by System Three resulting from the operation of the First Axiom

equals the variety disposed by System Four"; finally, "The variety disposed by System Five equals the residual variety generated by the operation of the second Axiom" (Perez-Ríos, 2012: 241). The VSM also considers the following theorem, which has been proven on the basis of previously established statements. This theorem is related to a recursive system and states: "in a recursive organisational structure, any viable system contains, and is contained in, a viable system" (Beer, 1995: 118).

Figure 20, later in this section, shows a graphical synthesis of these guidelines and combines the VSM principles and guidelines with those of interpretive systemology. These principles and guidelines can be grouped into five major groups: Sense, Identity, Coupling, Operational Balance and Managerial Balance. 'Sense' principles help to realise the raison d'être of a whole system seeking the common good. These principles have a close relationship with the 'Identity' principles that point to the rationale of the organisation as a system. Between these two principles is built a strong and deep link regarding the sense and identity of the system and these principles also allow organisations to clarify the selected environment with which it coevolves. 'Coupling' principles then arise and help to identify the basis upon which the relationship between the organisation and its environment should work, aligned with 'Sense' and 'Identity' principles. Finally, the combination of the principles of Operational and Managerial Balance allow the organisation to respond in a timely manner to interactions with the selected environment, in looking for the right balance between horizontal or operational variety with vertical or managerial variety. The researcher presents each group of principles below. The principles are identified with a word or words between prime symbols (') and this 'title' will be the same as that used in Figure 20 and presents the relations between the guidelines and the principles.

The first principle is 'Experiencing everyday day life', which states that we normally experience things as wholes and not as mere sets of parts. This sense of experiencing the world moves us to the sense of 'Belonging': if human beings experience themselves as open ephemeral beings, always turning towards whatever is the case, they do not possess, they belong. When human beings feel they belong to the world, the sense of gratitude appears as 'Thankfulness', as the living ethos of a very different way of experiencing whatever takes place

in the world and the world itself, so the main constituent of life-mood is based on a mixture of a deep sense of gratitude and indebtedness for life and its gifts (Fuenmayor, 2012a, 2012c). Thus, the ethos of belonging is thankfulness and indebtedness and its expression is care. These are ways to both harmonise with the world and to help to express, respectfully and discretely, its process of unfolding. ‘Harmonising’ and ‘Expressing’ came together under the form of caring, in which the mission is to care for the world and for whatever is disclosed in it and by it. Thus, making sense is intrinsic to such caring. The sense of caring, in order to harmonise with the world, promotes a holistic sense. We need to make ‘Holistic sense’ i.e., find the meaning of things, happenings, situations within a totality and act for the global good in accordance with that sense, acting so that human action can harmonise with a fair and legitimate totality. In order to have a full sense of a good life, it is necessary to learn the basic activity of attempting to make holistic sense of whatever is the case and to find the path leading to the quest for a sense of life as a whole. A holistic sense is related to seeking the common good and we need to think through the consequences of our actions in terms of the common good. This relationship between a holistic sense and the common good leads us towards another key relationship between human beings in the ‘Heart of Enterprise’ and the ‘Historic and Cultural’ background. This relationship is based on the metaphor of ‘ground’ and ‘figure’: the ground or cultural background allows us to understand the shape of the figure, i.e., our behaviours in the world; but, at the same time, our behaviours shape our culture. It is the ground that makes possible the distinction of the figure. The figure disappears into the background of the ground. These guidelines are represented in Figure 12.

The ground-figure metaphor helps us to understand our foundation for acting in the world based on our cultural and historical background. However, our acting in the world needs to identify the meaning of such acting and this meaning requires a ‘Primary Unity’ of understanding that is necessary in order to clarify our holistic sense (Fuenmayor, 2012b, 2012c). However, making sense is not a

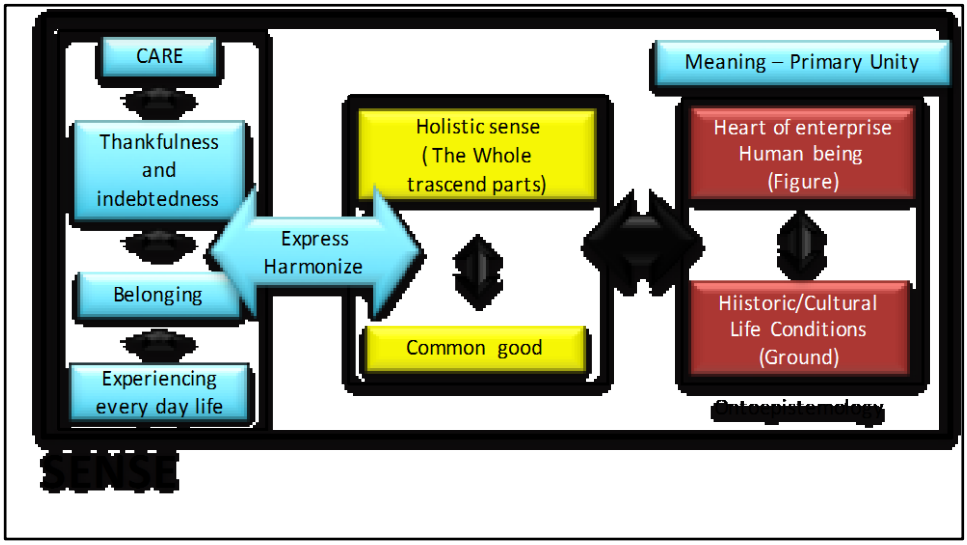


Figure 12: Summary of Sense guidelines

mere thinking activity; it involves acting, feeling, loving, inviting, thinking, speaking and any other form of communication. The meaning serves us when exploring, in this case the system called ‘enterprise’, to agree upon its nature because this is a ‘Convention’ between human beings on the ‘Identity’ of the system (Beer, 1995). In order to manage complexity in any system, it is necessary to have a deep insight into the conventions between humans related to its nature, boundaries, purpose and priorities in a coherent manner (Beer, 1995). Survival is a purpose that closes on itself because this is a matter of preserving identity. Agreement upon the nature, purpose and boundaries shapes the ‘Identity’ of the system, and serves as a basis for seeking ‘Cohesion’ in the system. Cohesiveness is a function of the purpose of a system. Viable systems with a concentrated purpose will be closely-knit and highly cohesive (Beer, 1994). These guidelines are represented in Figure 13.

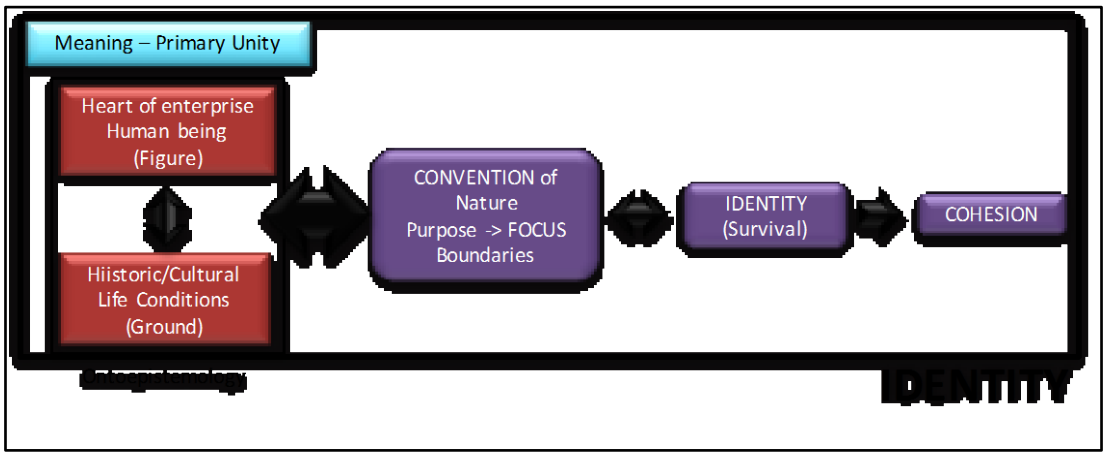


Figure 13: Summary of Identity guidelines

The cohesion of structurally coupled autonomous organisations at every recursive level enhances sustainability (Beer, 1995). The relation between the previous two groups of principles and guidelines is presented in Figure 14.

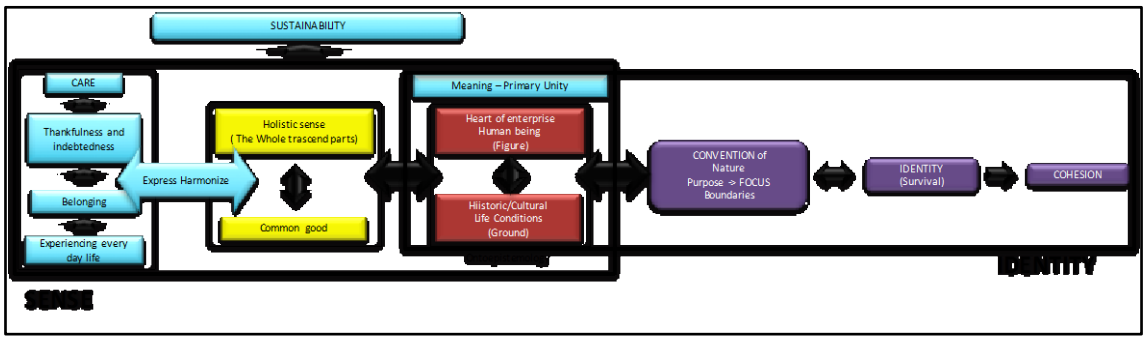


Figure 14: Relationship between Sense and Identity guidelines

With the above groups of principles, it is possible to explore the meaning of enterprise for stakeholders, reflecting on the sense of organisation in relation to its identity to define the relation with the selected environment. The purpose pursued attenuates environment variety by determining aspects of it relevant to the system-in-focus. Thus, the next group of guidelines presented is related to the relation between an organisation and its environment. As the variety in the environment is essentially infinite, the system-in-focus must decide the environment with which it is to deal. The definition of 'Relevant variables', which matters in the interaction between the organisation and its selected environment, is fundamental as an attenuator. In addition, the agreement of what the system is (its identity) is also, indirectly, an agreement that helps to clarify variety measures. However, the 'Measures' to take care of are not only related to the men, materials, machinery and money in an independent way, but also to their inherent complexity when managed together. The measurements must be as close to real time as possible and thus the measurement systems must refresh themselves and inform continuously rather than periodically.

Based on the Identity guidelines, the focus allows the 'Continuously changing and selected environment' to be drawn i.e., a system 'Adapts' to a continuously changing environment and 'Coevolves' with it while maintaining its identity. However, a viable system needs to keep its own internal environment stable i.e.,

'Internal homeostasis'. This is a property of a viable system: essential variables self-regulate to remain within physiological limits, despite the system having to cope with an unpredictable external environment. However, an organisation is a flexible organism within its environment and both are 'Structurally coupled' in the cognitive field of the organism (Beer, 1995). An organism that destroys its environment destroys itself. The interaction of one system with another in which it is embedded is achieved by 'Diffusion' across the boundaries between them. These guidelines are represented in Figure 15.

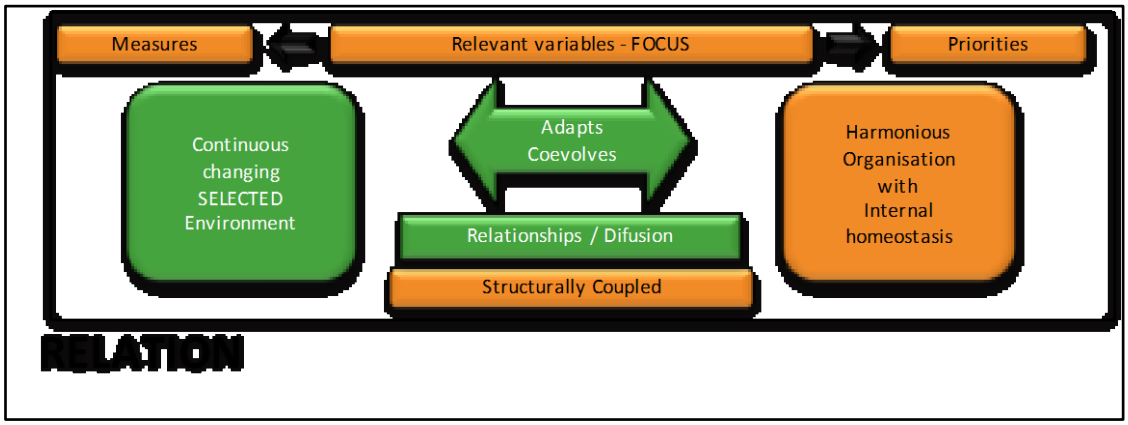


Figure 15: Summary of Relation guidelines

In addition, the relation between the three previous groups of guidelines is shown in Figure 16.

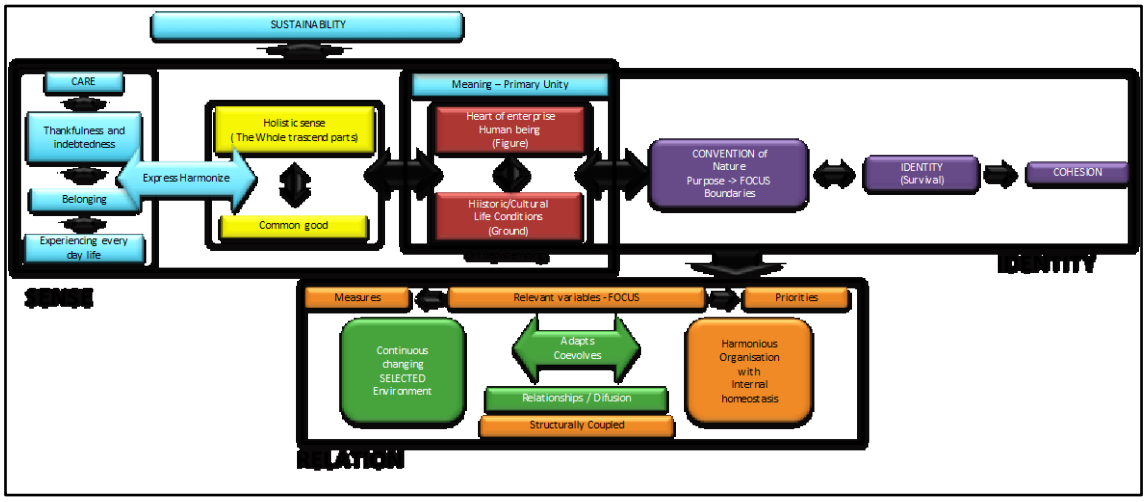


Figure 16: Relationship between Sense, Identity and Relation guidelines

In order to deal with the environment, it is necessary to consider some guidelines regarding variety. As it was stated, only variety can absorb/destroy variety. Thus,

it is necessary to attenuate the variety in high- variety systems and to amplify the variety in low-variety systems i.e., it is necessary to attend to the requisite variety, which means that the variety in a system which is attempting to control another system must be at least as great as the variety in the system that it is trying to control. Only a system that has the requisite variety will be able to cope with the complexity of its interactions with the environment. In order to handle this requisite variety, it is important to manage the right balance between the operational (S1) and managerial (S2, S3, S3*, S4 and S5) requisite variety in facing a chosen environment (Beer, 1995). Thus, the next guidelines are related to the balance between the Operations and the Meta-system. This integral 'Balance' requires a mix between the local compressive stress at the horizontal level (Operations) and the overall tensile stress in the vertical axis (Meta-system). This balance between vertical (coherence force/systemic viability) and horizontal (operational force/effectiveness) variety is the basis of a cohesive whole and the heart of an effective viable system (Beer, 1995). This dynamic balance requires the continuous interaction of all the various systems as a single harmonious whole coevolving with the environment.

Regarding Operational Balance, there are four aspects to be considered. The first aspect is related to the requisite variety i.e., it is necessary to have in mind residual variety where the variety generated/absorbed by the Environment is greater than the variety of the Operations and this is greater than the variety in the Meta-system (i.e., E > O > M). The second aspect is related to management based on the concept of the 'black box'. The black box idea offers a managerial approach to controlling explosions in variety. This approach avoids breaking a system down into its parts, instead controlling it through monitoring its outputs and manipulating its inputs appropriately (Beer, 1995). The third aspect is related with the maximum 'Local autonomy' required by Operations. The final aspect aims to 'Local self-regulation' in order to be able to adapt to sudden changes in the environment and to be effective within the cohesion and identity limits of the whole defined by the Meta-system. These guidelines are shown in Figure 17.

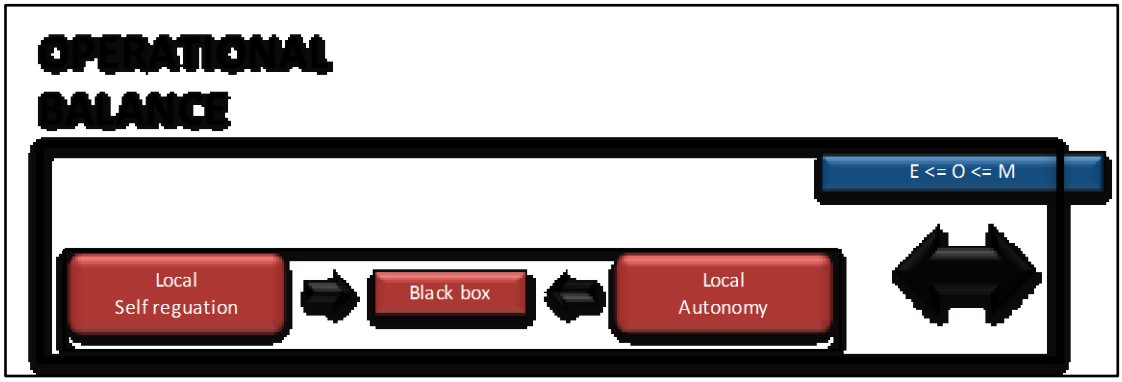


Figure 17: Summary of Operational Balance guidelines

As part of managerial balance, it is important to consider the need for 'Minimal Meta-system vertical intervention', as this is essential to viability and this minimum is compatible with systemic cohesion. In addition, this managerial balance also considers four interacting aspects. The first aspect is related to transduction: 'Transducer variety' must be at least equivalent to the variety of the channel. The channels used to pass information must themselves exceed that variety recognition capacity in order to convey requisite variety. The second aspect is the 'Designed attenuators and amplifiers' that have to be inserted on the appropriate side of the equation. It is also necessary to amplify and attenuate variety in the diffusion process. The third aspect to be considered is that data should be as close to 'Real time' as possible. The systems should monitor essential variables (Critical Factors) and report nothing if everything is progressing as planned. The information system involved needs to reduce the variety that managers have to handle in order to avoid irrelevance. Different guidelines are necessary in order to manage information for the process of decision-making. One aspect to be considered is that control is directly related to information. However, the more control you want, the more information you need but, in the end, the less control you have: more control, more information, more time for analysis, less relevance, no right decisions on time and, in the end, loss of control. In addition, creating extra controls means more added variety and, finally, loss of control (Espejo & Reyes, 2011). The final aspect to be considered is related to the people making the decision: they must represent the richness of different viewpoints. The 'Decision-making' mechanisms should be designed to have the requisite variety for the decisions required. Dealing effectively with Decision-making processes requires a Systems 3-4-5 homeostat. Algedonic filtration and closed-loop systems are necessary to create the right environment

for decision-making (Beer, 1995). These guidelines are shown in Figure 18.

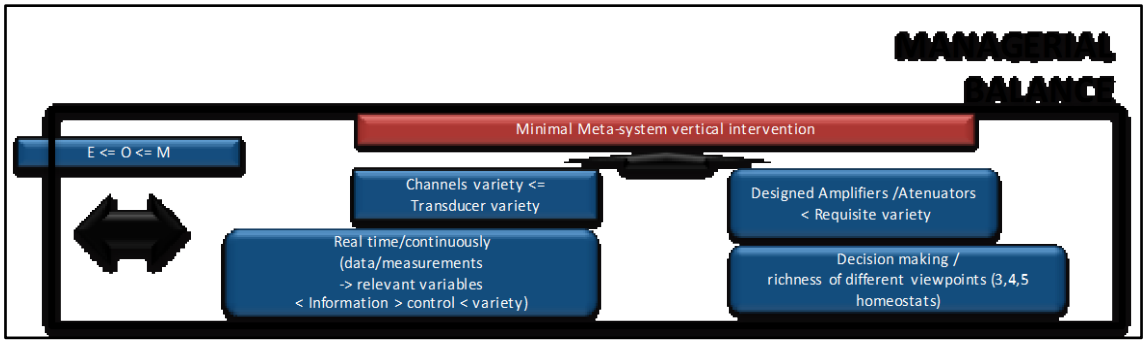


Figure 18: Summary of Managerial Balance guidelines

Management is the task of managing complexity. A manager is a variety engineer oriented to managing such variety using the necessary amplifiers and attenuators (Beer, 1995). A set of meta-systemic rules of interaction helps self-regulation, so less control at high levels is necessary, which significantly reduces complexity. Thus, a manager needs to consider the guidelines for Systems 1, 2, 3, 3*, 4 and 5 in order to manage the interactions between these VSM systems appropriately:

- System 1:
  - System 1 must produce itself.
  - Each operational unit is to be treated as a black box.
  - Freedom of an operational unit is a function of the purposes of the system as perceived.
  - Must work within the intentions of the whole organisation.
  - Each S1 will be responsible for its own ‘internal control’.
  - Alerting signals from S1 should go directly to S5.
  - It is recommended that ‘O’ is composed of between three and seven units.

- System 2:
  - S1s must work within the stabilising influence of S2.
  - S2 is in service to S1 as a damping mechanism and not a command function.
  - S2 cannot include committee members because the whole needs to absorb continuous high-variety interactions.

- System 3:
    - Mutually supportive operations are significantly more effective than working in isolation.
    - Real synergy for S1s is the interactions between them; there they can agree to increase real synergy.
    - S1s must respond to the optimising influence of S3 for the benefit of the whole.
    - S3 is the common element for inside-now and outside-then. S3 is the managerial fulcrum of a viable organisation.
    - S1 + S2 + S3 is the autonomic management, which works on internal stability and performance optimisation within established frameworks without reference to higher management.

- System 4:
    - The enterprise as a whole needs an adequate model of its total environment; it must itself contain a regulatory model of the range of possible futures. This is S4's job.
    - S4 must also be fully aware of the internal capacity of the organisation.
    - S4 needs to create strategies within the context of both S5 policies and S3 information to the capacity of S1s.
    - S4's efforts must work in an integrated way and focus is a new notion for capturing the essence of S4 integration.

- System 5:
    - The meta-system is an operational element in another viable system at the next level of recursion.
    - The meta-system must provide cohesion and ensure identity.
    - The meta-system will develop 'second-order control' or a 'control of the controllers'.
    - S5 continuously gathers information from the external environment via S4 and from the internal environment via S2, S3 and S3*.
    - S5 increases its variety by employing integrated teamwork and organising itself as an assemblage of managers.
    - S5 is the meta-systemic administrator of Ashby's law; it necessarily absorbs the residual variety of S3-S4 interaction.

- The need of S5 at each level is only to deal with the ‘residual variety’ not within local control.
- S5 only intervenes when any of the systems have been out of control at the local level.
- S5 works on the balance of investment between S3 and S4; S4 acquires whatever investment capability remains after S3 has taken what is needed for S1 to produce itself.
- S5 balances S3-S4 investment whereby the criteria are based on the requisite variety equation that must subsist between S3-S4.

Figure 19 shows the interaction between Operational and Managerial Balance guidelines as a summary of the above discussions.

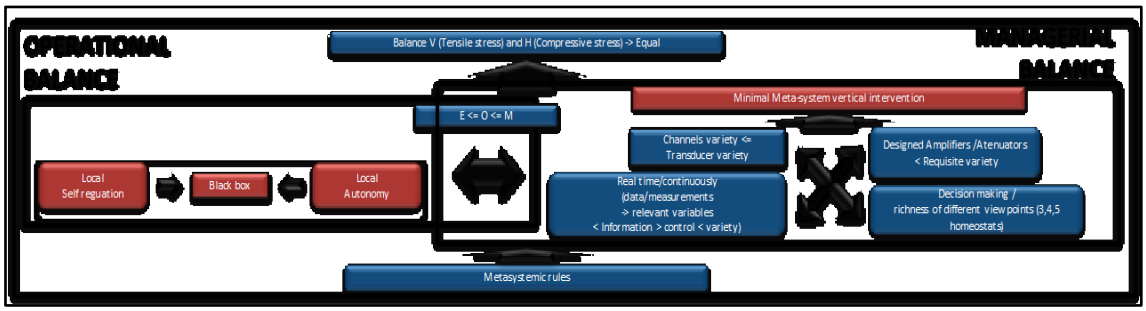


Figure 19: Relationship between Operational and Managerial Balance guidelines

Finally, it is important to consider two more guidelines: the concept of recursion and the necessary culture to enhance the application of the VSM in an SME. First, in a recursive organisational structure, any viable system contains and is contained within a viable system. ‘Recursive levels’ must be correctly identified, which enables the study of and ability to deal with the appropriate focus, level and range of decisions. Second, because the heart of an enterprise is the human being, the VSM requires a culture of respect, trust, transparency and reciprocity to be developed. Espejo and Mendiwelso (2011) argue that organisational transparency is necessary to improve communication and enhance confidence between people. In summary, Figure 20 presents the interaction between all five groups of guidelines discussed above. The VSM theory can then be seen to provide enough grounding to allow the researcher to address the research questions. The next step was to search the VSM literature to discover its uses and applications for managing complexity that could be adapted for use in the

context of SMEs in Mexico.

2.5.6.3 The VSM in the SME sector

In this section, the researcher explains research findings regarding the use of the VSM to support systemic interventions in SMEs. The researcher reviews different databases to identify the main trends in the literature regarding the VSM and SMEs.

The first database is related to books: Amazon. Using the following search terms - "Viable System Model" and “Management” - 52 books were identified. Table 18 shows these books and their distribution over time.

Table 18: Summary of books referring to the "Viable System Model" and “Management”

PERIOD	BOOKS
1957-1969	9
1970-1979	1
1980-1989	1
1990-1999	14
2000-2009	10 (5in German)
2010-2013	17 (3 in German)

Before 1995, the majority of the books (76%) were by the original author, Stafford Beer. In contrast, in the years 2010-2013, other authors published one-third of all the published books and, between 2000 and 2013, approximately 50% of the books identified. These data show an explosion in VSM literature based on the books published since the 1990s. Even though the majority of these books are related to management, none of them refer specifically to managing complexity in SMEs. Table 19 shows a detailed list of these books, their years of publication and authors.

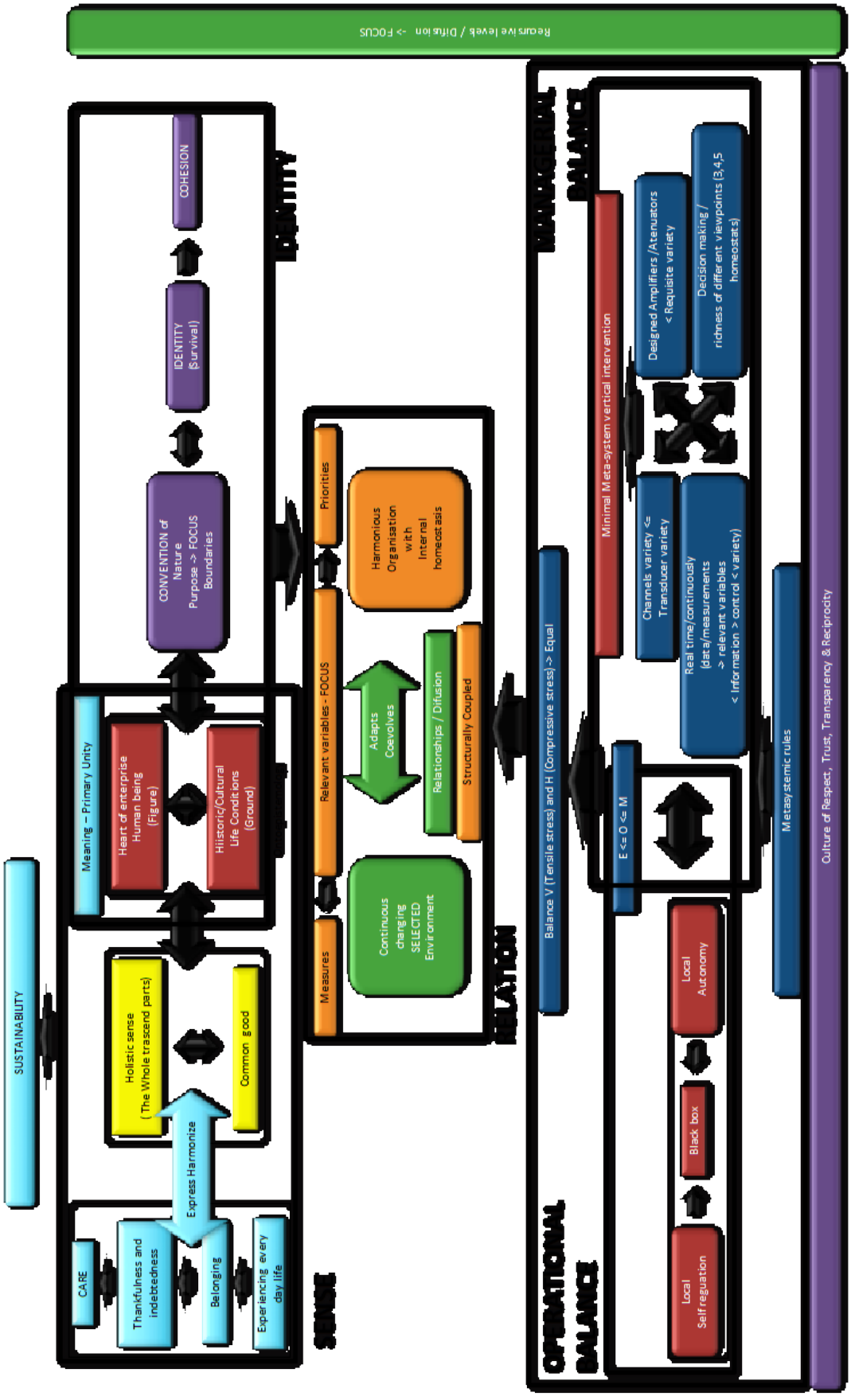


Figure 20: Relationship between all five groups of guidelines

Table 19: Books found on Amazon.UK using the search terms "Viable System Model" and “Management”

BOOK	YEAR	AUTHOR
The Scope for Operational Research in Industry. With a portrait (57)	1957	Stafford Beer
Operational Research and Personnel Management. Pt. 1 (Institute of Personnel Management. Occasional Papers. no. 14.) (59)	1959	Stafford Beer and Reginald William Revans
Operational Research in Iron and Steel (Sigma Papers. no. 3.) (63)	1963	Stafford Beer
An Essay on Operational Research (no.1) (63)	1963	Stafford Beer
What Every Director Should Know About Automation (64)	1964	Edward Heath, Lord Piercy, W.S. Tandler and Stafford Beer
The Theory of Operational Research (no.8) (65)	1965	Stafford Beer
Cybernetics and Management (65)	1965	Stafford Beer
Management Science: the Business Use of Operations Research (68)	1968	Stafford Beer
Icl Lectures in Technical Communication (72)	1972	Stafford Beer, Colin Cherry and Peter Wason
The Viable System Model: Interpretations and Applications of Stafford Beer's VSM (89)	1989	Raúl Espejo and Roger Harnden
Developing an index monitor for Beer's viable system model	1990	Robert L. Flood
The Viable System Model: a more adequate tool for practising management?	1993	John Leonard William Beckford
Brain of the Firm 2e	1994	Stafford Beer
Decision and Control: Meaning of Operational Research and Management Cybernetics	1994	Stafford Beer
Heart of Enterprise	1994	Stafford Beer
Beyond Dispute: Invention of Team Syntegrity	1994	Stafford Beer
Platform for Change	1994	Stafford Beer
Diagnosing the System for Organizations	1994	Stafford Beer
Stafford Beer Classics Library: 6vol. Set	1994	Stafford Beer
Managing the Evolving Corporation	1994	Langdon Morris
The viable system model (VSM) and organisation theory: a complementary approach to the case of a pharmaceutical manufacturer.	1995	Nasser W Ja'bari
Designing Freedom	1998	Stafford Beer
Rethinking the Fifth Discipline: Learning Within the Unknowable	1999	Robert Louis Flood
The development of a purposeless system approach	1999	Hwan-Yann Su
A Method and Software for Designing Viable Social Systems	2001	JD R de Raadt
Information Systems Evaluation Management	2002	Wim Van Grembergen
Business Performance Measurement: Theory and Practice	2002	Andy Neely
The Design and Evaluation of Multimedia for Management Education	2003	Susan Jane Jones
Organization Structure: Cybernetic Systems Foundation	2003	Yasuhiko Takahara and Mihajlo Mesarovic
Holistic Management: Managing What Matters for Company Success	2007	William F. Christopher
The Fractal Organization: Creating Sustainable Organizations with the Viable System Model	2008	Patrick Hoverstadt
Approaching Civil-military Cooperation: A Shared Platform for Experience and Research	2008	Sebastiaan J.H. Rietjens and Myriame T.I.B. Bollen
Initiate OE Processes and Design: A handbook for managers, consultants and project managers (German)	2009	Walter Häfele
Lila Management principle: think new and successful business change. With a history of Dodo cress	2009	Kurt Völkl and Heinz Peter Wallner
Intelligent Organizations: Powerful Models for Systemic Management	2010	Markus Schwaninger
Business in the Cloud: What Every Business Needs to Know About Cloud Computing	2010	Michael H. Hugos and Derek Hulitzky
Optimization of IT service organizations: Productivity and quality improvement in the IT production (German)	2010	Ingo Bock
Distract what your company directs: Management Process Architecture (MPA) as a quantum leap in the company's management and employees (German)	2010	Marius Klauser
Design suggestions FR Agile software development ... Under The angle of Cybernetics (German)	2010	Ulrich Biberger
Governance: Systemic Foundation and Framework	2010	Ralf-Eckhard Türke
A Complexity approach to sustainability: theory and application	2011	Angela Espinosa and Jon Walker
Organizational Systems: Managing Complexity with the Viable System Model	2011	Raul Espejo and Alfonso Reyes
Cybernetic Revolutionaries: Technology and Politics in Allende's Chile	2011	Eden Medina
Ahead of Change: How Crowd Psychology and Cybernetics Transform the Way We Govern	2011	Constantin Malik
Systemic management: sustainable design and control of complex systems in the future (German)	2011	Patrick Rundio
Managing Software Developing Projects	2011	Peter Hirschbichler
Design and Diagnosis for Sustainable Organizations: The Viable System Method	2012	Perez Rios Jose
The Manager's Guide to Systems Practice: Making Sense of Complex Problems	2012	Frank Stowell and Christine Welch
Systemic Management for Intelligent Organizations: Concepts, Models-Based Approaches and Applications	2012	Stefan N. Grösser and René Zeier
FAST Track Baukybenernetik - Cybernetic Construction Project Management (German)	2012	Michael Frahm
Scrum and the standard model of effective management by Malik: A synthesis of systemic management. (German)	2012	Jacqueline Sharma
Smart Working	2013	Anne Marie McEwan

The second database explored, Web of Knowledge, is an academic citation indexing and search service, which is combined with web linking. This database provides bibliographic content and tools to access, analyse, and manage research information because multiple databases can be searched simultaneously. A search based on the search term "Viable System Model" and a filter for “Management” found 58 articles. Table 20 presents a distribution based on year of publication.

Table 20: Summary of published articles related to the VSM (Web of Knowledge database)

PERIOD	ARTICLES
1984-1989	1
1990-1999	14
2000-2009	23
2010-2013	20

The above data also show an explosion in the VSM literature based on articles published since the 1990s. These articles cover a wide scope of topics. However, the most-referred-to topics are communities development, process improvement and sustainability. Details of this database are presented in Table 21.

From the above database, only three articles refer to SMEs. The first of these articles is “Systemic model for diagnosis of the micro, small and medium enterprises from two cities from the countryside of the State of Sao Paulo in Brazil” (Tejeida-Padilla et al., 2010) and is related to the diagnosis of a social group, public authorities and support entities. The second one is “Passing on a family business, or a family business passing on - an application of the Viable System Model” (Beckford, 1992), which also discusses the diagnosis and restructuring of a small firm. The last article is “Complexity management in practice: A Viable System Model Intervention in an Irish eco-community” (Espinosa & Walker, 2013) and is the only one that presents a complete explanation of a VSM intervention with emphasis on the learning process with the support and facilitation of a consultant team.

The third database came from a freely accessible web search engine, Google Scholar, which indexes the full text of scholarly literature across an array of publishing formats and disciplines. A search based on the search terms "Viable System Model" and "SME" after the year 1990 produced 28 articles. These articles and their distribution are presented in Table 22 based on year of publication.

The above data also confirm the explosion in VSM literature in the last decade. A detailed table of this database is presented in Table 23.

Table 21: Summary of VSM published articles found on Web of Knowledge

"Viable System Model" and "Management"

TOPIC	1984	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
VSM Methodology (52)	1																								
Interpretations and applications (48, 49, 50, 51))		1	3																						
VSM foundations (47)				1																					
Family business (46)				1																					
Workshop methodology					1																				
Project management (45)					1																				
National development (41)						1																			
Eco development (42, 43)						1																			
VSM software (44)						1																			
Measurement systems (38,40)									1		1														
Multibusiness corporation (39)									1																
Intelligent organisations (37)												1													
Knowledge management (31,36)														1			1								
Organisational evolution (35)																1									
Smart Networks (Electricity market) (34)																1									
Organisational structure design (33)																	1								
Transfer pricing (32)																	1								
Manufacturing interorganisational coordination (30)																		1							
Design rules for Intranets (29)																		1							
Lean systems (1,23)																			1						1
Autopoietic VSM (25)																			1						
Non Governmental Organisations (24)																			1						
Sustainability practices (21, 22, 27, 28)																			2	2					
Waste Management (26)																			1						
Strategy Plan System (15)																					1				
Complex organisations (16)																					1				
Network Structures and Cultural Tourism (17)																					1				
Tourism Industry examination (18)																					1				
Diagnosis Financial Institution (20)																					1				
Creating Sustainable Organisations (19)																					1				
Enterprise Resources Planning Systems (14)																						1			
Software process ann architecture (12)																						1			
Functional subcultures (11)																						1			
Systemic Model for Diagnosis of SMEs (13)																						1			
Variety engineering - Information flows (8)																							1		
Qualitative studies (9)																							1		
Endure organisations																							1		
Organisational Processes																							1		
Organisational Cooperation for Cultural heritage (10)																							1		
Organisational resilience																							1		
Free technologies																							1		
Organisational Intelligence function (5)																								1	
Operating Agencies in Policy implementation (6)																								1	
Accidents management																								2	
Purchasing process (7)																								1	
Supply chain Management System (2)																									1
VSM Intervention Eco-community (3)																									1
Information processing in disaster response (4)																									1

Table 22: Summary of published articles related to the VSM (Google Scholar)

PERIOD	ARTICLES
1990-1999	1
2000-2009	3
2010-2013	24

Table 24 summarises eight patterns from the above database. Of the 28 articles, only two refer to SMEs: “Networking and internationalization of SMEs in emerging economies” (Senik et al., 2011) and “The applicability of the VSM as a diagnostic for small to medium sized enterprises” (Burgess & Wake, 2012).

Table 23: Published articles by group related to "Viable System Model" and "SME" (Google Scholar)

	1993	2009	2010	2011	2012	2013
SERVICES MANAGEMENT						
E-services					1	
Service delivery				1		
Service systems	1			1	4	
Health car service systems			1			
INFORMATION MANAGEMENT						
Information and Knowledge management				2		
Information systems		1				
Information systems for datacenters				1		
SUPPLY CHAIN						
Supply chain and Theory of Constraints		1				
Virtual digital retail ecosystem (Supply chain)			1			
NETWORKS						
Colaboration in industrial Networks		1				
Networking of SMEs in emerging economies				1		
STTATEGY						
Relation strategy and operation			1			
Strategy			1			
GROUPS MANAGEMENT						
Managing systemic research groups				1		
Cooperating Communities of practice					1	
METHODS/METHODOLOGY						
Viplan Methodology SME				1		
OTHER APPLICATIONS						
Organisational resilence				1	1	
Diagnostic for SME					1	
Marketing					2	
TELT Platform			1			

Table 24: Patterns of articles related to the VSM (Google Scholar)

PATTERN	ARTICLES
Service management	9
Other applications	6
Information management	4
Supply chain	2
Networking	2
Strategy	2
Groups and communities management	2
Methodologies	1

In summary, the VSM literature has been increasing in the past 15 years. This literature is spread across different fields of application. However, very little material has been written recently about the SME sector, and has focused mainly on diagnosis and not on working with managing complexity as an ongoing process. Only one work is related to the adoption of the VSM in SMEs but this was conducted in an eco-community organisation, not in a for-profit organisation.

2.5.7 Summary

In this section, the researcher explored how to cope with complexity within SMEs context. The approach to address such context emerged through the researcher's journey when reviewing approaches to facing complexity. It started from the need for a new way of thinking, which led to a consideration of complexity sciences and systems thinking approaches; here, critical systems and organisational cybernetics (the VSM) emerged as the core approaches. After reviewing this literature, the researcher identified the need to build a multi-methodological approach to this research that would consider the social role of SMEs and their challenges when using the VSM.

Therefore, it was necessary to explore how to use the VSM supported by other complexity and systemic approaches, in order to develop the ability to face increasing complexity in a globalised world, which presents challenges in the context of SMEs. This would be based, however, on a critical understanding of the core meaning of being in an organisation searching for the common good in society. However, although the VSM literature has developed in the past decades in different fields of application, very little of this is related to the SME sector and most of it is focused on organisational diagnosis. There is very little about the use of the VSM as an ongoing process in SMEs and no work has used it in combination with critical systems approaches in the context of a formal multi-methodological approach.

2.6 Considering the VSM through a methodology

2.6.1 Introduction

The VSM and its principles established a foundation for facing complexity. The research questions, theory and propositions in this research clarify two key aspects of using the VSM: first, the need for a multi-methodology to apply in the context of Mexican SMEs; and second, the need for a strategic process to adopt such a multi-methodology in daily practice. In the following sections, the researcher addresses how to face these challenges.

2.6.2 Criticism of using the VSM in practice

Some authors (Espinosa & Walker, 2011; Espejo & Reyes, 2011; Hoverstadt, 2008; Jackson, 2003; Leonard, 1992) argue about the value of the VSM in diagnosing or designing organisations. However, in order to face challenges, SMEs need to move beyond diagnosis and design: they need to manage change in their daily life. Hoverstadt (2008), as a practitioner and consultant, states that the purpose of management is very simply that of doing two things: deciding what needs to happen, and ensuring that what should happen actually does. The VSM is extremely helpful in deciding what needs to happen, but how can it be used to ensure that things actually do? For this research, it was important to develop an approach to facing complexity, not only at the level of diagnosis and design, but also in terms of the practice in SMEs.

With regard to the VMS as a methodology, Jackson (2003: 88) states:

> The VSM embodies in a highly usable way the various cybernetics laws and principles that Beer regards as essential to improving the performance of organisations. It is no surprise, therefore, to find it at the very centre of the approach I am calling organisational cybernetics. Nevertheless, it is worth remembering that the VSM itself is a model rather than a methodology and can be used for purposes other than prescribed by Beer.

In order to address this, some authors have developed their own methodology for applying the VSM in real-world cases (Espejo & Reyes, 2011; Espinosa & Walker, 2011; Hoverstadt, 2008). In 1985, Beer published *Diagnosing the systems for organisations*, in which he introduces the VSM and offers advice on how to apply it “in the form of a handbook or manager’s guide” (Jackson, 2003: 86). It shows that, even for Beer, it was important to offer a more practical approach to the VSM for managers.

Espinosa and Walker (2011: 98) “describe the methodological approach that we have used when involved in real-life interventions to support organizational transformations”. They combine the VSM with systemic tools using a multi-methodological approach when deploying their own methodology. Espejo and

Reyes (2011) argue that the VSM is primarily a problem-solving tool for reviewing a strategy to manage complexity and to support the design of effective control. The VSM as a transitional object helps people to learn and interrelate more effectively. The use of the VSM as a framework to diagnose and design has been extensive. However, Espejo and Reyes (2011: 111) also argue that “On the other hand, explaining in detail how to use the VSM as a diagnostic and design tool for effective management is the purpose of the Viplan Method”. Espejo and Reyes developed their method in order to apply the VSM and its guidelines for effective management. Hoverstadt (2008) also refers to his own book, *The fractal organisation*, as an attempt to take a scientific approach (the VSM) to analysing and designing organisations that is more accessible to managers. As such, it is intended as a book for practical managers, not academics. Hoverstadt (2008), like others, suggests working to facilitate the use of organisational cybernetics for managers in practice. Therefore, it is important for this research to work on a methodology using the VSM in daily management practice.

2.6.3 Using the VSM in practice

According to the research questions, theory and propositions referred to above, the multi-methodology for this work had to be oriented to an intervention. Midgley (2000) argues that an intervention aims to facilitate change. It is important for SMEs to find a path to facilitate change in order to face complexity in a changing environment. This kind of methodology should be explicit about three inseparable aspects of improvement in facilitating change in a system: critique, judgement and action. Thus, one question arises: How could the researcher use the VSM and its guidelines, not just for diagnosing and designing an organisation, but also for taking continuous actions to provoke change using an ongoing process which allows reflection on the boundaries, in any particular situation, and to choose appropriate methods accordingly to face change? The orientation taken by the researcher was to reflect upon the VSM in order to frame a methodology for intervention to be used by managers in practice. To explore this kind of methodology, the researcher considered the work of authors who have had experience of the use of the VSM among managers in daily life and have strong degree of knowledge about the VSM theory.

As both the methodology and the process were key to this research, the researcher provides here a basic definition of each. A methodology is defined as a system of methods (a body of knowledge) used in a particular area of study or activity to investigate phenomena. A process is defined as specific, structured, and managed set of work activities, with known inputs, designed to produce a specified output (*New Oxford American Dictionary*, 2013). Another definition of a process is a sequence of interdependent and linked procedures, which, at every stage, consume one or more resources (employee time, energy, machines, money, etc.) to convert inputs (data, materials, parts, etc.) into outputs. These outputs then serve as inputs for the next stage until a known goal or end result is reached. A business process is defined as a series of logically related activities or tasks (such as planning, production or sales) performed together to produce a defined set of results (*Business Dictionary*, 2013). The common denominator of these definitions is that a process is a logical sequence of related activities through steps or stages to convert inputs into outputs. Therefore, for this work, it was necessary to find a system of methods that would allow the development of an ongoing process. From this relation between a methodology/process perspective and in order to answer the research questions, the researcher needed to focus on developed methodologies and frameworks to implement the VSM in organisations, because if the key point is to manage complexity as an ongoing process, this process requires a systemic and systematic sequence of steps or stages in order for it to be adopted easily in SMEs.

There are many ways of conducting organisational analysis using the VSM and different practitioners have their own approaches. Some practitioners are very methodical, following a set series of stages, while others are much more fluid (Hoverstadt, 2008). Thus, different approaches to working with the VSM were analysed. The first and main criteria for this analysis were that all these approaches should belong to practitioners with a deep understanding of the VSM and who, at the same time, had praxis in the application of this framework in the real world in for-profit organisations with successful cases. Some authors who match these criteria are: Patrick Hoverstadt, Angela Espinosa and Jon Walker, and Raúl Espejo and Alfonso Reyes.

Each of the authors referred to in the previous paragraph has his or her own approach based on different assumptions. Espinosa and Walker (2011: 98) explain their approach as follows:

> Rather than to impose a rigid set of linear stages leading to the redesign of the current structure, our approach has been to support the members of an organisation to critically observe their current organisation and current performance; and to rethink it using VSM distinctions (diagnosis), jointly reflect, discuss and design ways of improvement and put into practice the agreed actions (self-transformation). We have found that at different stages of an organisational intervention, it has been useful to use different systemic tools for analytical purposes. And finally we see how they worked, reassess the situation, decide on new issues for further development and restart the learning loop (self-reflection).

Espejo and Reyes (2011) argue that the purpose of their 'Viplan Method' is to study organisational systems through the diagnosis and design of organisational structures. Diagnosing is similar to producing a snapshot of structural relations at the time observations are made. For them, designing is the more interesting mode of the application of the method. Patrick Hoverstadt (2008) suggests there are many ways in which the VSM can be used but the two most basic are the analysis of an existing organisation and designing a new one or redesigning an existing organisation. Hoverstadt (2008: 286) also argues

> Whatever the sequencing of steps in analysis, the process should always be structured as a learning loop. A model of an organisation is a hypothesis that needs to be tested against reality as experienced by stakeholders in the system. The model informs the inquiry and inquiry informs the model. So there is no right or wrong approach.

A comparison between these approaches is presented in Figure 21. This figure shows that all the approaches referred to above run on the basis of four common stages. The researcher named these stages: Meaning, Understanding, Focusing and Executing. First, in the Meaning phase, the authors work in order to agree on the identity of the system under focus and its boundaries. In the Understanding stage, the authors work in order to unfold the complexity of the system under focus and diagnose it. In the Focusing stage, they work to identify how to face problematical situations revealed in the previous stage. Finally, in the Executing

stage, the authors work in order to follow up the actions defined in the previous stage. From this comparison, the researcher could observe that all the methodologies use the same sequence of stages i.e., from Meaning towards Executing, passing through Understanding and finally Focusing. Despite all using the VSM as a backbone and the same sequence of stages, the way the authors use the VSM is quite different: the boundaries of the intervention and the emphasis on the stages is different from author to author, as well as the tools used, the scope and objectives of each stage.

2.6.4 The gaps in the research

The gaps in the research were explored by considering methodology and process. The gaps identified came from the whole of the literature review process thus far but also as a result of the researcher's observations as a 'reflective practitioner' (Schön, 1991).

Praxis has its own value. Schön (1991) argues that a reflective practitioner can develop a strong degree of knowledge based on two combined abilities. First, the ability to develop knowing-in-action, which means a kind of knowing that is inherent to intelligent action. The workday life of a professional depends on tacit knowing-in-action. Every competent practitioner can recognise phenomena for which she/he cannot give a reasonably accurate or complete description but ordinary people and professional practitioners often think about what they are doing. In this entire process of reflection-in-action, which is central to the 'art' by which practitioners sometimes deal well with situations of uncertainty, instability, uniqueness and conflicts of values, is where the reflective practitioner can develop the second ability. In this second ability, based on the personal process of reflecting on knowing-in-action, the researcher realises the relation between a methodology and the process that underlies it. In addition, Checkland (1985: 758) states that

> all practical action is theory-laden, in the sense that if we observe any apparently purposeful human action, we can always ask of it: "What intellectual framework would in logic make this particular action meaningful?" (This question is independent of whether the doer is conscious of the deduced framework.)

Espinosa and Walker´s approach
(Adaptation from Espinosa and Walker, 2011, 2013)

PHASE	STAGES	AIMS
Introductory	Agreeing on identity	Identify the system-in-focus and define identity
	Recursive analysis	Identify primary activities and levels of recursive organisation.
Self-Diagnosis	Structural diagnosis	Look for weaknesses in the system's viability by reflecting on the meta-questions
Self-transformation	Strategy - structure alignment	Identifying critical factors and required organisational adjustments for effective strategy implementation.
	Implementation of agreed changes	Agree and implement the required changes
Self reflection	Monitoring and reviewing changes	Monitor and review the situation.

Viplan Method
(Adaptation from Espejo and Reyes, 2011)

STAGES	AIMS
Naming systems	Exploring an organization's identity related with the purpose of the system that it is what system does.
Technological models	Finding the activities, and their relations, those are necessary to carry out this transformation process.
Structural models	Strategies for organization's transformation to respond to environmental opportunities and threats .
Organization's unfolding complexity	Working out an organization's recursive structure and necessity of enabling autonomy or primary activities within the organization.
Mapping Organization Resources	Mapping the primary activities that are contained within primary activities and the functional resources that support their cohesion and adaptation.
VSM's systemic functions	Mapping resources onto the VSM's systemic functions – policy, intelligence, cohesion, coordination and implementation – and the mechanisms for cohesion and adaptation.

Hoverstad´s approach
(Adaptation from Hoverstadt, 2008)

PHASE	STAGES	AIMS
Identity	Defining identity	Define the identity of the system you are investigating
Statics of the organisation (Structures)	Unfolding Complexity	Unfold the complexity of the fractal structure of operations (system 1) and delivery
	Modelling environment	Model the environment(s) at each level and the Complexity Drivers
	Modelling Operations	Model connections between operations (their interdependencies) and between environment subsets.
	Modelling System 2	Model coordination mechanisms (System 2)
	Modelling Management functions (Systems 3,4 and 5)	Model management functions (Systems 3, 4 and 5), their interactions, connections to operations (system 1), to the environment and to one another
	Checking missing components	Check for missing components, and missing links
Dynamics of the organisation (effects of complexity differentials)	Checking imbalances	Check complexity imbalances
Relationship between Statics and Dynamics analysis	Implementation	Work out implications of diagnosed structural problems – do these match the problem symptoms and provide insight to allow a solution to be designed?

MEANING of the system
UNDERSTANDING the System
FOCUSING the System
EXECUTING on the System

Figure 21: Comparison of methodologies

Thereby, this gap analysis was also influenced by the researcher's reflection-in-action. In the following two sections, the researcher presents an analysis of both the methodology and the process utilised to face complexity.

2.6.4.1 Framing a multi-methodology approach (the methodology)

As stated, SME managers need to improve their understanding of managing complexity as daily practice in fieldwork. In order to facilitate this, they need to adopt a framework for managing complexity in fieldwork with a business approach for the use of the people involved. Thus, gaps in methodology are not only related to the methodology itself, because they depend on their use in specific contexts by specific users. Checkland (2000) argues that whenever a user perceives a problem situation and uses a methodology to try to improve it, three elements are closely linked: the user, the methodology as 'words on paper', and the situation as perceived by the user, as presented in Figure 22. When an outsider develops any analysis of what happens, this would have to embrace these three elements and the interactions between them. This would include converting the methodology, like a set of principles, into a specific approach or 'method' which the user felt was appropriate for the particular situation at a particular moment in history. Considering these three elements, the researcher analysed each of them in turn to establish the gaps related to the methodology in the facing of complexity in SMEs.

Regarding the user, Espinosa (2015) argues that simply understanding the VSM requires specific skills and even more when the aim is to apply it. However, this research is aimed at SME managers who have a less managerial background (Palacios, 1998). Thus, this methodology should be oriented towards managers with a low level of managerial skills. The users need better

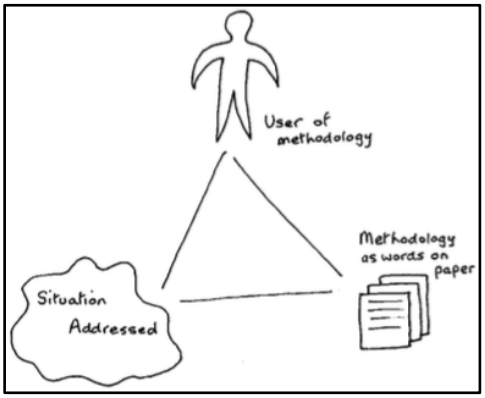


Figure 22: Three interacting elements always present in methodology use (Source: Checkland, 2000)

understanding, not only of the VSM, but also of the methodology for intervention. According to Espinosa (2015), in-depth training is not enough for users to develop an intervention using the VSM by themselves; they need some kind of coaching to develop the methodology. Therefore, the methodology needs to be user-friendly in order for it to be used easily by novices.

Today, Mexican SMEs cope with complexity within contexts related to the specific challenges facing SMEs, as discussed earlier. Previous methodologies show a path to facing complexity at the level of “What to do” but less at the level of “How to do” in daily practice. In order to face their challenges, SME managers need to learn how to cope with complexity in the field using a guided ongoing process built upon a methodology. SME managers need to consider different methods for facing these hurdles, and so the necessary methodology needs to be able to integrate complementary approaches. This explains the need to develop a multi-methodology approach to work in the specific context of SMEs.

Based on the research questions, it is necessary to have a multi-methodology to apply systems thinking approaches. Thus, the main gap related to the matter of ‘methodology’ lies in finding a specific multi-methodology to face complexity in SMEs and, further, a multi-methodology to frame an ongoing process to build a learning cycle. Systems thinking approaches are intuitive and easy to understand at high level (Espinosa, 2015a) but, in order to apply them in practice, managers need guiding principles and a multi-methodology in order to facilitate adoption. Manager need not only a multi-methodology with appropriate methods, but also the techniques and tools to apply them in practice.

2.6.4.2 Managing complexity as a daily practice (the process)

In order to analyse the 'process' gap, it is important to distinguish the link between the ideas themselves and their use in action and the inherent learning process. Checkland (1985: 758) suggests making "a distinction between, on the one hand, a basic set of ideas, and on the other, a process (or methodology) for applying these ideas in an organized way to some particular area of application". This suggestion is represented in Figure 23 and helps in distinguishing three aspects: first, some linked ideas in a framework (F); second, a way of applying these ideas in a process using a methodology (M); and, finally, an application area (A). Having used M, a team may then reflect upon what learning has been acquired i.e., learning about all three elements: F, M and A.

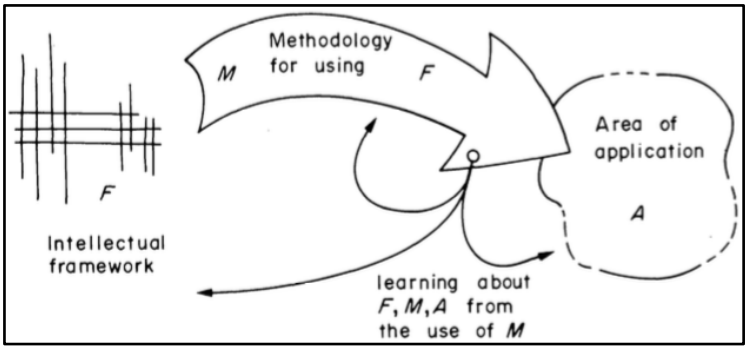


Figure 23: Process of learning about F, M, and A (Source: Checkland 1985)

To reiterate, the area of application is related to the context of SMEs and, with this consideration, the key point is how to develop a process using a methodology that helps to incorporate such ideas in a framework. These 'ideas' come from the previous literature review and the following gaps that emerged from the analyses following a comparison of methodologies. From the comparison of previous methodologies, it is possible to identify some gaps in the development of a process to implement the VSM in the context of SMEs. In order to facilitate the gap analysis, the researcher decided to present it using the same four stages used in the methodology comparison: Meaning, Understanding, Focusing and Executing. In addition to these stages, however, and according to the social role of SMEs, the researcher identified two previous gaps that emerged because of

the need for a new way of thinking and acting based on historic and cultural background.

The first of the previously mentioned gaps relates to the context in order to develop the intervention. Previous methodologies start directly with identity analyses but, mainly because of the users in SMEs, this research needed to work initially and in depth on the context of SME. There were two rationales for this approach: to better understand SMEs' historic and cultural background (Fuenmayor, 2012) and its possible influence on developing an intervention and the process of its adoption; and second, to strengthen the relationship between the researcher and the organisation (Franco et al., 2011). In a compilation of interpretations and applications of the VSM integrated by Espejo and Harnden (1989), Jackson (2003) argues that the VSM is of dubious value even as a tool for increasing efficiency and effectiveness. This is because the emphasis the VSM places on organisational design may preclude proper attention being given to the generation of shared perceptions and values in the organisational culture. This gap is directly related to the way of understanding this matter from the beginning of a change process.

The second gap emerged from the analysis of enterprise life-cycles theories (Adizes, 1992, 1994, 1999; Lipi 2013; Pereneyi et al., 2011) at the stage of SME's survival. This gap depends on the organisation's financial status to face change (Lewis and Churchill, 1983). According to Kim and Mauborgne (2005), there exist two possibilities for facing change: by improvement or by disruptive change. However, there is another possibility: a real need to survive. Improvement or disruption assumes that an SME has the conditions for better performance but, when an SME risks going bankrupt, the aim is simply to survive. When change agents analyse the context of an SME in terms of information, it is possible for them to understand the need to survive, in which the aim is to break even in order to continue improvement or disruption. To an organisation with a need to survive, external support could be of help because the organisation may be facing abnormal problems that the managers cannot solve quickly but to which the organisation needs a quick response (Adizes, 1999). Previous methodologies show a process for working towards better performance, either by way of improvement or disruption. At the stage of needing to survive, an SME needs

even more focused actions on critical constraints in order to break even as soon as possible in order to be viable in the short term (Lewis & Churchill, 1983; Goldratt, 2009).

The third gap refers to the Meaning phase, which is related to the exploration, made by people, of an organisation's systemic meaning for them and how this could be related to seeking the common good. Even this meaning helps people to face complexity. By looking only at the VSM, Jackson (1988: 156) argues:

> Beer is aware of the need for a degree of shared purposes in an enterprise (reducing complexity on the people plane). However, ways of engineering shared values and beliefs are neglected in the VSM, and there can be little doubt that he sites the source of viability of an organisation in its structural arrangements for handling “systems” complexity.

On the other hand, an organisation is a social entity, whose impact goes beyond profits because it also has a social impact on stakeholders’ growth and development (Ackoff, 2006). As identity is related to “what the system does” and what the system “does” in relation to stakeholders, identity is also defined and based on its relationships with stakeholders (Espejo & Reyes, 2011). The gap is centred on how to explore the organisation's meaning for stakeholders as an interrelated system that promotes the common good. Therefore, for this work, it was important to be aware of the “people dimension” when facing complexity (Flood, 1988). Jackson (1988: 157) argues:

> Organisations of course, although they share many features in common with organisms, are not simply organisms. They possess other important features, which tend to be neglected in any cybernetic treatment of complexity. This is especially the case with regard to those aspects of complexity emerging from the “people dimension”. Of particular significance is the lack of attention to goal-setting and the implication that, because this is a function of higher-order levels of the system, little effort needs to be expended on bringing about shared norms and values in the body of the system.

The fourth gap is identified in the Understanding phase and is related to understanding and making meaningful a problematical situation for all the stakeholders involved. The people inside an organisation are not unique stakeholders; the organisation has external stakeholders, such as clients,

suppliers and intervenors. If the identity of an organisation is also shaped from the relationships with all its stakeholders, their perception is also useful in understanding a problematical situation.

On the other hand, as has been stated, the VSM is also a useful transitional object for diagnosing a system. A critical aspect is then how people in an SME understand a problematical situation from their own perspective that is also based on their historic and cultural background as a social community that evolves over time (Fuenmayor, 2012). Understanding a culture facilitates an understanding of behaviours and so the VSM diagnosis goes even further: in order to change behaviours, people need to reflect upon the VSM diagnosis based on their culture in order to understand and be conscious of the problematical situation (Mascorro, 1995). It is not enough just to ‘understand’ the VSM diagnosis; it is necessary that it becomes meaningful to the people involved. The key point is not just to understand a problematical situation, it is necessary to appropriate this understanding in order to act in reality. Previous methodologies have moved from a VSM diagnosis towards the organisational culture. Addressing this gap lies in first understanding stakeholders' cultural background in order to make meaningful the VSM diagnosis, and then to ‘connect’ it with the current culture to act in practice, with people’s acts based on their background.

The researcher identified two gaps in the Focusing phase. The fifth gap considered is related to the design process. Beer (1995) states that the environment is an organisation's choice, whereby the organisation decides the environment in which to deal. Thus, the organisation has the opportunity to design the environment in order to couple with it and be viable over time. However, although this guideline is clear to understand, the issue is: How to do this in SMEs? On the other hand, the selected environment is directly related to the results expected. The results expected by the business determine the environment in which to operate (Kaplan & Norton, 1997, 2001). Thus, the fifth gap emerged from these two related aspects: How to design an environment that allows SMEs to achieve the expected results? The defined results also help to evaluate the process of change at the level of the business, and so these expected results also focus the change for all the people involved (Bossidy & Charan, 2002).

The selected environment is the target of the organisation's internal design in order to face it. The sixth gap is related to the process of alignment. In the Mexican context, most SMEs are at a stage where everything is a priority: they exist in the "Go-Go" stage (Adizes, 1994), where the market is rising but the organisations have low-level management skills. In this context, a change process implies changes in different arenas of organisation. These 'new' changes converge with current improvement efforts in the organisation. Previous methodologies worked in order to: "identifying required organisational adjustments to implement organisational strategy " (Espinosa & Walker, 2011: 160) or to "work out implications of diagnosed structural problems" (Hoverstadt, 2008) but how the SME needed to coordinate efforts regarding time, resources, etc. along with all the people involved. It is not enough just to identify actions for improvement; in order to execute them, it is necessary to coordinate such actions (Bossidy & Charan, 2002). Therefore, this research needed to consider the process of alignment between the people involved in a way that would be simple to put into practice.

Finally, in the Executing phase, the researcher identified the last gap, which is related to the management of the implementation of daily work. Previous methodologies assisted people in defining actions for improving. However, it is not enough just to define the actions; one of the major challenges (Bossidy & Charan, 2002; Kerr et al., 2002; Kim & Mauborgne, 2005) for enterprises is the execution or implementation of such actions. Most Mexican SMEs are in the "Go-Go" stage of their lifecycle (Bonilla, 2010), in which personnel work based more on people than on working systems. In order to move towards the next stage in the lifecycle, called "Adolescence", the organisation needs to improve its management systems in order to enhance coordination and so execute practice that is viable over time.

However, the main problem is that the current historic-cultural background is anchored in people, not in working systems. In order to improve the necessary execution, this work needed to explore the management process for coordinated execution in order to achieve the expected results. This execution process gives people the opportunity to close a learning cycle from active experimentation

towards concrete experience in order to reflect and gain an abstract conceptualisation (Kölb, 1984). Before implementation, learning stands only in the world of ideas (Jackson, 1995; Kölb, 1984). The execution of ideas allows people to move into experiential learning, where they learn by practising and doing things and thus reshape their own historic-cultural background (Fuenmayor, 2001, 2012a).

Managing complexity as a management process could facilitate a learning cycle to improve the ability to face increasing complexity as a daily practice. Two of the VSM methodologies analysed explicitly consider a learning loop process but this depends on the intervention and a close relation between practitioners and the organisation. However, other questions emerged from this analysis: How could these approaches promote, not only the use of the VSM approach, but also the adoption of the VSM to manage complexity in a continuous manner? How could the organisational background and its evolution influence the adoption of the VSM? How could the organisational culture affect the implementation of the VSM? Could the learning process emerge and be sustained without help from specialised and experienced practitioners?

2.6.5 Summary

To address the gaps related to the research questions, the researcher, also working as a reflective practitioner, decided to develop an approach to managing complexity in SMEs. The approach was intended to emphasise the human and cultural aspects of people's interactions, which are fundamental to improving the viability of SMEs. This research approach is integrated by a model and methodology, which are referred to as the "Model K+" and "Methodology K+" from now on and are explained in the next chapter.

Summary

Bearing in mind the necessary social role of organisations as part of our development as a society to seek the common good, the researcher reviewed the importance of the SME sector in Mexico as an engine in today's society. However, due to globalisation, SME complexity has been increasing

exponentially in recent years and will expand even more in the time to come. One question emerges: How can SMEs cope with this increasingly complex environment in order to be viable over time and, at the same time, work for the common good?

This chapter has demonstrated how, in order to explore this topic, a systems thinking approach - as a new way of thinking and acting in practice - can help. However, in order to cope effectively with the increasing complexity in the SME sector, it is necessary to develop an approach that enables SME managers to apply a systemic approach to management in their daily life. Therefore, for this research, it was necessary to develop a model, methodology, methods, techniques and tools in order to learn in the field, through experience, by adopting this approach.

Chapter 3: Methodology

Introduction

Some authors distinguish between the approach for the research and the intervention. These two approaches are related: the first is oriented to the research foundations and its design while the second to the intervention process (Espinosa, 2015; Midgley, 2015; Wilby, 2015). In this chapter, the researcher presents and discusses the approach for the research followed by developing the model and the methodology for an intervention in the practice of SMEs.

3.1 Research approach

In this section, the researcher first analyses the research dimensions to be considered in the research approach and he states key definitions in each dimension. This is followed by an analysis of the research approach to be used for this research.

3.1.1 Research dimensions

Different authors argue the importance of considering the philosophical and methodological dimensions for research approach, while others include the practical dimension. Midgley (2000: 273) states:

> I have argued that philosophy, methodology and practice are all necessary for systemic intervention to flourish, and that each one of them should inform the other. Therefore, to engage in practice does not mean abandoning philosophy and methodology: it simply means allowing insights to flow between the three.

Midgley (2000) also argues that philosophy, methodology and practice are mutually supportive areas of study. Philosophy justifies what can be considered as valid practice: the philosophical approach must help the researcher to see the practice of the intervention from a different perspective. In addition, focusing only

on methodology and methods encourages purely instrumental thinking. However, there is often a blurring of the boundary between methodology and philosophy: some philosophical ideas may feed into methodology and vice versa. Midgley (2000: 108) states:

> Methodology is one particularly important vehicle through which philosophers can apply their ideas: it is through methodology, which sweeps in philosophical reflection, that we can better understand how methods of intervention can be used to create and sustain valued personal, social and ecological change.

However, different research definitions appear among these three complementary research dimensions. For the researcher, it was very important to distinguish the meaning of and relation between these definitions for two reasons: first, to have a clear idea of the selected research approach in guiding the work; and second, to understand the frame to be used in the research.

3.1.1.1 Research definitions

In this section, the researcher states core definitions related to the philosophical, methodological and practical dimensions of the research in order to establish an understanding of them. The researcher integrates from different perspectives the definitions used in this research to avoid ambiguities.

The first definition to set is ‘theory’. Taking the following definitions from different sources (Gill & Johnson, 2010; Midgley, 2000; *Oxford Dictionaries*, 2013), the researcher uses theory to mean a system of ideas or statements intended to explain phenomena from the observer’s perspective. The next concept is ‘ontology’, which the researcher summarises as the study of the nature of reality as a product of one’s mind (Burrell & Morgan, 1979; Gregory, 2012; *Oxford Dictionaries*, 2015; Thursfield, 2012). In this research, ‘epistemology’ is used as the study of the nature of knowledge (Burrell & Morgan, 1979; *Oxford Dictionaries*, 2015; Thursfield, 2012). ‘Paradigm’ is used to mean a general worldview based on a set of fundamental and reinforcing ideas that define the nature of research and intervention (Gregory, 2012; Mingers, 2006; Mingers & Brocklesby, 1997; *Oxford Dictionaries*, 2015).

Checkland (1999) defines a ‘model’ as a representation of some part of the world outside us; while others say that it is a research tool to describe or explain a social phenomenon (Reason & Bradbury, 2006). In summary, ‘model’ is used in this research to refer to a representation of the world outside ourselves, used to explain a social phenomenon. ‘Conceptual framework’ is considered as an analytical scheme that simplifies reality to make it easier to discuss, analyse or research by selecting certain phenomena variables and suggesting certain relationships between them (Fisher, 2007).

Jackson (2000) states that ‘meta-methodology’ is a way to explore the nature and use of methodologies, and Mingers (1997) defines it as a combination of more than one methodology within a particular intervention. Referring to ‘methodology’, the researcher reviewed definitions from different authors (Avison & Fitzgerald, 2006; Burrell & Morgan, 1979; Checkland, 1999; Jackson, 2000; Midgley, 2000; Mingers, 1997; Oliga, 1988; *Oxford Dictionaries*, 2015; Skyrme, 1997). The researcher summarised the findings for ‘methodology’ as: the study of the principles and guidelines that justify the use of the particular methods to be employed in an intervention.

For ‘method’, the researcher established the following definition for this research: the appropriate and specific set of processes and activities that includes techniques, tools, and models, operated in a sequence to deal with a particular situation in order to achieve a given purpose (Midgley, 2000; Mingers, 2006; Oliga, 1988; *Oxford Dictionaries*, 2105). In this research, ‘technique’ is considered as a way of doing a particular activity that, if it is skilfully employed, can guarantee a particular result (Avison & Fitzgerald, 2006; Checkland, 1999; Mingers & Brocklesby, 1997, Mingers, 2001; *Oxford Dictionaries*, 2015). Finally, a ‘tool’ is defined by Mingers and Brocklesby (1997) as an artifact that can be used to perform a particular technique.

In summary, the above definitions were necessary in order to start with a consistent and solid research approach (Midgley, 2000). At the same time, the above definitions are related and the next section presents this relation.

3.1.1.2 Relationships between research dimensions

The researcher analysed and discussed about previous research definitions with some authors (Espinosa, 2015; Midgley, 2015; Wilby, 2015) in order to distinguish the relation between them and the three dimensions of research (philosophical, methodological and practical). In summary, ontology, epistemology, paradigm and theory are related to the philosophical dimension because they all justify the methodology to be used in practice. At the methodological dimension, a multi-methodology and methodology are guidelines, which help people by providing a vehicle through which they can apply ideas. Thus, at the practical dimension, the researcher needed to define the methods with their techniques and tools that would help people to apply a particular methodological approach in practice. Figure 24 represents this reflection and a summary of the definitions used throughout this research.

The philosophical dimension acts as the foundation for the research. However, the methodological and practical dimensions have a common denominator: they are nested, i.e., the definition of a concept encompasses and guides the next; in other words, guidelines at the methodological level drive application at the practical level (Espinosa, 2015; Midgley, 2015; Wilby, 2015). These relations are presented in Figure 25. In the following sections, the researcher presents his research approach, supporting his choices through these three linked dimensions: philosophical, methodological and practical.

3.1.2 Philosophical level

This section presents the philosophical approach used in the research. The researcher first presents the ontology and epistemology that guided this work as the first cornerstone of the research. The paradigm and the theory approach selected for the research are then presented.

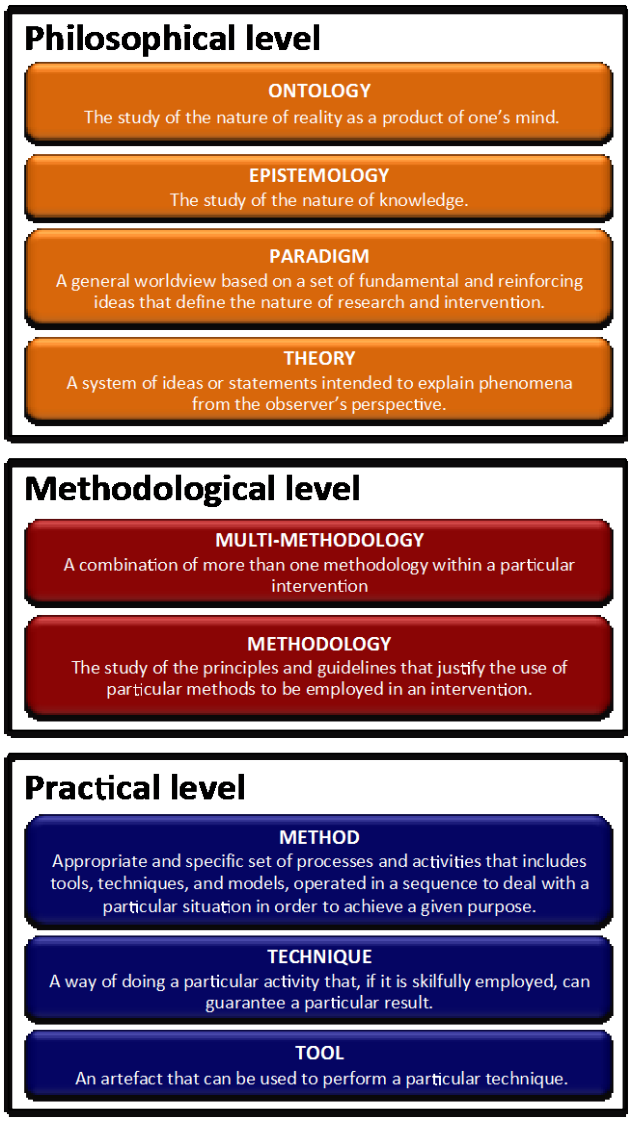


Figure 24: Levels of research and the definitions used

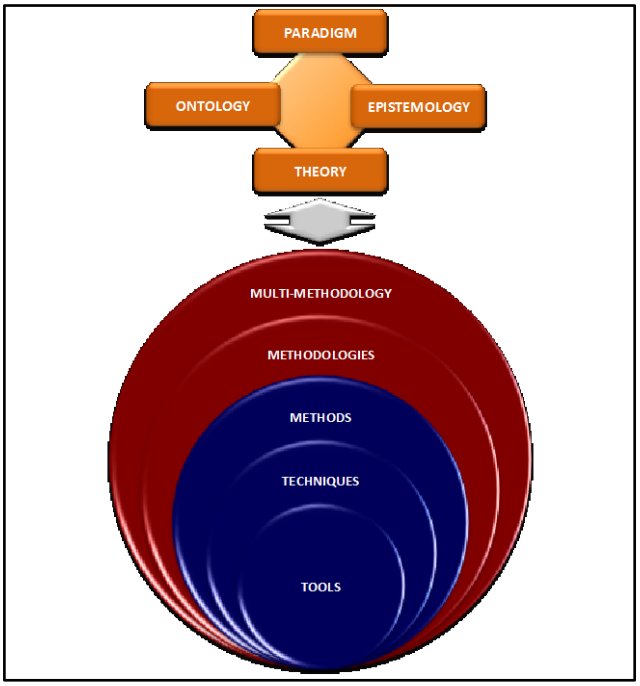


Figure 25: Relation between levels of research

3.1.2.1 Onto-epistemology for the research

As a practitioner (Schön, 1991) working in the field of Mexican SMEs, the researcher confirmed two aspects of their leadership style: first, the fragmented view of the leaders of their organisation (Palacios, 1998), leading to efforts being focused most of the time on local improvements and not necessarily to the benefit of the whole; and second, a lack of understanding of the importance of their own culture in the way it allowed them to evolve through time (Fuenmayor, 2012, 2012a, 2012b, 2012c) as they try to adopt other 'new cultures' without honouring their own. Therefore, it was necessary to support this research with an ontology that would help leaders to understand the phenomenon holistically but, at the same time, recognise their own culture. The chosen ontology and epistemology are based on interpretive systemology (Fuenmayor, 2001, 2001a, 2001b, 2001c, 2012, 2012a, 2012b, 2012c). Based on this approach, the researcher found the onto-epistemology for this research. The following section presents the acquisition of this cornerstone. According to Midgley (2000) Fuenmayor proposes an onto-epistemology where the reality and knowledge are related recursively together: in this way of thinking, interpretive systemology does not root the origin of meaning in the subject, but within the recursive form between the subject and object

According to Fuenmayor (2012, 2012b), the holistic condition of something is its sense. However, sense is a transcendent function in relation to that of which we speak i.e., it transcends to us, not just as individuals, but also as a culture. In this transcendent condition, the being of things is based on the ontological dependence of a grounding that gives being to everything, as will be explained in detail below.

In viewing Figure 26, it is possible to see one figure at a time, but we can also see two completely different figures. Once we have seen both figures, we can also move from one to another: one disappears into the background of the other; the figure disappears into the background; the ground makes possible the distinction of seeing the figure. We need to explore the world based on the relation of a phenomenon with its embedded culture. A phenomenon is not isolated from the culture; both are related, as in the figure-ground metaphor.

Figure 26: Gestalt figure and ground (http://www.afn.org/-gestalt/fignd.htm)

In other words, phenomenon and culture draw each other. This can also be understood from Escher´s drawing hands. This is another drawing metaphor, shown in Figure 27: the hands are drawing each other (Fuenmayor, 2012).

Things or phenomena are acts of apparition whose ontological shape reflects the distinction of the ‘figure’ of what is the case over the ‘ground’ (the culture) that makes the ‘figure’ possible. The ‘ground’ has been shaped by the experience of living; not only our living, but what preceded us: our collective history. In short, the ground that makes possible the shape of anything or any phenomenon comes from our historic and cultural character (Fuenmayor, 2012, 2012a).

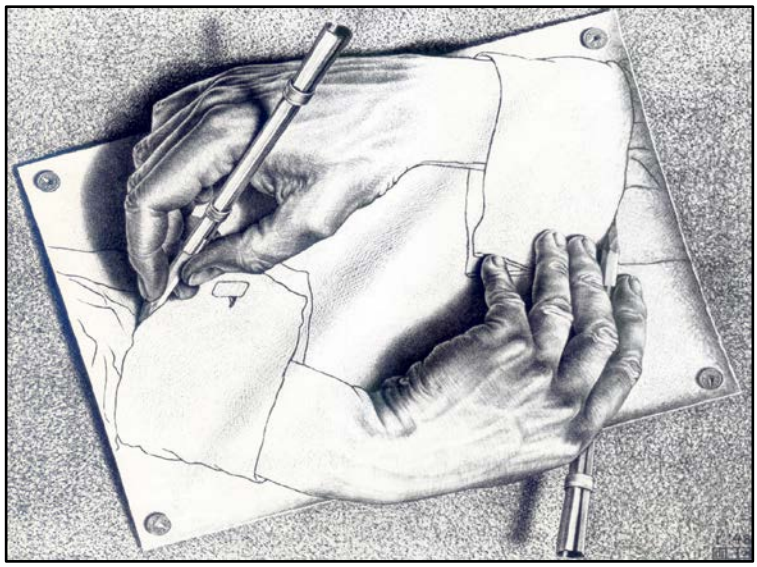


Figure 27: Escher's drawing hands (http://www.wikipaintings.org/en/m-c-escher//drawing-hands)

The isolation of a phenomenon from its context (its historic and cultural background) means losing sight of the holistic condition of any phenomenon. Human beings need a holistic sense to find meaning in things, happenings, and situations within a totality (Fuenmayor, 2012, 2012a).

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However, in order to think of a situation as a whole, it is necessary to find a holistic primary unity to make holistic sense of it. With this primary unity, one makes holistic sense of whatever is the case. Therefore, in order to have a full sense of a phenomenon, it is necessary to learn about the primary unity and attempt to make holistic sense of whatever is the case, and then to find the path heading to the quest for a sense of the whole (Fuenmayor, 2012, 2012b).

In daily life, making sense becomes an issue only when we fail to make sense, i.e., human beings normally experience things as wholes and not mere sets of parts. However, we really need to experience and to account for this experience in order to better understand the holistic sense of a complex situation (Fuenmayor, 2012, 2012b).

Making sense is not a mere thinking activity. Making sense involves acting, feeling, loving, inviting, thinking, speaking and any other form of communication. We are open beings in a continuous state of flow and we are open to the miracle

of the disclosure of the world (Fuenmayor, 2012, 2012c). If a human being experiences her or himself as an open ephemeral being, always being towards whatever is the case, she/he does not possess, she/he belongs. The ethos of belonging is gratefulness and indebtedness; and its expression is care (Fuenmayor, 2012a, 2012b, 2012c).

The main constituent of life-mood is based on a mixture of gratefulness and indebtedness. These are ways to both harmonise with the world and to help to express, respectfully and discretely, its process of unfolding. Harmonising and expressing come together under the form of caring. Our mission is to care for the world and for whatever is disclosed in it and by it. Making sense is intrinsic to such caring (Fuenmayor, 2012, 2012a, 2012b, 2012c).

The deep sense of gratefulness and indebtedness for life and for its gifts is engraved in the very bed of the flow of our individual and communal lives. Thankfulness is the living ethos of a very different way of experiencing whatever takes place in the world and the world itself (Fuenmayor, 2012, 2012a, 2012b, 2012c).

With a systems approach, we, as human beings, must think through the consequences of our actions in the world in terms of the common good. Our purpose with a systems approach is to develop holistic understanding of human organisations; we can work on them towards the common good. With a holistic sense, we can act for the global good. Human action could then harmonise with a fair and legitimate totality (Fuenmayor, 2012).

Furthermore, Checkland (2000: S21) argues that

> SSM as a whole recognizes the crucially important role of history in human affairs. It is their history, which determines, for a given group of people, both what will be noticed as significant and how what is noticed will be judged. It reminds us that in working in real situations we are dealing with something which is both perceived differently by different people and is continually changing.

In summary, an understanding of the cultural and historical backgrounds underlying the performance of any human activity system or organisation was

essential for this research. Only through this deep understanding would the researcher have been able to distinguish the relationship between the figure-ground of phenomena which allows understanding of the holistic sense of every organisational experience.

However, as Fuenmayor (2012: 7) argues: "the evasion of understanding of the holistic sense of phenomena is not exclusive of reductionist science, it is rather the fundamental manifestation of final crisis of the entire western culture". Western culture is marked by a poverty in its sense of collective and individual life, which is itself a problem of a poverty and fragmentation of meaning; i.e., according to the proposed ontology, this is a problem of the 'ground' on which is drawn each 'figure' or distinction. It is then a problem of poverty of our cultural-historical 'ground', on which is drawn the form of anything that is the case (Fuenmayor, 2012). The researcher needed to be aware of this inertial force of Western culture that could also invade the mindset of leaders in Mexican SMEs.

Crespo (2016) argues that the way in which a human being perceives-understands what happens in the world (figure) is directly related to the way in which such a person decides-acts within it. The way in which the whole appears in front of us depends on our culture (ground). In order to apply an interpretive systemology approach to this research, the researcher first had to consider how to identify and distinguish the multiple meanings people have regarding their organisation in order to build the interpretive context that shapes their culture; second, the researcher had to determine the possible conflicts between the different meanings, their conditions and consequences; third, the researcher addressed new distinctions and identifications of meaning in order to start new cycles.

3.1.2.2 Research paradigm

Based on the previously mentioned onto-epistemology, this section presents the paradigm chosen for the research. This section begins by offering a brief introduction related to useful paradigms for analysis in the social sciences. It then presents the justification for choosing the selected paradigm and a summary of the paradigm chosen.

Mingers (1997a) argues that three paradigms can be considered in research: first, the empirical-analytic approach (positivist, objectivist and functionalist), related to the hard systems approach; second, the interpretive approach (subjectivist, constructivist and soft); and third, the critical systems approach, related to so-called critical systems. However, given that a paradigm is a very general worldview based on a set of fundamental philosophical assumptions that define the nature of possible research and intervention (Mingers, 2006), it is first important to recognise the basis for these assumptions. For the researcher, organisations are social phenomena, so they need to be studied and interpreted based on social theory. To develop a philosophical perspective, the researcher needed to make several core assumptions concerning social theory (Burrell & Morgan, 1979).

According to Burrell and Morgan (1979), these assumptions are related to two dimensions: the nature of society and science. The nature of society involves two views of society: from the regulatory point of view, society evolves rationally. Society is unified and cohesive (modernism); on the other hand, from a radical change point of view, society is in constant conflict, as humans struggle to free themselves from the domination of social structures (post-modernism). The nature of science involves two approaches to research: the subjective approach, which is based mainly on understanding and subjectivity, a focus on meaning and is based on human interpretation of the world; and the objective approach, based mainly on measurement and objectivity, the existence of universal laws and cause-and-effect relationships. Based on these two dimensions, Burrell and Morgan (1979) describe four paradigms for the analysis of social science, as indicated in Figure 28.

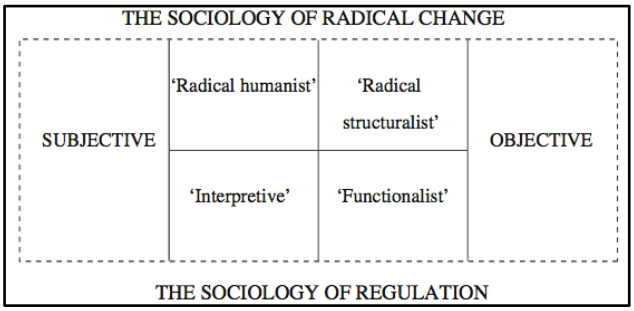


Figure 28: Four paradigms for the analysis of social science (Burrell & Morgan, 1979)

According to Jackson (2000), each paradigm can be related to a systems approach.

- Functionalist approach (objective - sociology of regulation): the systems within this paradigm seem to have a hard, easily identifiable existence independent of us as observers. People present no more problems than do the other component parts.

- Interpretive approach (subjective - sociology of regulation): the systems within this paradigm seem to be softer, elude easy identification and possess a precarious existence only as the creative constructions of human beings. We can understand systems by subjectively understanding the points of view of the human beings who construct them.

- Radical structuralist approach (objective - sociology of radical change): the systems within this paradigm seem to have a hard existence external to us. Causal regularities govern their behaviour. The approach assumes contradictions and conflict between different groups.

- Radical humanist approach (subjective - sociology of radical change): the systems within this paradigm seem to be creative constructions of human beings. To analyse systems, we need to understand the current social agreements that are seen as constraining human development.

Based on the four paradigms above, the next step was to select and justify which one of them could be used as a guide through the research process. Also derived from field observation (Schön, 1991), the challenge for SMEs, as stated by the researcher, is the development of a research process that allows the adoption of the management of complexity as a process; this knowledge starts from a deep reflective process between the researcher and the organisation in its everyday practice, while directly addressing current challenges. The most profound change processes are experienced in situations in which actors in an organisation are challenging their values and beliefs and trying new ways of doing things. In this

case, the purpose emerges from the actors and positive results reinforce the desire and will to change and improve organisations.

It was vital for the researcher to achieve an understanding of an organisation through fieldwork and to do this within a framework that would promote the reflective process. These reflective processes are based on the integration of the interpretations of reality by the people who are living within an organisation in order to promote a common sense within. Thus, the research needed a paradigm that would support a subjective approach to social science, as well as a regulatory point of view of society (Burrell & Morgan, 1979). The paradigm that fits these dimensions is interpretivism. This was a paradigm that needed to be considered in this research, as, through reflective processes, an interpretation of reality would be built between the people that make up the organisation. These are the people who interpret reality and try to share understandings of it within the organisation. Interpretivism is framed largely in nominalist ontology, whereby reality is considered as a projection of the human mind. With this approach, anti-positivism is a basic epistemological stance for obtaining phenomenological insight into knowledge. The main assumption about human nature is considered voluntarism, because man has free will and is an autonomous entity (Burrell & Morgan 1979). This approach is also consistent with interpretive systemology.

3.1.2.3 Research theory

A theory can influence how we understand and explain a phenomenon and how we achieve things practically (Gill & Johnson, 2010). Theory can be used to guide practical actions. The formulation and application of theory is at the heart of attempts to understand, influence or control phenomena. Theory categorises aspects of the world and relates these phenomena together in terms of relationships which explain why what we have observed has actually happened (Gill & Johnson, 2010). Saunders et al. (2003) also argue that the extent to which a researcher is clear about a chosen theory at the beginning of a piece of research raises an important question concerning the design of the research project. Theory can be formulated by a deductive or inductive approach.

The deductive approach has its origins in the natural sciences. With this approach, the researcher develops a theory and designs a research method to test it; in this case, data will follow theory (Gill & Johnson, 2010). With the emergence of social sciences, researchers needed to explore other approaches, such as the inductive. Using these approaches, the researcher collects data and develops theory as a result of data analysis; he or she then builds theory. In this case, theory will follow data (Gill & Johnson, 2010). The inductive approach is particularly concerned with the context in which phenomena are taking place. Therefore, the study of a small sample might be more appropriate than a large number, as with the deductive approach. Within this approach, a researcher is more likely to work with qualitative data and to use a variety of methods to collect them in order to establish different views of a phenomenon (Easterby-Smith et al., 2002).

In accordance with the onto-epistemology selected, it was necessary to have a deep understanding of the 'ground' of SMEs in terms of their historical and cultural background. For the researcher, this 'ground' meant having an in-depth understanding of the research context and the meanings that leaders gave to the phenomenon. Therefore, the researcher developed a theory using an inductive approach, which Gill and Johnson (2010) suggest is an interpretivist paradigm. However, simply for design purposes, the researcher drew a basic theory and propositions at the beginning in order to drive the research design. These theory and propositions were reviewed and restated based on data collected following the intervention. In summary, the selected ontology and epistemology based on the 'figure-ground' metaphor, with an interpretivist paradigm using an inductive approach to develop theory, are consistent with each other.

Based on previous philosophical dimension, the researcher now presents the design to guide the research.

3.1.3 Research design

Defining the research method(s) is one of the most important steps in research design. A key is to understand the research questions, their substance (what the research is about) and their form (who, where, what, etc.). The research

questions are one important factor in selecting an appropriate research method to follow (Yin, 2009). As stated the purpose of this research is to develop a new methodology based upon ideas on managing complexity from the VSM. In order to do this, an action research approach, including ideas from Yin´s case study method, has been adopted to the research design.

In this section, the researcher presents the methods used in the research. The selected methods were the frame used to guide the research process in the field in order to answer and draw conclusions regarding the research questions. First, the section explains the case study and action research methods and then offers a justification for their use in the context of this research. Second and based on Checkland and Holwell's (1998) action research cycle, the researcher presents the research design that guides the approach for this work. The researcher finalises this section with the explanation about necessary considerations related to the legitimacy of research.

3.1.3.1 Research methods

Even at the level of method, researchers have given increasing attention to mixing methods for a single study (Mingers, 2001). The key point is to mix methods into an integrated mode. This approach implies mixing methods that share the same research questions, in order to collect complementary data to conduct counterpart analysis (Johnson & Onwuegbuzie, 2004).

However, studies using mixed methods research are more difficult to execute than those limited to single methods. However, mixed methods research can enable us to address more complex research questions (Midgley, 2000, 2011; Yin, 2014).

In addition, as stated, the CDM is about understanding a problematical situation in terms of a series of systemically interrelated research questions expressing purposes for an intervention within a specific context. The researcher also needs to focus on the learning system based on a continuous action-reflection experiential learning in practice and this is the main reason to select an action research approach in order to understand how to perform this research in the

daily life of SMEs (Checkland, 2000, 2006, 2012). On the other hand, seeking to support the research design and thinking about its legitimacy, validity and reliability, the researcher decided to frame this research using the case study approach (Yin, 2014). Dresch et al. (2015) argue that action research and case study are typical research methods in operations management, where case study helps to understand certain phenomena in depth while action research allows for direct interactions between the researcher and research object.

In summary and considering the CDM based on the research questions, the researcher selected an action research approach to deploy this research in practice and the case study approach to frame the research design. In the following three sections, the researcher first analyses these two complementary methods for developing the intervention. Then, the researcher presents the research design and this section finalises with the review of the legitimacy of the research.

3.1.3.1.1 Action research

According to Reason and Bradbury (2006), the systems thinking approach assumes that the world is systemic, which means that phenomena are understood from the emergent properties that arise from the interaction of the whole system. The whole is greater than the sum of its parts. Thus, a significant understanding of a phenomenon is related to a deep understanding of the interaction between the parts, not analysing each one. From a learning perspective, this research needed to understand or at least to explore in depth the necessary learning system behind any methodology through a deep understanding of the phenomenon in the field. Checkland (1999) argues that, from the start, such researchers have not simply tried to observe action as external watchers, but to take part in the change process; this made change, and how to achieve it, the object upon which the attention of the research fastened. This puts the research process into the ‘action research’ tradition, which was based on Kurt Lewin’s work and developed in the 1940s: Lewin (1946) argued that real social events could not be studied in a laboratory.

On the other hand, and based on the onto-epistemology of this research, it was necessary to understand the 'ground' i.e., the culture that shaped the 'figure' or the observed phenomenon. According to Schein (1990), in order to understand organisational culture, it is necessary to explore three aspects: the artifacts (processes, methods, etc.), the adopted values and the basic beliefs. The key point is that these aspects are shown in people's behaviours beyond just the documented information (Mascorro, 1995). In order to understand the 'ground', the researcher needed to be involved in the daily activity of an organisation to observe the behaviours of the people involved.

In the post-war period, Lewin (1946) coined the term 'action research' (AR) to describe a research process in which the theory would be developed and tested by practical interventions in action. He specifically highlighted the process of the interplay between researcher and participants through an iterative cycle of action and reflection. AR focuses on action; in particular, promoting change in organisations. Coghlan and Brannick (2005) point out that the purpose of AR is not just to describe, understand and explain the world, but also to change it.

In addition, the purpose of AR is always and explicitly to improve practice (Blaxter et al., 2001). AR was conceived as a means of contributing to the improvement of society by enabling the resolution of social problems (Gill & Johnson, 2010). As a result of their own daily organisational dynamics, SMEs are required to improve their practice (Palacios, 1998). Gill and Johnson (2010) state that AR is intended, not only to contribute to existing knowledge, but also to help people solve some of the practical concerns and enable them to deal with a problematical situation. Checkland (1999, 2000, 2006, 2012) also argues that the aim of AR is to make neither the ideas nor the practical experience dominant. Rather, the intention is to allow tentative ideas to inform practice, which then becomes the source of enriched ideas and so on, in a learning cycle. Therefore, this research was developed through AR, whereby the researcher simultaneously addressed a practical situation and the ongoing development of science in an ethical framework (Jackson, 2000).

For this research, it was necessary to explore the interpretive platform (Fuenmayor, 2015) based on the beliefs that people hold and which 'build' such

platform. Fisher (2007) describes AR and proposes that the only way researchers can improve and challenge their understanding is by taking action and by learning from experience. From this perspective, the belief is that action or behaviour can only be changed by challenging a person´s values and beliefs and that these can only be altered by testing them in action. Checkland (2010a) also points out that the aim of action research is to move into the action, which means making things happen in real-life situations. Thus, AR could help in exploring new beliefs in action.

Gill and Johnson (2010) suggest the following phases for conducting AR:

- Phase - Diagnosis (of problem or issue):
  - Identification and definition of the problem with the involvement of stakeholders.
  - Observation and analysis of the causes of those real-life problems.
  - Deployment of theory in order to make sense of the real encountered problems.
  - Re-conceptualising the nature of the problems.
- Phase - Planning (action/intervention):
  - Based on this diagnosis, action is planned and agreed with participants aimed at the resolution of re-conceptualised problems.
  - Definition of what constitutes resolution or amelioration of problems.
- Phase - Implementation (taking action):
  - Implementation plan aimed at resolving problems.
- Phase - Evaluation (effects of action):
  - Monitoring and evaluating action.
  - Reflecting action in terms of the problems and of relevant theory.

It is vital for SMEs to identify the value of managing complexity in practice using a process to face daily challenges in a world of continuous change. According to Blaxter et al. (2001), AR also suggest the following set of characteristics, which would help in the adoption of this process in SMEs : it is educative to the participants and the researcher; it deals with individuals as members of social groups; it is problem-focused in a specific context; it involves a change intervention; it aims at improvement and involvement; it involves a cyclic process in which research, action and evaluation are linked; and, finally, it is founded on

research relationships in which those involved are active participants in the change process.

Action research, participatory action research and action learning are the most common terms used to describe research that involves the following: a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview through an iterative cycle of action and reflection, theory and practice, in participation with others in the pursuit of practical issues (Reason & Bradbury, 2006).

3.1.3.1.2 Case study

Case study (CS) is defined as empirical inquiry (Yin, 2009) that is used to investigate a contemporary phenomenon in depth, to consider real-life contextual conditions in which the boundaries between phenomenon and context are not so evident, and with a phenomenon that has more variables of interest than data points and relies on multiple sources of evidence.

The need to develop research based on case studies arises from the desire to understand complex social phenomena. CS also allows the researcher to retain the holistic and meaningful characteristics of real-life events (Yin, 2009).

Yin (2009: 10) states that

> the first and most important condition for differentiating among the various research methods is to classify the type of research question being asked. In general, “what” questions may either be exploratory or about prevalence. “How” and “Why” questions are likely to favour the use of CS, experiments or histories.

Three conditions should be considered when using CS: “How” and “Why” questions are asked and when the research is focused on a contemporary set of events over which the researcher has little or no control.

The CS method could be used for exploratory (understanding), descriptive (portraying) and explanatory (causality) purposes. Yin (2009) points out that

research questions based on “How” and “Why” are more explanatory and likely to benefit the use of CS. This is because “How” and “Why” questions deal with operational links that need to be traced over time, rather than mere frequencies or incidences. The more research questions focus on explaining some present circumstance, the more the CS method will be relevant. CS is used when research questions require an extensive and in-depth description of social phenomena.

For CS, the researcher needs to consider five key components of research design: the research questions to be answered; the propositions related to the research questions that direct attention to something that should be examined within the scope of study; the unit(s) of analysis to work with what emerges from the research questions; the logic relation between the data and the propositions; and, finally, the criteria for interpreting the findings.

Yin (2014) argues that a single CS is analogous to a single experiment, and many of the same conditions that justify a single experiment can also justify the use of a single CS. The selection of the CS should be related to the theory and propositions; these form the substantive context for each of the following five rationales. First, the CS should be critical to the theory or theoretical propositions. The theory should have specified a clear set of circumstances within which its propositions are believed to be true. The single CS can be used to determine whether the propositions are correct or whether some alternative set of explanations might be more relevant. Second, a single case can be studied where the case represents an extreme or unusual case, deviating from theoretical norms or even everyday occurrences. Conversely, a third rationale is that of a common case, in which the objective is to capture the circumstances and conditions of an everyday situation again because of the lessons it might provide about the social processes related to some theoretical interest. A fourth rationale is when a researcher has an opportunity to observe and analyse a phenomenon previously inaccessible to social science inquiry. A fifth rationale is the longitudinal CS: studying the same single CS at two or more different points in time. The theory of interest would likely specify how certain conditions and their underlying processes change over time.

CS was an appropriate method for this research because it was pointing to “How” and “Why” research questions relating to contemporary actions over which the researcher had little or no control. In addition, the research questions focused on how SMEs could develop an ongoing process to achieve systemic understanding of the organisation, adopt a learning process to manage complexity and develop people’s skills. In considering an evolving process to manage complexity, the research needed to be developed based on a longitudinal approach in order to evaluate adoption and performance through time; as a pilot single case study based on an inductive approach from which would emerge a theory of intervention that would help to further the development of knowledge; and finally, as a typical case because the circumstances that surrounded the case represented typical characteristics of Mexican SMEs.

Using AR and a single case study with a longitudinal approach allowed the researcher to review a learning process over time. Palacios (1998) maintains that the choice to portray an intervention as case study is that the case study allows a research to retain the holistic and meaningful characteristics of real life events. In conclusion, AR allowed an intervention that involved an organisation in an implicit change process in order to transform its reality in a manner parallel to the research process. In addition, AR developed through a case study allows the consideration of holistic and meaningful characteristics in real-life events.

3.1.3.2 The design

The design is a logical sequence of activities (a plan) that allows the researcher to connect the empirical data to the research questions and, at the end, with its conclusions. The research design is a plan that guides the researcher in the process of collecting, analysing, and interpreting observations made during the intervention process; it is also a logical model of proof that allows the researcher to draw inferences concerning causal relations between the variables under investigation. The main purpose of research design is to help to avoid situations in which the evidence does not address the initial research questions (Gill & Johnson, 2010).

In addition, because the purpose of this research was to develop a new

methodology based upon ideas on managing complexity from the VSM, the researcher adopted an action research approach (Checkland, 2012, 2010a, 2006, 2000; Checkland and Holwell, 1998), including ideas from case study method (Yin, 2014, Palacios, 1998). Thus, a single case study intervention in a Mexican SME was selected to provide the empirical data for the action research.

In order to conceptualise the cycle of action research to be used for this work, the researcher mainly drew on Checkland's work (Checkland, 1985, 1989, 1990, 1995, 1999, 2000, 2006, 2012). According to Checkland and Holwell (1998) Figure 23 presents the necessary elements for conducting research: a particular framework of ideas "F" are used in a methodology "M" to investigate an area of interest "A" and, from doing the research, the researcher may learn about all three elements. Checkland and Holwell (1998) drawing on these elements in Figure 23, state the cycle of action research (Figure 29).

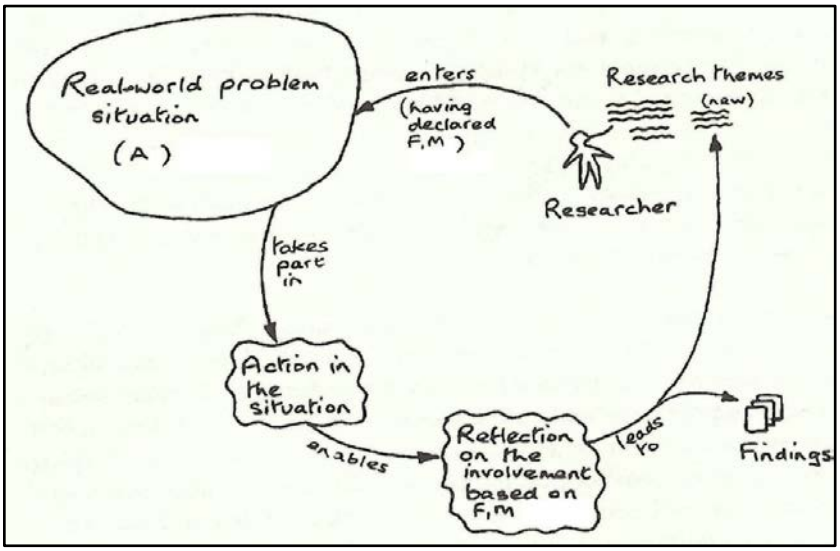


Figure 29: The cycle of action research in Human situations (Checkland and Holwell, 1998)

Drawing on Figure 29, the researcher now presents the research design. Having in mind the research questions stated in chapter 1 and, based on the literature review in chapter 2, the researcher states the intellectual framework "F" through a model (named Model K+ later on) which also considers the research gaps. Based on this model and taking into account the SMEs' challenges as the specific context for this research the researcher integrated the methodology "M" to be considered in practice (named Methodology K+ later on). The researcher used a multi-methodology approach, the creative design of methods, to integrate such

methodology with the VSM and SSM as the core approaches to manage complexity and establish the learning system respectively. Having declared “F” and “M”, the researcher enter into real-world situation of the SME selected in order to take part in it with all the people involved. Through the action in the situation, the researcher and people involved could develop different sources of evidence in order to reflect on "F", "M", "A" and the research questions. Based on the reflections, the researcher was able to present the research findings and so working in the cycle of action research along the intervention. The Figure 30 presents a graphical summary of the research design.

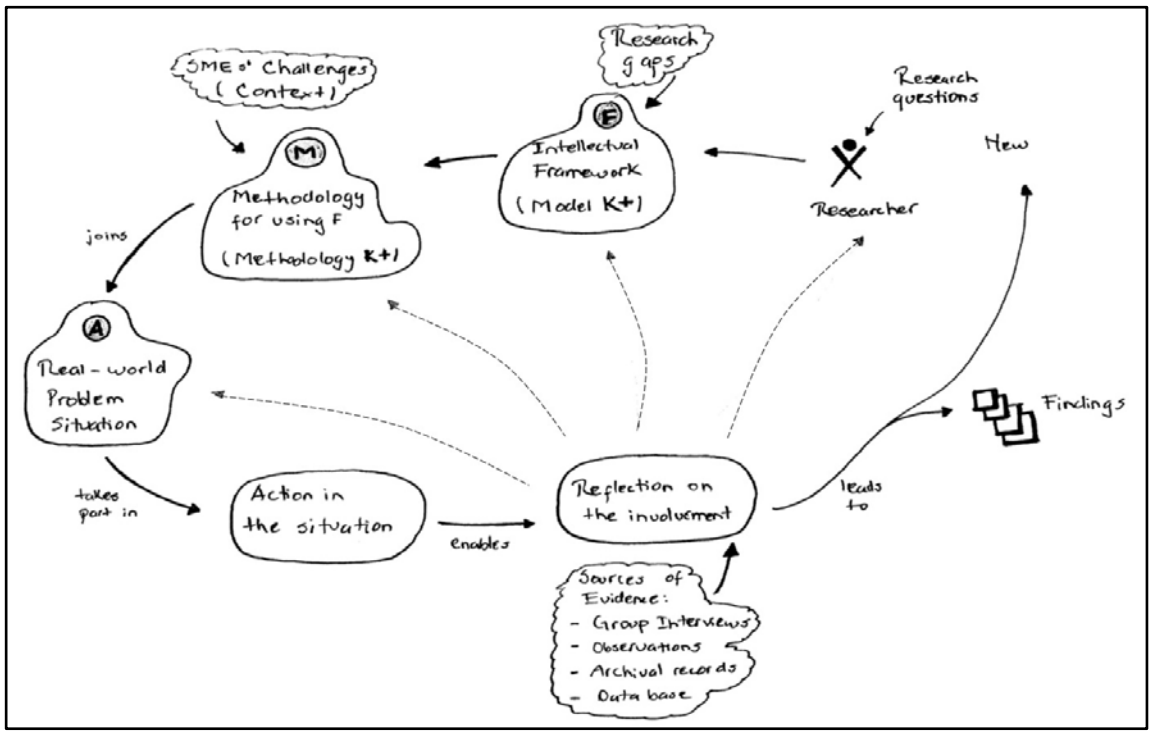


Figure 30: The cycle of action research to be used.

According West and Stansfield (2001), Checkland identified the nature of learning about the area of concern “A”, the way in which the action was undertaken “M”, and the theoretical basis from which the action stemmed “F”. Without a reference point “F”, it would not be possible for the researcher to make sense of his/her experiences. However, this is a continuous process of learning i.e. a cycle of action research. Thus, for this work, the researcher used an action research approach developing a case study in the Mexican SMEs' context.

3.1.3.3 The legitimacy of the research

With regard to the credibility of research findings, Gill and Johnson (2010) state that the aim is to reduce the possibility of getting the wrong answer. To achieve this, the researcher needs to focus on reliability and validity. As Yin (2009) states, validity can be established by considering three aspects: identifying appropriate operational measures for the concepts being studied (construct validity); seeking to establish causal relationships, whereby certain conditions are believed to lead to other conditions (internal validity); and defining the domain to which the study´s findings can be generalised (external validity). Reliability of research points to demonstrating that the operations of the study can be repeated with the same results. The goal of reliability is to minimise errors and biases in a study.

Yin (2009, 2014) recommends different principles for improving validity and reliability in research. Four principles are considered for construct validity. First, the researcher uses multiple sources of evidence to relate and support the operational measures. This evidence can come from the following six sources: documentation, which can take many forms and should be the object of explicit data collection plans; archival records, which can take the form of computer files and records; interviews, which are one of the most important sources of case study evidence; direct observations, because a CS will be developed in practice; participant observation, whereby the researcher becomes a participant in the field; and physical artifacts, such as a technological device, a tool or some other physical evidence. The second principle to be considered is the creation of a CS database with at least two components: data or an evidentiary base and the researcher's report. The third principle is to maintain a chain of evidence to increase the reliability of the CS. Using this chain, the reader of the CS can follow the evidence from the initial research questions to the CS conclusions. The fourth principle is a recommendation to exercise care when the researcher uses data from electronic sources.

Based on the design and the above-mentioned principles, the researcher decided to use the following four sources of evidence:

1. Case study database: for this research, all the files used to develop the CS were stored on a main database according to the intervention matrix, in order to enable this also to be used to demonstrate a chain of evidence.
2. Group interviews: this information was generated using software. With this software, the researcher was able to ask the same question simultaneously of an entire group. For a stated question, each participant could write an answer and all the answers were stored on a database. This database was the source of evidence for the interviews. This evidence was created in order to explore respondents' main insights into the process and the main insights for the learning process, using Kölb's cycle to frame this evidence.
3. Researcher's observations: this information was generated through all the workshops along the intervention process for the CS when observing people in action. These observations were developed in order to reflect on the research questions and the theory and propositions related to the MetK+.
4. Archival records: this information came from the SME. These data were used to support the research questions and propositions related to the impact of the research in the SME.

For internal validity, the researcher triangulated data between different sources, as follows. In order to analyse the information in accordance with Yin's (2014) suggestions, the researcher considered four analytical techniques. First, pattern matching logic, in order to compare empirical and predicted patterns to strengthen the internal validity of the CS. Second, explanation building, which is a special type of pattern matching, although here the goal is to analyse CS data by building an explanation of the phenomenon and to look for causal links, or "How" or "Why" something happened. In most case studies, explanation building occurs in narrative form. Third, time-series analysis, in which there may only be a single dependent or independent variable. Fourth, logic models, which are useful in CS evaluations. A logic model stipulates and operationalises a complex chain of events over an extended period of time. These events are staged in repeated cause-effect-cause-effect patterns, whereby a dependent variable or event at an earlier stage becomes an independent variable or a causal event for the next stage.

The techniques used for this research were dependent on the four selected referred to above. The relation between the sources and the techniques for this research was as follows:

1. The technique employed for the archival records used to analyse the impact of this research on the SME was time-series analysis, in order to review the business's key performance indicators (KPI) trends.
2. The technique employed for the interview database was pattern matching in combination with explanation building.
3. The technique employed for the researcher's observations was explanation building.
4. The main database was used in two ways: as evidence of all the information used throughout the entire research process and to demonstrate a chain of evidence. This database was organised using the same structure as the intervention matrix.

One tactic was considered for external validity: the theory must be tested at the level of stage, phase and sub-phase because the theme level is related to methods in practice in specific context.

Finally, in terms of reliability, the researcher worked by using the intervention matrix as the CS protocol and followed and documented its design and procedures. The researcher also used the CS database integrated with all the information generated through the research process.

Midgley (2000: 106) argues:

> One thing that all methodologies have in common, however, is a concern with the validity and/or legitimacy of methods. The term "validity" is generally used by proponents of observational science: if a method is valid, it yields knowledge that reflects reality without known distortions or intervention by the observer. However, those (like myself) who believe that truly independent observation is impossible tend to avoid the word "validity" and talk about legitimacy. If a method is legitimate, it is viewed as appropriate in the circumstances.

It is methodology that allows us to examine the strengths and weaknesses of methods, and this means that a method can 'work' in specific conditions. Thus, the researcher considered all the above approaches to ensuring legitimacy in

order to strengthen the reliability and validity of the research. However, a key aspect to be considered was the legitimacy of the selected methods in the specific context and circumstances of a particular SME, which were tested in practice in order to improve the ability to manage complexity in this kind of organisation.

Once the researcher defined the philosophical dimension and research design, he now addresses the methodological and practical approach for the intervention, starting from the model as a way of thinking and the foundation of the methodology for intervention using the CDM to frame such a methodology.

3.2 The Model

This research needed a model to explain the process that a group of people could use to manage complexity in an SME i.e., the social phenomenon implicit in this process. Beer (1995) states that a model is not good or bad; it is simply more or less useful for a certain situation. Based on the previous literature review, in this section, the researcher develops the conceptual model used for the systemic intervention.

3.2.1 K+ and its social role

The first aspect to consider in this section is related to the meaning of the symbol ‘K+’, the researcher conceptualised its meaning many years ago. This symbol has two elements: the letter ‘K’ and the sign ‘+’. The former is the first letter of the word ‘kuantum’, a derivation of the word ‘quantum’, and refers to a discrete quantity of energy (*Oxford Dictionaries*, 2015); the latter is a sign referring to addition. Thus, K+ is a symbol whose meaning, for the purpose of this research, refers to the addition of the energy between people in order to enhance synergy. When the researcher refers to the ‘Model K+’, he refers to a model that helps people to manage complexity in such a way that the process behind it promotes synergy between the people in an organisation.

3.2.2 The Model K+

3.2.2.1 Introduction

In this section, the researcher develops the Model K+ (ModK+). First, the researcher considers the research focus that guide the model. Second, the researcher confirms the need for two pillars for this research: managing complexity and the learning process. Third, the researcher identifies the 'building blocks' for building the ModK in order to structure and shape the ModK+.

3.2.2.2 Model orientation

In accordance with the research focus presented in chapter 1 and the case study recommendations earlier in this chapter (Yin, 2009, 2014), the researcher stated the initial theory and its propositions in order to guide the development of the ModK+ and the methodology to implement it. Keys and Midgley (2002) argue that there are two ways to deal with a systemic intervention: the first is by proposing a theory or methodological insight of value in understanding a process issue and then draw upon examples from practice from one case study or several to support the arguments; the second is by making the primary focus a rich, detailed narrative about an application and then to write about the theory within this; in the latter, the methodological or theoretical ideas can be introduced as part of the narrative. Even when a theory and its propositions are stated, this effort is made to guide and focus the intervention design. Future data and their analysis will support the final theory and propositions. The role of theory development, prior to the conduct of any data collection, is one point of difference between a case study and related qualitative methods and grounded theory (Corbin & Strauss, 1990). According to Yin (2014), in using a case study method, it is highly desirable to develop some theory as part of the design; the simple goal is to have an adequate blueprint for the research, and this requires theoretical propositions. As Sutton and Staw (1995: 378) state, "Theory is about the connections among phenomena, a story about why acts, events, structure, and thoughts occur". Yin (2014) states that, in addition to theory or theoretical propositions facilitating a

case study design, they will play a critical role in generalising the lessons learned from the research.

Thus, the research design embodied a theory and propositions for what was being studied. The researcher stated both the core theory and its propositions in section 1.2.3 as the cornerstones of the ModK+, and as described in the following section.

3.2.2.3 The two pillars of the Model K+

Even with the VSM as the backbone of this research, it was necessary to recognise some aspects about its use in building the ModK+. Jackson (2000) argues that the VSM is useful for understand the principles of viability underpinning the behaviour of complex organisations, but the VSM is a model rather than a methodology. As stated, the VSM has two main uses: to diagnose and to design an organisation using cybernetics principles. The VSM theory exists but, when a researcher tries to apply the VSM in SMEs, it is necessary to frame or follow a methodology that helps the systemic intervention in practice. Some authors have developed their own methodology for such a purpose, as stated in section 2.6.3; however, the researcher, in using this work, aimed to develop a methodology, not only for applying the VSM in practice, but also to facilitate the adoption of an ongoing process to manage complexity. The methodology will be the vehicle to put into practice the VSM as a process.

Based on the proposed theory and propositions, this research explored in more detail the learning requirements for the process of adopting the core concepts of organisational cybernetics on a daily basis with the aim of developing the ability to address complexity. The concepts of process and ability are related to learning systems. Thus, a key point for this research was a learning process that would enhance the ability of SME personnel to address complexity by applying key concepts suggested by the VSM. Thus, the first insight in order to build the ModK+ was the need to work with the VSM by embedding its core distinctions in an effective learning system. The OECD (2010: 21) states: “Learning processes are at the core of entrepreneurship and SME development. They are essential for the formation of a new business, its survival and growth as well as for the

upgrading of existing SMEs". Thus, a cornerstone of this research was the aim of embedding the VSM and its principles in people's daily practice through a learning system.

Here it is necessary to review different approaches to designing an effective learning system in an organisation. Senge (2006: 4) suggests that, "as the world becomes more interconnected and business becomes more complex and dynamic, work must become more 'learningful'". Mitleton-Kelly and Ramalingam (2011) argue that organisational learning concepts have evolved over time and they found four contrasting approaches to learning in this evolving process: behavioural, cognitive, social constructionist and Gestalt theories.

Behavioural theories started with Cyert and March (1992). These theories assume that learning is manifested by a change in behaviours shaped by the environment. Thus, learning is the acquisition of new behaviours through a conditioning process involving repeated factors which are central to such learning. These theories also suggest that standard operating procedures drive organisational action, and these institutionalised forms of actions are what produce results. This process is presented as a form of trial-and-error learning. The focus here is on an incremental process of learning which involves routines in response to environmental challenges, thereby achieving greater 'alignment' with the environment.

Cognitive theories were developed by Argyris and Schön (1996), who argue that memory and thought processes are at the heart of learning that focuses on the physiological processes of sorting and encoding information and events. These theories are an alternative to behavioural approaches because individuals, rather than the environment, control the learning. Cognitive approaches seek to explain learning with reference to 'mental processes', from which thought, belief, perception and interpretation are derived. Cognitive learning processes are those which result in changes to mental models held in long-term memory by creating new connections or altering existing associations between knowledge structures. As a result of the importance of mental processes, the role of individual learners is central to the cognitive approach. Here, organisational learning is individual (Mitleton-Kelly & Ramalingam, 2011).

Social constructionist theories were developed by March and Olsen (1975). These theories view learning as a process in which an individual actively constructs new ideas or concepts based on current and past knowledge or experience. Here, learning is a very personal endeavour but a key element is that this learning also happens as individuals engage in social activities on shared problems. Learning is seen as the process by which individuals are introduced to a culture by more skilled members i.e., as the product of social interactions. Individuals are seen as social actors, who collectively construct an understanding of what surrounds them and learn from social interaction. According to this approach, learning can only be achieved through active participation and, as participation is constantly changing, this approach focuses on change, rather than on order and regulation. This approach also sets out to explain the type of social context that is most suitable for organisational learning, focusing on group and community rather than on individual minds. Organisational learning is viewed as the process of social construction of shared beliefs and meanings in which the social context plays an essential role (Mitleton-Kelly & Ramalingam, 2011).

Gestalt learning theories are based on the work of Nonaka and Takeuchi in *The knowledge-creating company* (1995) and Peter Senge (2006) in his learning organisation concept. These theories present a holistic approach, rejecting the mechanistic perspectives of stimulus-response models. At the heart of these theories is the idea that human nature is organised into wholes. Organisational learning is only successful when it is based on an understanding of how the whole organisational system is connected, rather than focusing on individual parts.

In order to clarify the learning approach, it is necessary to consider three aspects: first, based on the onto-epistemology of this research, it is necessary to challenge the current culture of the SME; second, theory and propositions of this research aim to a methodology that enhances the adoption of a process to managing complexity; finally, this research also aims for an intervention to facilitate a change in practice. In summary, this research needed an approach that would consider to manage complexity as a process that people's behaviour needs to evolve in order to face the selected environment sharing people's experience with a holistic perspective; this is also the result of changes in mental models. Mitleton-

Kelly and Ramalingam (2011: 357) argue: “Some of the most successful approaches to organisational learning have not used one specific approach, but instead have synthesised elements considered to be complementary from different schools”. For this purpose, the researcher reviewed two approaches: the learning cycle behind Checkland’s SSM and Kölb’s learning cycle.

The learning system had to be designed to complement the VSM when building the ModK+. First of all, Checkland (2000: S17) states there has been a crucial shift in the concept of ‘system’:

> The world is taken to be very complex, problematical, mysterious. However, our coping with it, the process of inquiry into it, it is assumed, can itself be organized as a learning system. Thus the use of the word “system” is no longer applied to the world, it is instead applied to the process of our dealing with the world. It is this shift of systemicity (or “systemness”) from the world to the process of inquiry into the world.

This is the main distinction between the two forms of systems thinking: ‘hard’ and ‘soft’; between just the world and the process of inquiry into the world, respectively.

In order to cope with increasing complexity, we need to improve our learning system through enhancing our process of inquiry about the world, to better understand phenomena based on our historical and cultural background. The VSM is the backbone that helps us to enhance our process for inquiry into the world, for a better understanding of the organisational phenomenon and thus for the evolution of our own historic and cultural background.

According to Checkland (2000), the aim of SSM is to allow tentative ideas to inform practice, which then become the source of enriched ideas and thus the building of an action research learning cycle. A second aim (Checkland, 2000: S12) of this approach is to find ways of understanding and coping with the difficulties of taking action, both individually and in groups, to ‘improve’ the situations which day-to-day life continuously creates and continually changes. SSM has key thoughts which explain the overall shape of the development and direction it took: first, every situation in which an action research approach is used is a human situation, in which people take purposeful action that has a meaning

for them; second, when looking for a purposeful activity by human beings, it implies many interpretations of such a purpose; and finally, SSM is an inquiry process and it is necessary to move from the 'obvious' problem which requires solution to the idea of a situation which a group of people may regard as problematical. In this way, SSM emerges as an organised learning system. Checkland (2000: S15) states:

> And since the initial choice of the first handful of models, when used to question the real situation, led to new knowledge and insights concerning the problem situation, this leading to further ideas for relevant models, it was clear that the learning process was in principle ongoing.

SSM offers clear guidelines on how to design an organised learning system. The researcher borrowed such insights to build the ModK+, linking the strength of VSM theory for managing organisational complexity and SSM for solving problems and enhancing the learning in a problem-solving context. Thus, the purpose of the ModK+ is to organise exploration of the world supported by a learning system to develop capabilities in facing increasing complexity. SSM as a learning system has the following stages: first, finding out about a problematical situation when exploring the real world, such as the complexity of relationships; second, exploring relationships via models of purposeful activities based on explicit world views; third, structuring an inquiry by asking about a perceived situation using a model as the source of the question; fourth, people taking actions in order to improve a situation based on finding insights; and finally, acknowledging that it is a never-ending inquiry process (Checkland, 2000).

On the other hand, and in accordance with the onto-epistemology of this research, it is necessary to understand the learning system through the evolution of organisational culture. It is not possible to 'see a culture'; the culture is expressed in different ways (Schein, 2010). One aspect to be considered in order to 'see the culture' was the relation between behaviours and culture. You can 'see' culture through the behaviours that are observable (Mascorro, 1995) but these behaviours can change through social interactions which enhance the learning process (March & Olsen, 1975). Kölb (1984) suggests that learning is a process whereby knowledge is created through the transformation of experience

and this transformation has a direct impact on behaviours and thus on culture. Culture shapes different behaviours but, at the same time, new behaviours evolve current culture. According to Kölb (1984), this transformation of the experience passes through four phases: concrete experience, reflective observation, abstract conceptualisation and active experimentation. Jackson (1995) explains the same phases as: concrete experience, observation and reflection, formation of abstract concepts and generalisations, and, finally, testing the implications of concepts for future action. Vince (1998) points out that the Kölb cycle implies the same phases with a complementary view: a direct experience in which either or both thoughts and feelings are generated, a process of reflecting on them in order to draw rational conclusions or emotional insights about experience, and finally, the implementation, testing and initiation of action from experience.

Bearing in mind possible cultural differences, the researcher also reviewed Jackson's (1995) analyses of cross-cultural differences in learning styles. Drawing on Kölb's learning cycle, Jackson suggests the following phases: receptivity modality (Kölb's 'concrete experience') is the phase in which an individual learner is receptive (or not) to different types of stimuli; in the perceptual modality (Kölb's 'reflective observation') phase, the individual learner filters stimuli in different ways; the cognitive modality (Kölb's 'abstract conceptualisation') phase is where an individual processes information in different ways; finally, in the behaviour modality (Kölb's 'active experimentation') phase, the individual may have preferences for the way that behaviour in learning is managed. When reviewing SSM phases and Kölb´s learning cycle, a correlation emerges between them. Phase one and two of SSM are related mainly to the process of reflective observation'; phase three is mainly related to abstract conceptualisation; and phase four is related to active experimentation in order to gain concrete experience. Both SSM and the Kölb cycle are learning cycles.

Gregory and Romm (2001) point out the advantages of building learning in a team at the organisational and/or community level rather than just at the level of the individual. The focus is on regarding a team as individuals working together to improve their systemic intervention practice through mutual learning that helps

them to complement and support one another. In addition, Checkland and Scholes (1990: 28) argue:

> SSM is a methodology that aims to bring about improvement in areas of social concern by activating, in the people involved in the situation, a learning cycle which is ideally never-ending. The learning takes place through the iterative process of using systems concepts to reflect upon and debate perceptions of the real world, taking action in the real world, and again reflecting on the happenings using systems concepts.

In areas of social concern, SSM works on human activity systems, which are sets of human activities that are related to each other so that they can be viewed as a whole (Checkland & Scholes, 1990). SSM constitutes a system of a particular kind: a learning system which aims to increase knowledge and understanding of a real-world situation. The conclusion of this learning cycle is more likely to lead to another different problem situation.

Problem-solving should be seen as a never-ending process in which participants' attitudes and perceptions are continually explored, tested and changed (Checkland, 1999). SSM seeks to work with different perceptions of reality, facilitating a systemic process of learning in which different viewpoints are examined and discussed in a manner that can lead to purposeful action in the pursuit of improvement (Jackson, 2003). Naughton (1977) argues that in order to know that SSM is properly used, it is necessary to consider five 'constitutive rules' or principles: first, SSM is a structured way of thinking which focuses on a real-world situation which is perceived as problematic, the aim always to bring about what will be seen as an improvement in the situation; second, SSM's structured thinking is based on a systems approach. Its whole process uses an explicit epistemology and any work with this approach must be expressible in terms of this epistemology; third, the SSM approach has the following guidelines: there is no automatic assumption that the real world is systemic, the SSM user is always conscious of moving from the real world to thinking about the world of holons that are used to enquire into, or interrogating the real world in order to articulate a dialogue; fourth, any potential use of SSM ought to be characterised by conscious thought about how to adapt to a particular situation; and fifth, because SSM is a methodology, not a technique, every use of it will potentially yield lessons in

addition to those about the problem situation. These guidelines were considered in the design of the ModK+.

Checkland (1999) argues that using systems ideas in a problem-solving approach is very different from the goal-directed one. The first approach is based on structuring a debate, rather than being intended as a recipe for guaranteed efficient achievement. As Checkland (1999: 279) points out,

> The notion of “a solution”, whether it optimizes or “satisfices”, is inappropriate in a methodology which orchestrates a process of learning which, as a process, is never-ending. To this extent the methodology as a whole clearly articulates phenomenological investigation into the meanings, which actors in a situation attribute to the reality they perceive. And at a more detailed level, too, there are many parallels between the operations within the methodology and the philosophical/sociological tradition of interpretive social science.

3.2.2.4 The building blocks of the Model K+

In order to explore the building blocks for the ModK+, the researcher needed to consider certain implications when combining the VSM with SSM. First, Checkland (2000) argues that, at a higher level, every situation is a human situation in which people are attempting to take a purposeful action which is meaningful for them. This led to the idea of modelling purposeful ‘human activity systems’ as sets of linked activities, which together could exhibit the emergent property of purposefulness. However, in order to face complexity as an organisation, the main purpose is to be viable as a system evolving with its environment. It is possible to model a human activity system through the VSM because its purpose is related to increased organisational viability. The VSM exhibits the emergent property of the purposefulness of the human activity system called an SME, whose purpose is survival in order to preserve the identity of the system (Beer, 1995).

Second, this research is driven by onto-epistemology and a paradigm that states that people interpret reality in order to understand a phenomenon based on their own historical and cultural background. These interpretations imply a continuous reflection process (Kölb, 1984) as part of their own learning cycle. However, for this research, the VSM was used to drive the purposeful activity of exploring the

real world in order to share understandings about an organisation's viable model and so help people to agree upon its purpose. The purpose is always the same: to be viable in a selected environment. As the purpose of any organisation is based on what it does (Beer, 1995), any different possible interpretations are not only related to this purpose, but also to the interactions between the entities as a system in order to increase the viability of the system. Checkland (2000) argues that models are used as a source of questions to ask of the real situation. Thus, the VSM was also used to rethink the current 'ground' or cultural platform.

Third, the suggested (Beer, 1995) starting point from which to draw the VSM is the definition of the purpose and nature of a system in order to set the boundaries (Midgley, 2000) and thus model organisational processes and agents' interactions using VSM language. Beer suggests (1995) that the purpose of a system is to be viable in its environment and to face complexity. When people diagnose an organisation using the VSM and its principles, a problematical situation appears. In SSM, the starting point is to explore a problematical situation between people to express it through relevant relationships in a model of purposeful activities in order to question it.

However, based on onto-epistemology and the social role of SMEs, the ModK+ needed to consider in depth the real meanings that an organisation has for the people involved. Heelan and Schulkin (1998) point out that meaning is not a private mental entity but a shared social entity embodied in language and a cultural environment embodying community purposes. Meaning for people goes beyond the purpose of an organisation as a system. In the end, an organisation is a human activity system with a specific cultural or interpretive platform (Fuenmayor, 2013) that is the foundation for the way in which people can see complexity. For the people involved, the meaning that everyone grants to an organisation as their community transcends the purpose of the organisation as a system. The culture is the 'ground' that gives a specific 'figure' to an organisation and its viable model. The culture transcends the shape of the organisation's viable model. Gregory (2007: 1507) argues that: "it is important to recognise that Beer's VSM is essentially participatory. Ulrich (1996: 20) states that: "It is people on whom the meaning of improvement depends first of all, for they possess the

sense of purposefulness, the power, knowledge and sense of responsibility that together determine what ought to count as ‘improvement’".

In summary, it is necessary to understand the organisational meaning for the people involved in order to explore the purpose, nature and boundaries of the organisation to shape its VSM, having in mind how to increase its viability. Thus, ‘meaning’ precedes ‘understanding’ and so these are the first two ‘blocks’ or phases of the ModK+. The first three phases of the learning system behind SSM (finding out about a problematical situation, developing models of purposeful activities, and asking about perceived situations) are considered under the ‘umbrella’ of the ‘meaning’ and ‘understanding’ phases. The last phase of SSM, related to people taking actions in order to improve the situation, implies a different ‘umbrella’.

In order to explore the third phase, the researcher considered the VSM methodologies comparison developed in chapter 2. These methodologies offer meaning and understanding phases but, before taking action, these methodologies develop, implicitly or explicitly, a process for reflecting upon the design of the ‘expected’ VSM and, from this design, oriented actions emerge. Using the VSM as a transitional object (Midgley, 2013), it is possible to diagnose the current system’s performance and, based on these reflections, design a ‘new’ system in order to improve the ability to cope with complexity. The design using the VSM implies the three elements of Environment, Operations and Meta-system and this design is the first element of the next umbrella: Focusing. The system´s new design helps people to start focusing on improving the system.

In summary, until now, we can state: by reviewing the organisational meaning for people in order to explore the ethos of the current culture, understanding the system in focus (boundaries) based on the meaning, and understanding the problematical situation of the system, it is possible, from this platform, to Focus upon the necessary adjustments in order to shape the ‘new’ design of the organisation’s VSM. This ‘new’ design also implies the statement of ‘actions’ to improve the system’s viability (mainly strategic actions). However, these actions are not merely a ‘list’; they can be related for the purpose of increasing the system’s viability. Simply having a definition of ‘actions’ to improve is not enough,

however, and Kaplan and Norton (1997) express the need to frame these 'actions' passing through the strategic, tactical and operative levels, i.e., from vision-strategies to objectives-projects and, finally, to specific activities. This alignment of the three levels is also related to the Focusing phase. Here, focus is on the alignment of the three levels of strategic thinking in a shared mode, in order to integrate the different levels of coordinated actions among everyone involved to enhance the organisation´s viability. The process of aligning the organisational focus facilitates a shared understanding about how to coordinate 'actions' between people. Without this alignment, it is difficult to 'land' a common strategy for all the people involved.

Some authors (Bossidy & Charan, 2002; Kaplan & Norton, 1997; Kim & Mauborgne, 2005) express the need to pay special attention to the execution of actions. Even if the actions connect the strategic with the operational levels, this does not guarantee their effective execution (Bossidy & Charan, 2002). Thus, it is necessary to consider the 'Executing' phase, the focus of which is related to following up the execution of the three levels in practice. This phase of execution is where the concrete experience takes form. This phase is completely oriented to the practical implementation of all the coordinated actions in order to improve a system's viability.

In summary, the four building blocks of the ModK+ are: Meaning, Understanding, Focusing and Executing. These blocks or phases represent the way of thinking considered in the ModK+ for framing a learning system to apply the VSM in order to cope with the increasing complexity in SMEs. Figure 31 presents these building blocks or phases.

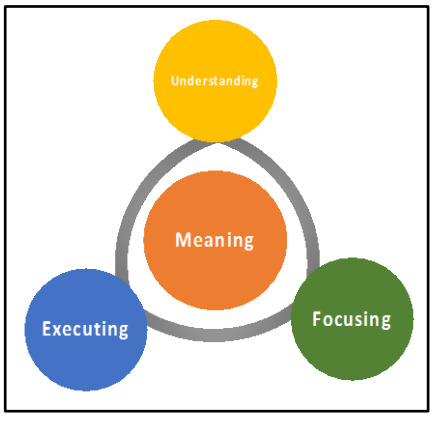


Figure 31: Phases of the Model K+

3.2.2.5 Structuring the Model K+

As stated in the theory and propositions of this research, the learning system behind the building blocks of the ModK+ needed to be represented in a multi-methodology which facilitates the adoption of an ongoing process, using organisational cybernetics as the backbone to enhance complexity management in the daily practice of SMEs. The selected multi-methodology approach was the CDM, which implies a move towards the practical level i.e., methods, techniques and tools. Thus, in order to frame the Methodology K+ (multi-methodology) that helps put the ModK+ into practice, the researcher now presents a brief analysis of the structure of the Methodology K+ (MetK+).

Mingers (2000) argues that a typical OR intervention passes through several stages: from an initial exploration and appreciation of the situation, through analysis and assessment, to implementation and action. Individual methods and techniques have their strengths and weaknesses with regard to these various stages. He describes the different levels or decomposition as a distinction between philosophical principles (Why?), methodological stages (What?), and techniques (How?). The primary focus of a method is its stages: the conceptual account of what needs to be done. These stages are justified by principles and actualised by a set of activities or techniques. Some techniques may have tools. Ormerod (1997), however, points out a different perspective, in which each phase or step in an intervention will require a specific transformation depending on the overall purpose of the intervention, the specific context, the participants to be involved, and the overall intervention design. The learning system behind the ModK+ requires consideration of both perspectives: all the structure that is necessary but, at the same time, all possible freedom to choose the methods depending on the purpose of each step. In order to shape the MetK+, the necessary structure had to be supported, starting at the level of the building blocks of the ModK+. Following Mingers (2000), the level of the phases must relate more to the philosophical principles (Why?) behind the learning system and the next level or sub-phase level must be related to the methodological stages (What?). The next section explains these complementary levels of the ModK+.

3.2.2.6 Shaping the Model K+

There follows the researcher's choice and explanation of each phase and sub-phase level of the ModK+ as well as the principles behind them. The ModK+ properly begins with the Meaning phase. As has been explained, our systemic approach to an organisation starts with the meanings that team members grant to the organisational purposes, and how these enable them to distinguish the necessary relationships that shape their organisational identity. These meanings, implicit in most cases, lead team members to act in a particular way (Fuenmayor, 2012). Thus, the Understanding, Focusing and Executing phases of the ModK+ rest upon the Meaning phase. The Meaning phase is where the actors of the organisation, seen as a human activity system (Checkland, 1999), are situated and where they become aware of the real meaning that their organisation has for them; it is also where they can grow and develop as human beings in a community. Thus, the objective of this phase is to distinguish key elements as a team, in order to share the organisation's meaning between the actors in such a way that this shared meaning increases cohesion, trust and respect (Adizes, 1992) and enhances their own culture. Two specific objectives are sought in this phase: first, to distinguish as a team the organisational ethos that is the basis for their daily actions; and second, to distinguish those key relationships (Espejo & Reyes, 2011) which have shaped and are congruent with their own ethos and to set the first boundary and identity of the system-in-focus (Midgley, 2000). These main objectives of the Meaning phase become the drivers of its sub-phases: Organisational Ethos and Organisational Identity, respectively.

Even when the members of the organisation explicitly share the meanings in the previous phase, it is necessary to draw and share the understanding of the organisation i.e., the system-in-focus, in order to validate the congruence between such meanings and the 'shape' of the system. In order to obtain an organisational model, the VSM could also be used as a transitional object (Midgley, 2013) to structure team engagement and provide a focus for the dialogue between them (Franco, 2006). Checkland (2000) states that the purposeful activity models used in SSM are intellectual devices, whose purpose is to help people structure the exploration of the problem situation being addressed. In the ModK+, the VSM is used to explore interpretations in order to

understand in an explicit, shared, and detailed way, the interactions between the three elements (Environment, Operations and Meta-system) of the organisation's viable model. Thus, the organisation's VSM becomes another transitional object to explore, as a team, the different interpretations of the problematical situation of the organisation.

However, the above 'reality' of the perceived problematical situation is based on the interpretations of the people involved, and on their culture and their interpretive platform (Fuenmayor, 2012). Thereby, the VSM allows a higher level of systemic understanding of the system-in-focus and its reality (Espinosa & Walker, 2011). The Understanding phase, therefore, pursues three specific objectives: first, to identify accurately, based on impact, all the different entities that make up the system-in-focus using the VSM for modelling (Espinosa & Walker, 2013); second, to identify the perceptions that key stakeholders have about the performance of the system, as only through the understanding of these perceptions could the researcher understand the interpretive platform that stakeholders use when exploring a problematical situation (Fuenmayor, 2012); and third, to make an organisational diagnosis using the VSM (Espinosa, 2014) to validate and substantiate the different perceptions that key players have about a problematical situation in order to share it as a team. From these three objectives emerge the two sub-phases of the Understanding phase: an Organisational System to explore the first objective and a Problematical situation in order to address the last two objectives.

When people in an organisation identify a shared problematical situation, they need to align their efforts to deal with it through a shared approach as a team, through executing concrete actions and thus increasing the viability of the system-in-focus (Bossidy & Charan, 2002; Kaplan & Norton, 2001; Kerr et al. 2002). In order to align these efforts, an in-depth review of current beliefs is needed so that this reflection can promote a different way of thinking in order to increase their requisite variety as a team; before this type of review, the beliefs held relate more to the current interpretive platform (Fuenmayor, 2012a) on which the organisation supports its present performance. It is also of fundamental importance that this alignment starts with a complete and clear analysis of the results the organisation needs to achieve (Bossidy & Charan, 2002; Kaplan &

Norton, 2001). Focusing on these results also helps the team members to measure the progress required for developing the necessary variety to face their environment. Depending on this assessment, the organisation then designs a more convenient Operations and Meta-system to respond properly to this environment (Beer, 1995).

Thus, the actions required are defined in order to make the necessary internal adjustments to the organisation's design to cope with the environment and achieve the expected results. However, these actions require a formal process of alignment as a team for close understanding and coordination between the members in performing such actions and enabling the synergies possible within the team (Kaplan & Norton, 2001; Kerr et al., 2002). Therefore, the focus of this phase is on reviewing the organisation's design and establishing the actions necessary to align the focus among the team members to achieve the performance defined and face the problematical situation identified.

In order to achieve the above, the ModK+ focuses on the following four specific objectives: first, to make explicit, as a team, the results expected in order to focus efforts (Kaplan & Norton, 2001); second, to decide the environment in which it is necessary and convenient to interact (Beer, 1995); third, as a function of this environment, to design a Meta-system and Operations to achieve the balance between the necessary cohesion and autonomy to generate the requisite variety to cope with it (Espinosa & Walker, 2013); and fourth, to align the actions between the members of the team (Bossidy & Charan, 2002; Kaplan & Norton, 1997) in a coordinated mode. Based on these objectives, the sub-phases of the Focusing phase emerge as follows: the first and second objectives are addressed in the External Business Model sub-phase; the third objective is explored in the Internal Business Model sub-phase; and the last objective is developed in the final Organisational Focus sub-phase.

The three previous phases of the ModK+ are based mainly on processes of analysis and synthesis. However, in order to improve a real problematical situation, it is not enough simply to declare alignment efforts; they have to be executed. Checkland (2010a) states that moving people to action entails wider considerations. The outcomes of the previous phases are, in essence,

agreements between people about the different aspects to be considered in order to gain the requisite variety. Thus, the last phase of execution is critical: this is precisely where a team moves to put such agreements into practice. If the people involved do not translate agreements into concrete action, this slows or even stops the change process (Bossidy & Charan, 2002; Kerr et al., 2002), since it directly reduces a team's confidence when people cannot achieve evident progress (Kotter, 2012).

One of the challenges of working in SMEs is people's inertia regarding using old ways to do their work (Adizes, 1994), where one of the main features is inconsistent or poor execution (Palacios, 1998). For the researcher, it was necessary to consider such inertia because the people involved are not normally aware of such inertia or poorly coordinated execution. There is a natural inclination in a team to continue doing things as before (Adizes, 1999), which implicitly generates an unconscious barrier to changing the way things are done (Kerr et al., 2002; Kim & Mauborgne, 2005). The current management style in SMEs is dominated by everyone knowing the 'rules of the game' (Adizes, 1992). However, the style outlined by the ModK+ promotes greater coordination and consistency when executing tasks and results orientation and performance evaluation when focusing improvements. This new approach involves different rules for the game, which need to be learned in order to collaborate using a different way of thinking (Kotter, 2012).

In the previous phases, team members simply explored new paradigms, passing through reflective observation, abstract conceptualisation and active experimentation. However, in this new phase, the team members actually put their insights into practice with concrete experience (Kölb, 1984). It is also very important to consider that, as a first effort for working with 'new' rules for implementation, this phase will be designed in such a way that it encourages the team to develop their abilities (Kerr et al., 2002). Here, it is not enough simply to agree upon or to outline a new way to execute improvement. Based also on practice (Schön, 1991), the researcher noted that it would be necessary to accompany the team in this process, in order to help them achieve the necessary consistency and effectiveness to close the gaps in the problematical situation identified and to continue developing a systemic approach in the organisation

(Espinosa, 2015a). In this way, the team members could increase their confidence and commitment to operating under this scheme by achieving results using a different approach to execute improvement actions.

The above phase then focuses on designing and operating a follow-up process that facilitates the adoption of the consistent implementation of actions in practice, in order to render the aligned actions concrete and thus close the gaps identified in the problematical situation. For this purpose, this phase pursues two specific objectives: first, to define, agree and develop the minimum and necessary conditions for achieving an effective implementation that will increase the likelihood of achieving results in the shortest possible time; and second, to accompany the team in order to support the process of adopting systematic monitoring but, at the same time, supporting their systemic understanding in daily life. In order to address the objectives, this phase has a Management Process sub-phase.

All the phases and sub-phases of the ModK+ described above are summarised in Figure 32.

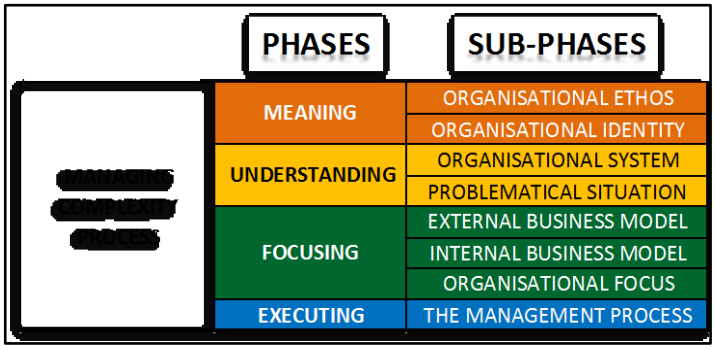


Figure 32: Phases and sub-phases of the Model K+

In order to represent the phases and sub-phases described above, the researcher developed a graphic representation of the ModK+ (see Figure 33). In producing this graphic model, the researcher has tried to avoid two possible misunderstandings. First, this image represents the non-linear dynamic of the model and actually represents a more organic look behind the interactions of the different phases and sub-phases in an attempt to include the learning cycle. Second, the image should help to clarify the thinking behind the different

elements, so that the user has a systemic perspective of the model. In reviewing the evolution from just the phase level to the sub-phase level can be appreciated. Four different colours represent the phases: orange corresponds to the Meaning phase; yellow is related to the Understanding phase; green represents the Focusing phase; and the Executing phase is presented in blue. The use of the colours is the same at the phase and sub-phase levels.

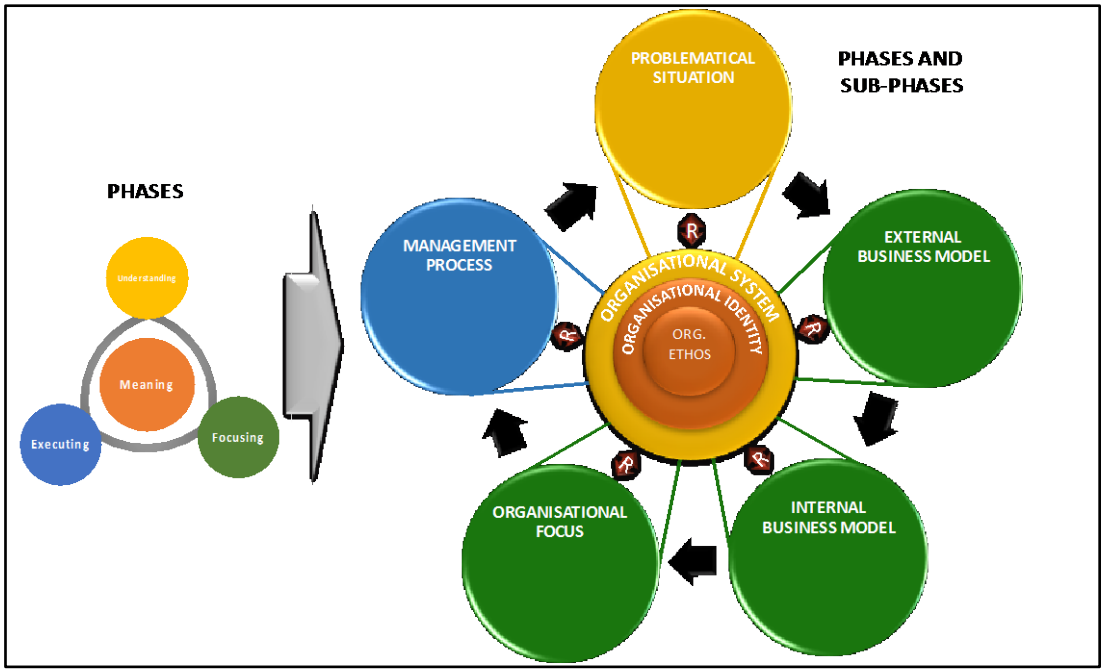


Figure 33: Dynamic between the phases and sub-phases of the Model K+

The graphic ModK+ depicts three concentric circles over to the right of Figure 33. These circles remain at the core of the ModK+, representing the strong relation in an embedded mode between the organisational ethos as the basis for both Organisational Identity and for shaping the Organisational System. These three concentric sub-phases reflect the core of the learning system as the foundation for the change process. The five circles orbiting the concentric circles in Figure 33 are linked by a series of black arrows, which reflect the dynamic nature and interaction between the rest of the sub-phases in a cycle that reflects the process of change; this dynamic or learning cycle could start in any of the five circles: this is the organic feature of the ModK+. Each of the five circles has a connection (two lines of the same colour from each circle to the centre) and there is a bidirectional arrow, in dark-red containing the letter ‘R’, between each outer circle and the core. These arrows represent the reflexive possibility at each phase of the model that might require reframing an essential part of the organisation (centre) and vice

versa i.e., some reflection regarding the ethos of the organisation may cause some rethinking about the dynamic in the outer circles, or a major change in these external circles might cause deep reflection upon the identity of the organisation.

3.2.2.7 Summary

The ModK+ has been presented in order to use it to frame the intervention contained in this research in practice in SMEs. This intervention was framed using the phases and sub-phases of the ModK+ to frame the MetK+, which is presented in the next sections of this chapter.

3.3 Intervention approach

3.3.1 Introduction

As stated in chapter 2, some authors have developed their own methodology for applying the VSM and its principles. The ModK+, which uses the VSM as a backbone for managing complexity, is not itself a methodology. In the first section of this chapter, the researcher presented the philosophical dimension and research design but, in order to test the ModK+ in practice in an SME, it was necessary to develop the intervention approach based on the methodology for the intervention, in order to drive all the methods and techniques in the field. Furthermore, Checkland (2000: S37) argues: “Never imagine that any methodology can itself lead to ‘improvement’. It may, though, help you to achieve better ‘improvement’ than you would without its guidelines. But different users tackling the same situation would achieve different outcomes”. Thus, the aim of the methodology for the proposed intervention was to bring guidelines to the implementation of the ModK+.

The methodology for the intervention required consideration of all the challenges related to SMEs presented in chapter 2. In this section, the researcher presents first the methodological dimension and the core methodologies to be considered. Then, the researcher states the complementary approaches that it is necessary to consider in order to address the challenges SMEs face, as presented in

chapter 2, followed by a brief summary of each. Following this, and based on the CDM, the researcher presents the frame that was used to integrate all these complementary approaches (Midgley, 1990, 2011) in the methodology for the intervention. This chapter ends by presenting the practical dimension for the intervention to be applied in the field.

3.3.2 Methodological dimension

Midgley (2000) states that the methodology for an intervention is characterised by three key activities: first, it suggests a purposeful action by an agent to create change in relation to a reflection on the boundaries; second, it involves reflection upon the boundaries of problematical situations; and third, it refers to an intervention that embodies the pursuit of the ideal of comprehensiveness. A methodology that is adequate for systemic intervention should be explicit about three inseparable aspects: critique, judgement and action, it is necessary to reflect upon the boundaries, theories, methods and actions for improvement, all of which must receive explicit consideration. Midgley (2000: 216) points out an important aspect that it is necessary to emphasise:

> Certainly, there are so many methods that it is impossible for anyone intervener to be competent in the use of them all. However, comprehensive coverage is not the point, the point is to engage in a continuous process of learning and reflection, building new skills over time.

The above will always be a core aspect of the MetK+.

3.3.2.1 Multi-methodology used in the research

In order to understand multi-methodology, it is first necessary to discuss methodological pluralism. Midgley (2000) argues that there are three types of challenges regarding methodological pluralism: the first is philosophical, which states that all methodologies make different philosophical and theoretical assumptions. If the researcher wishes to mix them in a framework, she/he has to justify them at the philosophical level; the second is cultural, and the barrier to

the widespread adoption of multi-methodology as a research strategy; the third is the psychological resistance to methodological pluralism.

In considering the above challenges, it is necessary to consider a model of learning in order to address them. Midgley (2000: 268) suggests:

> [The model of learning] addresses the paradigm problem by making it clear that no pluralist methodology can exist without making its own paradigmatic assumptions. It deals with psychological resistance by talking in terms of learning…However this model does not deal with the question of whether the time is right, culturally speaking, for methodological pluralism.

Midgley (1990) maintains that the theoretical side of systems science has become quite well developed. Some authors have proposed a pluralist approach rather than an isolationist one. Isolationists use just one working method, while pluralists draw on many theories and methods according to need. Isolationist approaches are limited theoretically and are, on a practical level, lacking in both flexibility and responsiveness in comparison with a pluralist approach. Therefore, theoretical pluralism is pragmatic, although this does not mean it is anti-theoretical. Midgley (2000) states there are some implications for theoretical pluralism: first, knowledge cannot be seen as cumulative in any sense; second, theories should be seen as more or less useful depending on the purpose of the intervention; third, there is always an agent making choices between options; and fourth, theory refers to a local relevant context, rather than being universal.

Midgley (2011: 6) also argues that there are philosophical justifications for theoretical pluralism:

> first, all knowing is inevitably bounded; second, researchers can generate greater insight by exploring the boundaries of knowledge than they can taking boundaries for granted; third, different theories assume different boundaries; fourth, so exploring multiple boundaries can usefully involve drawing upon multiple theories.

In addition, Midgley (2000: 248) states:

> I suggest that those engaging with methodological pluralism are trying to establish the foundations for a new paradigm. Of course, pluralists can still learn from other paradigms but this learning is always geared to the enhancement of one's own paradigmatic position. It is because I do not believe that paradigmatic thinking can be transcended that I stress the mixing of methods, not methodologies. I argued that we can learn from other methodologies to aid the ongoing construction of our own, and we can detach methods from their original methodological principles in order to use them in new ways seen through the eyes of our own methodology.

This argument addresses the paradigm problem: there is no need to claim that the agent is operating across paradigms; she/he just has to acknowledge that she/he is setting up a new position which encourages learning about ideas from other paradigms, but reinterpreted in her/his own terms. The primary emphasis is on the learning process. For the agent to start learning, it is not necessary to have full knowledge of a multitude of methods and methodologies. The agent only needs a critical attitude.

Following the same path, Midgley (2000) suggests that it is necessary to move from theoretical to methodological pluralism in order to build a flexible and responsive intervention. Midgley (2000) states that methodological pluralism could exist at the level of methodology and method: at the level of methodology, where other methodological ideas allow insights to inform the base methodology during a particular intervention; and at the level of method, when the researcher uses a wide range of methods in support of particular purposes. Midgley also argues (2000: 215): "This means that, if we are using a systems methodology, even methods developed outside the systems paradigms can be used as part of systemic intervention". Midgley (2000: 171) further states:

> Majority methodologies produced on the Century are "isolationist": they prescribe one best way of doing things. In contrast, a pluralist can use the full range of available methods, but they are seen through the theoretical lens of his own methodology, and are made meaningful in local situations by the way they meet (or fail to meet) the purposes of the agents engaged in intervention and of course these purposes may be evolved through the intervention itself.

Midgley (1990: 108) also arguments that

> Pluralists have to recognise that, if they are to use working methods and theoretical perspectives drawn from paradigms that have traditionally been seen to be incompatible with one another, then these supposed incompatibilities have to be overcome in order to avoid theoretical contradiction. Overcoming these incompatibilities must, of course, involve the development of a perspective, which harmonizes the assumptions of traditional isolationist theories.

Working methods drawn from the various paradigms have to be seen as appropriate for different perceived situations, but while this might mean that they are separately defined at the methodological level, at the 'higher' theoretical level they must be seen as complementary. The development of a new, overarching perspective raises the possibility that a meta-isolationist position has been created rather than a truly pluralist one. However, there is a difference between a pluralist, critically subjective meta-theory which reconstructs some of the assumptions of the paradigm in order to maintain theoretical coherence, but still gives equal respect to the validity of the working methods by aligning them with categories of situational context, and an isolationist theoretical perspective which denatures other paradigms by taking their working methods and ascribing them only marginal validity while maintaining that a single approach is still applicable in most circumstances. Given all this, however, it must still be recognised that pluralism will never invalidate isolationism.

Having explained the value of methodological pluralism in an intervention, the next step is to outline the strategy selected to define the multi-methodology approach used in this research, which also means the strategy of mixing methods in practice. According to Mingers (1997), the multi-methodology approach is based on understanding how individuals within an organisation interpret the world and collaborate among themselves. Mingers (2006) also argues that multi-methodology simply means employing more than one method or methodology in tackling some real-world problem. Three main rationales exist in favour of a multi-methodology approach: first, real-world phenomena are inevitably of a multidimensional nature; second, an intervention is not usually a single and discrete event, it is instead a process that unfolds in different phases with different tasks through time; third, combining different methods can provide the possibility of triangulating the information, thus providing more confidence in the research. However, Midgley (Mingers and Gill, 1997: 261) argues that "Most research

situations are perceived as sufficiently complex to warrant the use of a variety of methods. Therefore, it is more useful to think in terms of the design of methods than a simple choice between ‘off-the-shelf’ methodologies”. Because of the nature of this research, the researcher decided to use a multi-methodology approach due to research multidimensionality, the necessity of developing multi-methodology as a process and, finally, to support the results with a strong data analysis. This research also has followed the advice of Mingers and Gill (1997) when developing systemic interventions using a multi-methodological approach.

The concept of systemic intervention is defined by Midgley (2000) as an intervention that embodies the pursuit of the ideal of comprehensiveness, in which intervention means the implementation of the chosen methods; this systemic intervention is a purposeful action for improvement led by an agent to create change in relation to a reflection of boundaries. This intervention had to consider the following trinity: philosophy, methodology and practice. Within this context, the researcher aimed at using Midgley’s (1990, 2000, 2011, 2015) creative design of methods (CDM) to perform a systemic intervention. Petkov et al. (2008) argue that the concept of multi-methodology proposed by Mingers is quite similar to Midgley´s CDM. Even Mingers (2005) argues that his concept of multi-methodology is quite similar to Midgley's CDM.

Midgley (1990) presents CDM as one pluralist approach to mixing methods and that this approach involves the development and understanding of a problem situation in terms of a series of dynamic sets of systemically interrelated research questions expressing purposes for an intervention that evolves over time, each of which might need to be addressed using a different method or part of a method. The methodology that is finally designed is different from the sum of its parts. A synthesis is generated that allows each individual research question to be addressed as part of a whole system of questions. However, a synergy can be generated that allows a whole system of purposes to be addressed together. In order to generate purposes, a boundary critique becomes crucial. In choosing the appropriate methods in a particular situation, the agent needs to draw upon intuitive resources to consider various methods, purposes, principles, ideological assumptions and examples of past practice. The CDM also values interventionist learning (Midgley, 2000; Schön, 1991).

Using the above approach, a task can be conceptualised in relation to the research questions, each of which has a single context. In deciding an appropriate methodology, the researcher has to draw on working methods relevant to all the defined contexts. More often than not, the questions will be interrelated, so the working methods will have to reflect this through a systemic creative process of methodology design (Midgley, 1990). In recent works, Midgley et al. (2013) argue that it is necessary to find the relation between a particular method or set of methods in a context and particular purposes, giving rise to outcomes, all these elements need to be interrelated in a specific reflection on the use of methods. Midgley (2011: 8) also argues: “given that different theories inform different methodologies and methods, methodological pluralism (drawing upon methods from different paradigms) becomes philosophically justifiable alongside theoretical pluralism”.

Midgley (2011) further points out the value of embracing theoretical pluralism for systemic action research that draws upon more than one theoretical perspective to inform practice. The pluralist approach offers a unique openness and flexibility that are essential to grasp if the researcher wants to orientate methodology to research questions in a responsive manner, rather than letting a single method or theoretical perspective determine the questions it is able to answer (Midgley, 1990).

In summary, because of the nature of this research, the researcher needed to consider theoretical and methodological pluralism. To achieve this, the multi-methodology approach used was the creative design of methods in order to frame the systemic intervention for the research.

3.3.2.2 Core methodologies

Beer (1985, 1995) and others (Clemson, 1994; Espejo & Harden, 1989; Espejo & Reyes, 2011; Flood & Jackson, 1991; Hoverstadt, 2008; Jackson, 2000, 2003; Perez-Rios, 2012; Schwaninger, 2006a, 2006b) point out two modes of using the VSM: the ‘design’ mode, based on cybernetics principles to establish an organisational design to address complexity; and the ‘diagnostic’ mode, to assess

the system's viability. According to Espinosa and Walker (2011), the VSM is particularly useful when it is applied to social organisations in order to consider their viability, using the VSM to understand the organisation at different levels and reflect on any structural factors that affect its viability. Most applications of the VSM use it as a meta-language to represent complex (social) systems, usually by mapping and analysing their organisational patterns of interaction in order to assess the system's viability.

Espinosa and Walker (2011: 13) also state:

> With the VSM, Beer developed a language and tools which enable us to understand the structural invariance of living organisations co-evolving with their niche that is a prerequisite for their viability. The focus of the analysis is to observe the ability of the organisational system to handle the complexity of the tasks required to fulfil its purpose in the context of a highly complex changing environment.

Even though the VSM is a powerful approach when used as a meta-language to diagnose and design social organisations in order for them to be able to cope with complexity, the VSM itself does not suggest a learning cycle for understanding its use, adoption and means of improving organisations. When practitioners try to use the VSM, they need to develop their own methodology and apply it with an implicit or explicit learning cycle. Thus, the methodology for this research needed a complementary approach to enhance the learning process for managing complexity but focus on the intervention. Ultimately, systemic intervention, using a learning system as a vehicle, points to creating change by acting on real life.

In summary, to manage complexity in SMEs, it is necessary to follow two main approaches: one to develop a system's viability using the VSM and its principles; and one to develop a learning system in order to extend people's understanding of managing complexity

3.3.3 Complementary approaches

Midgley (2000: 173) states:

> The purpose of learning from other methodologies is therefore that reflections on the similarities with, and differences from, one's own ideas can enable the continued evolution of one's own methodology in a manner that enhances the conceptual basis with which interventions are planned.

The main purpose behind the use of complementary approaches is to cope with increasing complexity in the context of current SMEs challenges in such a way that these approaches help people to manage complexity on a daily basis. The main use of complementary approaches is at the level of methods; in other words, at the level of how to do things as daily activities.

The challenges facing SMEs presented in chapter 2 offer an opportunity to design a CDM to cope with increasing complexity in these types of enterprises. Midgley (2000) argues that a key leverage in a systemic intervention is the judgement on which points to choose for appropriate methods in a specific context. The challenges in SMEs suggest a specific context for intervention i.e., the need for: strategic agility to cope with increasing complexity, value innovation to drive differentiation in new markets, a business focus to execute the strategy, a focused environment in order to evolve with it, and focused Operations and a Meta-system in order to achieve the requisite variety.

As stated (Schön, 1991), a reflective practitioner can develop a strong degree of knowledge by considering the combined abilities that emerge from a personal process of reflecting upon knowing-in-action. Using this process of knowing and reflection in action, the researcher was able to group the complementary approaches into three types: strategy amplifiers, strategy attenuators and K+ sequences. Strategy amplifiers are complementary approaches whose purpose is to amplify the strategic possibilities for SMEs; using this rationale, the researcher selected strategic orchestration (Ruelas-Gossi, 2009; Ruelas-Gossi & Sull, 2006, 2010), which points to rethinking the business model and redefining the nature of the business, but thinking about an SME as a network and not as an isolated enterprise. The other strategy amplifier is the value innovation approach (Kim & Mauborgne, 2005), the purpose of which is related to expanding possibilities in a market which are based on differentiation.

On the other hand, strategy attenuators are useful in order to attenuate variety, but this is done based on the shared focus between people. Depending on their challenges, SMEs need to attenuate variety: when defining expected organisational performance, when selecting an environment, and when aligning efforts between team members. Thus, the researcher suggested the following four strategy attenuators. First, inspired by the theory of constraints (Dettmer, 1997; Goldratt, 1991, 1997), setting specific expected results would serve as a basis for evaluating business impact and its critical constraints. Second, in order to define the selected environment, the researcher suggested using again the value innovation approach (Kim & Mauborgne, 2005) and, third, business model generation (Osterwalder, 2004; Osterwalder & Pigneur, 2009), as both approaches are useful for identifying key aspects in an environment in order to establish the selected environment. Fourth, the researcher suggests strategy attenuators related to the Operations and Meta-system: the balanced scorecard approach (Kaplan & Norton, 1997, 2001) and the business process follow-up approach (Bossidy & Charan, 2002; Kerr et al., 2002), which should help team members to operationalise a strategy and follow-up the execution process. In addition, the researcher suggested K+ sequences, which are aimed at facilitating the learning process and adoption of some elements of the ModK+. These sequences are related to the training scheme, business levelling, system identity, system design (external and internal), and system focus. A brief summary of these complementary approaches is presented in Figure 34.

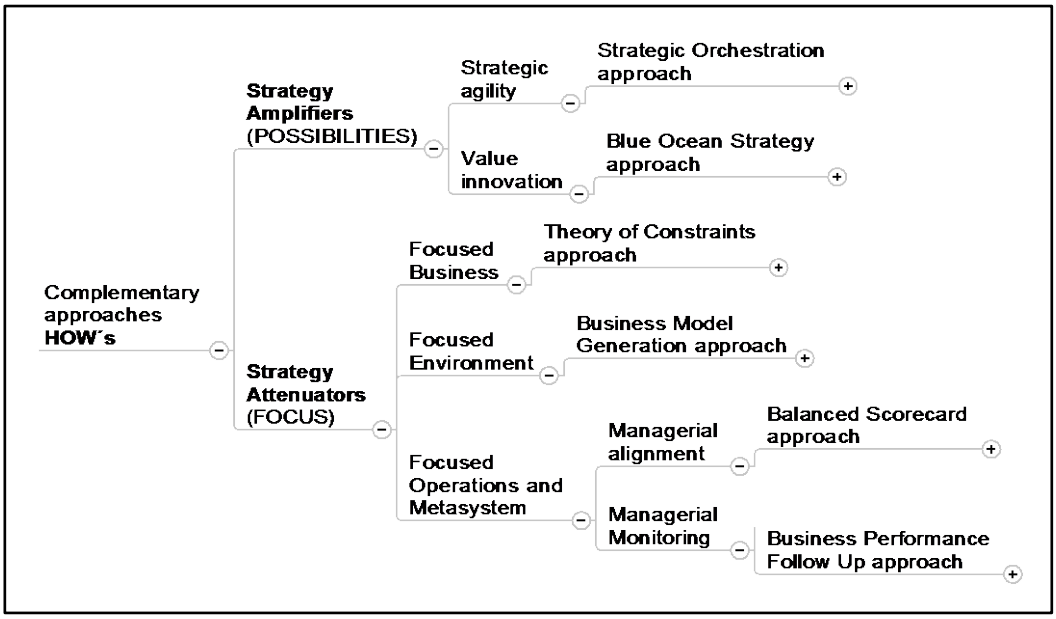


Figure 34: Summary of complementary approaches

All the above complementary approaches share the purpose of being able to face the challenges of SMEs and are suggested as part of the methods of the MetK+. In the following three sections, the researcher briefly explains the complementary approaches and identifies their foundations.

3.3.3.1 Strategic amplifiers

3.3.3.1.1 Strategic agility

Today, organisations such as SMEs need to reach the market more quickly, adapt to changing circumstances and reduce their invested capital (Ruelas-Gossi & Sull, 2010). In this scenario, following a strategic approach to addressing these challenges in SMEs became another key focal point for the research. The OECD (2010: 17) states:

> Collaboration is an important element in the strategies of innovative SMEs to overcome some of the barriers they face, including limited funding and the lack of management resources, technological competences, and adequate time horizons to invest in a long-term strategy.

Strategic approaches have evolved over time. In the past, the question of strategy was related to an improvement in efficiency within an established business model and having the power to do this. Strategy theories were egocentric: the starting point was the individual organisation that exists to create, capture and sustain economic value (Ruelas-Gossi, 2009). The new strategic question refers to becoming more agile with a new business model. The term ‘agility’ refers to making more with the same resources, either faster or better. Strategic agility refers to an organisation’s capacity to exploit, consistently, emergent opportunities, in a faster and more effective manner than its competitors (Ruelas-Gossi, 2009). This new paradigm is based on an allocentric orientation, with a broader perspective that incorporates the mindset as a network and not as an individual organisation (Ruelas-Gossi & Sull, 2010). Norman and Ramírez (1993) argue that organisations increasingly work in networks and offer bundles of products and services as a group.

Today, the art of creating and co-producing value with others is at the centre of any strategic approach. Within this allocentric arena, Ruelas-Gossi and Sull (2006, 2010) developed the strategic orchestration approach. The purpose of strategic orchestration is to pursue an opportunity, not by leveraging strategic power, but by assembling and managing a network of partners in a novel way to seize opportunities. Ruelas-Gossi and Sull (2010) also point out that this approach is helping companies in Latin America and other emerging regions to increase their strategic agility. The OECD (2012) also states that SMEs do not innovate by themselves but in collaboration with suppliers, customers, competitors, universities, research organisations and others, i.e., their networks help them to overcome some of the obstacles to innovation.

Strategic orchestration offers several advantages. First, the network is simple for the customer to use, thereby stimulating adoption. Second, while the network is simple to use, it is very difficult to copy because key partners are already involved. Finally, the organisation that orchestrates the network is in a good position to earn (Ruelas-Gossi & Sull, 2010). Strategic orchestration relies on four basic principles. First, identify and engage sophisticated nodes. Sophisticated nodes are those that require performance based on best practices, information and transparency, have high performance standards and can drive constant improvement. Second, adopt a lightweight focus on assets. Relying on partners can allow a company to minimise the resources needed and have the following advantages: it can minimise the possibility of losses, pursue more initiatives and ultimately reduce capital investment to enable increasing return on investment. Third, continue orchestrating: in unpredictable markets, possibilities must be re-evaluated consciously and continuously. Fourth, commit to transparency: building relationships with demanding clients, technology partners, investors and suppliers often requires an increased level of transparency (Ruelas-Gossi & Sull, 2006).

In summary, SMEs have the advantage of flexibility but the disadvantage of limited funds. Strategic orchestration helps to exploit advantage and minimise critical disadvantage in developing strategic agility. In addition, Ruelas-Gossi and Sull (2010) suggest that strategic orchestration allows organisations a prompt response to market demand, faster adaptation to changes in the environment,

and lower working capital allowing greater efficiency in taking advantage of market opportunities.

3.3.3.1.2 Value innovation

Considering that SMEs face a lack of funding and, at the same time, increasingly complex business environments around the world, the situation does not appear attractive. However, SMEs have the enormous strength of their flexibility in being able to explore new ways to face this complexity with fewer resources. This calls for finding novel approaches to compete and remain viable over time. Kim and Mauborgne (2005: 4) point out that “The only way to beat the competition is to stop trying to beat competition”. SMEs require a different approach that focuses on the capacity to create new market spaces.

Kim and Mauborgne (2005) developed a value innovation approach they called blue ocean strategy to develop the capacity to create new markets. They argue that the key defining feature of this approach is value innovation that is strongly linked to what customers value. Value innovation focuses on making the competition irrelevant by creating a leap in value for both customers and the organisation. Value innovation occurs when companies align innovation with utility, price and cost. The value innovation approach points to all the new market spaces not in existence today. This approach is characterised by the following: first, creating uncontested market spaces; second, making the competition irrelevant; third, creating and capturing new demand; fourth, breaking the value-cost trade-off; and fifth, aligning the whole system in pursuit of differentiation and low cost (Kim & Mauborgne, 2005). These features pursue highly profitable growth with strong focus and with only the necessary resources.

The value innovation approach is based on guiding principles for the successful formulation of strategy and principles that drive effective execution of strategy. There are four formulation principles. First principle: reconstruct market boundaries. Six Paths Frameworks exist to remake market boundaries, which require looking across to: alternative industries, the strategic groups within industries, the chain of buyers-purchasers-influencers, complementary product and service offerings before-during-after, functional or emotional rationale/price

or related to feelings, and finally looking across time to external trends. Second principle: focus on the big picture, not on numbers, by mainly using a value curve as a key tool for this approach that considers three systemic elements: first, it shows the strategic profile of an industry by depicting the main factors that affect competition; second, it also shows the strategic profile of current and potential competitors identifying which factors are relevant; and third, it shows the organisation's strategic profile or value curve. Third principle: reach beyond existing demand by aggregating the greatest demand for a new offering. This principle reduces the risk associated with developing a new market. To achieve this, organisations focus on two strategies in taking a reverse course: first, instead of focusing on customers, the organisation needs to look at non-customers; and second, instead of concentrating on customer differences, the organisation needs to examine the powerful commonalities in what buyers value. Fourth principle: obtain a strategic sequence. Organisations need to build their strategy by following the right sequence through four stages; first, the organisation needs to work in order to ensure that it brings exceptional buyer utility; second, the organisation needs to find a price that could attract the mass of target buyers; third, the organisation must review the target cost to sustain a healthy profit margin in order to create value for itself; fourth, this final stage relates to adoption among the main stakeholders: employees, business partners and the general public.

There are two execution principles. The first principle states: overcome key organisational obstacles. To achieve new markets with a value innovation strategy, leaders need to focus on people, acts and activities that exert a disproportionate influence on performance to stimulate voluntary execution driven by people’s free will. In using this approach, there are four main obstacles to face (Kim & Mauborgne, 2005): the first obstacle is cognitive, and leaders need to make people aware of the need for a strategic shift and to agree on its causes; the second obstacle is a limitation of resources but, instead of focusing on acquiring more resources, leaders concentrate on multiplying the value of the ones they currently have; the third obstacle is unmotivated staff; the fourth obstacle is opposition from powerful vested interests. The second principle states: build execution into strategy. People are required to step out of their comfort zones and change old paradigms. In order to increase trust and

commitment, the key variable is a fair process that has three mutually reinforcing elements: engagement, explanation and expectation clarity.

3.3.3.2 Strategic attenuators

3.3.3.2.1 Focused business

To develop focused improvement efforts, the researcher selected the theory of constraints (TOC) because it is based on finding the weakest link and strengthening it to the benefit of the whole system. TOC is a thinking process that enables people to invent simple solutions to seemingly complex problems. TOC is also a new management paradigm that views any manageable system as being limited by a very small number of constraints in achieving its goals. TOC uses a focusing process to identify each main constraint over time and restructure the rest of the organisation around it. A constraint is anything that limits a system in achieving a higher performance; that is, a factor that limits a system from doing more of whatever it is capable of doing (Bates, 2013).

In order to concentrate improvement efforts on the main constraint in a way that is capable of producing the most positive impact on the overall system, Goldratt (1997) recommends taking the following five steps: first, identify the system's constraint; second, decide the approach to use to exploit this constraint; third, subordinate and synchronise everything else to the previous decision i.e., adjust the rest of the system to enhance the constraint so that it then operates with maximum effectiveness; fourth, elevate the performance of the constraint by doing whatever is necessary to eliminate constraint; and fifth, go back to the first step and look for the next main constraint.

According to Dettmer (1997) TOC also considers certain principles in its philosophy. These principles can be organised into three groups. First group with five principles related to the systems approach: systems thinking is preferable to analytical thinking in managing change and solving problems; knowing what to change requires deep understanding of the system’s current reality; an optimal system solution deteriorates over time as the system’s environment changes; a process of ongoing improvement is required; and the optimum performance of a

system as a whole is not the same as the sum of all the local optima (Ackoff, 2006). Second group, with three principles, is related to systems as chains: systems are analogous to chains, as each system has a weakest link or a constraint that ultimately limits the whole chain; strengthening any link in a chain other than the weakest does nothing to improve the strength of the whole chain; and system constraints can be either physical or relate to policy. Third group with five principles associated with undesirable effects and core problems: most of the undesirable effects within a system are caused by a few core problems; core problems are almost never superficially apparent, they manifest through a number of undesirable effects; elimination of individual undesirable effects gives a false sense of security while ignoring the underlying core problem; core problems are usually perpetuated by a hidden or underlying conflict; and inertia is the worst enemy of an ongoing improvement process. These principles are related directly to the research because, in essence, all of them are related to the systems approach: their basis lies in seeing the system as a chain. Goldratt (1991) argues that the TOC focuses on identifying those elements in a value chain that limit the overall performance of Operations; attention to which allows us to amplify the capacity of the system.

3.3.3.2.2 Focused environment

Beer (1995) states the importance of coupling the relation between Operations and Environment and that it is necessary to understand this relation systemically for effective management. For this reason, the researcher considered the business model generation (BMG) developed by Osterwalder and Pigneur (2009) a valuable and fundamental tool for setting this relation. Osterwalder (2004) suggests that BMG describes the rationale for how an organisation creates, delivers, and captures value and the ontology of this BMG is a set of elements and their relationships that aim at describing the money-earning logic of an organisation.

BMG can best be described through nine basic building blocks grouped in four arenas. In order to understand the ontology behind BMG, it is necessary to consider these four arenas: first, the Product arena, to identify what business the organisation is in and the products and value propositions offered to the market;

second, the Customer Interface arena, to seek who the organisation's target customers are, how it delivers its products and services to them, and how it builds a strong relationships with them; third, the Infrastructure Management arena, to answer how efficiently the organisation performs infrastructural or logistical issues, with whom, and as what kind of network enterprise; fourth, the Financial Aspects arena, to address what is the revenue model, the cost structure and the business model for sustainability (Osterwalder & Pigneur, 2009).

In the Product arena, one basic block is considered: Value Proposition, which describes the bundle of products and services that create value for a specific customer segment. In the Customer Interface arena, three basic blocks are included: first, Customer Segments, which are the different groups of people or organisations an enterprise aims to reach and serve; second, Channels Value, which describes how an organisation communicates with and reaches its Customer Segments to deliver a Value Proposition; and third, Customer relationships, which represents the types of relationships an organisation establishes with specific Customer Segments. In the Infrastructure Management arena, another three basic blocks are considered: first, Key Resources, which describes the most important assets required to make a business model work; second, Key Activities, which shows the most important things an organisation must do to make its business model work; and third, Key Partnerships, which presents the network of suppliers and partners that make the business model work. Finally, the last two basic blocks are included in the Financial Aspects arena: first, Cost Structure, which describes all the costs incurred to operate a business model; and second, Revenue Streams, which represents the cash an organisation generates from each Customer Segment (Osterwalder & Pigneur, 2009). The Customer Interface arena and its blocks are related to value management and the Infrastructure Arena and its blocks to efficiency management. For the purpose of this research, the Infrastructure Arena was addressed using the previous Focus Improvement and Value Added approaches. For this research, the real value of BMG lies in the Customer Interface arena because it is necessary for SMEs to find a structured way to work with the environment selected.

Each of the three blocks of the Customer Interface arena has a very specific approach to mapping and understanding the relation between Operations and the Environment (Osterwalder & Pigneur, 2009). The Customer Segments block is reviewed through five different types: mass market, niche market, and segmented, diversified and multi-sided markets. The Channels Value block is reviewed through five types: sales force, web sales, own stores, partner stores and wholesalers; and through five phases: awareness, evaluation, purchase, delivery and after-sales. Finally, the Customer Relationships block is evaluated using six categories: personal assistance, dedicated personal assistance, self-service, automated service, communities, and co-creation with the customers (Guzman, 2012).

3.3.3.2.3 Focused Operations and Meta-system

Managerial alignment

As a consequence of lack of funding, the alignment and focus of all the efforts in the whole system should be a critical aspect for SMEs. The Model K+ needs to focus on the way that SMEs maintain a strong alignment between managerial and operational efforts.

A complementary approach considered to align efforts was the balanced scorecard (Kaplan & Norton, 1997). When change was incremental, managers could use slow-reacting and tactical management control systems, such as budgets, but these systems were designed for 19th- and early- 20th-century industrial organisations and are inadequate for today's dynamic, rapidly changing environment. However, many organisations continue to use them. Organisations need a new kind of management system: one explicitly designed to manage strategy, not tactics. On the other hand, a study on managers revealed that the ability to execute a strategy was more important than the quality of the strategy (Kaplan & Norton, 2001). Another survey of management consultants in the early 1980s also reported that less than 10% of effectively formulated strategies were successfully implemented. This failure rate supports the conclusion that execution is more important than good vision and strategy (Kaplan & Norton, 2001).

The balanced scorecard (BSC) is a strategic management approach that enables an organisation to clarify its vision and strategy and translate them into operational and practical elements. The BSC uses a logic: skilled, empowered employees will improve the ways they work in the process, improvements to work processes will lead to increased customer satisfaction, which will ultimately lead to better financial results. The employees' knowledge and skills are the foundation for all innovation and improvements. Based on this logic, the BSC provides a framework to consider a strategy used for value creation through four different perspectives: first, from the financial perspective, a strategy for growth, profitability, and risk is viewed from the shareholder perspective, thus the outcome is the satisfaction of shareholders; second, from the customer perspective, the strategy for creating value and differentiation is viewed from the customers' side, thus the outcome is the satisfaction of customers; third, the internal business processes perspective seeks the strategic priorities for the various business processes, which creates customer and shareholder satisfaction, thus the outcome is effective processes; and fourth, the learning and growth perspective focuses on the priorities for creating a climate that supports organisational change, innovation, and growth, thus the outcome is a motivated and prepared workforce (Kaplan & Norton, 2001).

The BSC allows strategy operationalisation defined by integrating five levels of detail to focus efforts on organisation: strategic vision, strategic themes, strategic objectives, strategic goals/indicators and strategic projects (Kaplan & Norton, 1997). Kaplan and Norton (2001) maintain that, in order to develop a strategy-focused organisation, five principles must be considered. First, it is necessary to translate the strategy in operational terms in order to create a shared and understandable point of reference for all; second, it is necessary to align the whole of the organisation to the shared strategy; third, the organisation needs to make the strategy everyone's everyday job in order to understand the personal contribution to the success of that strategy; fourth, it is necessary to make the strategy a continuous double loop process: one that integrates the management of tactics and of strategy and another process for learning and adapting the strategy evolved; and fifth, mobilising change through executive leadership in order to achieve the required ownership and active involvement.

Strictly speaking, the BSC is a tool for strategy implementation. When used by organisations that already have an explicit strategy, the BSC can help them implement their strategy faster and more effectively by following the above principles and guidelines (Kaplan & Norton, 2001).

In today's continuously changing environment, alignment and focus are necessary to create breakthrough performance in any organisation. A well-crafted and well-understood strategy can, through alignment and coherence of an SME's limited resources, produce a performance breakthrough (Kaplan & Norton, 2001).

Kaplan and Norton (2001: 370) also argue that

> the key issue for any organisation, regardless of size, is the alignment of individuals and processes to the strategy. Small companies as well as large benefit from having everyone understand the strategy and implementing it in his or her everyday job.

In summary, due to lack of funding, the alignment and focus of all efforts should be a critical aspect for SMEs. Thus, for this research, this strategy-focused organisation approach was mainly used to align improvements between SME's members.

Managerial follow-up

Systemic monitoring was developed using the business process follow-up (BPF) (Guizar, 1998; Escobedo, 1998). In essence, this model is based on dividing the year into four quartiles of 13 weeks each. In each quartile, the first week is used to review and adjust a strategy. There are 11 weeks of pure execution and week 12 is for assessing in depth the progress of the system and analysing whatever is necessary to rethink/adjust the strategy in order to start the cycle again the following week (Kerr et al., 2002).

This follow-up was based, for the execution of its activities, on a series of coordinated meetings with the team to operate the follow-up process at the three

levels of strategic thinking and focused on the achievement of the intended results.

3.3.3.3 K+ sequences

The VSM and its principles are very useful in the world of thought (Checkland, 1999) and in the conceptual world as a guide. However, in practice, novices need a ‘bridge’ to apply it. The length of the bridge is related to the necessary experience to apply the VSM in practice. Even the VSM and its principles are difficult to apply for people related to the systems thinking world and much more for novices in cybernetics in an SME (Espinosa, 2015a).

In order for novices to apply the VSM and its principles, the researcher developed different enablers to help the learning process. These enablers are called ‘sequences’ and are aimed at offering a tool for building a bridge between the VSM and daily practice. Based on Schön (1991), and using the researcher’s experience, sequences were suggested to help people achieve a concrete experience with certain principles when applying them in practice. The sequences were used in different phases of the MetK+.

Throughout the MetK+, the researcher explained each step in detail. The purpose of this amount of detail was to help people gain an accurate idea of ‘how’ to perform each step of the MetK+. However, although each short step seeks the same purpose, a few of these processes, using the following sequences, played a key role in the learning cycle. The researcher tried to facilitate the adoption of the MetK+ using the following sequences because they represent flows to guide the discussion between the people involved by using the sequence to facilitate dialogue. In order to follow the sequence, the reader needs to follow the arrows: one step leads to the next.

1. Context:
    a. K+ Training sequence:
    Coaching approach → Teamwork → Managing Complexity → Intervention practical approach.

2. Meaning phase:

    a. K+ Value System sequence:

    Shared definition of value → Personal values → Values recognised by others → Personal Values Integration → Organisation's Values Integration (OVI) → Comparison between OVI and current values → Definition of the organisation's value system.

    b. K+ System Purpose sequence:

    Customer → Actors → Suppliers → Business partners → Community → Owners.

    c. K+ System Identity sequence:

    Products/Services (Outputs) → Customers → Transformation processes → Inputs → Suppliers → Operations actors → Meta-system actors → Competitors → Business partners → Regulatory entities.

3. Understanding phase:

    a. K+ Organisational Distinctions sequence:

    Products/Services (Outputs) with highest throughput → Customer Segments based on throughput → Transformation processes with bottlenecks → Inputs, according to impact on cost → Suppliers, according to impact on cost → Operations actors → Meta-system actors (S3, S2, S3* and S4) → Owners of the system (S5) → Competitors, according to market share → Government entities → Business partners, based on the network.

4. Focusing phase:

    a. K+ Environment Design sequence:

    Problem situation review → Reviewing other approaches → Product-service analysis → Customers/type-segments analysis → Convenience criteria definition → Value proposition analysis → Sales quota definition → Customer base review → Competitors analysis → Business partners review → Government entities review.

    b. K+ Operations Design sequence:

Problematical situation review → VSM principles analysis → Environment design review → Attenuators and amplifiers review → Organisational design, roles and responsibilities update → Indicators review → Communication channels review → Interaction rules update → Anti-oscillatory mechanisms analysis.

c. K+ Meta-system Design sequence:
Problematical situation review → VSM principles analysis → Environment design review → Attenuators and amplifiers review → Operations design review → Organisational design review → Meta-system roles and responsibilities update → Indicators review → Communication channels review → Interaction rules update.

d. K+ Organisational Alignment sequence:
Strategic objectives and strategies → vision; and from strategic objectives → goals and indicators; finally, from strategic objectives → integrating and validating projects and critical processes.

The researcher used the above sequence as a method for facilitating people's greater understanding of 'how' to perform different key aspects of the MetK+.

3.3.3.4 Summary

Figure 35 presents a summary of all the elements considered to frame the MetK+: the two pillars for the organisational cybernetics and the learning system, the selected strategic amplifiers and strategic attenuators and, finally, the K+ sequences.

The MetK+ needed to integrate the two pillars and all the complementary approaches in a framework that would be the foundation for the systemic intervention in an SME in order to manage complexity as an ongoing process.

3.3.4 The Methodology K+

In this section, the researcher presents the process followed for building the MetK+. The researcher first reviews in depth the selected multi-methodology, followed by a definition of the framework considered in order to build the MetK+ using the CDM approach and, finally, how the researcher deployed the full MetK+ for implementation in practice.

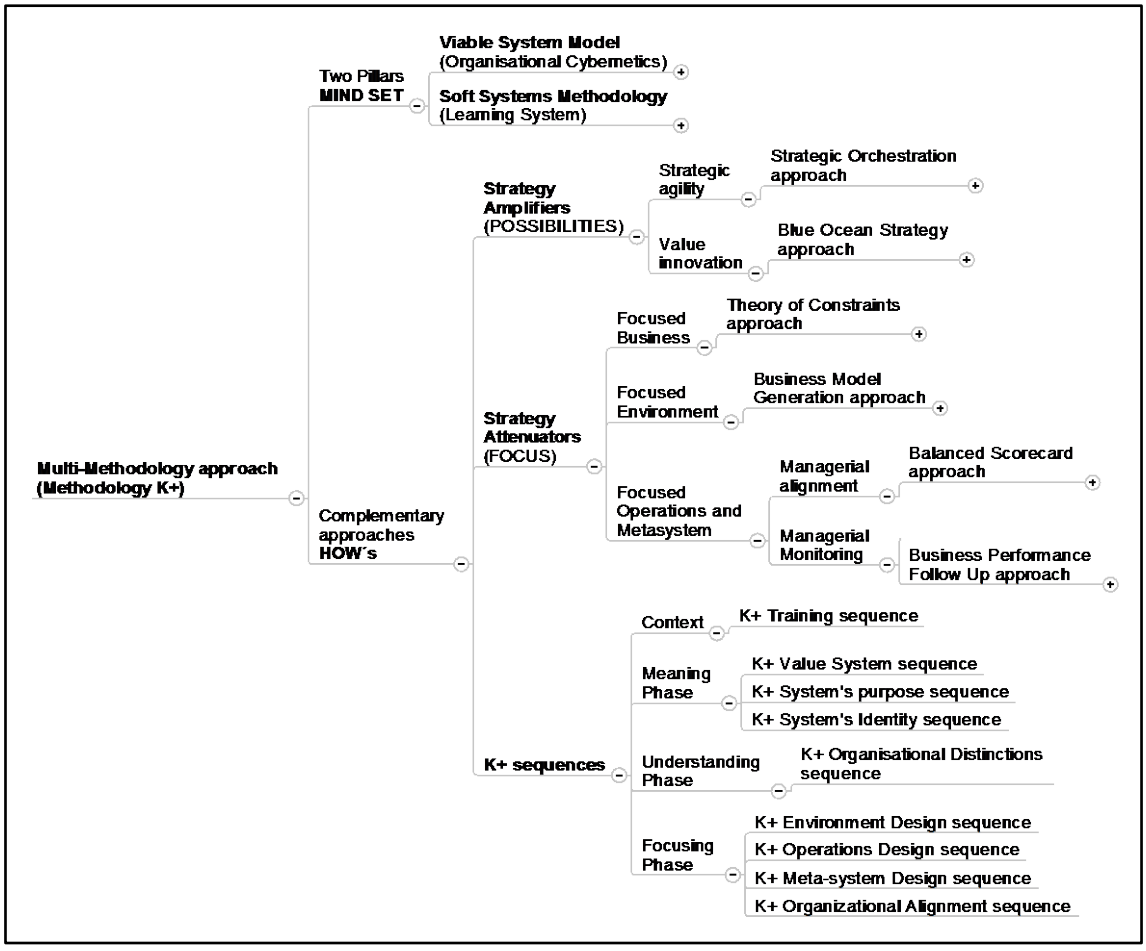


Figure 35: Multi-methodology approach of the MetK+

3.3.4.1 The creative design of methods

In this section, the researcher presents the main aspects considered when using the CDM to frame the MetK+. Midgley (1990, 2000, 2011, 2015), as the founder of this approach, refers to the following aspects when working with the CDM. The CDM does not simply seek to align systems methodologies with their most appropriate contexts of application; it also selects, designs and mixes the

methods. In the CDM, methods are drawn from other methodologies and interpreted through the intervener's own methodology, because the CDM involves understanding the situation in which an agent wishes to intervene in terms of a series of systemically interrelated questions, expressing the agent's purposes for the intervention. Each purpose might need to be addressed using a different method, or part of a method. Purposes are not necessarily determined in advance, but may evolve as events unfold and understanding of the situation develops i.e., the interventions take place over time and different purposes may emerge at different 'moments' through the process. The concept of time is, therefore, crucial to the CDM. The methods that are finally designed are often different from the sum of their parts. The key point is to build a whole system of an interrelated set of purposes through a synergy of different methods. In the CDM approach it is possible to identify two different types of question expressing purposes which guide the design of methods: boundary questions and issue-related questions, leading to the design of methods.

Midgley (2000: 241) states: "The CDM involves the development of a dynamic set of interrelated questions expressing purposes for the intervention that evolve over time each of which might need to be addressed using a different method or a part of a method". The focus is on purposes expressed in questions: How have they arrived at local situations? Why are they important to agents? And how are they pursued in terms of the choice and/or design of methods?

When applying the CDM, the intervener must consider a set of questions that express the purposes for choosing a method (or synergy of methods) that will help to realise such purposes. It is also possible to draw upon one's intuitive knowledge and/or reflect on a variety of aspects to the methods (Midgley, 2000), such as their stated purposes, the methodological principles associated with them, the theories and principles behind their development, and the ways in which they have been used in past practice by a practitioner. Schön (1991) and Midgley (2000) argue that observations of the past practical experiences of different methods can be valuable in selecting and mixing the right methods for a particular intervention. It is strongly recommended to articulate the purposes through the questions rather than the questions themselves.

3.3.4.2 The framework

It is important to emphasise that the MetK+ for the intervention points to the adoption of a learning process in order to improve SMEs' management of complexity. As it was stated a process is a logical sequence of activities related through steps or stages to convert inputs into outputs or results. Methodology points to the guidelines and principles behind methods and these facilitate learning as an ongoing business process.

From the above relation between methodology-method-process, and in order to answer the research questions, the researcher focused on developing the methodology and its framework to implement organisational cybernetics. If the key point is to manage complexity as an ongoing business process, this process requires systemic understanding of the selected approach (ModK+) and a logic sequence of stages (MetK+) in order to adopt it easily. However, Midgley et al. (2013: 3) emphasise that "It is widely accepted that the 'success' or 'failure' of a method in any particular case results from use of the method-in-context and cannot be attributed to the method alone". In developing the MetK+, a key aspect to be considered was the context in which the intervention would be deployed in practice.

In order to frame the MetK+ for the intervention in practice, the researcher needed to explore the structure of the frame. As already stated, some authors (Avison & Fitzgerald, 2006; Checkland, 1999; Midgley, 1990, 2000, 2011, 2015; Mingers & Brocklesby, 1997; Mingers, 2000, 2001, 2005; Oliga, 1988; Skyrme, 1997) consider a methodology as a guide, which drives methods, processes, procedures, techniques and tools that can be used in dealing with a problematical situation. All these different levels of intervention are framed in a methodology. According to Avison and Fitzgerald (2006), a methodology consists of phases, themselves consisting of sub-phases, which will guide the choice of technique that might be appropriate at each stage.

Thus, the researcher needed to define the different levels that correspond to the levels of the embedded knowledge: from the methodology to the tools through to the methods, procedures, and techniques. When consulting *Oxford Dictionaries* (2015), the researcher found the following definitions of the different levels. A

stage is a point, period, or step in a process or development. A phase is a distinct period in a process of change or forming part of something's development. A theme is the subject of a talk, piece of writing, exhibition, etc. Thus, for this research, a stage represents a period in the intervention process in which are embedded different phases as periods in the process of learning. A sub-phase represents a sub-level in the same process of learning and a theme represents the last level of the structure of the MetK+. The structure of the intervention considers that the corresponding phases, sub-phases and themes are embedded at every stage (first, second and third levels, respectively).

The structure of the MetK+ was developed under the following guidelines relating to the CDM approach used: the level of a stage simply demarks a period in the intervention and distinguishes the main moments of the intervention process; the first level of a phase is addressed only from the methodological point of view as a framework for all the content that it contains. Following the CDM at the phase level, the researcher addressed three aspects: introduction, objective and sub-phases. The three key aspects of the CDM, context - question - purpose, will be addressed in the second level of the sub-phases. Thus, each sub-phase will describe the following: the specific context of the company; the objective in the company, which includes both the research question it is intended to answer and the purpose of the sub-phase; and finally, the themes that articulate each sub-phase. Activities and methods are deployed at the third level of the themes. In summary, each stage contains phases which in turn include corresponding sub-phases, and each sub-phase integrates the corresponding themes. This structure is represented in Figure 36.

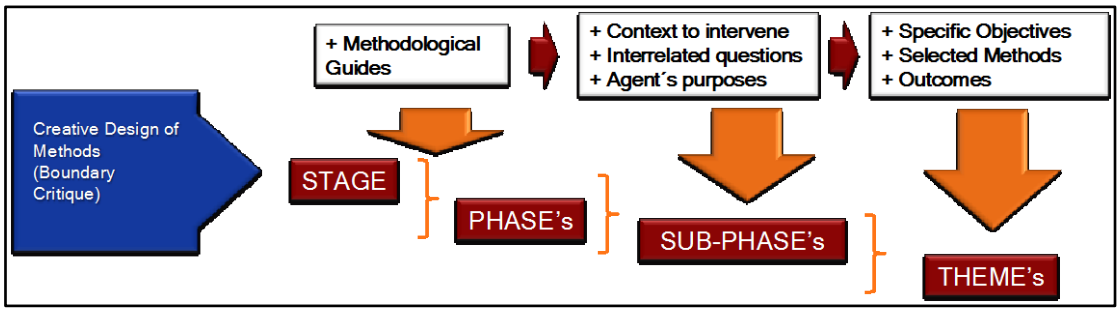


Figure 36: Summary of the levels of the intervention in the MetK+

3.3.4.3 The Integration

According to Midgley (2000), an intervention is the implementation of chosen methods. An intervention is a planned and purposeful change whereby an intervener predetermines the outcome; thus, the intervener has an authoritative position in relation to others. A systemic intervention is a purposeful action with an expected effect but which is only useful in a local context. The effect of this action seeks improvement, which needs to be defined temporarily and locally by agents to create a change in response to reflection upon the boundaries of a problematical situation. The MetK+ enhances a learning system to improve the management of complexity in a specific context in SMEs. However, and based on onto-epistemology, the methodology for this intervention needed to consider a deep understanding of the organisational culture or 'ground' which shapes the behaviour of the people involved i.e., this is not only about how to apply organisational cybernetics, but also how to enhance adoption of this approach in the current 'ground'. Using the above framework, the researcher identified three main stages for the intervention: Preparation, Organisational Levelling and the Managing Complexity Process. In the following sections, the researcher develops each stage, along with its phases and sub-phases, in order to present these levels in framing the MetK+ for the intervention.

In the Preparation stage, the purposes were to build a strong relation with the SME and to understand the initial context i.e., the 'ground' for this SME. This first stage is composed of two phases, Relationship and Context, in order to address the above-stated purposes. With regard to the Relationship phase, some authors (Checkland, 1981; Espinosa & Walker, 2013; Midgley, 2000) argue the need to work closely with an organisation in its present key challenges and, through these challenges, develop the research in the field. Therefore, from the very beginning of the intervention, the researcher considered strengthening the organisation-researcher relationship as a key element by fostering greater mutual confidence. This confidence must be based on a clear understanding of the various aspects it is necessary to share in order to achieve an intervention with a high probability of mutual benefit (Franco, 2006). In that sense, the overall objective of this phase is to strengthen confidence through mutual understanding, which will serve as a

basis for formalising all necessary agreements to carry out useful and enriching action research for both parties and always to look for mutually effective dialogue. For this phase, the following specific targets are pursued: first, the organisation and the researcher foster a climate of confidence based on clear and open communication; second, formalisation of the commitment and willingness of everyone involved in the process; and formalisation and a shared understanding of the scope of the research in order to narrow expectations to both parties. To achieve these targets, there are three sub-phases in the Relationship phase: Engagement, Formal Agreements and Agreed Scope.

In the first stage and in the second Context phase, it is necessary to remember that a systemic intervention seeks to implement actions for improvement, developed by an agent, to promote a change (Midgley, 2000). In action research, the researcher plays a key role in developing the change, but the organisation's leaders also become key actors in the change. However, it is also the case that the research process starts from two different platforms or backgrounds: from the researcher and from the leaders in the organisation; thus, it is necessary for them to share their perspectives in order to evolve as a change team (Franco, 20006). For this reason, the organisation and the researcher needed to share a starting point: it was necessary for the researcher to deepen his exploration of the organisational context, to allow him greater understanding of the perceived reality in the organisation; it was also necessary for the organisation's leaders to understand, in greater depth, the mindset behind the MetK+ and the intervention.

In this phase, the aim is to understand and share, as a change team, the necessary organisational and methodological contexts to implement a systemic intervention. There are three specific objectives within this phase: identification of the internal leader team that will have the main responsibility for the change process; the leader team needs to understand the foundations of the systemic intervention to be made through basic training; and the researcher needs to have an in-depth understanding of the context of the research in the organisation. In order to achieve these objectives, the following sub-phases were developed: Leader Team, Team Awareness and Researcher Awareness.

The second stage of Organisational Levelling is optional. In this stage, the MetK+ has just one phase: Levelling. Based on the analysis of the firm life-cycle theory (Adizes, 1992, 1994, 1999; Lipi 2013; Pereneyi et al., 2011), the researcher included this optional stage in the intervention. The Levelling phase is carried out just in the case that it is necessary, which depends on the level of risk with which the 'short-term viability' of the system-in-focus is threatened. Such viability is significantly influenced by cash flow and the ability to generate demand (Lewis & Churchill, 1983). Padilla (2014) maintains that what the blood means to the human body, the cash flow is for the organisation. This phrase is used to magnify one of the critical variables of SMEs (Palacios, 1998): cash flow. Cash flow is based, in general terms, on the management of two major variables: income and expenses. In terms of the TOC (Goldratt, 1991, 2009), the basis of the two business variables used in the ModK+ is translated principally at the relation between throughput or real income to the system and its operational expenses. The break-even point is the minimum necessary cash flow for income to cover minimal expenses.

In the survival life-cycle, there are at least two major scenarios for the management of cash flow. In the first scenario, a healthy cash flow allows an organisation to focus on development and growth. In the second scenario, an organisation that is not capable of at least achieving break-even focuses on survival, with a much greater level of risk (Adizes, 1992, 1994, 1999; Lipi 2013; Pereneyi et al., 2011). On the other hand, if an organisation does not generate enough demand, this is translated into an inability to generate income and, when it is no longer possible to reduce costs to break even, the organisation is faced with being unviable in the short-term. Even if the organisation obtains the economic resources to finance its operations, its inability to generate demand will render such resources useless, since the organisation might not be viable in the short term and will be much less so in the future (Lewis & Churchill, 1983). Without enough demand, the organisation will be at major risk and is destined only to consume 'new' resources but without the ability to generate enough income to continue its operations. An organisation that is consistently unable to reach even its break-even point and sufficient demand to achieve this is in a critical condition and facing a high level of risk. On the other hand, it should be clarified that the researcher uses the term 'levelling', to describe the process

through which an organisation shifts from a condition of survival to one in which it searches for growth and sustainable development. The target of this phase is then to level the performance of the organisation, which means raising or solving those critical constraints that prevent it from generating demand and/or achieving break-even in order to be viable in the short term (Lewis & Churchill, 1983). Two specific objectives are pursued in this phase: to identify the critical constraints that prevent the organisation from being viable in the short term, and to develop the necessary actions to reverse or level such constraints. Thus, this phase includes two sub-phases: Critical Constraints and System Levelling.

In the last stage, the Managing Complexity Process is where the researcher will apply the ModK+ in the field. This stage deploys the four phases previously described in sections 3.2.2.5 and 3.2.2.6. The first three levels (stage, phase and sub-phase) of the intervention are presented in the summary in Figure 37.

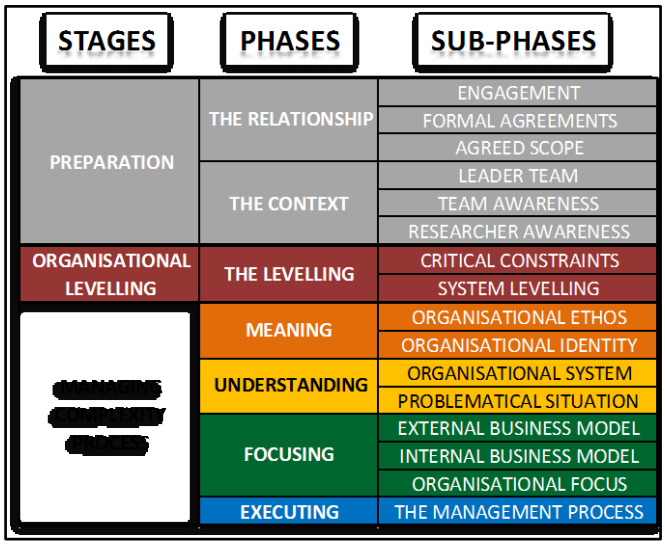


Figure 37: First three levels of the MetK+

All the above phases and sub-phases are presented in combination with the ModK+ in Figure 38, which presents the whole of the MetK+ (blue perimeter) and includes the three stages (Preparation, Organisational Levelling and the Managing Complexity Process) using the ModK+. All the sub-phases are presented using rectangles which correspond to each phase and use the same colour. As explained, the Preparation and Levelling phases are developed prior to the Managing Complexity Process. It is important to state that the Levelling

stage uses the same ModK+ in the rationale behind deploying this stage, which is why a small representation of the ModK+ is shown within this stage.

The MetK+ for the intervention was the foundation for the design of the whole intervention, as detailed in the following section.

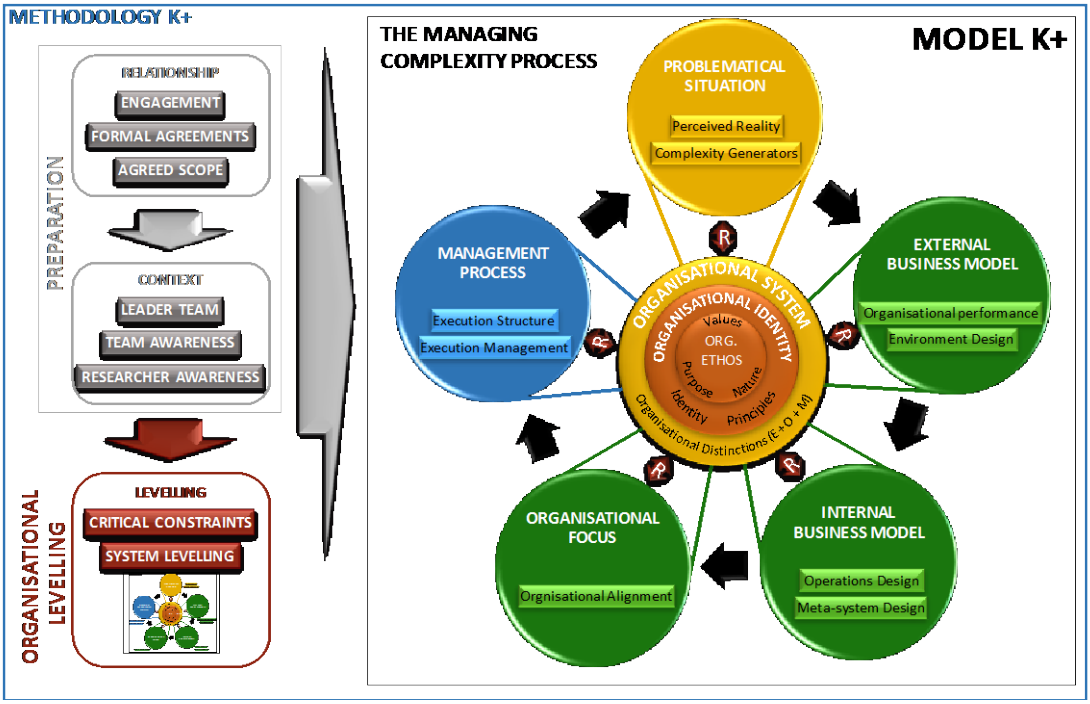


Figure 38: Methodology K+ for the intervention

3.3.5 The implementation

3.3.5.1 The chosen methods

According to the CDM, the methods chosen must address a specific context and circumstances and are part of the research design for an intervention. As stated earlier, the fourth and last level of the MetK+ are its themes and it is at this level that the researcher will apply different methods, techniques and tools using the methodological guidelines (stages, phases and sub-phases).

However, Midgley (2000) argues that, practically speaking, and in order to get from a set of questions expressing the agent's purposes to methods that will help realise these purposes, it is possible to draw upon the researcher's intuitive knowledge to reflect on possible methods. Midgley (2000: 228) also argues that

> students of systemic intervention might feel less daunted by the prospect of practising if they are encouraged to value their own intuition as an important resource; if the exploration of theory comes to be seen as a means to enhance learning to improve the individual's intuitive resource for the future, then theory will be perceived as less divorced from practice than is currently the case for many interveners, when people make mistakes based on erroneous intuitive judgement, they will be less likely to attempt to hide them with rational justifications.

On the other hand, Schön (1991) argues that systematic knowledge that is based on a profession has four essential properties: it is specialised, firmly bounded, scientific, and standardised. It is also possible to select methods using the process of knowing-reflecting in action. The researcher, as one agent in creating change using a systemic intervention, looked to his knowing-reflecting in action and his intuition in order to choose methods that would best suit the specific challenges of SMEs. In previous sections (3.3.2, 3.3.3 and 3.3.4) the researcher implicitly introduced the methods to be used. In Figure 39, he shows them explicitly and in relation to each sub-phase. In Figure 39, the researcher also shows all four levels of the MetK+ for the intervention.

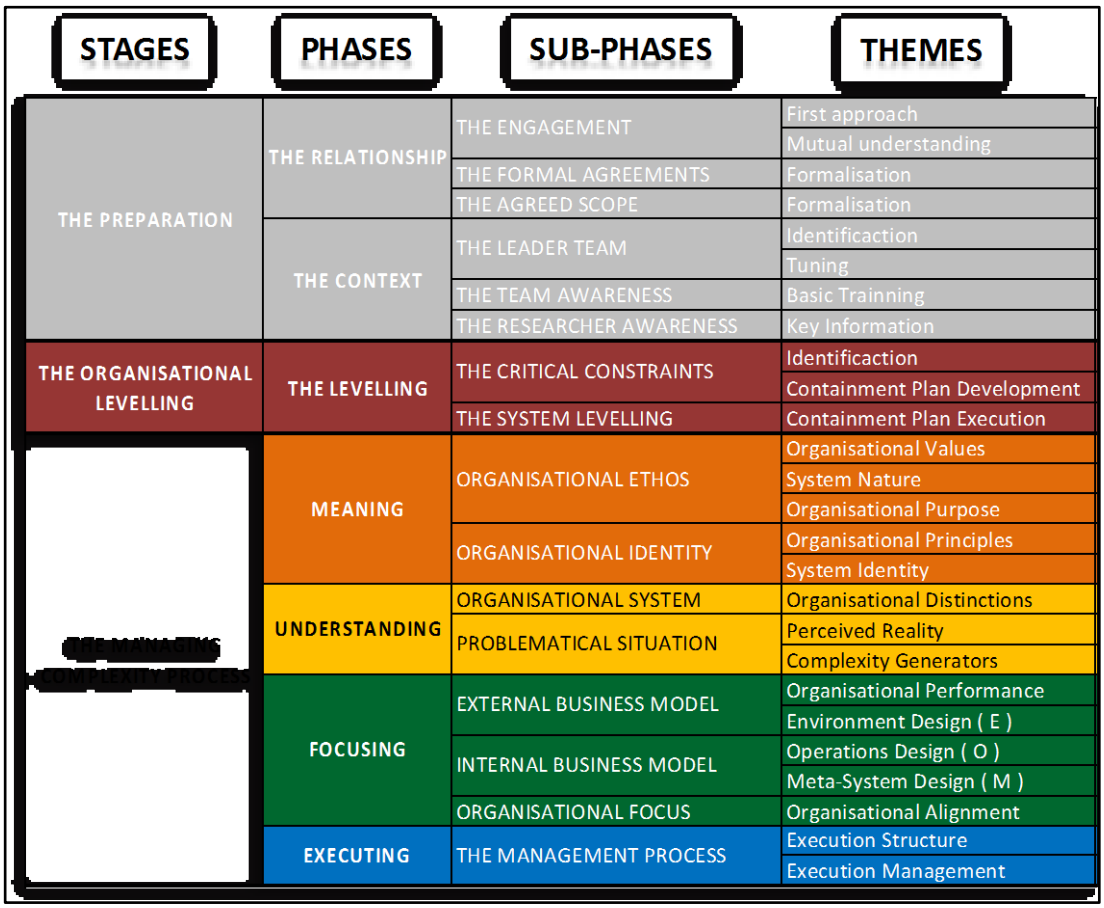


Figure 39: The four levels of the MetK+ for the intervention

The following aspects were developed for each theme: an introduction or specific context in the selected SME; specific objectives; activities to be deployed using methods, tools and techniques; and the outcomes. As all these themes are related to a specific context, they are all detailed through the case study in the practice of the intervention.

3.3.5.2 The intervention matrix

A research design is a logical plan for getting from the research questions to the conclusions (Yin, 2009). In order to establish a logical sequence to develop the intervention in practice, the researcher developed an intervention matrix that includes all the levels (stage, phase, sub-phase and theme) and which also includes at the theme level: main inputs, main activities, techniques, participants, main outputs, evidence, dates, activities and the duration of each one. Figure 40 provides just an illustrative overview of the full intervention matrix. The reader can review Table 30 that presents the Preparation stage of this matrix as a real example (red box of this figure).

The colours in Figure 40 correspond to the colours used for the four building blocks of the ModK+: Meaning, Understanding, Focusing and Executing. Because a key element of the MetK+ is the learning process behind the systemic intervention, the researcher included eight specific ‘moments’ for reflection with the participants throughout the intervention process, as shown in Figure 41.

All the reflection on the learning is based on the experiential learning approach (Jackson, 1995; Kölb, 1984; Reynolds y Vince, 2004; Read et al., 2012). Thus, the intervention matrix integrates all the necessary elements to begin the MetK+ for an intervention in an SME in practice.

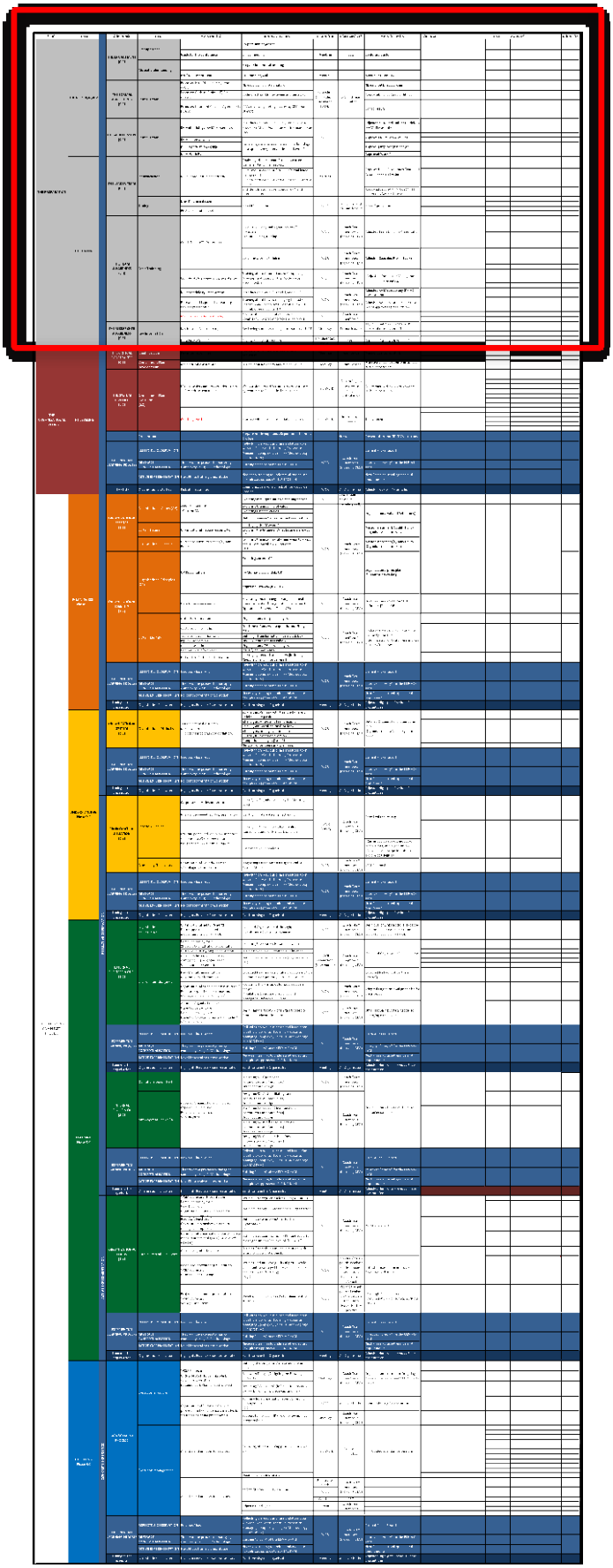
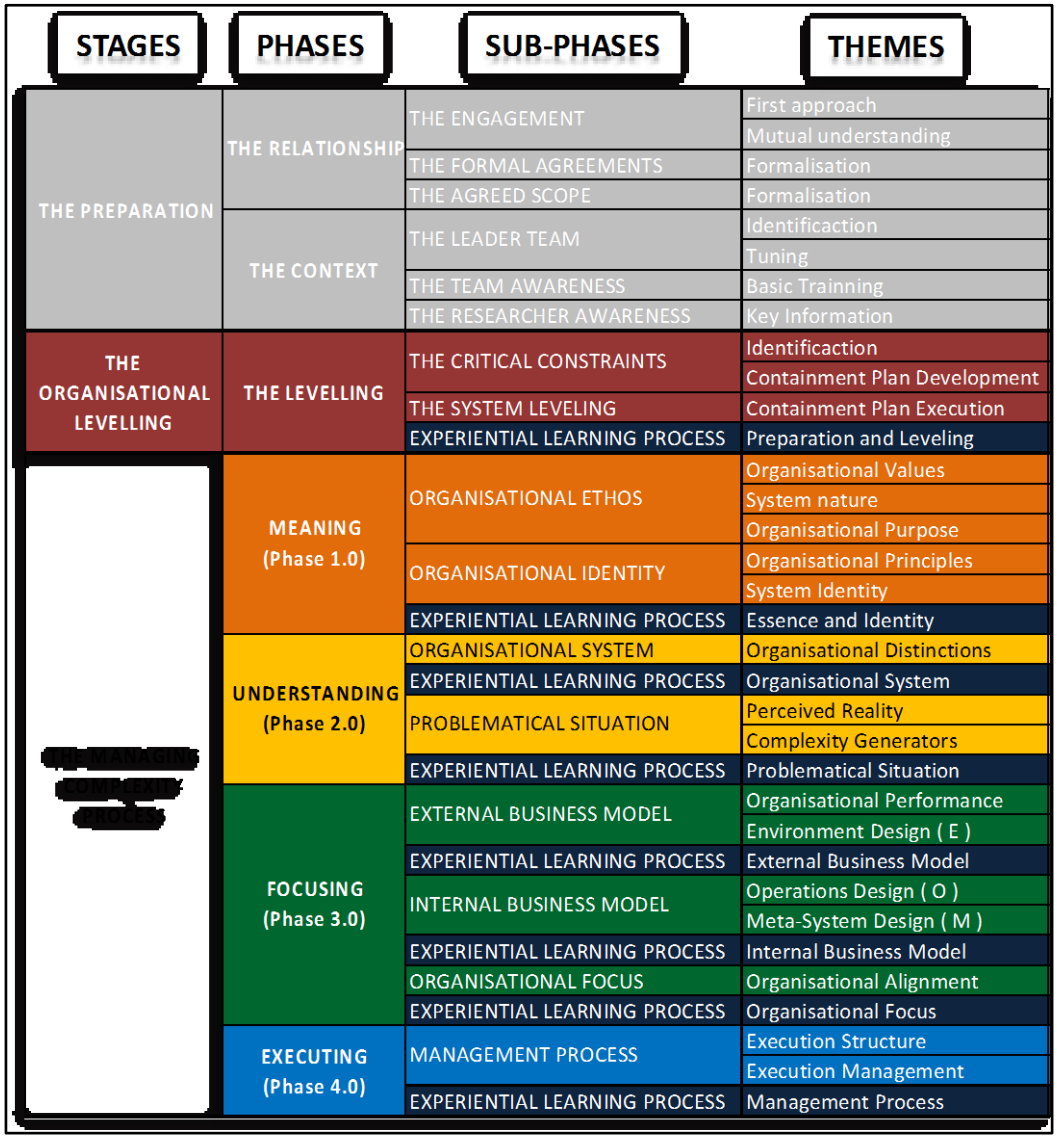


Figure 40: Overview of the intervention matrix



STAGES	PHASES	SUB-PHASES	THEMES
THE PREPARATION	THE RELATIONSHIP	THE ENGAGEMENT	First approach
			Mutual understanding
		THE FORMAL AGREEMENTS	Formalisation
		THE AGREED SCOPE	Formalisation
	THE CONTEXT	THE LEADER TEAM	Identificaction
			Tuning
		THE TEAM AWARENESS	Basic Trainning
		THE RESEARCHER AWARENESS	Key Information
THE ORGANISATIONAL LEVELLING	THE LEVELLING	THE CRITICAL CONSTRAINTS	Identificaction
			Containment Plan Development
		THE SYSTEM LEVELING	Containment Plan Execution
		EXPERIENTIAL LEARNING PROCESS	Preparation and Leveling
[redacted]	MEANING (Phase 1.0)	ORGANISATIONAL ETHOS	Organisational Values
			System nature
			Organisational Purpose
		ORGANISATIONAL IDENTITY	Organisational Principles
			System Identity
		EXPERIENTIAL LEARNING PROCESS	Essence and Identity
	UNDERSTANDING (Phase 2.0)	ORGANISATIONAL SYSTEM	Organisational Distinctions
		EXPERIENTIAL LEARNING PROCESS	Organisational System
		PROBLEMATICAL SITUATION	Perceived Reality
			Complexity Generators
		EXPERIENTIAL LEARNING PROCESS	Problematical Situation
	FOCUSING (Phase 3.0)	EXTERNAL BUSINESS MODEL	Organisational Performance
			Environment Design (E)
		EXPERIENTIAL LEARNING PROCESS	External Business Model
		INTERNAL BUSINESS MODEL	Operations Design (O)
			Meta-System Design (M)
		EXPERIENTIAL LEARNING PROCESS	Internal Business Model
		ORGANISATIONAL FOCUS	Organisational Alignment
		EXPERIENTIAL LEARNING PROCESS	Organisational Focus
	EXECUTING (Phase 4.0)	MANAGEMENT PROCESS	Execution Structure
			Execution Management
		EXPERIENTIAL LEARNING PROCESS	Management Process

Figure 41: Eight moments of reflection about the learning process

Summary

In this chapter, the researcher has distinguished the methodology for the research from the methodology for the intervention: the former guiding the research process, the latter guiding the intervention in practice.

In this chapter, the researcher addressed the challenge in establishing a research methodology using three levels of research: philosophical, methodological and practical. At each level, the researcher defined and supported his choice in driving the research.

On the other hand, looking to the systemic intervention in practice, the researcher first integrated the Model K+ to establish the approach of the systemic intervention. Then, the researcher framed the Methodology K+ for the intervention by integrating the two pillars and all the complementary approaches using the creative design of methods to do so.

Finally, the researcher established the research design in order to perform the research in the field. The next step was to apply the ModK+ and MetK+, and is addressed in the next chapter.

Chapter 4: Presentation of the results

Introduction

This chapter presents an action research case study to demonstrate the ModK+ and MetK+ in practice, with the aim of facilitating a learning process for managing complexity in Mexican SMEs so that they can improve their viability.

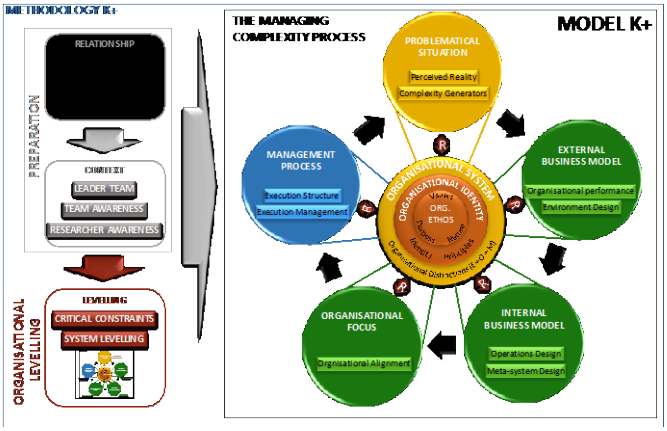
This CS was carried out in the city of Leon in the state of Guanajuato in the central region of Mexico. The city boasts a tanning and shoemaking tradition dating back more than 400 years old. The city of Leon is considered the Mexican capital of the leather and footwear industries, which have international recognition of their quality. The CS was conducted in an SME called Concurmex, SA de CV (CCX), which operates in the manufacturing sector. CCX is part of the leather industry and produces and sells leather as well as maquila services (services to third parties using operational facilities) of different types. CCX is currently recognised by the differentiated products that it commercialises, mainly aimed at the women's and men's footwear sectors, as well as for the leather goods industry. This CS had an effective duration of six months. This development began on 1st July 2014 and ended on 17th January 2015. This chapter gives an account of the entire process undergone during this intervention. CCX has characteristics, described in chapter 1, that can be considered as belonging to Mexican SMEs within the industrial sector. CCX has 66 employees and its annual sales exceed US$6,000,000.

The CS was performed using the MetK+ and is reported here using the sequence given in the intervention matrix. Using this sequence, the researcher describes the stages, passing through the phases, sub-phases and themes. At the theme level, as already stated, the researcher provides an introduction, objective, main activities and results. In order to help the reader to follow CS through the four levels of the intervention.

The researcher also will identify each phase using a 'tracker' (Figure 38) with a black rectangle or circle in such a way that this image positions the reader.

Stage: Preparation

4.1 Phase: Relationship



4.1.1 Engagement

CCX is a company in which the Chief Executive Officer (CEO) is also a partner and, therefore, a first effective approach to him was key to triggering his interest in this research. This first approach was intended to generate the necessary empathy, interest and sponsorship by the CEO for implementing the CS, as he would also be one of the main drivers of the change process. Sections 4.1.1.1 and 4.1.1.2 cover the two main themes of this sub-phase in detail.

4.1.1.1 First approach

In Mexican SMEs, the CEO is generally involved in several strategic, tactical and inclusive operative topics at the same time. The CEO dedicates time and attention to those aspects that are considered of greatest relevance and priority to leading the organisation. The intended purpose of this theme was to promote the basic understanding of the CEO of the CS SME with regard to the research scope and, in particular, to use business terminology with regard to the practical expected benefits in order to capture his interest and commitment to developing

this research and focusing this effort as the means to run a deep change process in this SME.

For this first theme, the researcher developed a guide to cover core aspects to share with the CEO in order to ensure his support for this CS. This effort was considered a key milestone in enhancing the relationship between the CEO and the researcher. The researcher would have preferred to perform this first approach face to face but, given the existing constraints, he decided to achieve this through a virtual videoconference.

The researcher developed a guide for this approach using the following topics:

1. To express his gratitude to the company for considering his request to take part in this research.
2. To offer a brief Introduction of the purpose of the research and the objectives of the intervention under an AR approach with a direct impact on the company.
3. To explore the CEO's rationale for opening the possibility of carrying out the research.
4. To discuss with the CEO the three main problems/challenges faced by the SME at the start of the research. The discussion was framed as the context for the researcher in order to explain the ModK+ in terms of having a practical relationship with the business.
5. To explain the ModK+ in relation to the above problems as well as its intended impact on the SME. This was used to guide dialogue clarifying any specific doubts between the CEO and the researcher regarding the implementation of the research and its direct effect on the SME's performance.
6. To state his commitment to the impact of the research on the results of the organisation.
7. To set the next steps.

This sub-phase resulted in a formal commitment by the CEO to allow the research, which was confirmed by an email submitted to the University of Hull in which he expressed his approval for the researcher to undertake this CS.

4.1.1.2 Mutual expectations

There is a limit to the resources in an SME and such resources are mainly aimed at critical efforts in the short and medium terms (Palacios, 1998). In that sense, it was important to prioritise the systemic intervention as a vehicle for articulating a deep change that deserved certain necessary resources. In the case of the limited resources, it was necessary to clarify the expectations of both the researcher and the company.

The objective was to review the ModK+ and MetK+ with the CEO in order to connect them with his perceived reality to establish mutual expectations for the intervention as a genuine opportunity for growing and developing the company. For this purpose, a working meeting was requested and organised inside the company in which the following information was presented: an agenda for the meeting, the intervention matrix, and an executive presentation to explain all the key aspects of the research. Given the previous experience of the researcher as a consultant, the presentation was articulated using a businesslike approach, which facilitated communication using business language but which touched upon the necessary academic aspects.

The contents of the agenda were developed keeping in mind the CEO's basic questions regarding the research:

1. *What is this for?* Answered by an introduction during which the central topics were addressed: complexity management and change and their impact on the real world of SMEs.
2. *What are we going to do?* This question was addressed using the research questions as a basis for making clear the ultimate goal of this research.
3. *Why is it necessary to carry out this effort?* This was managed as an open question whereby the CEO could give his answers about the company's position and the expected benefits of the intervention.
4. *What is this effort needed for?* It was also initiated by an open question to the CEO in order to explore specific targets.
5. *How is it going to be done?* This enabled the ModK+, MetK+ and intervention matrix to be examined in detail. This part also served to establish the scope

of the work. The CEO and the researcher also agreed all the logistical aspects in order to prepare the researcher for collaboration inside the company.

6. *Who is going to do it?* This was addressed to agree the critical roles of the process, the main actors and the internal leader of the project.
7. *Where is it going to be done?* It was specified that it would be field work with the direct participation of a real-world SME.
8. *When is it going to be done?* The work plan for the intervention matrix was checked in detail.

The result of this theme was to achieve final ratification for the research and its approach by the CEO in order for the researcher to interact and participate inside the organisation.

4.1.2 Formal agreements

This sub-phase was carried out after the CEO made an internal announcement about the research project and the need and utility of formalising agreements between the organisation, the participants and the researcher. In addition, the researcher formalised the ethical aspects required by the University of Hull to conduct the research. It should be noted that the management team was surprised, in a positive way, by the required formalisation of the research project.

The objective here was to integrate all the necessary agreements in order to formalise a relationship based on confidence and mutual respect. The intention was to foster the willingness and openness of the people involved in presenting research based on a strong ethical framework aimed at protecting the information and integrity of the SME and the team. This sub-phase has only the following single theme.

4.1.2.1 Formalisation

AR requires deep involvement with an organisation (Checkland, 2012). Such involvement is related to the level of confidence and mutual respect between the organisation and the researcher. Agreements are a formal representation of the first breakthrough in the evolution of the necessary confidence and respect for a

successful AR process. The objective was to formalise all necessary arrangements that explicitly expressed the commitment of all the stakeholders to a research project supported by a strong ethical framework.

In order to carry out the research, the researcher generated four types of formal agreement: a non-disclosure agreement, a code of ethics, and informed consent agreements with both the organisation and the participants. The non-disclosure agreement established the moral and formal commitment of the researcher and his supervisor to the organisation to protect any of the SME's confidential information during the development of the research and subsequent to it. This formal agreement was signed by mutual consent by the researcher, his supervisor and the organisation, represented by the CEO. The code of ethics contained the ethical principles that would guide the research and was based entirely on the University of Hull's code of ethics. The CEO, as the representative of the organisation, and the researcher signed this code. Finally, the informed consent agreements for both the organisation and the participants were intended to establish a formal agreement for everyone concerning their consent to participating in the development of the entire research in a free and open manner. The agreements with the participants were validated individually with all the people involved, regardless of their role and the amount of time invested in the research. The agreement with the organisation was validated and concluded with the CEO as its representative.

This theme was conducted by undertaking the following activities:

1. The researcher developed the four basic documents for the formal agreements.
2. The CEO and the researcher ratified these agreements.
3. The researcher reviewed the agreements with everyone involved in order to discuss any queries with each person.
4. The internal Human Resources Manager (HR) printed all the necessary agreements.
5. The HR Manager requested the corresponding signatures for each of the agreements and, finally, integrated them in an agreements file. (Note: all the signed documents were photocopied and copies were filed in the company records.)

The results obtained from this theme were that all the documents relating to the four types of agreement were signed by everyone involved.

4.1.3 Agreed scope

Newton (2015: 8) argues:

> There is a well-known saying that states that: 'Projects don't fail at the end, they fail at the beginning'. There is a lot of truth in this and whilst failure may not appear obvious until the final stages of a project, the post-implementation review often finds that there were known issues with the project which could and should have been addressed at much earlier point. These issues often turn out to be to do with the 'scope' of the project.

Gaining agreement on the scope of an intervention before starting implementation is a critical success factor. Delimiting this scope allowed a clear, explicit and shared vision of the intervention from the beginning of the process, minimising possible future conflicts.

In addition, this SME had not developed any systemic intervention or performed any deep change process, and much less so extensive in time. Therefore, the objective in this sub-phase was to share explicitly as a team i.e., between the SME and the researcher, the same scope of work for the intervention in order to agree this basic cornerstone for effective future dialogue. This sub-phase has only the following theme.

4.1.3.1 Formalisation

A systemic intervention may be subject to as many interpretations as the number of participants involved. Therefore, a shared and explicit agreement on the scope of intervention was one of the first boundaries to analyse in order to lay the foundation for effective dialogue. Here, the objective was to formalise explicitly the scope that would serve as a basis for guiding the implementation, in order to clarify the expectations of the team leader and the researcher regarding the intervention and its expected impact.

Two complementary documents were reviewed for this theme: one involving the scope of work and one containing the intervention matrix. In terms of the scope of the work, the researcher and the SME stated the following topics:

1. Project identification data: the title of the research, company name, start and term dates of the intervention, sponsor, project leader, and researcher.
2. The background to the project.
3. The main and specific objectives of the project.
4. The scope of the research.
5. Participants/Leader Team
6. Key assumptions to be considered.
7. Potential constraints of the project, in order to anticipate how to manage them.
8. Cost-benefits related to the impact on the company.
9. The estimated schedule of the work.
10. Key authorisations.

The intervention matrix was also adjusted and contained the following:

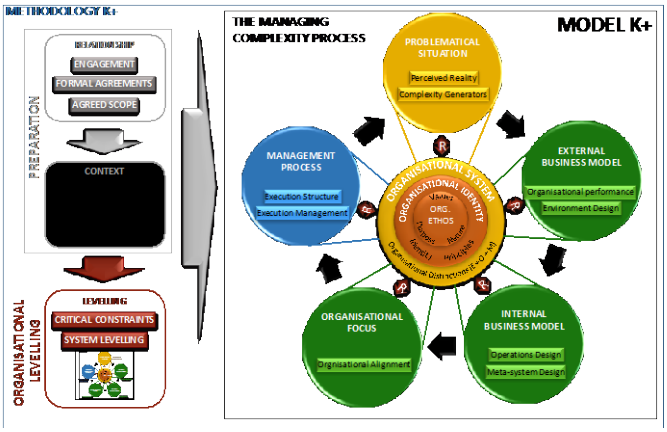
1. The ‘rows’ were ordered by linking the levels of the MetK+: stage/phase/ sub-phase/theme.
2. The columns developed for each topic contained the following:
    a. Main inputs of necessary information.
    b. Main activities to develop.
    c. Technique or method to use.
    d. Participants to get involved.
    e. Main outputs or deliverables generated.
    f. Estimated duration of the development of each topic.

The method used to clarify the scope of the work was as follows:

1. The researcher developed the two basic documents mentioned above.
2. The researcher also developed a basic presentation of the bases of the ModK+ and MetK+ in order to use it as the introduction for the theoretical frame that would support the scope of the project.
3. The CEO and the researcher reviewed both documents in detail and both made all the necessary adjustments to the final version.
4. The CEO and the researcher signed the final version.

The outcomes of this theme were that the scope and intervention matrix documents were properly validated, signed and ready for further dissemination to the leader team.

4.2 Phase: Context



4.2.1 Leader team

A change process involving the entire organisation had never been developed in CCX. However, previous interventions had been considered with the CEO and a few of the managers. In addition, using AR promotes the commitment and interest of all those involved in the change process (Checkland, 2010), and a key aspect for fostering this is to inform, from the beginning, everyone involved of what they need to understand about the process in which they will be taking part.

Therefore, the objectives were the initial and formal identification of the leaders from the beginning to support the better coordination of action and to formally notify the organisation of everything necessary throughout the process. The second 'tuning' objective also served to legitimise the process itself as a vehicle for the development of a change process aimed at managing complexity. This sub-phase has the following two themes.

4.2.1.1 Identification

It has been noted that the development and growth of Mexican SMEs rests on a few key people (Adizes, 1994, 1999), with formal or informal leadership, who are

capable of prompting change in an organisation to enable it to respond adequately to the changing environment. The researcher considered that there was a higher probability of success if, prior to the intervention, the profile of formal and informal leaders was reviewed in detail in order to integrate a robust leader team to guide the change process.

Here, the objective was to integrate a leader team to drive the change by working closely with the researcher to improve the team's ability to manage complexity by using the ModK+ and MetK+. In response to circumstances, the researcher decided to integrate the leader team in two ways: initially, the criterion was to integrate an extended group of formal (those with formal authority) and informal (those with influence in the organisation) leaders who were formed from the basic aspects proposed by this research. For the second criterion, the intention was to integrate the definitive leader team to drive the execution of the CS in the field. In order to identify the leader team, the researcher worked very closely with the HR Manager for the following reasons: her experience and sensitivity regarding employees' profiles and backgrounds; in order to consider this project as part of an internal process of human development, as intended by HR; and, finally, to involve her from the beginning in the strategic role of HR in the process of change. For the first identification effort, the following activities were carried out:

1. A detailed check of the current CCX organisational chart, with the aim of understanding the company's internal organisation, its different departments, roles and hierarchical levels and how they operate.
2. Identification of those people who had a formal managerial role in the SME. Four roles were identified: the CEO, and the Sales, Administration/ Finance and HR Managers. The personal backgrounds of these members of the company were also reviewed.
3. A joint validation with the CEO and HR Manager of those people who, with or without formal authority in the organisation, exercised a strong influence based on informal leadership. This group was considered to contain: five production supervisors (from the wet-blue, RTE, drying, finishing and delivery areas), the CEO's assistant, the person responsible for production scheduling, the saleswoman for national accounts, the person responsible for design and development, the person responsible for customer service, the

maintenance manager and the head of accounting. The general backgrounds of these 12 people were also reviewed.

4. In this way, the first leader team was formed. The work began with the 16 people listed above. They were notified that they would be part of the first leader team and that at a specific time this would be revised to redefine the definitive leader team for the development of the intervention.

Even though it was a large group, this extended group was chosen because this phase of the context would focus more on training and, whatever happened, this training would serve to create a critical mass for the future intervention.

It took almost one month from the first identification to get to the second one. In the second identification step, the following activities were conducted:

1. The first step was the researcher's direct observation in practice of the behaviour of each team member. Throughout the different activities that occurred over the course of the month, the researcher had the opportunity to observe three aspects considered relevant: a genuine interest in deep change; a real influence on the other participants and, finally, the confidence and will to make things happen.
2. The second step was, together with the CEO and the HR Manager, to review two psychometric tests and a 360º assessment that had been applied to the majority of the members of the extended team.

    a. The first psychometric test, based on Adizes (1994) PAEI was designed to identify the primary and secondary profiles of each individual from among four possible options: A-administrator, oriented to organisation and order; P-producer, oriented to facts and results; E-entrepreneur, oriented to the generation of new ideas; and I-Integrator, oriented to integration between people (Adizes, 1992). Table 25 summarizes the results of the psychometric test applied to the majority of the extended group members and a summary for the entire team is given at the foot of such table. Thus, it was observed that there was a greater tendency of the extended team members towards the P-producer (30%) and A-administrator (26%) profiles.

b. The second psychometric test was applied previously by the HR manager and it was aimed at evaluating personality characteristics grouped according to five variables: negative emotionality, extraversion, openness, adaptability and goals focus. Six characteristics were assessed for each variable.

Table 25: Psychometrics of the extended leader team (based on Adizes-PAEI)

Employee's name	Producer	Administrator	Entrepreneur	Integrator
José Guadalupe Lira Jasso	30	23	29	18
Fátima Ofelia Mandujano Parada	27	18	30	25
José Carmen Mendez Vera	26	28	24	22
Sergio Morales	33	33	22	12
Ivonne Edith Lopez Lozano	29	27	24	20
Mauricio Isaac Guzmán Chavez	28	34	19	19
Diana Hernández	38	17	24	21
Claudia Leonor Lona Méndez	28	34	19	19
Juan Carlos Alcacio Olaez	29	26	24	21
Gerardo Padilla	31	14	36	19
Ángel Negrete	35	26	19	20
Enrique Soto	24	24	22	30
Arturo Rámirez	29	28	24	19
Ana Monica Hernández	37	30	19	14
María Teresa Gonzalez	22	30	22	26
Fedra Vargas	29	22	25	24
Alejandro Javier Pierdant Orozco	33	29	19	19
Juan Manuel Alcacio Olaez	32	27	25	16
	540	470	426	364
GROUP DISTRIBUTION	30%	26%	24%	20%
	P	A	e	i

c. Finally, the 360º assessments applied previously by the HR Manager to the production coordinators were also reviewed (Table 26). This evaluation was very useful, as it contained the opinions and recommendations of all the coordinators' colleagues. This review also allowed an exploration of some features of the internal culture of the organisation through the opinions of its own staff. Thus, this second step focused on a comprehensive review of all the work in order to cross-reference information and gain an integrated and complete profile of the members of the extended team.

Table 26: 360º assessments of the production coordinators

OPERATIONS COORDINATORS 360° EVALUATION (CCX JULY 2014)								
NAME	PRODUCTIVITY	PLANNING AND RESULTS	LEADERSHIP	RESPONSIBILITY AND DISCIPLINE	ATTITUDE	VALUES	SECURITY AND HEALTH	INDIVIDUAL AVERAGE
JUAN MANUEL ALCACIO	7.59	7.73	7.91	7.68	8.00	8.45	7.86	7.89
JUAN CARLOS ALCACIO	8.00	8.28	7.94	8.28	8.11	8.00	7.67	8.04
JOSE CARMEN MENDEZ	7.68	7.77	7.23	7.73	7.05	7.86	8.18	7.64
CHRISTIAN MORALES	7.14	7.36	7.00	7.71	7.86	8.57	7.29	7.56
ENRIQUE SOTO	7.73	6.95	6.50	7.23	6.73	6.18	7.82	7.02
ARTURO RAMIREZ	7.23	7.14	6.77	7.82	8.09	7.73	7.73	7.51
JOSE GUADALUPE LIRA	7.09	7.29	7.29	7.38	7.25	7.50	7.54	7.36
GROUP AVERAGE	7.49	7.50	7.24	7.69	7.58	7.76	7.73	7.58

3. From the two previous steps and taking into account the experience from both the CEO and HR Manager of the leaders' profiles, the final leader team was created. This team was formed of the following members: the CEO; the Sales, Administration and Finance, and Human Resources Managers; and the following coordinators: RTE, finishing, purchasing (formerly the CEO's assistant), accounting and production scheduling. (Note: when the leader team was formalised, their roles were covered by people who had changed their role or by roles which changed owners during the intervention. This situation is explained later in the development of this case.)
4. Once the above process was completed, the information and the selection process were explained to everyone in the extended team. Subsequently, the researcher asked all the team members their opinion in validating the formation of the leader team and they agreed to continue with this definitive leader team.

The result of this theme was the creation and validation of the final leader team that would work closely with the researcher to drive and perform a systemic intervention.

4.2.1.2 Tuning

Introduction

This project was conducted in an organisation that had initiated several change processes in the past but had not concluded any of them and without generating radically different results, according to the CEO. These different change efforts

were isolated projects, in which some of the participants were involved in addressing a particular topic but not as an intervention that included the collaboration of all areas to achieve a shared purpose. Therefore, the researcher faced a team that lacked trust and confidence in the ability of external interventions to generate a deeper change.

In that sense, this tuning theme focused on achieving two complementary objectives: to present the necessary information about the intervention to the whole organisation in order to legitimise the intervention; and to enhance people's confidence and commitment towards the intervention as a medium with different characteristics from previous efforts through which to generate hope and acceptance of a change process with a higher probability of success.

The following activities were performed:

1. Drawing on the previous presentation (used and revised with the CEO in the Mutual Expectations theme), the researcher adjusted it, after considering the CEO's suggestions, in order to prepare a second version.
2. This presentation was again reviewed and validated with the CEO. A favourable schedule was also identified to develop an open session that would not be subject to time constraints. It was hoped that this approach would encourage the team to ask questions and explore any aspect they required for the research and its scope.
3. The release meeting was carried out through a question and answer session. The final presentation for the release was used only as a guide, because the session was oriented towards open dialogue rather than simply a presentation given by the researcher.
4. At the end of the session, the researcher publicly expressed his commitment to achieving evident results using the MetK+. Similarly, the researcher promised everyone present that he would promote a radical change and he requested their commitment and confidence to succeed as a team.

The result of this theme was the release session during which all the team's queries were answered.

4.2.2 Team awareness

For this sub-phase, it was decided to invite additional members to build a larger critical mass. However, the composition of this group was very wide: from people who had not finished basic education to those with a master's degree. As mentioned, it was important to deepen understanding of the methodological foundations, but to do so in a simple and easy way.

Therefore, the objective of this phase was to use a practical approach to conduct training in the basic theoretical framework upon which were founded the ModK+ and MetK+, in order to facilitate a deeper understanding of the bases of the research. It was intended that all the participants in the project would share a common language from the very beginning. There is one theme in this sub-phase.

4.2.2.1 Basic training

The basic training was important because it was the first formal encounter between two approaches: the implicit approach followed by the organisation in its daily management and the researcher's approach. This distinction was clear to the researcher but not necessarily to the team, and thus the researcher had the responsibility of integrating both approaches in practice. In order to achieve this integration, the researcher considered it important to take into consideration three aspects for the training: the heterogeneity and background of the participants; the sequence in which the modules would be addressed; and the organisation's 'rhythm' for assimilating content.

Here the objective was to ensure greater ownership and mutual understanding between the team and the researcher about the foundations of the research and, through these, to both review their paradigms in order to explore reality from a different perspective and have a broader and more complete picture. The above was promoted through simple language in response to the heterogeneity and rhythm of the group.

It should be clarified that the training process was originally designed to be only a part of the Context phase. Nevertheless, after reviewing the first cycle of progress the researcher realised that he needed to strengthen the foundations and that he would have to revise all the concepts in a second training effort.

The method followed to deploy the basic training for the first effort was as follows:

1. The researcher developed a sequence of four modules that obeyed the following considerations.
    a. The first two modules would be used to strengthen the team development:
        i. Coaching as a means of more effective interaction of a leader in a team. So, the first module on coaching was developed through a guide with the following agenda:
            - Definition of coaching
            - Role of coaching
            - Values promoted by coaching
            - Basic principles of coaching
            - Language and action
            - The cycle of coaching
            - Film: “The Legend of Bagger Vance“. Because of the length of the film, it was watched and analysed in two parts. This learning strategy served to reinforce the concepts of coaching through the dialogue promoted by the analysis of the film. The way the film was used had a strong effect and impact on the audience’s understanding of the content of this module, which they fed back at the end of the session.

        ii. By observing the initial interactions between the participants, the researcher noted that they had a low level of cohesion. There were internal conflicts between different areas and this module was key in trying to help integrate them as a team. Thus, the second module was oriented to teamwork and team building, which was also approached using very basic concepts but was considered useful for the audience. This module was developed using a guide but was

based mainly on different group dynamics to promote the integration and cohesion of the team. The following topics were used as a guide:

- Introduction.
- Definition of teamwork.
- Fundamentals of team building
- Complementary profiles of TW.

iii. The two previous modules were used to energise and facilitate more interaction between the members of the extended team, as well as encouraging greater dialogue between them and the researcher. Therefore, the third module focused on the foundations of the ModK+ through the reinforcement of greater awareness of the implications of change and complexity in CCX. This content was intended to pave the way for recognising the importance of carrying out a systemic process that was precisely aimed at managing complexity in the organisation. The researcher used a guide with the following themes:

- Introduction (increased change and complexity)
- Key definitions of the VSM
- The variety required and its impact on the organisation
- Review of the system concept
- Definition of a viable system
- Precedents of the VSM
- The model of a viable system (components and systems)
- First CCX VSM map.

iv. The last module was oriented towards a detailed review of “What” and “How” the intervention would be and work in practice, using a guide that was used to review the ModK+, the MetK+ (only at the phase and stage levels in this first review) and the AR approach and its implications. The agenda was as follows:

- Introduction
- The four phases of the ModK+
- A review of the ModK+ and the MetK+
- A review of the research methods.

The result obtained was formal training in these four modules for all the members of the extended team. In addition, these four modules served to strengthen the integration of the entire team through the team dynamics and dialogues generated throughout the sessions. This process also helped in the integration between the researcher and the team.

4.2.3 Researcher awareness

The researcher considered it important to review and analyse information that would allow him to achieve greater comprehension of CCX's context and its environment. Deepening his awareness of this context would also help him to develop the research with a more systemic vision to be applied to both the SME and the intervention design. Finally, reviewing this information would, at the same time, serve to develop a closer relationship between the researcher and CCX's actors through the processes of the dialogue necessary for this review.

Here, the objective was to understand the actors' perceptions of reality and complement these with data and information derived from records of the daily activities in different areas. This sub-phase has only the next theme.

4.2.3.1 Key information

The analysis of information should not be unilaterally conducted by the researcher. Even the experience of the researcher as a consultant was not enough to analyse the SME's information, as he lacked understanding of the context and background which give meaning to the information in CCX. On the other hand, using only the actors' viewpoints based on their paradigms could limit the interpretation of information.

Thus, the objective was to conduct a joint analysis between the researcher and the actors of the information that the organisation manages and generates in its daily operations. This analysis would allow everyone involved to share the same reality by using both the perception of the participants and the CCX's data.

The key information requirements analysis was inspired by the VSM. The requirements are based on the minimum required information of all the systems of the VSM. The activities developed for this analysis were as follows:

1. The researcher generated a list of information requirements related to each system of the VSM, as can be seen in Figure 42.

Environment	Environment	Regulatory entities to consider in CCX
		Competence and value attributes
		Current and future business networks
		Future niche markets to explore
		Key variables to monitor the environment
	Value Offer / Markets	Current customers analysis based on Pareto principle (total sales)
		CCX's current markets
		Current value attributes perceived by customers on current CCX's value offer
		Current value offer analysis based on Pareto principle (total sales)
		Prices structure of the current products and services
		CCX' current distribution channels
Operations	S1's	CCX's core operations processes
		Operations flow of the core operations processes
		Operations processes indicators
		Ongoing projects in the company
		Relation between core inputs and suppliers for the CCX's operations processes
Meta-system	S2	Planning and scheduling mechanisms in CCX
	S3	CCX key performance management indicators
		CCX management goals
		Cost structure for the current value offer
	S4	Key variables to monitor the environment
		Potential future customers, based on current CCX's value offer
		Value attributes to develop, thinking on future demand
		Current and on-going innovations in the company
	S5	CCX strategic approach
		CCX's mission
		CCX's values
		CCX's purpose
		Boundaries of current CCX system
		Budget management for the short and long term
		CCX's policies manual
		CCX's organisational chart
		CCX`s business processes map

Figure 42: Information requirements based on the VSM

2. The researcher reviewed these information requirements first with the CEO in order to explain the need, use and reason for each request. The researcher and the CEO both defined who was responsible for the data. It is necessary to clarify here that the non-disclosure agreement had already been signed, which enabled a greater openness to sharing information.
3. A timetable was developed for reviewing this information jointly with those responsible, as presented in Table 27.

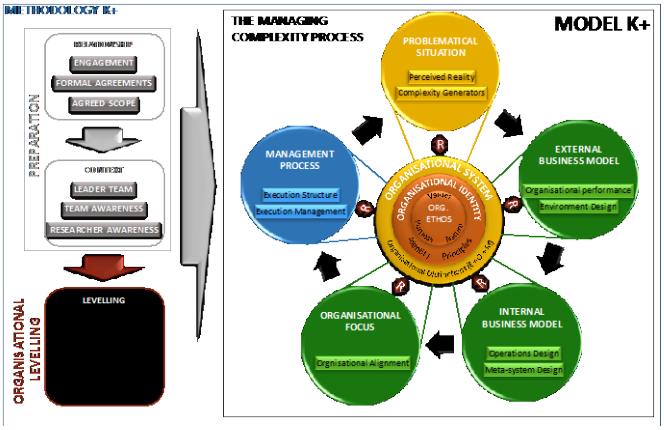
Table 27: Agenda for joint information analysis

Owner (s)	Topic	Estimated time	Day	Hour
Gerardo (GP) - CEO	CCX purpose	3 hrs	WED 23	6-8:30PM
	CCX value offer			
	Key variables to monitor the environment			
	Current and future business networks			
	CCX strategic approach			
	CCX key performance business indicators			
	CCX business goals			
	Current and in process innovations in the company			
	Ongoing projects in the company			
	Budget management for the short and long term			
	Relation between core inputs and suppliers for the CCX's operations processes			
	Boundaries of current CCX system			
GP + Production Coordinators	Planning and scheduling mechanisms in CCX	30'	FRI 25	10:45-11:30AM
GP+Jaime+Mauricio	Regulatory entities to consider in CCX	30'	WED 23	4-5PM
Gerardo y Claudia	Future niche markets to explore	60'	FRI 25	4-5PM
	Potential future customers, based on current CCX's value offer			
	Value attributes to develop, thinking on future demand			
Claudia Lona	Current customers analysis based on Pareto principle (total sales)	90'	WED 23	5-6PM
	CCX's current markets			
	Current value offer analysis based on Pareto principle (total sales)			
	CCX' current distribution channels			
Mauricio	CCX's core operations processes	60'	FRI 25	9-10AM
	Operations flow of the core operations processes			
	Operations processes indicators			
Diana	CCX's mission	60'	THU 24	10-10:45AM
	CCX's values			
	CCX's organisational chart			
	Core leaders' profiles			
	CCX's policies manual			

4. The scheduled meetings were held and each one used to check information with its ‘owners’. It should be noted that these meetings were developed according to the following sequence: Environment (E), Operations (O), and Meta-system (M), so that the researcher could build an initial systemic overview as he progressed in the analysis of the information.
5. Finally, the researcher integrated his main comments based on his information analysis by using the VSM as the basis for his preliminary diagnosis. The diagnosis served as the basis for addressing the next theme on the critical constraints faced, which are explained as part of the next stage.

Two results were obtained from this topic: the integration of the database with all the basic information to start the intervention and a preliminary diagnostic carried out by the researcher based on the VSM.

4.3 Phase: Levelling



4.3.1 Critical constraints

The first aspect to clarify in this sub-phase is the criteria under which a constraint is considered critical. For the ModK+, the criteria are as follows (Adizes 1992, 1994, 1999; Goldratt 1991, 2009):

1. Critical constraints cause a condition in which accumulated losses exceed the financial response capacity.
2. The constraints directly prevent the organisation from reaching break-even by means of the direct interaction of the S1, S2, S3 and S3*.
3. These constraints also directly prevent the organisation from being able to respond opportunely to its environment (principally its clients) in the short term.
4. The last and most important is that the organisation, through its leader team (at least), does not realise the systemic effect of the constraints and, therefore, does not face them with an integral solution; only with local actions that do not have an impact on the whole system.

During the previous process of information analysis, critical aspects (that met the above criteria) were detected and required immediate and coordinated actions to ‘elevate’ the constraints (Goldratt, 1997, 2009). In the case of not addressing

these aspects, the short-term viability would be strongly compromised and, therefore, there was a risk of the company falling into bankruptcy and closing.

However, the researcher was aware that, given the seriousness of the situation, the management team did not seem to have the same sense of urgency. They still managed the SME as if its survival was not at such high risk. In this sub-phase, the first main challenge was to help the management team to become aware of the seriousness of the situation, as, while they were not perceiving their situation, they continued to act in the same way. In the opposite case, of having the management team perceive the seriousness of the situation, they might have explored new paradigms that invited different actions to reverse the situation (Fuenmayor, 2000).

Therefore, this sub-phase established three objectives: to analyse in depth information related to the critical constraints identified so that the researcher could review them with the management team (the CEO and the HR, Sales, and Administration and Finance Managers); to validate with them how to proceed in order to face and manage the critical constraints by including the extended team; and finally, to assist the extended team in gaining awareness of the seriousness of the situation and, from there, ask for their collaboration in addressing it urgently. The two themes of this sub-phase are presented below.

4.3.1.1 Identification

From the previous analysis based on the VSM, the researcher was clear that the organisation was not capable of responding opportunely to its environment: it was losing demand (key customers) and was not achieving its break-even. The SME continued to accumulate important losses that were affecting its financial capacity and this situation was not allowing it to reverse its situation. It was necessary and urgent to identify some of the critical aspects that were threatening the organisation's survival. However, critical constraints were not identified among the management team, much less shared.

Therefore, two objectives were sought for this theme: the researcher had to define the critical constraints to be addressed, in order to validate them with the

management team; he also needed to support the management and the extended teams in two ways: to make them aware of the seriousness of the situation and to evaluate the negative and immediate impacts of these aspects in the event of not addressing them. It was intended that, after the second objective was achieved, this insight would provoke in both teams a significantly different reaction in their daily behaviour, which was necessary as well as urgent.

The activities for achieving the above objectives were as follows:

1. The researcher made a synthesis of the reviewed information by developing a mind map to allow him a full view of the various factors to consider.
2. Using the VSM principles and guidelines, the researcher achieved a synthesis of this information to integrate the critical constraints to be addressed.
3. The researcher requested a meeting with the management team in which all the information was reviewed. Using the VSM as a guide, the researcher and the team worked together to decide which critical constraints were to be elevated, or even if it was possible to establish very specific targets and be responsible for each of the critical constraints identified. The final synthesis of the constraints and targets made for the management team is presented in Figure 43.

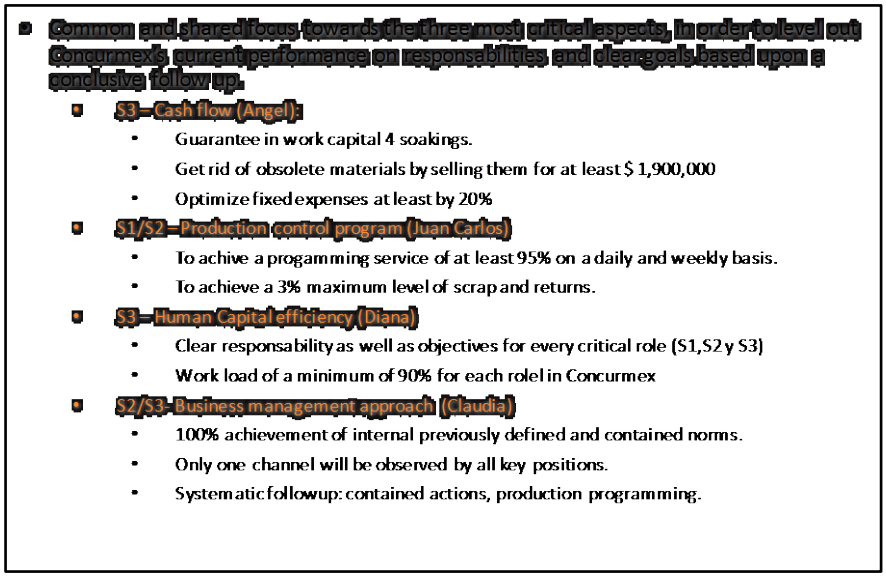


Figure 43: Final synthesis of critical constraints and targets

The result was the explicit identification of critical constraints and goals to pursue jointly with the company's management team. Having examined Figure 43, it

could be appreciated that the main constraints were found in Systems 1, 2 and 3 and were related to four basic themes:

1. The teams needed to ensure the minimum operative cash flow necessary to be able to perform S1s. This driver should be supported by three key actions: to achieve additional cash earnings from the sale of obsolete materials and equipment; the necessary optimisation of operations expenses; and the renegotiation of existing credit lines in order to obtain lower interest rates and longer terms. This operational flow directly affects the SME's outcomes, since key inputs were constantly missing and this situation made the entry of revenues by sales difficult. Thus, the SME was in a vicious circle which mutually reinforced low income and inadequate operational cash flow.
2. The necessary programming and control in S1s to deliver on time (service) and of the agreed quality product (minimum rejects and returns) to customers. Therefore, the SME would be able to promote, on the one hand, the refilling of orders from satisfied customer and, on the other, production costs would not be affected by quality problems. Based on the information, it was found that service levels to customers were, on average, 70%, and of this percentage, almost 20% of the final product was rejected. This meant that only 56% of the product was invoiced each week, affecting both operative flow and invoicing.
3. The SME needed greater efficiency in its utilisation of the workforce in all levels and areas (S3, S2 and S1s). A preliminary diagnosis found that, despite not having the capacity of a single shift fully occupied, the SME had excess personnel in all areas. This was generating a double negative effect: the payroll cost was very high, directly affecting operations costs, and the work environment was affected by having unoccupied staff.
4. Finally, the SME required a necessary and urgent decentralisation in decision-making and leaders taking responsibility (S3). The CEO had more than 10 roles under his direct supervision and no decision could be discussed without his mediation; so communication between members was deficient. Furthermore, the CEO acted as the only dialogue channel, which had a negative effect on the interactions between the teams. This prevailing management style was marked by a complete and comfortable dependence of formal leaders, and even the staff in charge, on the CEO. Thus, the CEO

was paying attention to all kinds of problems, in various excessively long meetings, which were not recorded and in which there was no formal follow-up on any agreement. This management style favoured a situation in which even roles with a formal authority were not exercising it since they were always waiting for the CEO's involvement to take the final decision. It was necessary to clarify that the CEO also needed to intervene in practically everything, in order to make sure that things would happen. In the end, leaders did not take full responsibility for their own processes and improvement measures.

Thus, the four basic axes for critical constraints were identified, validated and served as the basis for the following sub-phase.

4.3.1.2 Containment plan development

The seriousness of the situation required that awareness should be extended to the entire organisation to gain the commitment of all its members to reverse the critical situation. Time was the main constraint and, therefore, a joint and coordinated effort could accelerate the process to the benefit of all. The simple identification of critical constraints was not enough to unify efforts across the SME in a coordinated way. It was then necessary to specify actions to undertake, goals to achieve and clear responsibility for each of the identified critical constraints. Similarly, it was important to agree an effective follow-up process.

Here, the objective was to develop, by including the extended team, a containment plan that would elevate (Adizes, 1999; Goldratt, 1991) the critical constraints in order to achieve at least the required break-even. In addition, it was important to agree as a team how to monitor the progress of the plan, as well as achieving key indicators and the results expected.

The containment plan and its proposed actions took into account three basic principles of the VSM: to ensure the minimum necessary operation and autonomy of S1s; to develop and/or consolidate several critical anti-oscillatory mechanisms of S2 by looking at the S1s; and to address the actions necessary to promote synergy from S3 to S1s.

Using the above guidelines, the researcher worked with the extended team in the following activities:

1. The researcher integrated the main actions to execute in order to address the critical constraints as the first starting point, given the urgency of reorienting the SME's trend, and also because the extended team was still not fully aware of the situation or the future systemic impact. Using the VSM as a basis, this integration of actions considered the information collected in the working meetings and the previous joint analyses (mainly, the review of the financial status and cash flow management). The researcher then produced a presentation to share with the organisation. This presentation included proposed drivers of action for each of the critical constraints.
2. The above presentation was first checked in a meeting with the CEO and the three formal managers in order to: evaluate the direct impact of the constraints on the whole system when reversing them; develop and adjust, in detail, the actions to undertake; define goals to pursue in the short term; and, finally, define those responsible (based on the new emergent structure validated through the VSM) for the execution of these actions. As a result of this meeting, the researcher generated a file that integrated the agreed containment plan.
3. The above-mentioned file was reviewed with the extended team in order to: share awareness of the critical and problematical situation; explain in detail actions to be performed in a comprehensive manner; agree with the extended team the specific responsibilities for these actions; and establish a follow-up mechanism.
4. In addition, a meeting was held with the entire operations staff to explain the critical situation to them in simple terms. During the meeting, their full support was requested for an improvement in service and the quality control of products and services as key factors in reversing the situation of CCX, and, at the same time, to ensure their source of employment.

The main result here was that the containment plan was developed and shared to all levels of the SME. The researcher intended to synchronise the efforts of the entire organisation regarding the critical nature of the situation and specific actions to reverse this condition.

4.3.2 System levelling

The critical constraints identified jeopardised the continuity of CCX because they did not allow the minimum requisite variety to operate and deal with the existing context. Several factors were present at that moment in the environment, in the business and in the team, that were threatening the short-term viability and, therefore, survival of CCX. The main factors present in the environment were: a high dependence on a few customers (70% of sales corresponded to only two customers) and the strong dissatisfaction of most of them, mainly in terms of delivery service and inconsistency in quality product; this situation had led to lower demand. On the other hand, due to problems in operational cash flow, the organisation did not have the suppliers' support to finance, in part, the operation. Given these payment problems, suppliers requested payments in advance and/or a reduction in the amount owed to them. Opportune input supply was complicated and so too was production, as was then delivering on time and ensuring a good-quality product. From a business standpoint, the main factors were as follows: an accumulation of inventory (raw materials and in-process, finished and miscellaneous products); high operational expenses in proportion to existing production; and real income by sales was below the minimum necessary. Finally, the main factors related to team building were as follows: low credibility and trust in achieving change in the organisation; a low level of empowerment in key roles; lack of clarity in the scope of each role and the minimum responsibilities; high dependence on the CEO by all key roles; and a poor system of formal follow-up for operational, tactical and strategic actions.

Therefore, the objective of this sub-phase was the management of the containment plan focused mainly on the S1, S2, S3 and S3*, in order to reverse the threat to survival in the shortest possible time so that the organisation could be viable in the short term. This levelling allowed the organisation to gain medium- and long-term viability. This phase has only the next theme.

4.3.2.1 Containment plan execution

Once the containment plan had been developed and disseminated, the next step was to execute the plan decisively. It was only through execution that the situation could be reversed and thus stabilise the system. Once the organisation had stabilised its critical condition, it then had the conditions to grow and develop:

1. The organisation should not accumulate losses and should have the financial support..
2. The organisation had already reached its break-even by means of the coordinated interaction between the systems of the VSM.
3. The organisation should be capable of responding opportunely to its environment in the short term.
4. The organisation, through its leader team, should be aware of the systemic effect of the problematical situation faced.

Here, the objective was to execute the containment plan to reverse, in daily practice, the critical constraints in such a way that the organisation might stabilise its condition as soon as possible. This implementation should be supported by the minimum expected performance as a team to generate the requisite variety in its current environment.

The activities in this theme were oriented by the four critical constraints presented in the previous sub-phase (see Figure 43). The following activities are presented in respect of the sequence in which they were implemented in practice to the extent possible, since several of them were developed in parallel with different working teams:

1. A first key aspect was related to organisational design and looking for more efficiency, trying at the same time to maximise the potential of various actors in the SME. In that sense, the following topics were reviewed with the HR Manager and the CEO in order to promote better synergy between the teams:
    a. It was realised that a detailed analysis of the roles and responsibilities in the whole organisation was needed to adjust workforce needs to the organisation’s reality:
        i. Operative personnel were identified as being required for the existing production level. With this analysis and with the

results of a recent individual performance evaluation, an adjustment to personnel was conducted. As a result, 15% of the staff were fired and several people with experience in critical operations were relocated in order to improve production quality.

ii. The roles and responsibilities of all administrative staff were revised in coordination with HR Manager. This review served to adjust and narrow the scope of each role and to validate the necessary structure. Approximately 12% of the staff in this group were fired.

b. The internal organisational structure was reviewed and a redesign was proposed to attend to S1s, S2, S3 and S3*. It was intended that the key roles in the organisation's VSM would have specific responsibilities to minimise dependence on the CEO. This was done in order to take more opportune decisions and, simultaneously, relocate employees with very good profiles that could invigorate actions.

i. A vital aspect here was the work realised in Operations (S1s). At that time, there did not exist a coordinator of operations but there were six department coordinators in production. It was agreed to have a single channel or coordinator and, through a different selection process, try to legitimise this key role in the VSM of CCX. This process made it possible to outline the challenges and various undesirable effects due to a lack of a coordinator of operations. As a following step, the operations team was asked to select from the current six coordinators one coordinator they believed was able to lead them. The surprise was that five of the six coordinators voted for the same person. The new role was then offered to this individual and he accepted, asking for everyone's support to move forward with this new responsibility. Thus, the same operations team selected and validated its production coordinator. This approach significantly favoured cohesion in this team, enhancing their future autonomy.

c. Using the ‘new’ organisational structure, clear communication channels were defined (based on the VSM) for the interaction of several key information exchanges, principally in deliveries-production scheduling, acquisitions-production scheduling, customer service-production, cash-flow-acquisitions-production, and production scheduling-production.

2. The next activities were aimed at strengthening the internal culture to foster better team cohesion. It was important to encourage confidence among the team members on the basis of stronger mutual respect. For this purpose, the following activities, which primarily focused on S5 and S2, were performed:
    a. The need was reviewed with the CEO to agree with the team the minimum basic rules for interaction to encourage cohesion. The CEO agreed to take the next step in this initiative.
    b. Based on the previous agreement, a specific meeting was held with the HR Manager and the CEO to identify topics of internal culture which needed immediate attention. The topics identified were: handling privileges and authorisations, punctuality (days, meetings, etc.) and commitment fulfilment. It was decided that these topics would only be discussed in subsequent meetings to give an opportunity to the team to agree on how to deal with them. In addition, the whole team agreed upon a follow-up process to these agreements, which would be led by the HR Manager.
    c. Next, two meetings were held with the same purpose: to agree within the team upon basic rules of interaction (S2) for each of the above topics and thus promote better team coordination and integration. One meeting was held with all the staff and the other with all the formal leaders of operative personnel. In both of these meetings, a quick consensus was reached on basic rules of interaction. The majority of the members were satisfied with these results, which they shared with the researcher at the end of the sessions.
    d. The team implemented a follow-up to fulfil the defined basic rules of interaction. The internal policies manual and its follow-up mechanism formally began with these basic rules.

3. In order to balance cash flow and achieve break-even, the following activities were developed with the CEO and the Administration and Finance Manager, focusing mainly on S5 and S3:
    a. Four main elements had a significant impact on operating costs: quality costs involved in rejects and returns; the cost of the necessary services for production (water, energy and gas); the purchase of raw materials (hides); and payroll costs. For all these costs, a goal was defined and someone put in charge of maintaining greater control of the cost. This effort was handled as a very basic operational budget.
    b. The necessary minimum income to achieve break-even was analysed by considering the above basic operational budget. The sales team validated this minimal income and took it as the necessary minimum sales quota to cover.
    c. All unnecessary and obsolete equipment was also identified in order to sell it: leather (finished and partially finished, without movement), 'fleshing' (a leather sub-product), machinery, equipment and various miscellaneous items. Minimal amounts expected were assigned to each item and specific people were made responsible for advertising and beginning to sell them.
    d. An analysis of the existing credit lines was made in order to renegotiate them. It was intended to change very expensive lines of credit for more economic ones, and to change and minimise the total payments for each of them.
    e. Using the previous credit line analysis, a business strategy was defined that would ensure the necessary working capital to avoid fluctuations in production (mainly for purchase and timely arrival of inputs). In addition, this business strategy would allow reaching break-even through increasing income, decreasing operating expenses and helping with income by selling obsolete items.
    f. The above strategy served to state the basic indicators for monitoring and evaluating whether the company was reversing its negative trend.
4. This SME did not have an integrated schedule and production flow in each area was planned almost independently. This lack of integrated planning

and scheduling affected the continuous flow in S1s. Therefore, it was decided to include the development of the following S2 activities as part of the responsibility of production scheduling:

a. A production capacity matrix was generated of all the operations that made up the whole process. This could be used to locate those operations that were causing bottlenecks in the production flow.
b. All the necessary schedules to ensure continuous flow and a minimum level of customer service were identified as possible: raw hide purchase; wet blue; drying, since these resources are shared with maquila services; and finishing, because this area had the most diverse combination of operations and needed a suitable sequence. After analysis of the production flow, it was found that this area was the main constraint and bottleneck to tackle to improve customer service.
c. In addition, a daily follow-up mechanism coordinated by the production scheduling coordinator was established in order to check key variables in the integrated scheduling. The main key variables were: intermediate services between different production areas in order to anticipate problems; the opportune supply of all necessary inputs to production; and a review of the main problems, both internal (rejects) and external (returns), to find a solution and prevent them happening again. All the production coordinators adopted this mechanism.

5. For the leader team, it was also important to confirm and approve relevant value attributes perceived by current customers, in such a way that they would drive improvement efforts toward these attributes. With this in mind, the team was given the task of improving demand and sales growth to ensure the required minimum income. These activities were focused principally on S3 and S1, as follows:
    a. The commercial team revised the sales forecast in order to validate whether projected demand reached the minimum required income to achieve break-even.
    b. The commercial team also defined the required value attributes in order to prevent existing problems related to customer satisfaction.

Customer service and product quality were of greater impact in the short term for customers.

c. The products that were most in demand were analysed to include special care in their production processes.

6. Subsequent to the redesign of the production team, the researcher worked with them on the necessary actions to improve customer service and product quality. The following S1 activities were conducted:
    a. All formulas, processes and operation parameters of the articles most in demand were updated. Thus, the document base (S2) for more standardised operations was updated.
    b. A basic reference catalogue of all authorised samples for both the RTE and finishing areas was updated in order to have validated samples of the articles most in demand. These samples were the reference against which a customer accepts or rejects a final product concept.
    c. Jointly with the production team, a system was developed for scheduling production in the critical area of 'finishing'. This system was based on the capabilities matrix developed previously. Once this system was complete, production was planned and the daily sequence was delivered to every work station. This also enhanced communication and collaboration between production staff.
    d. The team concluded that an important source of oscillation in S1, which had an impact on both service and quality, was the opportunity for the arrival of inputs. This issue was revised with the Administration and Finance and Purchase Departments to establish working agreements in order to ensure timely delivery.
    e. With all the work developed above, a second meeting was held with all production staff that had a dual purpose: to reinforce the need for collaboration to improve service and product quality; and to homogenise how to put into practice the necessary standardisation. The production staff received this initiative in a very positive way because it meant a concrete step towards changing their present situation.

It should be noted that this process, called system levelling, was executed by following the four phases of the ModK+: Meaning, Understanding, Focusing and Executing. At the same time, the Levelling stage ran parallel in its execution with the development of the MetK+. This combination required extensive work by the researcher: both as facilitator in assisting staff in coordinating actions across all areas and in continuing the research process.

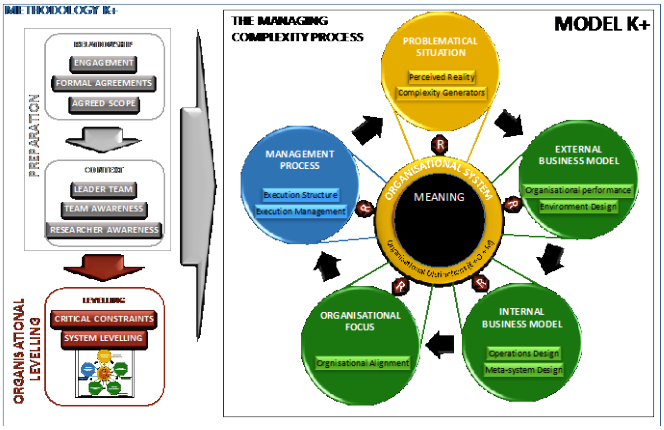
Using the VSM as a diagnostic tool and its principles as a guide to propose improvement, several results were obtained. In the levelling effort, the areas for opportunity were so great that results were evident in a very short time. However, in general terms, results were identified along the same basic themes. As a summary, the results were mainly as follows:

1. In relation to cash flow, management of this was achieved in such a way that it ensured the necessary working capital to operate S1s.
2. The new production scheduling warranted a minimum average of 95% customer service achieved.
3. Levels of returns and rejects decreased from an average of 20% to 6%.
4. A new working team design was articulated, leveraging the potential of several key partners. At the same time, this helped in adjusting personnel skills/competencies to the needs of the company.
5. The internal working environment improved significantly. This was favoured extensively by the establishment and pursuit of basic rules of interaction which enhanced communication. The establishment of clear communication channels was another key factor in improving the interactions between members.
6. Another aspect that renewed the confidence of the team, despite the fact that it was difficult to adopt due to inertia, was the systematic and consistent follow-up of actions and agreements for improvement.

The containment plan execution proved very fruitful: to the people involved, to the SME and to the purpose of the research. This plan also helped to apply the full ModK+ in practice.

Stage: The Managing Complexity Process

4.4 Phase: Meaning



4.4.1 Organisational ethos

This sub-phase is intended to address three key issues in identifying the ethos of a system: the values, mission and nature of the SME. Even if an organisation has defined such concepts, this is not enough; it is also important to reflect on practice through behaviours (Mascorro, 1995). We can only observe behaviours that reflect values, mission and congruency with the organisation's nature. In this way, it was sought to validate the congruence between what is declared and what is done in practice.

The three themes identified above will help to identify the ethos of the organisation, which should provide an account of everything that the organisation does. Therefore, the objective of this sub-phase was to identify explicit values, mission or purpose, and the nature of the organisation. To address this sub-phase, the information that the organisation currently had about its ethos was reviewed. CCX already had a formal definition of its values, mission, and organisational vision.

4.4.1.1 Organisational values

Introduction

It is not possible to observe values by themselves. Values predispose attitudes and others in turn manifest these through observable behaviours. Therefore, people's observable behaviours are those that reflect their values (Mascorro, 1995).

On the other hand, Padaki (2000) states that each organisation has certain basic convictions about its work and ways to develop its work. When these beliefs are translated into practice and are relatively enduring, these can be called organisational values. However, given that the basis of values is someone's belief system, correct meaning and precise value are a single attribute. In this way, an individual attribute is formed in someone and is also observable and measurable. Padaki (2000: 423) concludes:

> However, the collection of individuals that constitutes an organisation, can also be viewed as a collection of individual belief systems. The organisation shows a recognisable identity or "character" when there is a considerable agreement or overlap between the individual belief systems above the differences between them. Typically, this means a small set of interlinked values, instead of any unique value. This set consists of the values that may be called the value system of the organisation.

The value system of an organisation, based on observable and common behaviours, shapes an important part of organisational culture. Having recognised the value of teams, for example, this helps to strengthen its identity and increase its cohesion (Schein, 1990, 2010).

Here, the objective was the identification of those shared values that are observed through common behaviours in a team and considered as the value system of the organisation. The activities carried out to clarify the organisation's value system were as follows:

1. First, the researcher reviewed information about the current organisational values and found the following:

a. The SME implicitly defined values as beliefs. Each value was explained through interpretation attributed by the organisation's members. They mentioned six values that are individually defined.
b. Of the six values, the team agreed that there were inconsistencies in five of them based on observable behaviours that members reflect in practice. The CCX's values could not be considered as cohesive elements for the team members.

2. Given this, the researcher discussed with the CEO and HR Manager the need to work in depth on a CCX value system. They agreed the importance and need to address this aspect in order to increase organisational cohesion.
3. The researcher then designed a workshop for everyone in the extended team.
4. The workshop was developed according to the following sequence:
    a. The workshop began by reinforcing the existing focus on the achievement of the containment plan measures in order to level the SME's performance. At the time of this workshop, the SME already had evidence of new trends in key business indicators and this indicated that the containment measures were already working. This perception of improvement generated greater confidence in the team to start the process of change through the ModK+ and MetK+.
    b. As a second topic, the researcher worked on reviewing and locating the efforts regarding the ModK+, so the team could constantly connect each of them in order to be continually aware of the complexity management process. At this time, the team was not yet able to explain the ModK+ in their own words, but they could already identify the phases and approach to each one.
    c. The third topic developed in the workshop by the team was a first definition of the meaning of value. The researcher explained the basic theoretical framework to help perform this activity.
    d. The researcher facilitated a definition of value through the team dynamic. Four teams were formed, each developed a definition of value based on the theoretical framework (Padaki, 2000) and each team presented its definition. Finally, in an effort by the whole

group, the researcher facilitated an integration of a final definition of value in CCX.

e. Next, the members of the workshop explored their personal values individually. The researcher facilitated a group dynamic in which each participant reflected upon her/his personal values and wrote them on a sheet of paper. The researcher then gave an instruction to turn the same sheet face down, leaving the blank side uppermost. Each participant was then asked to look for those people in whom they recognised a value as a result of their behaviour in practice, and write it on their sheet. Thus, every person received, in written form, the values that their colleagues recognised in them. This dynamic was very emotive and the group really enjoyed this free expression space. This approach increased the level of team building in the group.
f. The group then worked on the integration of values. This process began with an individual integration in which each participant reviewed and concluded those values that the team had written and compared them with her/his own in order to integrate values that represented her/him. After individual integration, the researcher encouraged the participants to express their opinions to close this dynamic. It was an emotional moment, since the majority of the participants (14 of 18) reported that they did not expect the group to recognise so many values in each of them. This caused them to feel really appreciated and valued by their peers.
g. Based on the personal values already integrated, another group dynamic helped in the integration of personal values as a team. For this dynamic, four teams were again formed: each team integrated the values shared by the team members by considering their frequency and sorting them from highest to lowest. Each team then presented its summary and the researcher generated a list of the values of the four groups based on frequency in descending order.
h. The final part was to review the relations between the values that emerged from the previous exercise and to compare them against current organisational values. The team found that four of the original values had observable and common behaviours. The team

was shown to be satisfied with having found consistency between these values and behaviours, which motivated them to seek greater consistency with them. On the other hand, the team found that two 'new' values were really part of their culture: even though they were not formalised, the team demonstrated these values in observable behaviours, so they decided to include them. The team also found that there were two major inconsistencies with the original values. However, after a process of dialogue, they validated the need to leave them as part of their values and made a commitment to work strongly in order to express them in their everyday behaviours.

In this way, the organisational value system was integrated and this emerged from the entire group as a key element of their organisational ethos. It is important to note that this method of discovering organisational values caused an increased level of positive energy in the group and improved team spirit and the sense of belonging.

Thus, the result was the identification of an organisational value system. Nevertheless, another result was the feeling of mutual recognition among the members that they obtained from their partners and colleagues, as this helped to increase cohesion in the organisation.

4.4.1.2 Organisational purpose

Fuenmayor (2001) argues that the development of an organisational model is an iterative process between team members; he also declares that the starting point for constructing this model is the definition of organisational purpose. From this organisational purpose, the model is deduced from the activities required to achieve it. In addition, it is known that an organisational system interacts with its environment and that it is worthwhile identifying the purposes behind its different key relationships with the environment. Therefore, in order to distinguish these purposes, leaders need to consider all the key relationships, in addition to the internal actors, such as the customers, suppliers, business partners and the community itself (Espejo & Reyes, 2011). Thus, organisational purpose

addresses the “Why” and “What for” as an organisation carries out its functions in it interactions with stakeholders.

Here, the objective was to identify the explicit purpose that the organisation claims concerning its key relationships with the stakeholders that are part of its own identity as a system. Organisational purpose was addressed within the same workshop in which the participants identified an integrated the value system. The main activities that were carried out were as follows:

1. The researcher reviewed information about the purposes of the organisation and found that CCX already had a definition of its organisational mission. However, this mission considered its purpose only in relation to benefits to customers, leaving aside other key relationships in the system.
2. The researcher also designed a team dynamic as follows:
    a. The researcher posed a question to the group about how many entities interact with the SME, with the aim of eliciting identification of key relationships as a system. In this way, the team was aware of the different entities with which they interacted and the need to deal with them when thinking about its purpose.
    b. The following step was a plenary session in which the group expressed and agreed the purpose for seeking each entity. The team reached a consensus on the following purposes for each key relationship:
        i. Clients: to satisfy them with specialised and integral solutions.
        ii. Suppliers: to be trusted by them and to develop more business as partners.
        iii. Business partners: to improve current profitability and develop future business.
        iv. ‘Owners’: to generate and to distribute wealth and develop the business.
        v. Actors: growth and personal development.
        vi. Community: to respect the environment and generate employment.

It should be noted that making explicit the purpose sought as a company also allowed partners to become aware of their organisation and to see it as a system interacting with other entities in seeking mutual benefit.

Again, the outcome was to make explicit organisational purposes in relation to different key interactions as a system. However, these purposes also served as drivers. The members of the team were outlining in themselves a different sense of transcendence, since they were moving from the simple conception of themselves having only the intention of generating wealth to conceiving of the organisation as having a significant social and community impact upon all its key relations. This was imprinting a different meaning to the organisational purpose, but particularly upon the sense of the transcendence of the members of the team. These comments were collected at the end of the workshop. The organisational purpose then served as an attractor, which complemented the meaning that the organisation granted to all stakeholders and to society itself (Cornejo, 1997).

4.4.1.3 The nature of the system

As Beer (1995) states, the nature of a system is directly related to what the organisation runs in its S1s. This is as simple as referring to what the business actually does. However, there are very few companies that have identified the business in which they are operating in a manner consistent with what they are running on their S1s (Espinosa, 2015a).

The lack of clarity about the nature of a system could cause confusion within the organisation, because different S1s (if they exist) may not be considered with their appropriate importance. Normally, an organisation focuses on its main business unit and all attention and resources focus on this, leaving the others aside. Lack of understanding of an organisation's nature through S1s also translates into a lack of attention to the necessary support for S3, S3* and S2. This causes weak requisite variety by this lack of shared understanding whereby the necessary support is not given to all S1s.

Therefore, this theme aimed at specifying the nature of the system-in-focus by answering the following question: What business are you in? and second, to correlate this response with what the organisation really does in its S1s in such a way that there was congruence between these two objectives.

The activities implemented were as follows:

1. The researcher reviewed information related to this theme. The organisation recognised this as its ‘vision’ since it described (in this case), broadly speaking, the business in which it operated. The researcher found that it was not clear to the leaders the business in which the organisation participated when such information was contrasted with what had been done in their S1s.
2. Given the above situation, the researcher also designed a section in the workshop on organisational ethos to work on the question: What business are you in? During a plenary session, brainstorming began in order to answer this question until the researcher integrated a text that summarised the ideas of the group.
3. The text was compared with the S1s identified and, through this comparison, the organisation achieved a specific response about the nature of the organisation in a manner consistent with what it was actually running in its operations.

The result was an explicit definition of the nature of the organisation. However, another result achieved as a team was to be able to identify all the S1s that the organisation was running. With this identification, the team realised that they were immersed in more businesses than those initially imagined. In addition, this process created awareness of all the support functions (Meta-system) regarding the importance of attending all S1s and giving the necessary priority to each of them.

4.4.2 Organisational identity

The previous exploration of organisational ethos allowed the more explicit identification of the sense of transcendence pursued by the SME. This sense of transcendence takes shape through organisational identity, which is unique to each organisation regarding with its key relationships.

At CCX, the team had never seen themselves as a single system with defined boundaries. There were almost as many different understandings of their identity as there were team participants.

The objective here was awareness of both the organisational principles that guide their daily actions and support their organisational culture, and the detailed key relationships that are part of their identity. Awareness of these two topics strongly encouraged a more systemic understanding of the organisation and, therefore, allowed the team to visualise the organisation using a more holistic perspective and with a greater sense of transcendence. This sub-phase has the following two themes.

4.4.2.1 Organisational principles

An important part of an organisation's identity is the set of beliefs upon which its relationships are based (Fuenmayor, 2013a, 2013b, 2013c). These beliefs are implicitly present in the organisation and members share and adopt them (Fuenmayor, 2012), forming an organisational culture that allows them to understand the way to act in the SME.

However, a change process implicitly involves a possible reconsideration of the current belief system (Adizes, 1992). The VSM carries in itself guiding principles that could transform the beliefs of SMEs when adopting them. Therefore, the researcher considered it relevant to share with the team some of the principles of the VSM in such a way that the employees could compare their own organisational beliefs with them, because the MetK+ carried a different way of understanding the way to act and influence the organisation in order to enhance its viability.

One of the key principles of the ModK+, to which the researcher gave particular emphasis, is related to performance measurement. According to Thomson (Osenseis, 2016: 1): "What is not defined cannot be measured. What is not measured cannot be improved. What is not improved degrades always". The organisational metrics defined from the beginning serve as key attractors for stakeholders and, at the same time, motivate staff when they can confirm results based on them. This spirit of achievement also benefits a team's confidence and enthusiasm for further improving and participating in the process of change (Kotter, 2012).

Here, the objectives were to review the VSM and interpretive systemology's guiding principles in such a way that the organisation would be able to compare them with their current beliefs, and to identify the key metrics which were going to be used to evaluate the impact of the change process.

The main activities implemented to achieve the above objectives were as follows:

1. The researcher reviewed the graphical representation of the guidelines for the MetK+ (Figure 20), in order to relate them to the reality of CCX before presenting them to the extended team.
2. The researcher then designed a workshop to review these basic guidelines with everyone in the extended team at CCX.
3. In a plenary session, the team explored, reviewed and validated guidelines for the change process. It should be noted that, during the workshop the team mentioned that the guidelines had an implicit common sense and, because of this, their understanding seemed natural to them.
4. After this validation, and as part of the same workshop, the team reviewed the basic metrics by which the change process would be evaluated. In order to define the metrics, the researcher presented the theory of constraints approach. In this way, three key metrics were worked: the 'throughput' or real income of the organisation; different key inventories to monitor and control; and the most relevant operational expenses. Using this method, the SME could define the starting point and main variables for monitoring the change process. Figure 44 shows the organisational metrics identified.
5. Once these metrics had been defined, the management and finance team integrated initial values as starting points for measuring organisational performance.

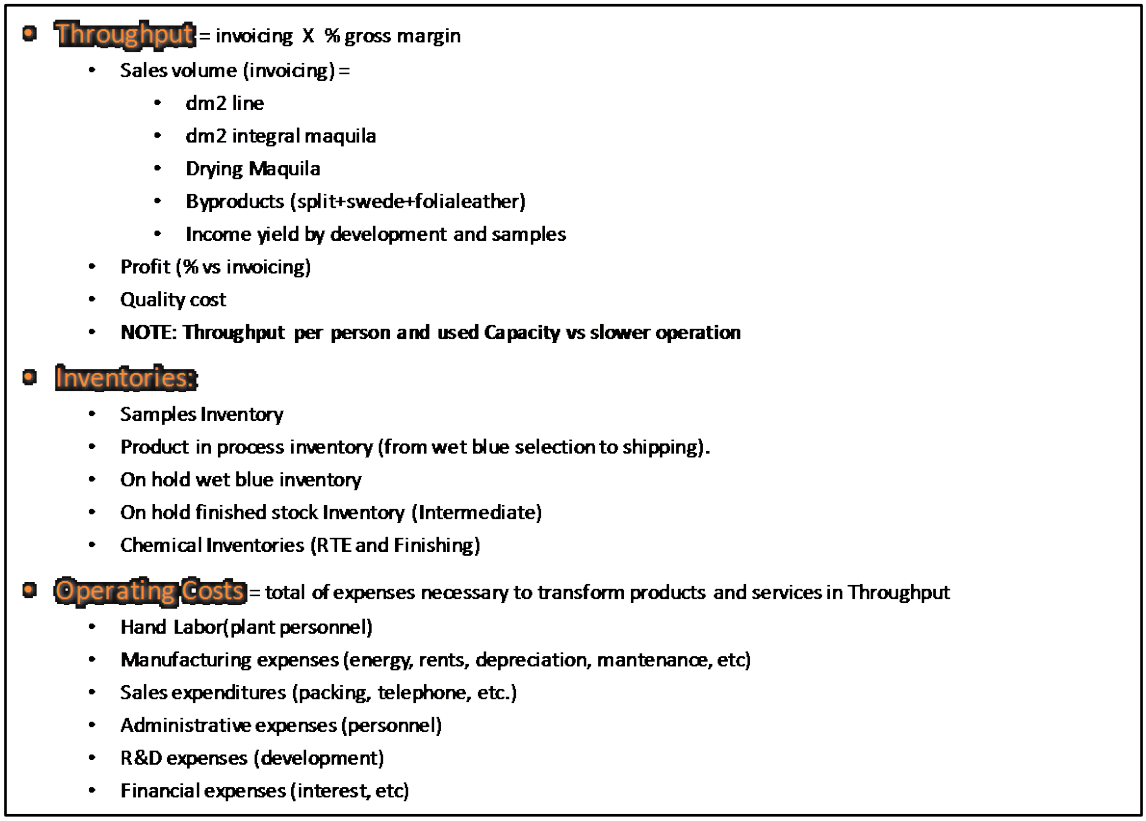


Figure 44: Organisational metrics identified

The main results were:

1. The explicit identification of guidelines on which leaders could rest the change process.
2. The opportunity for members to compare their existing beliefs against the implicit beliefs in the guidelines and be aware of the need to explore new paradigms for managing complexity.
3. The explicit identification, as a team, of key metrics to evaluate the impact of the change process implicit in the MetK+.

4.4.2.2 System identity

An organisation's identity is distinguished through the identification of key internal and external interactions with stakeholders. In the systems approach, there are different tools for exploring these relationships to set the essential definition of an organisation. Some examples are: a 'naming systems' tool called TASCOI (Espejo & Reyes, 2011); a tool called CATWOE and its essential definition of a system (Checkland, 1999); and a formal organisational model (Fuenmayor, 2001). All these tools help identify key relationships to understand the identity of

a system-in focus in a holistic way. In the case of TASCOI, such identification is made in terms of: its primary activities (T: transformation), internal relevant participants (A: actors and O: 'owners') and external stakeholders (S: suppliers, C: customers and I: intervenors). According to Espejo and Reyes (2011), the identity of an organisation must be recognised by the interested parties through their interactions. This means that the identity of an organisation also depends on stakeholders' recognition.

However, it is not enough simply to identify interested parties; it is also necessary to understand interactions from a systemic perspective in order to understand an SME holistically. The researcher explored these interactions jointly with the team using the VSM and was able to generate two benefits: on the one hand, these key relationships are precise and thus the system's identity is set; but, at the same time, this can also be a very basic first version of the SME's VSM.

Here, the objective was to identify explicitly the stakeholders in the system-in-focus, in order to represent them in the VSM and thus be able to understand holistically their key interactions as a system.

The following activities were developed to achieve the above objective:

1. The researcher designed a workshop in which a sequence was established to consider appropriate and logical ways of identifying and linking key stakeholders.
2. As an introduction, understanding of the VSM was reinforced by emphasising the location of key entities.
3. Post-its notes were circulated to the group and they were then asked to use them to consider the following aspects:
    a. To identify the products and services provided by CCX that generate income.
    b. To define the customer segments for the above.
    c. To identify the transformation processes which generate products and services.
    d. To identify inputs.
    e. To identify suppliers.
    f. To identify actors within the organisation.

g. To identify ‘owners’ or decision makers for the whole system.
h. To identify competitors.
i. To identify business partners.

4. Once the group had worked on identifying the above concepts, the next step was to place them on a flipchart on which had previously been drawn a simple outline of the VSM. The sequence for building it was key to the understanding of the group and this was done in the following way:
    a. First, an operations value chain was set by locating related Post-its on the VSM map in the following order: products and services; market segments and the clients associated with the products/services; transformation processes that generate products/services; necessary inputs for transformation; and the suppliers of such inputs.
    b. Then, all the actors involved in operations were identified.
    c. On the basis of this identification, the group worked on the meta-system, locating first the complementary actors of Systems 2, 3, 3*, 4 and 5. Subsequently, they identified the ‘owners’ in S5.
    d. The last step was to identify the suppliers, customers and business partners who collaborated with the SME to complement its value offer and, finally, the competitors for each market segment.
5. The work outlined above generated a basic version of the SME’s VSM, which appears in Figure 45.

The key relationships were thus specified at the first level of detail in the first representation of the basic version of the VSM. This representation, even in its first version, fulfilled the purpose of having an initial holistic display of the organisation.

The results were an identification of the key entities for the SME which, in turn, also clarified its identity and the first systemic understanding of the SME by all the people involved in the process. The participants expressed this insight at the conclusion of this workshop.

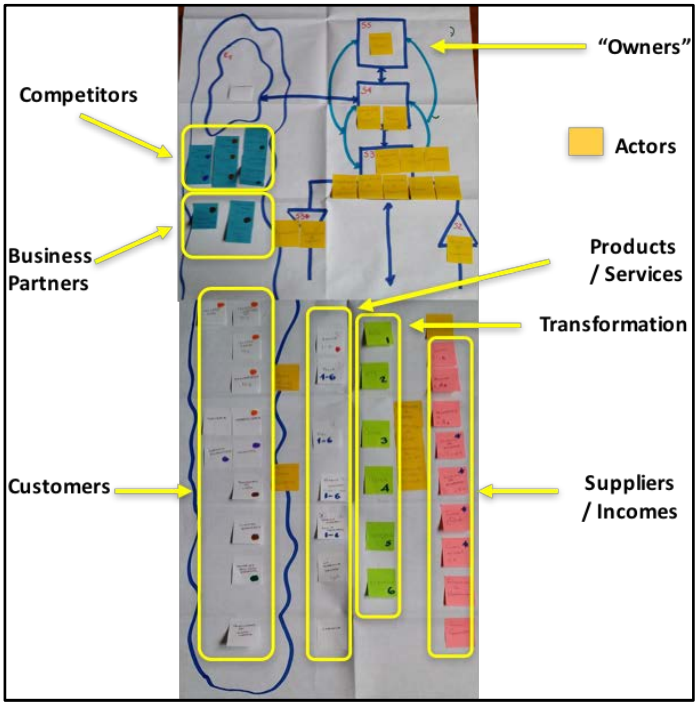
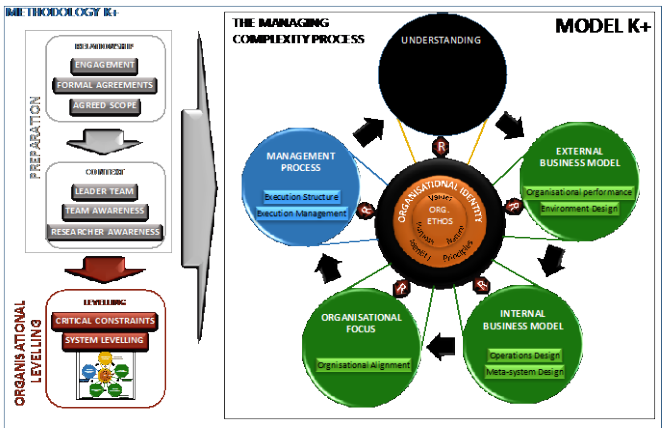


Figure 45: System identity and a basic version of the VSM

4.5 Phase: Understanding



4.5.1 Organisational system

A first draft of the organisation's VSM was produced in the previous Meaning phase, using a tool to name the system-in-focus. However, it was necessary for each key relationship to detail the specific actors who played a critical role in the functioning of the system.

CCX had not previously had any systemic representation of its system. Therefore, the idea of addressing this sub-phase was very attractive to the team because they wanted to use the organisation's VSM map to reflect on their organisation. The map became a transitional object for discussions between team members.

Here, the objective was to use the VSM for modelling. The team needed to distinguish between the different entities, based on their impact, which made up the system-in-focus to ensure that the team was fully aware of their current viable model.

4.5.1.1 Organisational distinctions

The detailed identification of key entities utilised the criterion in the Pareto principle (Pareto, 2015). The principle states that 20% of the invested input is responsible for 80% of the results obtained. Using this criterion, the researcher took into account the most significant variables for each identified entity in the SME's VSM. Thus, for example, this sub-phase aims to identify the 20% of customers who represent 80% of the SME's incomes.

Similarly, in an analysis of the entities that make up the Meta-system and Operations, beyond the simple location of different departments at the first level of detail, it was necessary to focus on interactions between the different functions within departments i.e., at the second level of detail. In the organisation, there were functions that might be grouped into one department but which systemically did not belong to it. Therefore, it is important to make internal distinctions at the level of function (second level) and not only at the level of departments or areas (first level). This effort to focus on the most relevant entities at the second level was also intended to help the team to contrast and reassess the perceived problematical situation, starting from the shared understanding that increases empathy between members.

Here, the objective was to identify, in detail, the most relevant entities and actors, both those internal to the organisation as well as external in the environment.

The activities involved were as follows:

1. The researcher designed a workshop to carry out this identification.
2. For this purpose, the researcher asked those responsible to identify in advance all the most relevant entities within each group (TASCOI) using the Pareto principle.
3. Prior to the workshop, the researcher also reviewed, with each person responsible, the relationship between the entities identified in the previous step.
4. During the workshop, the team addressed a detailed identification of each group in the same sequence used to identity. The following points explain this analysis and the criteria used to identify the most relevant entities:
    a. To specify the Operations throughout the value chain, an analysis was made in a plenary session with the team in the following order and in accordance with certain criteria:
        i. To identify products and services that generate greater throughput to the SME.
        ii. To define customer segments for the foregoing, located according to the criterion of greater throughput within each segment, and correlate them with products/services.
        iii. To clarify the transformation processes, located according to a criterion based on production capacity and, at the same time, locating bottlenecks.
        iv. To specify necessary inputs, located according to their impact on the cost of a product or service.
        v. To specify suppliers in relation to the most representative products in terms of cost and then the most relevant suppliers of those products with the greater impact on cost.
        vi. To specify the actors/roles of specific participants in the value chain.
    b. The team then made an analysis of the Meta-system based on the following:
        i. To specify actors/roles in the Meta-system by locating S2, S3, S3* and S4 but considering the type of function, not only the department or area.

ii. To specify the ‘owners’, identifying those who had the authority to alter the course of the system-in-focus. These were placed in S5.

c. Finally, the team reviewed the complementary actors in the environment, in addition to customers and suppliers, in the following order:
    i. To specify competitors, located according to the criterion of market share in relation to more relevant customers/ products/services.
    ii. To specify necessary and current business partners, located in accordance with different criteria:
        - For external governmental entities, those that had the facility to ask for necessary regulatory requests to be fulfilled were identified.
        - All the business associates who complemented CCX’s work in the different systems of the VSM were also identified.

Using this method, the team completed a second detailed mapping of the SME’s VSM, which then showed all the relevant entities in the system under analysis. It should be noted that even when the analysis was conducted using the Pareto principle, the team still had information about the entire universe (in their eyes) for each of the relationships identified.

The result of this theme was the development of a detailed version of the organisational VSM that represented the external and internal distinctions of the system-in-focus. Figure 46 shows this second detailed version.

A second result was the agreement of criteria between the members about the most significant variables in each relationship regarding the impact on the business. This also served them in reassessing their interpretations of their problematical situation.

Once the team had drawn up the second detailed version of the system-in-focus, they needed to review their problematical situation.

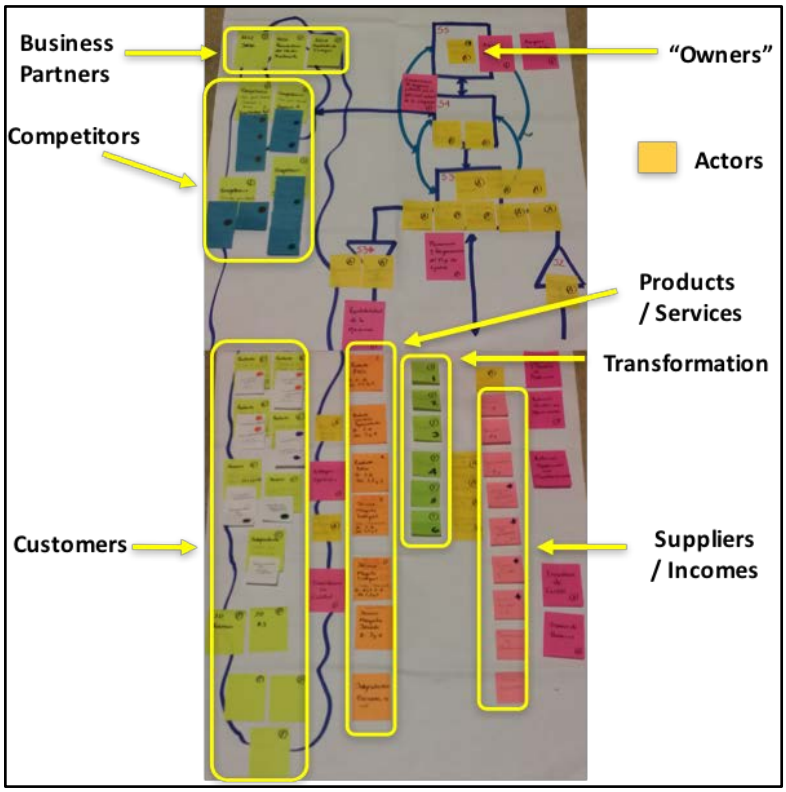


Figure 46: First detailed version of the organisation's VSM

4.5.2 Problematical situation

A problematical situation is problematic to the extent that it is perceived as such. Even when there are critical issues in an organisation, if the team does not act to address them, it may be because its members are not able to perceive or interpret such critical issues. Beer (1995) mentions that one significant amplifier of variety is the sheer ignorance of managers.

While someone is not capable of perceiving and understanding a problem, that person will not be able to act upon it. When someone is aware of a problematical situation, that person's energy flows to solve it. As Bacon (2001: 10) states: "Where the attention goes, the energy flows … where the energy goes, life grows".

Meanwhile, an external observer will barely understand the interpretive base that the members of an organisation use to analyse a problematical situation if she/he does not have a thorough knowledge of the beliefs that shape the organisational

culture. People's everyday behaviour is a reflection of the culture that gives context to this way of acting (Fuenmayor, 2001). Therefore, it was important for the researcher to explore the problematical situation identified in this research based on an understanding of the internal and external perceptions in relation to the situation.

However, even when such perceptions lead to understanding of the internal culture in relation to perceived problems, this may not be sufficient foundation for action. As stated at the beginning of this introduction, there may be serious problems that the team is not aware of or cannot understand. This is where the VSM in diagnosis mode can be of considerable help to team members in order for them to be able to 'look' into their organisation through the 'lenses' of the VSM, and, in this way, contrast and validate their own interpretations of the problematical situation. With these 'new lenses', team members will be able to perceive and understand the problematical situation relating to the system-in-focus.

Therefore, the objective here was to start by understanding the internal and external perceptions filtered through the VSM in order to understand the problematical situation. As a result, this process could also help team members to rethink their own paradigms and beliefs upon which is based their interpretation of reality in a way that leaders can identify the problematical situation and then focus their attention and energy upon solving it with a higher probability of having an impact on the business and a better working environment between them. This sub-phase has the following two themes.

4.5.2.1 Perceived reality

The perceived reality had two sources of perception: an internal perception that arose mainly from the actors themselves who collaborate within the SME; and an external one that arises from the opinions of external actors who can 'see from the outside'.

Exploring the internal perception of the problematical situation involved specific work with the people responsible in all areas of the company i.e., with the extended team.

In this case due logistical issues, the external perception was considered only with customers; their opinion of the performance of the system was also useful for the next Focusing phase. The insights of the customers of the problematical situation in CCX would serve to focus relevant actions to improve and thus redesign the CCX value offer to them.

Here, the objective was to identify the main patterns when analysing the perceptions, both internal and external, of relevant actors about the problematical situation in CCX. Thus, the researcher gained a better understanding of the cultural base on which rest the interpretations of the actors in relation to the problematical situation perceived by them.

The following activities were carried out for internal perceptions:

1. The researcher designed a workshop to gather information from the extended team based on the implementation of a SWOT (strengths, weaknesses, opportunities and threats) analysis (Dyson, 2004). Questions were designed to serve as the basis for gathering this information, as follows:
    a. What opportunities do you visualise in the environment that could be exploited to allow the organisation to achieve its objectives?
    b. What threats do you visualise in the environment that could be prevented to allow the organisation to achieve its objectives?
    c. What weaknesses do you perceive in the organisation's processes that could be addressed to allow the organisation to achieve its objectives?
    d. What weaknesses do you perceive between collaborators that could be addressed to allow the organisation to achieve its objectives?
    e. What weaknesses do you perceive in relation to customers that could be resolved to allow the organisation to achieve its objectives?
    f. What strengths do you perceive in the organisation's processes or could be further developed to allow the organisation to achieve its objectives?

g. What strengths do you perceive between collaborators that could be further developed and exploited to allow the organisation to achieve its objectives?
h. What strengths do you perceive in the relationship with customers that could be exploited to allow the organisation to achieve its objectives?

2. The extended team was invited to a workshop in which multi-keyboard technology was used to present a question simultaneously and every person could then, anonymously, write and view in a segment of the screen the responses to each question. This survey generated a database of the members' responses to each question.
3. The researcher then conducted a synthesis of the responses. For every question, he identified observable patterns by considering all the answers and preparing a presentation of the information. The researcher reviewed the presentation with the extended team to validate their answers and, in particular, the drafting of patterns that summarised them. The results of this synthesis are shown in Figures 47 and 48. From the two figures, it is possible to appreciate:
    a. A comparison of threats against perceived opportunities. Here were related the various threats against opportunities that could be taken advantage of in almost every case.
    b. A 'perceived reality map', on which weaknesses can be identified in the elliptical figures and strengths in the coloured boxes. Here, the researcher tried to correlate this analysis with the systems of the VSM. The researcher prepared and validated these summaries with the extended team. Both Figures 47 and 48 represent the validated versions of this work.

Using this method, the researcher integrated and validated the internal perception of the extended team with regard to the perceived problematical situation.

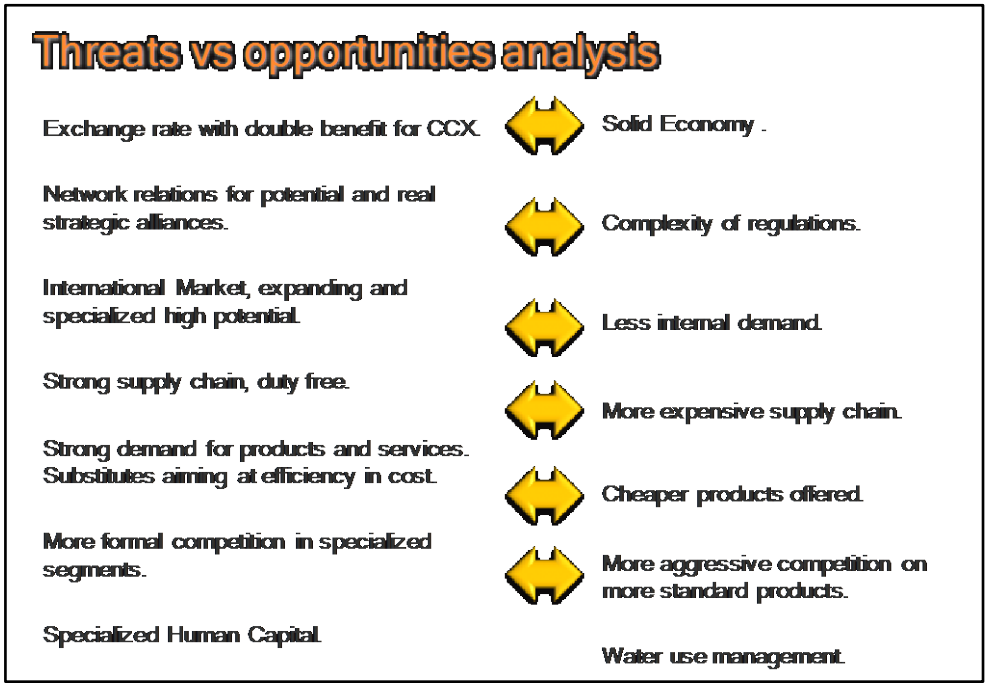


Figure 47: Threats vs opportunities analysis

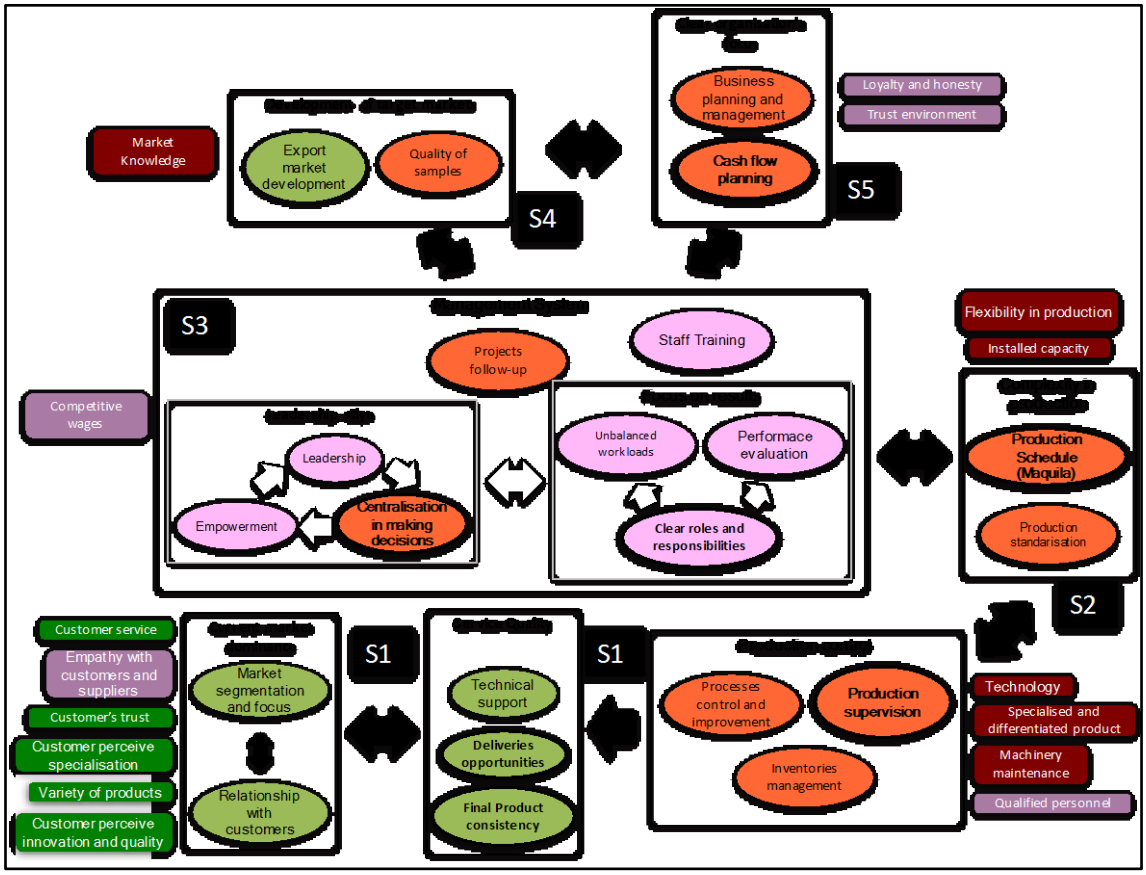


Figure 48: Perceived reality map

The following activities were carried out to identify external perceptions:

1. The researcher developed a dynamic to identify value attributes for customers from the commercial team's perspective, in order to focus efforts on achieving greater customer satisfaction in each market segment.
2. The researcher then, together with the commercial team, designed a survey to be applied to customers. This survey was based on two types of question:
    a. Open-ended questions, which were as follows:
        i. What does the organisation do correctly and should continue doing?
        ii. What does the organisation do that it should stop doing?
        iii. What should the organisation do?
    b. Closed questions, which focused on value attributes that were previously identified with the commercial team as most relevant: quality, service, innovation, opportunity and price. With these attributes as response options, the following questions could be asked:
        i. What are the three main attributes that are appreciated in the industry, regardless of whether CCX has them?
        ii. What are the three main attributes that you appreciate from CCX?
        iii. What attributes are seen in competitors that CCX has not mastered?
3. The relationship with the customers to whom the survey would be applied was integrated. In this case, 9 of the total 16 customers were selected to answer the survey. Responses were received and a database was compiled. Figure 49 provides a summary of the responses. The figure integrates value attributes evaluated by customers into a CANVAS curve (Kim & Mauborgne, 2005), which also reflects CCX's position against the competition and the industry for each attribute.

4. The integration of the results was presented and reviewed with the commercial team and then with the extended team. It should be noted that the commercial team was pleasantly surprised by the results; they thought that customers would be evaluated CCX in a negative way. This finding positively encouraged the team to work on closing any gaps.

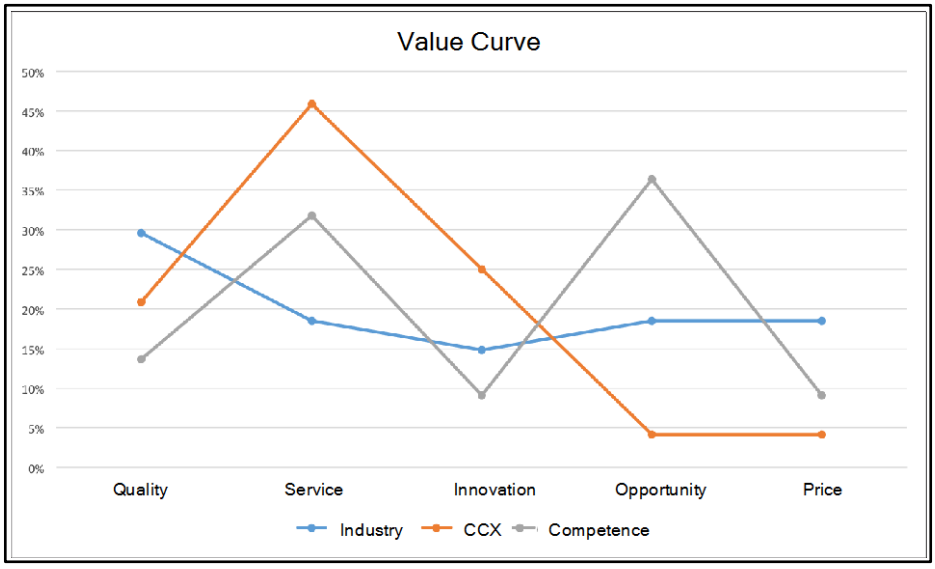


Figure 49: CANVAS curve comparison between CCX, the competition and the industry

The results were the synthesis of the internal and external perceptions of the main stakeholders in the organisation. In addition to these results, three other results were obtained that impacted positively on awareness and group dynamics:

1. The workshop to synthesise the SWOT patterns served to enhance members' empathy and shared consciousness of the different complications that every area was facing.
2. In the same way, a review of the external survey results improved the team's awareness of customers' perceptions, as well as the team's understanding of the relative importance of each value attribute for customers in relation to competition and industry. This situation generated a clearer and more specific understanding of the relevant aspects to address to improve the organisation's competitive position.
3. Reviewing the completed synthesis, both internal and external, also allowed members to begin an integral exploration of the problematical situation of the system-in-focus. In this way, leaders achieved a more systemic understanding of the organisation's problematical situation by considering both internal and external perceptions.

4.5.2.2 Complexity generators

When in an organisation each person faces her/his own problematical situation, at least two effects are generated: the situation persists and, worse, more conflicts are generated in a team trying to face different problematical situations. Much of the energy is consumed by trying to convince each other of the importance of a problematical situation as perceived by each individual. In addition, this problematical situation might regularly be seen in other departments but not their own, which further complicates the interactions between members (Kaplan & Norton, 1997). Alignment is necessary between members in order to increase the viability of the organisation. In order to focus efforts, the team needs to share a problematical situation to align their energy towards a common target.

Nevertheless, it is not enough to take into consideration only the perceptions of relevant actors in order to generate a definitive diagnosis, because what they perceive and interpret does not necessarily correspond to the problematical situation of the system. In order to achieve a diagnosis, the use of the VSM is essential, because using VSM principles is how members can compare and validate their perceptions.

Here, the objective was to make a diagnosis of the organisation as a team, in a specific moment, using the VSM as the means for filtering and validating the team's perceptions and interpretations of the perceived reality and thus share an understanding of the problematical situation faced in order to focus energy and efforts to deal with it.

The following activities were conducted for the development of this theme:

1. The researcher designed a workshop and included a presentation of the results of the internal perceptions, external perceptions and the foundations and principles of the VSM.
2. The researcher also updated the latest version of the SME's VSM map. He added the validated results of the Meaning phase - values, purpose and nature of the organisation - to the VSM map. These elements were represented in the map metrics to serve as a basis for evaluating the

performance of the organisation. All this was added to the map in order to help the analysis of the problematical situation.

3. The extended team participated in a workshop with the following agenda to review:
    a. The definition of a viable system.
    b. The synthesis of internal and external perceptions.
    c. The SME's VSM map.
    d. The VSM principles.
4. After reviewing the above issues, there was a plenary session with the whole team. The researcher distributed a sheet with a summary of the internal and external perceptions to each participant. He also gave Post-its notes to everyone. While considering the VSM principles, each team member reviewed the summary of perceptions and then wrote down what her/his judgement was regarding the problems, trying to distinguish them from undesirable effects. The team members were asked to focus, individually, on only the main issues.
5. Each team member then placed on the VSM map the problems she/he identified as being most directly related.
6. The researcher then reviewed jointly with the team the problems identified in the Operations, Meta-system and Environment. In doing so, the team reviewed organisational ethos and identity, the VSM principles and the purpose of each of the VSM systems. In this way, problems were grouped into related patterns and, above all, the leaders validated that they were problems and not undesirable effects.
7. At the end of this dynamic, the entire team had identified and validated the problematical situation of the organisation, as represented in Figure 50. It should be noted that on this occasion problems were identified in all the systems of the VSM, but this does not necessarily always have to be the case.
8. To close the exercise, the researcher and the team worked on a final synthesis, so that each participant would gain a clear idea of the problematical situation identified. The researcher generated a graph representing the synthesis of the dynamics of the interaction of the problems previously identified (Figure 51)
9. The researcher then asked each participant to explain this synthesised problematical situation to ensure that understanding had been shared and

grasped by the team members. The problems found in the final synthesis were called ‘complexity generators’, as it was concluded that the five generators identified were those that caused undesirable perceived effects, both internally and externally. This synthesis allowed the team to share in understanding the problems in the specific context of CCX.

There were two results: identification of CCX’s problematical situation represented in a new version of CCX’s VSM map (Figure 50); and a synthesis of the called ‘complexity generators’ (Figure 51) present at the time the analysis was undertaken. For this research a complexity generator is a main problem, i.e. solving this main problem means an impact on many undesirable effects.

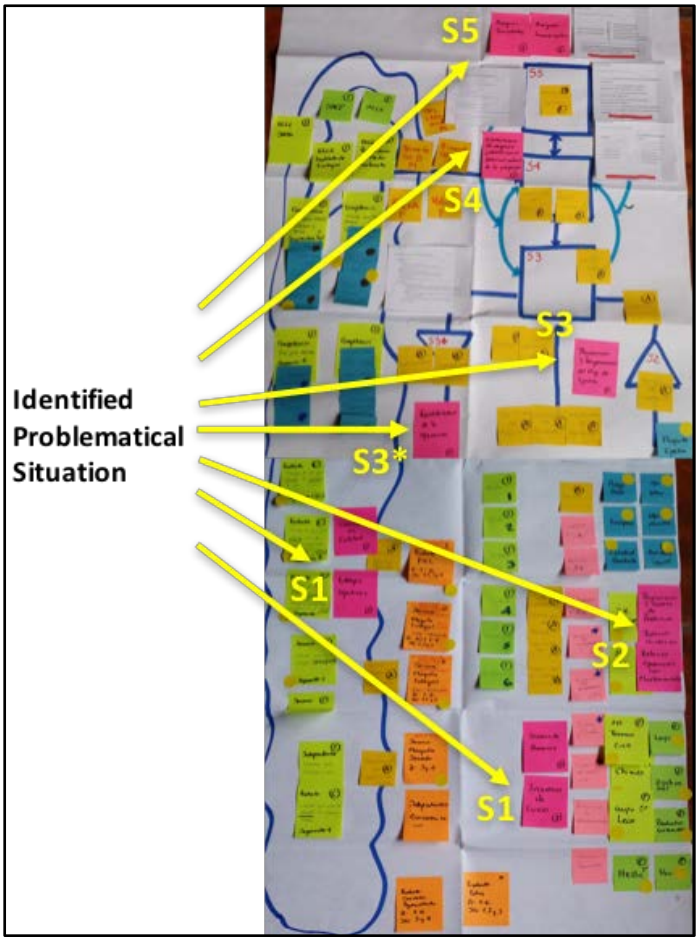


Figure 50: Identified problematical situation

However, other favourable results were obtained by generating awareness in the team: greater empathy among the team members when sharing various undesirable effects; a more systemic understanding of the problematical situation

that CCX is required to address; and a clearer and shared approach of drivers to action outlined to address the problematical situation.

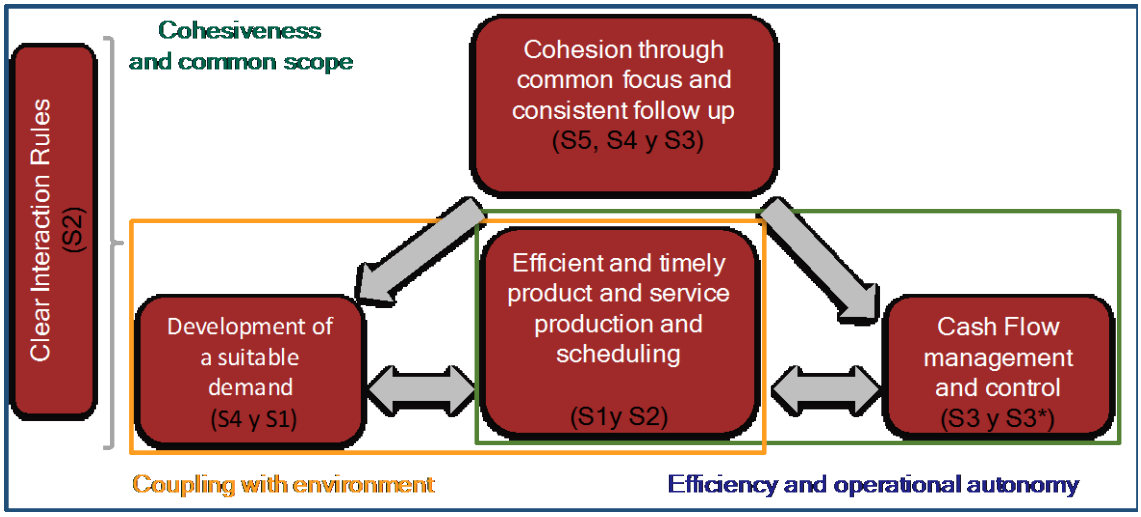
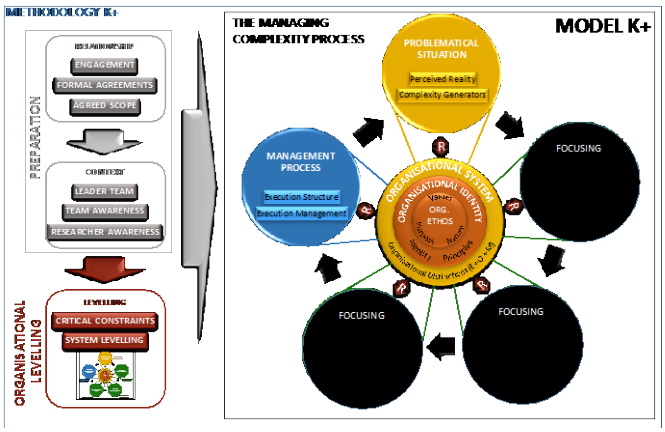


Figure 51: Summary of the problematical situation (complexity generators)

In this way, the team was able to finalise an organisational diagnosis, thanks to which the organisation was ready to continue towards the Focusing phase.

4.6 Phase: Focusing



4.6.1 External Business Model

Within this sub-phase, the researcher addressed the first ‘design block’, which includes a definition of the expected results and an identification of the

environment in which to achieve them. With regard to the expected results, these were discussed in the Levelling phase under the two key business variables in managing cash flow: throughput and operating expenses (Goldratt, 1991). Throughput is generated primarily through the relationship with the external environment with customers. Operating expenses are mainly optimised to the interior, through interaction between Operations and the Meta-system. The definition of these two variables serves as a basis for focusing both internal and external design.

In the Levelling phase, CCX faced challenges to its survival. In the time CCX spent developing the Focusing phase, the organisation had already shown an evident path towards a development-growth scenario based on trends in the results. In addition, CCX had information that clarified new expected results. Some changes in organisational design had also worked very well. Both factors increased the team's confidence and commitment to reviewing this stage in a different scenario.

Thus, the objectives of this sub-phase were to specify as a team the results expected in a period of time and thereby design a more suitable environment in which to achieve them in order to promote CCX's viability. This sub-phase has the following two themes.

4.6.1.1 Organisational performance

As has been discussed, a cornerstone of the ModK+ and MetK+ is the definition and monitoring of organisational metrics to evaluate the process of change. This allows a more concrete and practical approach for the people involved (Bossidy & Charan 2002). In order to define these organisational metrics, Mexican SMEs have at least two different scenarios in the survival life-cycle (Lewis & Churchill, 1983; Lipi, 2013; Pereneyi, 2011). First, an SME is consistently able to achieve its financial break-even because it has a value proposal that allows the achievement of a consistent demand for products and services. In addition, the SME can project an expected minimum demand, which allows it to be more selective and focused on its value proposal for more convenient demand. Thus, the SME is able to explore different ways to grow and develop. In the first

scenario, the organisation seeks ‘long-term viability’. In the second scenario, the SME is not able to achieve its break-even consistently. It has a value proposal and a relationship with its environment that makes it difficult to achieve a consistent minimum demand for at least its break-even. In this scenario, the organisation is focused on survival. Here it seeks ‘short-term viability’, enabling the organisation to survive.

In both the above scenarios, the SME has an implicit or explicit history of organisational metrics that reflect its performance over time. In order to define the starting point for these organisational metrics, it is important to understand this performance in depth. It is also important for the SME to assess whether it is located in the scenarios presented, in which the key is consistent behaviour to reach break-even and ensure the minimum necessary demand to maintain this.

On the other hand, to define expected organisational metrics in either of the two scenarios, it is important to consider the team when developing them. It is important to have members of, at least, S3, S4, and S5. These organisational metrics are, finally, an expectation for which it is required to consider both the present organisational reality perceived by S3, as well as future possibilities noted by S4, and balance both points of view by the S5 (Beer, 1995).

Here, the objective was to define the results that the SME would seek, either to survive or to grow and develop. Thus, the SME seeks to have a better idea of the necessary environment with which to interact. This definition needs both perspectives: present and future.

To achieve the above, the following activities were carried out:

1. Once the variables on which performance would be measured had been identified (within the Organisational Principles theme), the researcher worked with the CEO and the Administration and Finance Manager (AF) to state the different organisational metrics used by the management team to change processes. Prior to this research, several financial indicators were reviewed by CCX but not integrated into the three organisational metrics (throughput, operating expenses and inventories). Thus, a structure of information was

created in order to relate all past indicators with organisational metrics for the change process.

2. The researcher then, in agreement with the CEO, asked AF about integrating a report with a history of these metrics in the new structure. AF validated this report with the CEO.
3. Subsequently, a meeting was convened with managers from S5, S4 and S3 to review this report and project the expected results. At this meeting, the status of the containment plan's actions was reviewed to assess the history of its performance and its progress. The team was aware that they were still in a critical stage of survival. Thus, organisational metrics were focused on achieving break-even as soon and as consistently as possible. With this in mind, the team identified the minimum expected results required to reverse the situation. With this analysis, this team defined the expected goals for the next two months.

Specific results achieved for this theme were as follows:

1. A database was obtained to evaluate historic performance with the new structure of integrated information about organisational metrics.
2. The timely identification of goals to achieve for each defined organisational metric. Table 28 presents a matrix overview in which both historical information on organisational performance (July and August 2014) and the expected results for the next two months (September and October 2014) for the change process can be seen.

The above exercise also served to align and unify focus between the management team upon S3, S4, and S5.

4.6.1.2 Environment design

The strategies to address a problematical situation in a coordinated manner are determined by the environment in which the organisation decides to operate with (Beer, 1995). An SME has the power to decide in which environment it should be focused to achieve requisite variety and thus improve its viability over time. The environment with which the organisation establishes a coupling is ultimately the decision of the organisation (Beer, 1995).

Table 28: Detailed organisational metrics and expected results

THROUGHPUT	JULY '14	AUGUST '14	SEPTEMBER '14	OCTOBER '14
Leather sales (dm2)	1,613,868	1,404,803	1,814,400	1,895,040
Maquila (dm2)	428,946	200,711	480,000	480,000
Maquila-Dry ($)	$ 1,222,134	$ 352,432	$ 835,200	$ 835,200
Maquila-Dry (Lados)	32,884	30,667	32,000	36,000
Integral Maquila ($)	$ 695,549	$ 668,073	$ 532,160	$ 598,680
Subproducts ($)	$ 861,537	$ 771,256	$ 850,000	$ 850,000
Leather Price ($)	$ 4.75	$ 6.35	$ 4.76	$ 4.76
Hide cost ($)	$ 2.72	$ 3.76	$ 2.76	$ 2.76
Gross Margin ($)	$ 2.03	$ 2.59	$ 2.00	$ 2.00
Inputs-Ch cost ($)	$ 0.69	$ 0.92	$ 0.65	$ 0.65
Net Margin ($)	$ 1.34	$ 1.67	$ 1.35	$ 1.35
Tanning cost ($)	$ 0.30	$ 0.30	$ 0.30	$ 0.30
Flesh recovering ($)	$ 0.43	$ 0.40	$ 0.40	$ 0.40
Flesh Throuhput ($)	$ 0.13	$ 0.16	$ 0.10	$ 0.10
Throughput-Leather ($)	$ 2,162,583	$ 1,756,003	$ 2,449,440	$ 2,558,304
Throughput-Maquila ($)	$ 1,060,579	$ 510,253	$ 683,680	$ 716,940
Throughput-Flesh ($)	$ 209,803	$ 168,576	$ 181,440	$ 189,504
TOTAL	$ 3,432,965	$ 2,434,832	$ 3,314,560	$ 3,464,748

INVENTORIES	JULY '14	AUGUST '14	SEPTEMBER '14	OCTOBER '14
Samples Inventory (sides)	70	93	70	70
Samples Inventory ($)	$ 14,980	$ 19,973	$ 14,980	$ 14,980
P/Process Inventory (sides)	3,499	4,828	4,821	4,821
P/Process Inventory ($)	$ 2,617,252	$ 3,611,344	$ 3,606,108	$ 3,606,108
Wet Blue Inventory (sides)	875	872	654	654
Wet Blue Inventory ($)	$ 497,000	$ 495,296	$ 371,472	$ 371,472
Finishing Inv W/Mov (sides)	3,049	3,895	2,000	1,000
Finishing Inv W/Mov ($)	$ 652,486	$ 833,459	$ 428,000	$ 214,000
Ch Prod Inventory (RTE+F) ($)	$ 1,239,050	$ 1,504,184	$ 928,138	$ 628,138
Ch Prod Inventory W/Mov ($)	$ 264,908	$ 353,211	$ 264,908	$ 264,908
TOTAL	$ 5,285,676	$ 6,817,467	$ 5,613,606	$ 5,099,606

OPERATING EXPENSES	JULY '14	AUGUST '14	SEPTEMBER '14	OCTOBER '14
Labor cost ($)	$ 619.00	$ 692.00	$ 519.00	$ 470.00
Manufacturing cost ($)	$ 920.00	$ 1,160.00	$ 820.00	$ 820.00
Sales cost ($)	$ 250.00	$ 266.67	$ 200.00	$ 190.00
Administrative and Tax ($)	$ 880.00	$ 1,026.67	$ 750.00	$ 750.00
Dseign and development ($)	$ 97.00	$ 101.33	$ 76.00	$ 76.00
Financial cost ($)	$ 600.00	$ 800.00	$ 380.00	$ 380.00
TOTAL	$ 3,366	4,046.67	$ 2,745	$ 2,686

Thus, once the results to achieve have been defined, there were two questions to explore: What environment must the organisation interact with to generate the necessary requisite variety? How can the organisation develop markets that will allow it to achieve a suitable demand that ensures the organisation's viability? A

suitable and consistent demand for products/ services is crucial in order to generate the necessary cash flow to merely survive or to grow and develop. From an extreme viewpoint, without demand, Operations would not be required and, without these, the Meta-system is not necessary.

Under the above consideration, it was very important to determine how to approach the design of the environment. For this purpose, organisational identity was taken as the starting point because it considers all the relevant actors (internal and external) in the system under analysis. As mentioned above, this analysis was undertaken in three 'blocks': first, the Operations value chain was built using the K+ sequence: products/services, clients, transformation processes, inputs, suppliers, and actors; second, analysis of the Meta-system identified the actors and 'owners' of the system; and third, the complementary environmental stakeholders were reviewed: competitors, business partners and government agencies. From the previous summary, it is possible to observe that in the case of value chain analysis, it starts with the customer and its relation with the most suitable products/services. The rest of the chain depends on the customers' selection and the products/services. At this point in the analysis, the customers were the most relevant actors in the environment, since even suppliers 'depend' on their selection.

Similarly, formation of the Meta-system is dependent on the type of support that Operations need to increase their requisite variety and deliver products/services to selected customers.

Finally, after analysing the complementary actors, it was again observed that business partners are based on selected customers and products/services. The position of these actors is also, somehow, dependent. However, in the case of competitors, they are themselves relevant, since they are related to another stone of the ModK+ related to value attributes. The selected attributes influence the entities that are to be considered competitors.

However, it is important to remember that throughput, as a key variable in the management of cash flow, is also generated by the direct relationship with customers through income to the system resulting from the interaction with them.

In short, in designing an external environment, a key factor is the relation between the customers, the products/services and competitors that allows the generation of suitable demand, and ensures the necessary throughput for the healthy management of cash flow. This favours the managing of complexity for SMEs.

According to Kim and Mauborgne (2005), demand generation has two main approaches: through traditional competence (with approaches oriented to marginal improvements in products/services); or through value innovation (with a differentiation-oriented approach) that allows the organisation to differentiate itself from the competition, enhance the current market or develop new markets. SMES have important advantages over larger companies, one of the most important of which is their speed of adaptation to change. This speed of adaptation requires value innovation, but here appears a challenge: a limitation of the resources that are necessary but are in a world of traditional competition (Kim & Mauborgne, 2005). The ModK+ encourages value innovation as a strategy for developing new markets. However, value innovation is not only at the level of product/service, but also at the level of the business model (Ruelas-Gossi, 2009).

The objective focused on designing an environment that allowed the generation of suitable demand through the analysis of the relationship between customers, products/services and competitors. This design was achieved by a differentiation of value proposal, to be able to generate requisite variety and a healthy and necessary cash flow.

The following activities were implemented:

1. The researcher prepared a workshop to identify in detail the customers, market segments and products/services which were the most suitable for driving the company's survival. The managerial team was invited to the workshop, along with representatives of all the systems of the VSM.
2. The researcher began the workshop by reviewing briefly the synthesis of the problematical situation. In this synthesis, the generation of suitable demand and its effect on cash flow were identified as the main problem with the environment.

3. Within this workshop, the researcher also reviewed the strategic orchestration approach seen in chapter 3. Participants realised that the competitive advantage arises from becoming an orchestrating node in order to have a competitive advantage against other SMEs in the sector.
4. CCX has high product differentiation as a competitive advantage in its businesses: leather, drying maquila, integral maquila and selected sub-products. The results of all this analysis are shown in Figure 52: of all possible offers and present segments (12), CCX decided to focus (shown in the boxes) only on the most suitable.

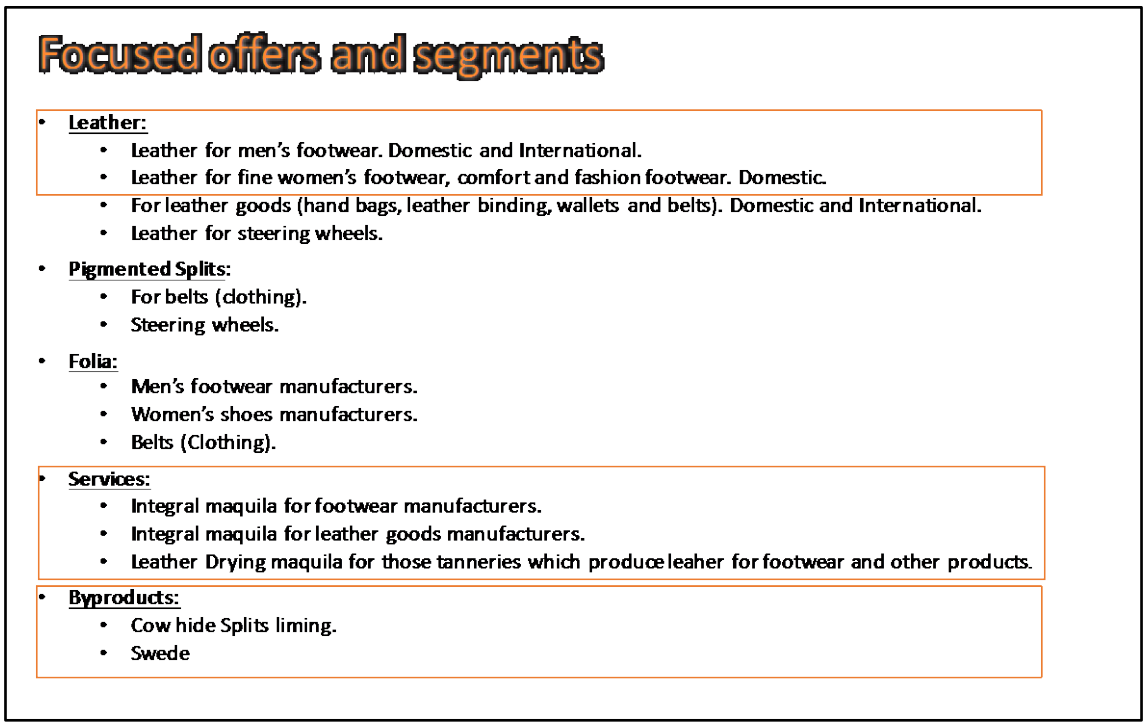


Figure 52: Focused offers and segments

5. The criteria for developing the most suitable offer for the context of CCX were checked. A key factor was to maximise the use of raw hides because of the need for cash flow. Based on these criteria, the team also defined suitability criteria to maximise the use of raw hides in the chosen offers and segments. This definition can be seen in Figure 53.

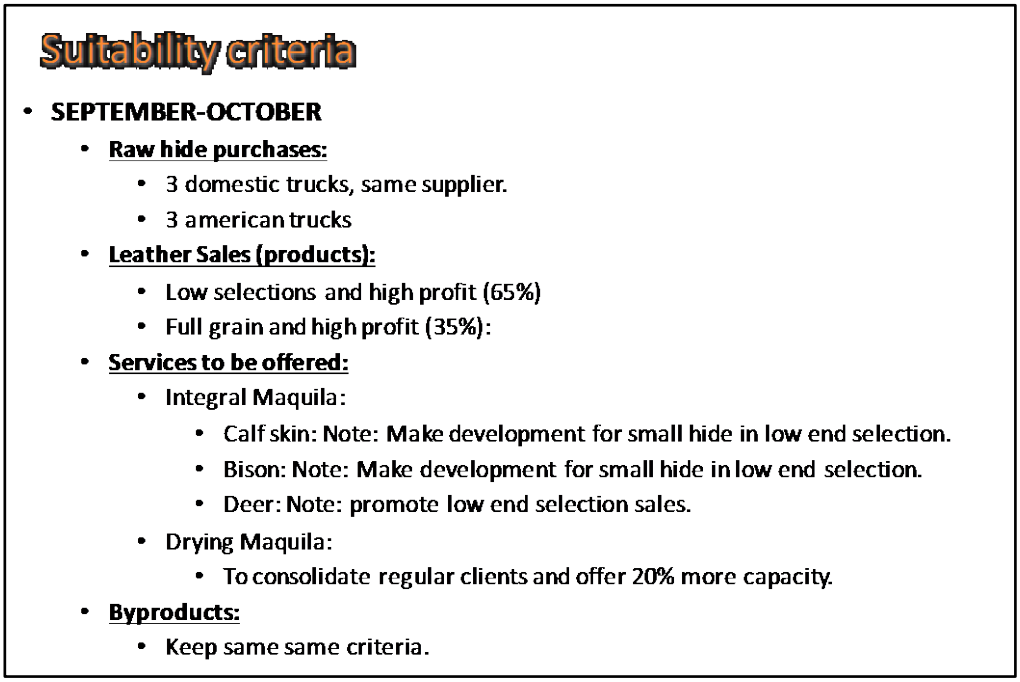


Figure 53: Suitability criteria

6. Once the managerial team had agreed the offers and segments and criteria more suitable for the reality of the organisation, it was important to ratify the value proposal that, at the time, was tending to be more attractive to current customers. In order to consolidate demand, the team decided to focus on the following attributes: opportunity for deliveries and product quality, as shown in Figure 54.

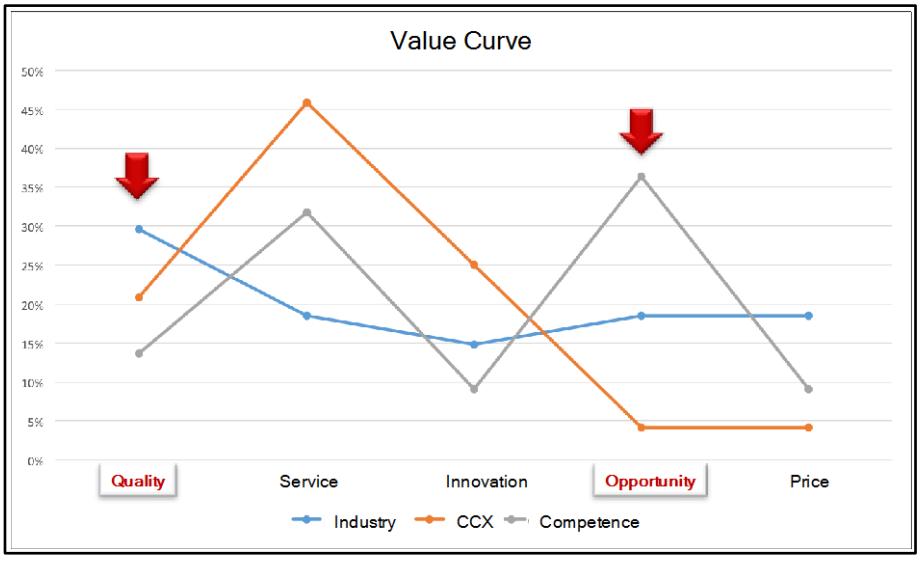


Figure 54: Value attributes to promote

7. Based on consideration of the attributes of quality and opportunity to be achieved, the next step was to estimate the overall sales quotas for each of the chosen segments and ensure the minimum necessary income to achieve consistent break-even. Subsequently, the team considered a feasible minimum demand to achieve for each segment. The results for each of the selected segments are shown in Figure 55.

Figure 55: Minimum commercial targets

8. The next step was to review the organisation's VSM map and use it to review systemically any implication of these decisions for the performance of the system. In addition, relations between products/services and their respective customers were detailed. For each of these blocks, the team reviewed the current competition in detail. In its analysis of the environment, the team also checked business partners and government entities. The way the VSM map was updated is shown in Figure 56.
9. The final step of this selection consisted of detailed customer identification to generate suitable demand in each segment. Two real-world examples of this analysis are presented in Table 29 (leather for women's and men's footwear in square decimetres). It should be noted that, after this detailed analysis, CCX identified a potential demand in all segments, and improving product quality and opportunity for deliveries seemed to reverse the situation to achieve the necessary minimum income.

Using the above method, a review of the selected environment that should be focused upon to achieve desirable and necessary demand was completed, and thus helped achieve short-term viability sooner than expected.

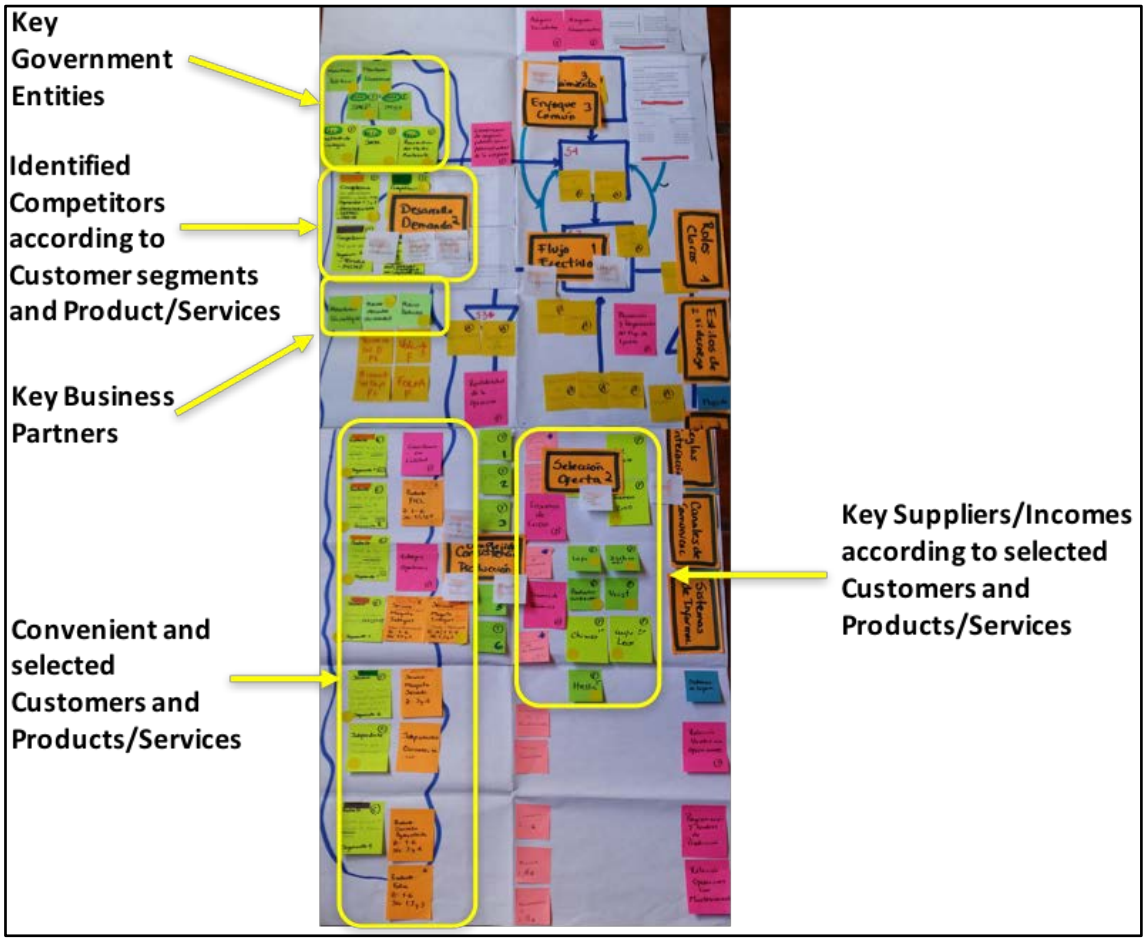


Figure 56: Organisation's updated VSM map considering the selected environment

Results obtained using the above design were as follows:

1. A precise identification was made of the most suitable products/services and criteria to handle each of them.
2. Market segments upon which to focus based on the most suitable products/services.
3. Value attributes to drive a new value curve to achieve required demand.
4. Commercial targets (quotas) to pursue in order to reach break-even.
5. The explicit identification of an environment with which the organisation will be coupled to be viable in the short term: clients-competitors, suppliers, business partners and government entities.

Table 29: Detailed customer analysis (real-world examples)

Product	Sector	Type of leather	Salesman	Markets					Sales (Dm2)	
				Customer	AAA	A	B	C	POT	2013	Expected 2014
Shoe leather	Men	**Durashoe**	Claudia	Duramas						330,000	600,000
			Gloria	Majar						15,000	40,000
			Alejandro	Dclase							65,000
			Alejandro	Colehaan							32,500
			Alejandro	Nuevo China							32,500
			Claudia	Kenley							13,000
		Gentry (color)	Gloria	Angar						20,000	40,000
		New Gentry	Alejandro	Allen Edmonds						30,000	50,000
		Everest	Alejandro	Boulet						20,000	30,000
			Claudia	Chavita							13,000
			Claudia	Nuevo Nacional							19,500
			Alejandro	Nuevo Exportación							19,500
		Atmosfera/Gér	Gloria	Evolución						50,000	50,000
			Claudia	Sccapino							26,000
			Claudia	DMC							26,000
		Montegrapa	Gloria	Evolución						50,000	50,000
		Dinasty	Gloria	Andrea						50,000	50,000
			Alejandro	Nuevo Exportación							13,000
			Gloria	Nuevo Nacional							13,000
		Apalossa (beig	Gloria	Angar						20,000	20,000
		Ciclón	Claudia	Duramas						30,000	50,000
			Gloria	Angar						20,000	20,000
			Alejandro	Nuevo Exportación							13,000
			Gloria	Nuevo Nacional							13,000
		Buenos Aires	Gloria	Flexi							260,000
			Glira	Vaqueras							
	Women	Aida	Claudia	Gillio						80,000	100,000
		Vegetale	Claudia	Gillio						40,000	50,000
			Claudia	Dione							32,500
		Vernice	Claudia	Duramas						20,000	30,000
		Murano	Gloria	Andrea						100,000	100,000
		Napa lady	Gloria	Interselec						25,000	30,000
		Lady Alfredo	Gloria	Alfredo Shoes						40,000	50,000

The main intangible result was the effect which this whole process had on the current team's beliefs On the one hand, the process followed allowed participants to understand their previous business model and the beliefs underlying it, but, at the same time, the VSM combined with other models (value innovation and strategic orchestration) allowed the leaders to see and understand their current and future business from a different perspective, and with another very different business potential from the one perceived previously (this was commented upon by the participants on the conclusion of this workshop).

4.6.2 Internal business model

According to Beer (1985, 1995), S1s must generate at least the requisite variety to interact with the chosen environment. Simultaneously, it is also necessary for the Meta-system to enhance the requisite variety of its Operations, ensuring the

necessary cohesion in the system and improving the viability of the organisation over time.

Nevertheless, even if an environment is selected, it does not imply that it is possible to manage it, as it may be beyond the control of the organisation itself. However, inside an SME, the situation is different: the organisation has the power to decide the internal design that it considers most appropriate to couple with its environment. It is necessary to form a balance between the vertical variety of the Meta-system and horizontal variety using the Operations (Beer, 1995).

In addition, it should be clarified that it is people who implement any organisational design; they are the heart of the enterprise (Beer, 1995). A team's full and clear understanding of the organisation's design is necessary to effect a successful implementation.

On the other hand, in this sub-phase, high expectation of the redesign was present in CCX. The team had already seen the results of a redesign earlier in the Levelling phase and they knew the impact that it could generate. In addition, the team had a better understanding of the VSM. Thus, while the team's expectations were higher, they were, at the same time, already aware of the operational implications of having a balance between vertical and horizontal variety and its effect on business.

Therefore, the objective in this sub-phase was to focus on the internal redesign (O+M), in order to address the problematical situation detected and be capable of generating the requisite variety to adapt to the chosen environment. This sub-phase has the following two themes.

4.6.2.1 Operations design

To be able to generate the requisite variety, operations should examine and promote their maximum possible autonomy in the organisation (Espinosa & Walker, 2011), as this is a key principle of this design. Autonomy is formed through the interaction of different key elements, such as work processes, rules

of interaction, methods, tools and equipment. However, one key variable in any system is the precise formation of the human team that enables all the above elements.

On the other hand, and derived from the complexity generators identified, it is possible to draw an initial approximation of the main necessary attenuators (AT) and amplifiers (AM) to be developed. The ability to develop these ATs and AMs is highly influenced by the formation of internal teams.

It is also possible to use the VSM principles to review the quality of internal organisational design to the extent that the responsibilities, performance metrics and communication channels are appropriate and increase the system's ability to generate the requisite variety. For these reasons, in this theme and the next, the researcher focused on reviewing the integration of the team responsible for making best use of all available elements to generate the requisite variety. The way to comply and communicate within such a team largely determines the ability of an organisation to address variety. Once the internal design had been reviewed, the team moved to validate the minimum necessary elements to do this.

Here, the objective was to review the organisational design in operations in such a way that it would allow the best use to be made of all available elements to develop attenuators and amplifiers to increase autonomy and generate the requisite variety for the environment.

The activities undertaken in this theme were as follows:

1. The researcher designed a workshop in which the team would carry out a review of the operations design. It should be noted that this workshop was conducted in four sessions because of the necessary level of analysis and consensus. This workshop needed four inputs: an integral synthesis of the problematical situation; the SME's VSM map already updated to its environment; an updated policies manual; and an updated roles matrix. The last two inputs were generated when the containment plan began.
2. As a next step, the researcher revised the list of participants to design the operations with the CEO and HR Manager and they decided to invite all the

staff with a direct participation in the value chain: the whole team of production coordinators (six people) responsible for programme scheduling; the maintenance coordinator, responsible for product development, responsible for purchasing; and the HR Manager, along with the CEO.

3. During the session, the followed agenda was used:
    a. A review of the complexity generators identified in the problematical situation in such a way that challenges were indirectly reviewed. These complexity generators were represented on the VSM map. As a summary of this analysis, there follow the key findings of the team to be considered in the design:
        i. Clear rules of interaction: a need to review these, particularly in interactions between the S1s and other support areas.
        ii. Common focus and follow-up: a need to share operations through the support of an internal general leader.
        iii. Suitable demand: a need to strengthen opportunity and the quality of the final product/service.
        iv. Programming and efficient operation: a need to work different schedules as anti-oscillatory mechanisms to improve production flow and count on clear responsibilities and formal communication channels.
        v. Operations flow management: a need to ensure necessary support from the meta-system to operate S1s on time.
    b. The basic organisational guidelines, already validated, were reviewed again to consider them in the design to be made.
    c. The CEO explained the environment design that was the outcome from the previous theme.
    d. In considering the complexity generators referred to previously, the team explored the main attenuators and amplifiers needed to address the problematical situation. These attenuators and amplifiers were also represented on the VSM map.
    e. In the following step, the team began to assess if the attenuators and amplifiers identified were enough to generate the requisite variety. This activity was developed using the VSM map to facilitate a systemic vision upon having made the analysis.

f. Once all the above steps had been validated, the next was to review the internal design required in operations. This design was addressed by considering the first level of recursion of CCX's VSM using the VSM guidelines. The most significant changes in the operations design, revising them as a viable system in themselves, were as follows:

   i. The need for general responsibility for operations to be given to the person who was previously designated the coordinator during the containment plan was confirmed. It was important for S1s to set the internal S5 to promote cohesion which would, in turn, work the internal S4 and S3. This new scope of the role was also necessary to meet the main key interactions between the S1s and support areas (S3), in such a manner as to facilitate autonomy of the S1s.

   ii. Responsibility of the S1 related to maquila drying and integral services was also confirmed. Although this S1 represented a small amount of income, it represented most of the direct earnings.

   iii. In relation to the S1 aimed at leather production and maquila services, which run through the same production processes, the adjustments were:

      - The responsibilities were reorganised into four internal segments (purchasing-RTE, drying-crust, finishing, and final inspection) instead of the previous six. In addition, the responsibilities and expected results of each coordinator were clarified within each scope in order to improve opportunity and the quality of products/services.
      - Another coordinator (from the initial six) was designated to the S4 of both the company and operations. This coordinator had already intuitively worked in this way in practice but it was of benefit to formalise this.
      - The role of the programming and control of production, as a responsibility of S2, was formalised

for both operations and the company and her role and scope were given in greater detail.

- Another coordinator (from the initial six) moved to attend S3*, so he would be monitoring the daily performance of the S1s.

g. Once the team had validated the above design, the HR Manager updated the roles in the roles matrix. This update also specified the primary responsibilities and scope of each role and their indicators.

h. Once the scope of roles had been formally defined, the following review was oriented towards key communication channels. It was necessary to assign responsibility for ‘each side’ of the key channel to ensure formal communication. The operations team formalised the channels between their departments. To interact externally with support areas, the formal channel would be the operations coordinator. The team also agreed the information source as coming only from the responsibility for programming and production control.

i. Next, the team updated the necessary clear rules of interaction so that operations would generate the requisite variety. These rules were developed internally first, and then in relation to their main key external interactions: sales, purchasing, product development and maintenance. In the same way, they reached agreement to operate more autonomously, which was established in the policies manual.

j. As a next step, the anti-oscillatory mechanisms were reviewed to improve the performance of the S1s and the team found the following:

    i. They created a comprehensive production schedule related to: raw hides, ‘wet-blue’, drying, and, above all, finishing, which was the main bottleneck.

    ii. The team reviewed and unified information sources and their use was unified and promoted in the support areas. Five different files were consolidated into two.

    iii. The team agreed to continue with a daily follow-up meeting between all the coordinators, including the maintenance coordinator, to make daily adjustments to stabilise operations performance as soon as possible.

iv. Finally, the team agreed to review and update all the formulas and control parameters for all the production processes related to the products/services selected in order to promote the required standardisation.

The main results obtained using this design were as follows:

1. Identification of the main attenuators and amplifiers to work within the S1s.
2. A new operations design.
3. Updated roles, responsibilities and indicators for key positions in operations.
4. Explicit and formal identification of those responsible for each key communications channel.
5. Necessary rules of interaction for better work interactions.
6. Identification of necessary anti-oscillatory mechanisms: production scheduling, common sources of information, consistent follow-up, methods, procedures and control parameters.

On the other hand, a key result was the better integration and cohesion that emerged in the operations team through the development of this process. Prior to this meeting, it was a challenge to foster dialogue between this team and the support areas, but this process facilitated sufficient empathy and trust between the members for them to communicate more effectively.

4.6.2.2 Meta-system design

Beer (1995) states that at the heart of a viable system is the balance between vertical and horizontal variety. This theme focuses on the meta-system design in order to enhance vertical variety to work in balance with the horizontal. Meta-system design considers two complementary but distinguishable components: a design oriented to the present, between S2, S3 and S3* to enhance the autonomy of S1s; and a design oriented to the future: S4. Both designs are oriented to improving the cohesion and identity of the whole system by the intervention of S5.

For this design, the team took into account several VSM principles. The most significant principles were: looking for the minimum intervention by the meta-

system but ensuring the cohesion of the system as a whole; decision-making mechanisms (S3, S4 and S5) must be designed to have the requisite variety to support S1s; and S4 needs to have full knowledge of the internal capacities of the S1s.

Here, the objective was to review the organisational design in the meta-system to support S1s in order to enhance the cohesion and identity of the system..

To achieve the above, the following activities were carried out:

1. The researcher used the same design as the previous workshop. The meta-system workshop was held in two sessions and the main inputs were as follows: synthesis of the problematical situation; an updated VSM map using all the operations adjustments; the latest versions of the policies manual and roles matrix (including those from the operations design); and the proposal of an operations design.
2. The next step was to review the list of participants with the CEO and HR Manager. The entire management team representing all the functions of the VSM was invited.
3. During the workshop, the following agenda was pursued:
    a. A review of the complexity generators previously identified in the problematical situation to clarify the key challenges. There follows a summary of the main findings to improve what the team considered necessary for the design:
        i. Rules of interaction: a need to review, and particularly set, key policies at the top level of the business and dictated by the CEO regarding the interactions between managers. There was also a need to validate the rules for key interactions between the S1s and support areas (S3). It was also necessary to clarify the responsibilities and communication channels between them.
        ii. Common focus follow-up: a need to move forward in development of the MetK+ to narrow to a common focus and define responsibility for a strategic follow-up.
        iii. Suitable demand: formal development of S4 to generate future demand and enhance current sales management.
        iv. Purchasing: looking to opportune input supply.

v. Cash flow management: an urgent need to strengthen the monitoring and control of expenses and the scope of the financial role to ensure a more opportune cash flow.

b. The team reviewed the organisational guidelines again in detail to consider them as a basis for the design.
c. To address the challenges identified, the team explored the main attenuators and amplifiers to consider in the meta-system in order to deal with the complexity generators. These attenuators and amplifiers were also represented on the VSM map together with those already identified for the S1s.
d. The team then began to assess whether the attenuators and amplifiers identified for the meta-system and operations were sufficient to develop the requisite variety to cope with the selected environment. This activity was developed using the VSM map to facilitate the systemic vision required to make this analysis.
e. Once the above was validated with the intention of using it for the meta-system design, the team began by reviewing the internal organisation using the guidelines. The most significant changes in the meta-system were as follows:
    i. Changes and adjustments in operations were presented to the management team by those responsible for HR and operations. Similarly, specific needs from operations by the meta-system were presented, particularly in relation to the rules of interaction and communication channels.
    ii. After the above introduction, responsibility was formally identified for attending to domestic and export sales, seeking to improve customer service and for following-up the closing of sales. A necessary internal role to manage the full sales cycle and to allow commercial executives to focus only on sales was also identified.
    iii. The team also validated the need to formalise the purchasing role. This activity was carried out by the CEO´s assistant, but not as a primary activity. This formalisation was carried out to ensure the opportune input supply required mainly by the S1s.

iv. A coordinator in charge of S2 was formally assigned. This generated a new role, the importance of which was validated by all. The S2 responsible also assumed responsibility for following-up the strategic management process and information systems.

v. A formal internal role for S3* was also validated, which used the organisational metrics and goals defined to monitor the performance of the entire system. This role emerged from the administration and financial management team.

vi. The following functions were designed to be part of S3 due to the need for the coordination and optimisation of operations: production coordination, maintenance coordination, HR Manager, Commercial Manager, and Administration and Finance Manager. This structure was much clearer to everyone and allowed focus on supporting and facilitating autonomy in the S1s.

vii. A formal responsibility for S4 was identified and assigned, which also integrated the function of research and development, and was, at the beginning, mainly oriented to generating suitable demand.

viii. The need for and location of the CEO's role in S5 and his interaction with the newly formalised S4 and S3 participants were understood.

f. Once the team had validated the above design, the HR Manager updated the roles matrix. This update also integrated baseline indicators to evaluate the key functions in the meta-system.

g. After the team had defined the scope of the key roles, the next step was oriented to ensuring the key communication channels required by operations. In addition, the members formalised channels with the administration and finance team in order to improve budget and cash flow management.

h. Finally, the team updated the necessary rules of interaction in the meta-system to improve its requisite variety for S1s. During this activity, the policies manual was again updated.

The main results were as follows:

1. The identification of attenuators and amplifiers to be attended by the meta-system.
2. A new organisational design for the meta-system.
3. Updated roles and responsibilities for key positions.
4. An explicit identification of formal communications channels and their representatives.
5. Necessary rules of interaction for the better functioning of the meta-system.

Another result was awareness among those involved in the meta-system of their primary orientation to service and improve S1s and the continuous search for system cohesion and identity. This awareness was enhanced when people became aware of the relevance and importance of S4, S3, S3* and S2 in improving the viability of the whole system. This design also encouraged in-depth dialogue between members that enhanced their empathy and trust, which they reported at the end of the workshop.

4.6.3 Organisational focus

Along with the above sub-phases of the ModK+, leaders identified improvement actions for the short, medium and long term. However, such actions were only enunciated, because previous sub-phases were oriented only to identification; this prior identification was not, in itself, enough to ensure the necessary coordination between all members to carry out improvements in practice to the benefit of the whole system (Bossidy & Charan, 2002). Therefore, the need for organisational alignment was raised.

Here, the objective was to enhance organisational alignment by looking to systemic integration through three levels of coordination (strategic, tactical and operative) in order to execute improvements in practice (Bossidy & Charan, 2002). This integration should, at the same time, facilitate understanding among members of the need to perform a coordinated and successful implementation to reinforce system viability. This sub-phase has only the following theme.

4.6.3.1 Organisational alignment

In order to enhance future execution, it is necessary to articulate improvements using a strategic approach (Kaplan & Norton, 2001). A strategic approach has implicit systems thinking: it is necessary to visualise the effect of improvement actions on the viability of the entire system systemically; it is also necessary to coordinate such actions over time to achieve the most effective impact in the shortest possible time. Therefore, when a strategic approach is mentioned here, it refers to a systemic way of thinking in order to align efforts looking the whole system.

The strategic approach involves three levels of thought correlated and nested together: strategic, tactical, and operative (Kaplan & Norton, 1997, 2001). The strategic level focuses mainly on long-term vision by defining a course in order to achieve a destination. The tactical level is mostly focused in the medium term by defining operational drivers that the organisation intends to follow. The operational level is mostly focused in the short term by defining specific and concrete actions required by the team to run in their daily practice, according to operational drivers and focused on a certain strategic-level direction and destination. Therefore, each of these three levels implies a distinct level of detail and the time to achieve it. The alignment between the three levels increases the probability of successful implementation (Kaplan & Norton, 1997).

Here, the objective was to articulate the team's shared focus by the alignment and integration of actions at three levels in order to deal with the problematical situation by considering the business model design. In this way, actions derived from such an alignment were specific enough to put into practice in everyday life, while at the same time being aligned to a defined strategic course.

The development of organisational alignment correlating three levels was carried out in several working sessions through five workshops designed for that purpose. It is important to comment that, in the past, the management team had already conducted similar exercises. However, those workshops only addressed the strategic level and, in the best case, a little of the tactical level, but had never addressed the operational level in detail; the process to bring it to the last level

was one that consumed more time and required more work. On the other hand, having assembled the extended team again, the researcher considered it important to review several aspects with them, since these were developed with some participants depending on the topic and it was important to share their understanding at this moment in the organisation. The researcher also considered it important to reinforce the organisation's strategic thinking in order to enhance future execution. Throughout the whole alignment process, the relation between the three levels was constantly reviewed.

This theme included the development of five types of workshop with the following activities:

1. The first workshop with the extended team was a suitable forum to reinforce assimilation of the ModK+ and MetK+. In this workshop, the researcher looked to the following objectives: to develop team-building dynamics in order to enhance the SME's culture; to review the ModK+ as a guide for a process in order to continue its assimilation; and to review, locate and connect the research results already achieved with the aim of reinforcing the team's understanding and validating consistency. An agenda and a presentation were developed to achieve the above objectives:
    a. Given the success of using a film for learning processes, the researcher designed a dynamic in which he used the movie "Hoosiers" to provoke discussion about leadership skills to encourage teamwork. He developed and pre-selected questions for each chosen block of the film in order to trigger reflections among the team.
    b. On the other hand, the researcher encouraged the team to be aware of the importance of working with a shared focus. The team was used to reacting but not to working under the same focus in order to achieve their vision. Therefore, the first team dynamic in the workshop was aimed at assembling a puzzle in two ways: in the first, the researcher gave them a puzzle with mixed pieces and did not give them an image to facilitate their work; in the second, the researcher gave them a puzzle as well as the image to focus on when assembling the puzzle. The team was able to contrast the

difference between the two ways. In addition, there was space to contrast this dynamic with what was happening in CCX. The participants concluded that they were doing their daily work in a similar way to the first, i.e., without a clear and shared focus.

c. The researcher perceived that understanding the ModK+ also needed a different approach and more than one explanation. Therefore, he designed a dynamic using six questions that corresponded to the main components of the ModK+. The challenge to the team was to place the questions in a sequence more suitable to a change process. Subsequently, the researcher facilitated the integration of all the answers and, to his surprise, the sequence integrated by the whole extended team was the same as the sequence of the ModK+. The team stated that, through this dynamic, they began to assimilate the logic of the ModK+ in their own words. The ModK+, together with the questions, is presented in Figure 57.

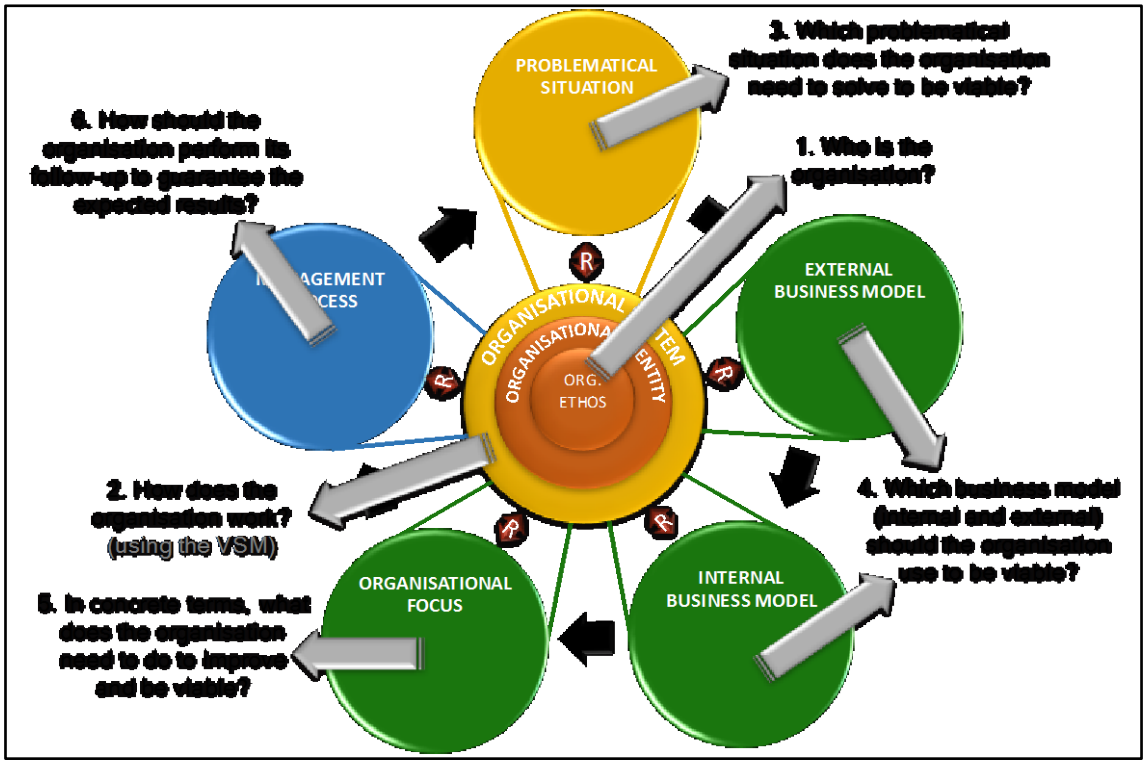


Figure 57: ModK+ with change process questions

d. The researcher and the team then worked on reviewing and connecting the most significant outcomes of the previous sub-

phases with the ModK+, so that the team could review the ModK+ by placing the outcomes thus far: values, nature and purpose, overview of internal and external perceptions, the problematical situation and its complexity generators, key metrics identified, convenience variables, commercial approach, and the latest version of CCX's VSM map (including the internal and external redesign).

e. In order to synchronise the two key concepts of the process that had not been shared with all the members, the researcher reviewed the strategic orchestration and value innovation approaches used in the External Business Model sub-phase.

f. The researcher then reinforced the main concepts of the management of complexity. Here, he employed a different approach, using examples of applications made by people in daily practice and during implementation of the containment plan. In this way, the group reviewed the three elements and six systems of the VSM, its key guidelines, and variety engineering through the management of amplifiers and attenuators.

g. The closing of the workshop focused on understanding the method of organisational alignment that would be used in CCX. Initially, there was a brief introduction to the most relevant concepts of the alignment method: vision, strategies, objectives, metrics indicators, projects and processes. Then, the method to integrate the previous six levels was presented. Finally, the researcher briefly explained the need to develop management mechanisms aimed at a follow-up.

2. The second workshop focused on developing the alignment method at the strategic level (vision and strategies) and partially the tactical one (strategic objectives). Nevertheless, this stage of the development was able to prompt several in-depth discussions between team members because of the gaps to be faced and the quality of the dialogue between them (which was still not high enough). However, the necessary abstraction process for developing the strategic level might have been difficult for some of the people in the extended team because only the leader team was used to this type of process. Therefore, the researcher

suggested to the CEO that this workshop need only be conducted with the leader team and the work could be shared with the extended team more easily later. The workshop had the aim of defining the organisational vision, strategies to achieve it, and the strategic objectives to be considered to support strategies through the following activities:

a. The new scope of the key roles was defined in the previous sub-phase. However, the team was used to working with the inertia of the previous scheme. It was now, however, necessary for the leaders to take full responsibility for their new role scope. For these reasons, the researcher considered it relevant to review the key roles again, together with their responsibilities and metrics, in order to respond to people's queries regarding implementation. Thus, the first activity was aimed at reinforcing people's understanding of their duties.
b. The complexity generators were then reviewed in such a way that the leader team could review the problematical situation.
c. The next workshop reviewed the most relevant ATs and AMs to consider for each complexity generator. There was a long discussion in one dynamic, which took place in a plenary session with the entire team until they reached consensus on the ATs and AMs that required development.
d. Within the ModK+, it is suggested that a detailed review of the strategy level has to be conducted every three months. Thus, the time scope for the first cycle of the strategic management process was established: October to December 2014.
e. Considering the time period established, the researcher asked the team to develop an objective to be achieved for each AT and AM. After in-depth dialogue, the team achieved a consensus of 16 strategic objectives (SOs) for the complexity generators identified. These SOs were written on Post-its and placed on CCX's VSM map. Using this dynamic, the team could also assess the objectives graphically by contrasting the SOs with the complexity generators represented on the same map.
f. Subsequently, the team reviewed these strategic objectives to infer the strategies implied in them. They identified three strategies that

were contrasted against the complexity generators in order to validate them as well.

g. Finally, in this workshop, the team correlated strategies and their associated strategic objectives in order to articulate the wording of the vision. Defining and connecting these first strategic levels was used to structure the first version of the strategic dashboard in order to articulate alignment.

3. In the next step, the researcher needed to work with the team on indicators for assessing the SOs identified and, at the same time, establish critical processes to be monitored and necessary projects to bolster expected improvements. It was decided to develop this workshop again with the leader team in order to structure the entire strategic dashboard. To achieve the above objectives, the researcher developed a presentation to carry out the following activities:

   a. In order to reaffirm the first three levels of the dashboard (vision, strategies and SOs), the researcher facilitated a brief review of them at the beginning of this workshop.

   b. Later, the researcher facilitated the development of the indicators to assess the progress of the SOs. The team concluded that three groups of indicators would be used: the first group contained the already defined business indicators, as they would reflect progress in the process of the change; the second were indicators related to three critical processes that required very close monitoring and which directly reflected the impact of the SOs (from SO3 to SO15); for the third group, the team concluded that some SOs (SO1, SO2, SO15 and SO16) were related more with the development of necessary improvement projects, so the progress of such projects to completion would be measured. The team validated these findings when they reviewed the relationship between the SOs and the indicators identified, as shown in Figure 58 . Similarly, the team conducted a cross analysis between the indicators identified and the three organisational metrics (throughput, inventory and business operation costs) to understand and validate the impact on the business of the achievement of such indicators. This analysis can be seen in Figure 59.

c. The team then worked on identifying the goals for the indicators related to critical processes and defined a goal for each indicator that should be achieved at the end of the established period. This analysis is shown in Figure 60.
d. As the next step, the team developed the following dynamics: in a plenary session, they used Post-its on which SOs were written and grouped in patterns depending on the type of implicit action to take. This was carried out in order to infer strategic projects. In this way, the team identified three strategic projects that grouped the SOs previously identified.
e. Once the team had identified the strategic projects and processes in the first improvement cycle, the researcher reviewed the list of participants with the team, both to detail the strategic projects and to validate the scope and responsibilities for the strategic processes. This workshop closed with this activity. At the time, there was already a detailed tactical level for the dashboard: objectives-indicators/goals. In the same way, the operative levels were ready but only enunciated: strategic projects and processes. However, the latter operating levels still needed more development, in order that all members could have a clear idea of the daily actions to be executed.

4. The extended team was invited to the development taking place in the fourth workshop. This workshop had two objectives: to continue supporting team building and to explain to the extended team the six already developed levels of the strategic dashboard to synchronise understanding among the members. To achieve the above objectives, the researcher developed a presentation to carry out the following activities.
   a. The session began with an overview of the last part of the film "Hoosiers".

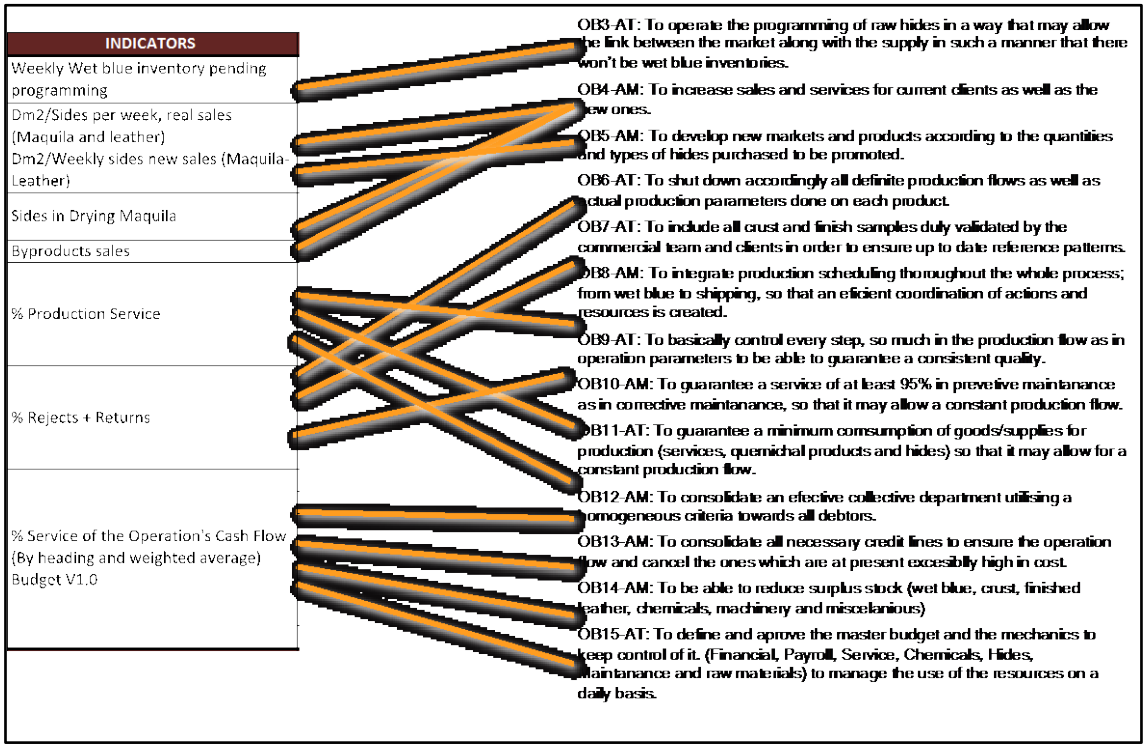


Figure 58: Cross analysis between strategic objectives and indicators

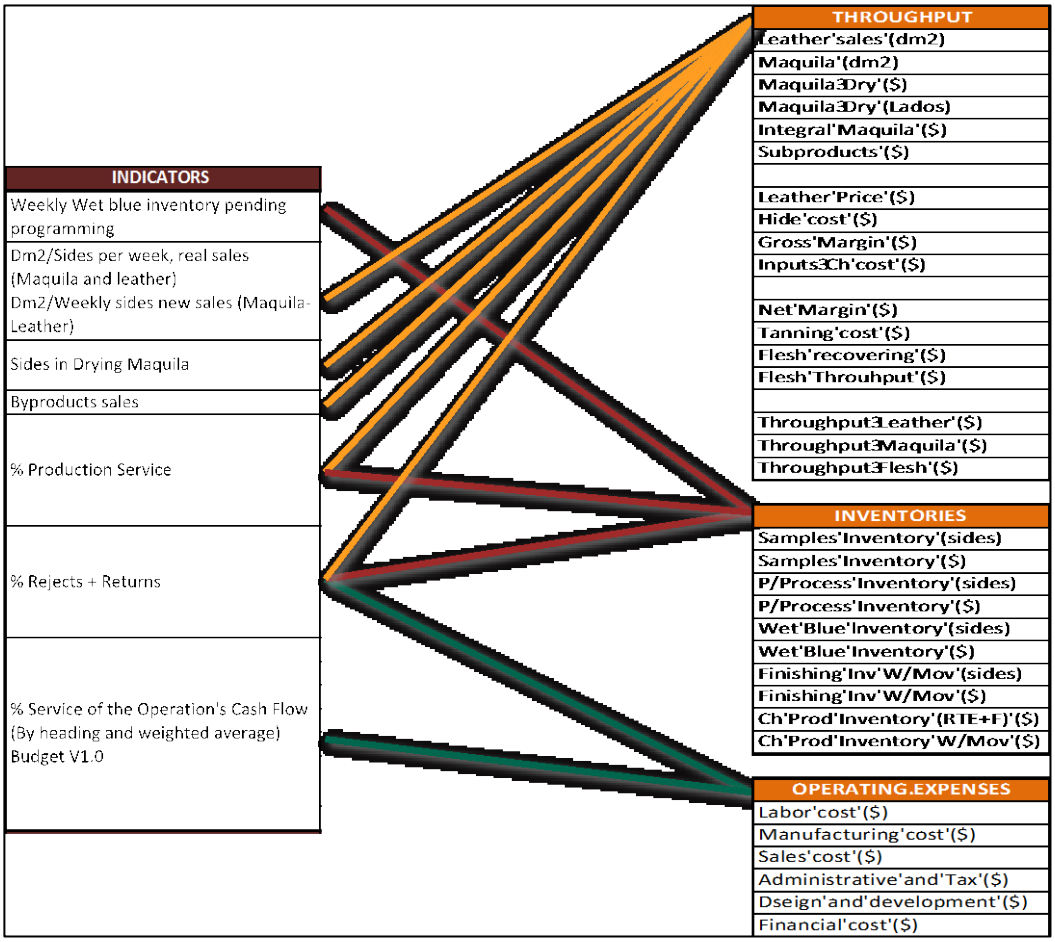


Figure 59: Cross analysis between indicators and organisational metrics

INDICATORS	GOALS
Weekly Wet blue inventory pending programming	Maximum 2,000 sides.
Dm2/Sides per week, real sales (Maquila and leather)	Leather: 1,814,400 dm2 (2,500 soaked sides weekly)
Dm2/Weekly sides new sales (Maquila-leather)	Integral Maquila: 480,000 dm2 (600 soaked sides per week)
Sides in Drying Maquila	Drying Maquila: 32,000 sides. (1500 sides daily)
Byproducts sales	Byproducts Split/Suede: 3850,000
% Production Service	> 95%
% Rejects + Returns	< 6%
% Service of the Operation's Cash Flow (By heading and weighted average) Budget V1.0	>90% for chemicals (500) >90% for hides (1,500) >90% for financial payments (100) >90% for maintenance (50) >90% for support areas (100) >90% for production utilities (water, electricity and gas) (100) >90% for payroll (150)

Figure 60: Strategic indicators and goals for the first improvement cycle

b. Next, the researcher presented a review of the ModK+ in order to strengthen understanding and locate the theme on which they were working.
c. The alignment method used was reviewed and the outcomes of each step were checked. The researcher had previously coordinated with the leader team in order to explain the outcomes related to the alignment method:
    i. The CEO explained the problematical situation found through the complexity generators (CG) in his own words.
    ii. The CEO expressed that it was considered that the first improvement cycle would take three months and he shared the identified vision of the company.
    iii. The HR Manager explained the three strategies.
    iv. The Commercial Manager shared the 16 SOs and their relation to the strategies and vision.

v. The Administration and Finance Manager explained the strategic metrics to be used, reviewing the organisational metrics, indicators, and strategic goals.
vi. The Coordinator of Planning and Production Scheduling then explained how identification of the three strategic projects was made.
vii. Finally, the Production Coordinator explained the rationale for focusing on the three critical processes detected.

d. In the next step, the CEO explained the need to perform a task at the operational level detailing the projects and analysing the critical processes. The extended team defined teams to perform these tasks after the workshop.
e. To close the workshop, the researcher gave a brief overview of the strategic projects and processes. The workshop ended with the integration of an agenda to detail the projects and processes. It is necessary to emphasise that the film had, again, a very positive effect on the team.

5. In order to detail the strategic projects and processes, the researcher promoted an independent workshop to review each one. For this purpose, the researcher integrated two presentations to be used as the basis for developing each strategic project and reviewing each strategic process. The activities were as follows.
    a. An introduction to the development of the projects based on the Project breakdown structure (PWBS) (*Project Management Institute,* 2000) method was provided.
    b. Next, an execution of the PWBS was made by each team:
        i. Based on the SOs that every project needed to integrate, the team defined the project vision to be achieved.
        ii. The team then defined the main milestones to achieve the above vision.
        iii. For each milestone, the researcher facilitated a dynamic whereby each person wrote on Post-its each one of the activities considered necessary to achieve the milestones.
        iv. In the above brainstorming process, the team integrated only those tasks necessary for each milestone.

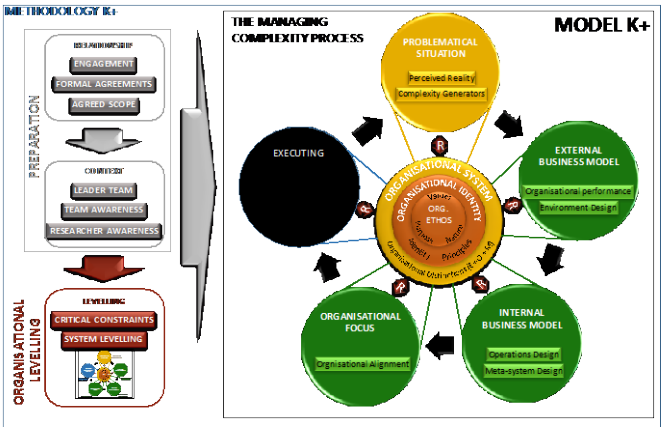
v. The next step was to assign a leader for the project to be responsible for each milestone and task.
vi. In addition, the team reviewed the time required and the budget associated (if required) for each task. Each workshop closed with this activity and a date was agreed with the project leader to present the formal working plan. The researcher also prepared a layout to facilitate the integration of this working plan.
vii. Once the project leader had finished his first version of the working plan, this was validated with the project team and the CEO.

c. For workshops about strategic processes, a dynamic for each process was also developed, as follows:
    i. The process team agreed the process scope and reviewed the basic process flow.
    ii. The team reviewed the critical factors of the process to be considered.
    iii. The team validated the process leader.
    iv. The team then ratified the indicators and goals for evaluating the process.
d. Finally, the researcher gave a presentation to which the extended team was again invited to explain the strategic projects and processes in detail so that the whole team could ratify them.

As a result, the team concluded their organisational alignment through the full integration of its strategic dashboard: vision, strategies, objectives, indicators-goals, projects and processes.

On the other hand, the researcher observed two results on team building: a greater awareness of the scope of the strategic approach, which moved from the vision to the specific actions that must be achieved in practice for a given period; and an improvement in empathy and coordination between the team members along the different dialogues generated during the five workshops described above.

4.7 Phase: Executing



4.7.1 Management Process

The need to create the necessary conditions to assemble a clear, simple and useful follow-up scheme, and to be able to execute it easily, was a critical aspect of this sub-phase. The researcher developed these conditions with the team looking for the adoption of the follow-up process.

Following the AR method, the conditions were related to three aspects: work logistics, an organisational design for a follow-up process, and enablers. The work logistics serve in planning and scheduling a consistent follow-up process to avoid duplication and, at the same time, promote better coordination in such a way that the three levels (strategic, tactical and operative) can be validated without omitting any relevant aspect from consideration. On the other hand, organisational design is related to the definition of all the roles necessary to operate a follow-up in a coordinated manner between everyone involved, and so favours team interaction. Finally, enablers are all those inputs required to increase the effectiveness of follow-up meetings (Bossidy & Charan, 2002; Kim & Mauborgne, 2005).

However, despite the development of the required conditions and because of a sense of inertia, there existed a need to accompany/coach the team in the implementation of the follow-up process, as coaching supports the more effective adoption of a process (Echeverría, 2006). Coaching also served to strengthen members' systemic thinking through linking all the elements of the ModK+ and

MetK+ in practice; in this sub-phase, both came to real practice through organic and non-linear interactions.

Based on the above, the objectives here were to design follow-up mechanisms for execution and to support the team during its implementation, in order to deploy an effective follow-up to close gaps by achieving the intended results. This sub-phase has the following two themes.

4.7.1.1 Execution structure

The previous pages have discussed the necessary conditions for increasing the probability of success in the Executing phase. It is vital to prepare these conditions for each of the three levels of organisational alignment. For the researcher, it was important to ensure the development of this theme, given the background of inconsistent follow-up in CCX. This preparation could also help the team to be aware of the implications and benefits of different follow-ups.

In the context of CCX, the conditions required were related to the following aspects:

1. For the work logistics, it was necessary to specify:
    a. Coordinated session scheduling (day, duration, time and frequency).
    b. An agenda to guide discussion and session duration.
2. For the team in the follow-up process, it was necessary to detail:
    a. Confirmation of a leader who would be responsible for coordinating and guiding each session. This leader was also the formal communication channel for monitoring.
    b. The participants required to be included in each session.
    c. Complementary roles for each session: the secretary responsible for recording and sharing agreements and for the integration and reliability of information used in the session; and the HR Manager, responsible for registering or adjusting any necessary basic rules of interaction and sharing them.
    d. Consequences and enhancers based on results.
3. Enablers required to be developed were:

a. Information to be considered for monitoring performance and the way to present it.
b. An indicators dashboard for each session that integrated the intended goals and performance for the time period.
c. Supporting documents to operationalise the follow-up: minutes and project progress layouts.
d. A shared digital folder in which all the information about the three levels could be shared.

Here, the objective was to establish enablers, teams and work logistics to operate follow-up at the strategic, tactical and operative levels.

The activities developed to achieve this preparation were as follows:

1. The researcher found it very helpful to generate a matrix in which the team could easily display the majority of the necessary conditions. This was done by considering the team's history and experience related to the follow-up. This matrix was used as a starting point for discussion with the team. An example of this matrix is shown in Figure 61.
2. This matrix was first reviewed with the CEO and HR Manager to make any necessary adjustments before sharing it with the extended team. The follow-up teams were integrated as follows: for the strategic level, follow-up would be done every three months through the organisation's leader team at a strategic monitoring meeting; tactical follow-up, aimed mainly at reviewing the performance of organisational metrics and strategic indicators, would also be conducted by the leader team every week at a tactical monitoring meeting; and, at the operational level, there would be two types of follow-up meeting: those aimed at evaluating weekly critical processes performance; and a follow-up to each strategic project, the progress of which would be reviewed weekly.
3. Subsequently, the researcher convened a meeting of the extended team because its members represented participants on all the follow-up teams. In this session, the extended team assimilated the strategic follow-up matrix and support documents after reviewing them in detail.
4. The first meeting of each team was then held with the secretary and his team to finalise the necessary information to be considered in each type of

TYPE OF FOLLOW UP	PROCESS	IN CHARGE	AGENDA	PROCESS INDICATORS	GOALS	SCHEDULE	FRECUENCY	PARTICIPANTS	REQUIRED DOCUMENTS
PROCESSES IMPROVEMENT	Commercial (S3)	Claudia Lona	1. Reviewing of previous meeting agreements. 2. Reviewing of process indicators and adjustments facing deviations 3. Write down agreements and follow up instructions	Weekly Wet blue inventory pending programming	Maximum 2,000 sides	Tuesday 8-9AM	Weekly	**Claudia Lona** Gloria Martinez Ferdia Vargas (S) Enrique Soto	1. Write a follow up meeting minute. Include previous actions for adjusting behavioral indicators 2. Behavioral indicator Graph
				Dm2/Sides per week, real sales (Maquila and leather)	leather: 1,814,400 dm2 (2,500 soaked sides weekly)				
				Dm2/Weekly sides new sales (Maquila Leather)	Integral Maquila: 480,000 dm2 (600 soaked sides per week)				
				Sides in Drying Maquila	Drying Maquila: 32,000 sides (1500 sides daily)				
				Byproducts sales	Byproducts Split/Swede: $850,000				
	Production (S3)	Juan Carlos Alcacio	1. Reviewing of previous meeting agreements. 2. Reviewing of process indicators and adjustments facing deviations 3. Write down agreements and follow up instructions	% Production Service	> 95%	10-10:15AM	Daily	**Juan Carlos Alcacio** Christian Morales Fátima Mandujano (S) Juan Manuel Alcacio Enrique Soto Arturo Carmelo	1. Write a follow up meeting minute. Include previous actions for adjusting behavioral indicators 2. Behavioral indicator Graph
				% Rejects + Returns	< 6%				
	Cash Flow Management (S3)	Angel Negrete	1. Reviewing of previous meeting agreements. 2. Reviewing of process indicators and adjustments facing deviations 3. Write down agreements and follow up	% Service Operation's Cash Flow (By heading and weighted average) Budget V1.0	>90% for chemicals (500)	Tuesday 10-10:30AM	Weekly	**Angel Negrete** Mónica Hernández Juan Carlos Alcacio Gerardo Padilla Cristian Morales Diana Hernández (S) Claudia Lona	1. Write a follow up meeting minute. Include previous actions for adjusting behavioral indicators 2. Behavioral indicator Graph
					>90% for hides (1,500)				
					>90% for financial payments (100)				
					>90% for maintenance (50)				
					>90% for support areas (100)				
					>90% for production utilities (water, electricity and gas) (100)				
					>90%for payroll (450)				
TYPE OF FOLLOW UP	PROJECT	IN CHARGE	AGENDA	ISSUES AT HAND	GOALS	SCHEDULE	FRECUENCY	PARTICIPANTS	REQUIRED DOCUMENTS
STRATEGY FOLLOW UP	Strategy Management (S5+S4+S3)	Gerardo Padilla	1. Reviewing of previous meeting agreements. 2. Reviewing of processes and agreements compliance 3. Reviewing of Projects and agreements compliance 4. Reviewing of the business performance indicators and session agreements registration.	CCR's Throughput	According to budget	Tuesday 9-10AM	Weekly	**Gerardo Padilla** Diana Hernández Claudia Lona Angel Negrete Juan Carlos Alcacio Fátima Mandujano (S)	1. Follow up meeting minute. Include previous form of actions for business behavioral indicators 2. Summary of meeting minutes and processes indicators performance 3. Projects advance sheets
				CCR's Inventories	According to guidelines				
				CCR's Operating expenses	According to budget				
				Commercial Process Performance	According to each process				
				Production Process Performance					
				Cash flow management process performance					
				Project: "Efficient Operation of Specialised Products and Services"	According to each project				
				Project: "Cash Flow management to ensure the operation"					
				Project: "Developing a convenient demand"					
TYPE OF FOLLOW UP	PROJECT	IN CHARGE	AGENDA	PROJECT INDICATORS	GOALS	SCHEDULE	FRECUENCY	PARTICIPANTS	DOCUMENTS REQUIRED
DEVELOP IMPROVEMENT PROJECTS	"Efficient operation of specialised products and services" (S1)	Juna Carlos Alcacio	1. Reviewing of previous meeting agreements. 2. Reviewing of work plan progress. 3. Registration of agreements for progress and budget adjustments.	- Project advance in a timely manner according to plan. - Budget according to advancement.	-Difference between real advance vs estimated <10% -Difference between real budget vs estimated <10%	Friday 9-9:15AM	Weekly	**Juan Carlos Alcacio (S)** Project team as required	1. Updated Project Plan 2. Meeting minute. Include ajustments for project time advancement 3. Project advance sheet
	"Cash Flow management to ensure the operation" (S3)	Angel Negrete	1. Reviewing of previous meeting agreements. 2. Reviewing of work plan progress. 3. Registration of agreements for progress and budget adjustments.	- Project advance in a timely manner according to plan. - Budget according to advancement.	-Difference between real advance vs estimated <10% -Difference between real budget vs estimated <10%	Friday 10-10:15AM	Weekly	**Angel Negrete (S)** Project team as required	1. Updated Project Plan 2. Meeting minute. Include ajustments for project time advancement 3. Project advance sheet
	"Developing a convenient demand" (S4)	Claudia Lona	1. Reviewing of previous meeting agreements. 2. Reviewing of work plan progress. 3. Registration of agreements for progress and budget adjustments.	- Project advance in a timely manner according to plan. - Budget according to advancement.	-Difference between real advance vs estimated <10% -Difference between real budget vs estimated <10%	Friday 11-11:15AM	Weekly	**Claudia Lona (S)** Project team as required	1. Updated Project Plan 2. Meeting minute. Include ajustments for project time advancement 3. Project advance sheet

Figure 61: Strategic follow-up matrix

meeting, as well as the way to present it through a dashboard by integrating the goals and performance for the time period. It should be noted that a shared folder was created with all the teams' information.

At the end of the above activities, the teams were ready to begin to operate the strategic monitoring. This resulted in the development of the necessary conditions to execute follow-up.

4.7.1.2 Execution management

Within this phase, all the members can experiment with interactions between the elements of the ModK+ in daily practice. For instance, a member could infer how the performance of a critical process could affect organisational business metrics and, simultaneously, this would serve to close a gap in an identified problematical situation. This situation would also allow her/him to reflect on current

organisational design and question whether this was the most suitable design to achieve the requisite variety. The main role of the researcher in this phase was to assist in this process of connection.

Having been given these connections, members could begin to understand that actions are also interrelated in the system-in-focus. The team began to understand that the ModK+ is an interconnected and non-linear model, and that the sequence of steps in the MetK+ only had the intention of building a first cycle of strategic monitoring through systemic intervention. However, what really mattered was the ongoing strategic process because it implies a learning process that can evolve over time.

This systemic follow-up was developed using the BPF model explained in chapter 3. The objective here was to strengthen the team's systems thinking approach, using the follow-up processes as a means to do this in practice. This would enable the team to adopt this management process as well as developing the system's requisite variety.

In reality, the programming and execution of meetings was done so that all necessary inputs were ready in a timely manner to develop this process.

Following the BPF model, seven meetings were scheduled with different teams to review the tactical and operational levels. It was also agreed to schedule a meeting for a detailed review of the strategy at the end of the period, in December.

The activities undertaken were as follows:

1. The researcher helped in conducting the first six meetings for operational follow-up. Three of these meetings were used to review critical processes and the rest to review strategic projects.
    a. The critical processes meetings were: leather production, cash flow and sales management. They were developed in the following manner:
        i. The secretary ensured, in advance, that the updated information and indicators dashboard for each process would be in the

management folder. This information served specific meetings but also for tactical follow-up.

ii. The team programmed a schedule and day to carry out each periodic meeting. Each meeting used the following agenda:
    - Review of agreements made at the previous meeting.
    - Review of process indicators and agreements in response to deviations.
    - Documentation of agreements on actions to follow.
    - Review and validation of bonuses achieved as a team.

iii. At the end of the meeting, the secretary published minutes with all the closed and new agreements in the management folder.

iv. The secretary monitored the implementation of agreements during the week.

v. This cycle was repeated during the 11 weeks of implementation.

b. In strategic projects meetings, a follow-up of the three projects was conducted and called: efficient operation of specialised products and services; cash flow management to ensure operations; and, development of appropriate demand. The following activities were developed:

i. The project leader acted as secretary in the meeting and gave a follow-up to his team each week, depending on the people involved in the weekly activities.

ii. Based on the follow-up, the leader updated the project status in the management folder.

iii. In addition, the leader prepared the project report (one page) that also served as the minutes, since it contained agreements to keep the project on schedule.

iv. The project report was reviewed each week with the secretary for tactical monitoring to validate progress and to leave it ready for use in the tactical meeting.

v. This cycle was repeated during project implementation until the end.

2. For the weekly tactical monitoring meeting with the leader team, the following activities were conducted:

a. In advance, the secretary ensured that information was updated on: critical processes, strategic projects, organisational metrics, and the complete indicators dashboard. All this information was placed in a management folder.
b. The team scheduled the time and day of each session in advance. At these meetings, the team used the following agenda:
    i. Review of the implementation of previous agreements.
    ii. Review of critical processes performance and their dashboards.
    iii. Review of the status of strategic projects using the project report.
    iv. Review of organisational metrics.
    v. Final review of current session agreements.
c. At the end of the session, the secretary published the minutes, together with the agreements, in the management folder.
d. During the week, the secretary monitored the fulfilment of all the agreements.
e. This cycle was repeated during the 11 weeks of implementation.

3. Finally, the following activities were developed for strategic monitoring:
    a. In week 12, a detailed review of the progress of the first management cycle was developed. During week 12, the following were carried out:
        i. The researcher requested the secretary of the tactical monitoring meeting and the Administration and Finance Manager to integrate the trends of the organisational metrics and process indicators in one document.
        ii. Next, the researcher reviewed with the team the results achieved in the first period of three months of the following: complexity generators, organisational metrics, process indicators and progress on projects.
    b. For week 13, a session was scheduled to define/adjust the strategy for the second management cycle. The researcher considered that the meeting would be a good time for the team to guide the strategy review. Thus, the following activities were conducted:
        i. The researcher integrated a basic presentation to structure the strategy review with the team.

ii. The presentation and focus of the meeting were reviewed with the CEO to validate its content, agenda, and the participants for the session.
iii. The researcher worked with the leader team to review the presentation, prepare the necessary information, and set the agenda with the facilitation of each member.
iv. The extended team was then invited to a meeting with the following agenda:
    - Introduction: review of the ModK+ using core questions to locate this effort.
    - Review and/or adjust organisational ethos: values, purpose and nature.
    - Review and/or adjust organisational identity: the VSM map and guidelines.
    - Review and/or adjust the complexity generators using the VSM to validate this diagnosis.
    - Review and/or adjust the value offer and organisational metrics.
    - Review and/or adjust the environment design selected.
    - Review and/or adjust the meta-system and operations design.
    - Review and/or adjust the VSM strategic dashboard through the six levels.
    - Review and/or adjust the execution structure for follow-up.
v. At the end of the session, the team adjusted only the following: a complexity generator related to demand development and, therefore, environment in just one segment to achieve this; the organisational design to boost further S4 in this environment; and the team redefined the scope of the commercial project.
vi. When these adjustments were finished, the team began the 11 weeks of follow-up again using the BPF model, continuing in this way to the next cycle.

The implementation of these meetings at the three strategic levels, using all necessary conditions to operate them, was the specific result of this sub-phase. This execution corresponded both to the first finished cycle of management and to the beginning of the second one, including the adjustments demanded by the environment.

The main qualitative result observed by the researcher was improvement in members' abilities to link actions through all three levels of strategic management. At the same time, these connections also improved their abilities to understand the change process in a more systemic sense.

Summary

In this chapter, the researcher related how he applied a systemic intervention using the ModK+ and MetK+ in practice from the level of stages to the specific level of themes. Through the systemic intervention the researcher collected the evidence of the case study in order to discuss it in the next chapter.

Chapter 5: Discussion of results

Introduction

Yin (2014) argues that a research design embodies a theory of what is being studied. As a reminder to the reader, the researcher stated the theory and propositions for this research in section 1.2.3. This chapter focuses on the discussion and analysis of data in relation to this theory, in order to confirm or reject its propositions.

In the following sections, the researcher states the general strategy for the discussion of the results and then presents all the data collected for this case study. By combining these sources of evidence, the researcher can discuss each proposition. Discussion begins with the multi-methodology because it is the foundation for the second discussion of the continuous process.

5.1 Strategy for discussion

Yin (2014) states that data analysis consists of examining, categorising, testing or even recombining evidence to produce empirically based findings. The analysis of case study evidence is particularly difficult because the techniques have still not been fully defined. However, the potential analytical difficulties in a CS can be reduced with a general strategy for analysing data. The best preparation for conducting this type of analysis is to have a general analytical strategy to link the data to some of the concepts of interest in order to drive the analysis. Yin (2014) suggests that the strategy should follow a cycle involving: research questions, propositions, data, the handling and interpretation of the data, and the ability to state findings and draw conclusions. Once researchers have made tentative connections, they may then better understand what is necessary to analyse the data.

In order to state the general analytical strategy for analysing the data of a CS, Yin (2014) suggests four different approaches. First, relying on theoretical

propositions: this strategy emerges following the theoretical propositions for the CS. The original objectives and design of the CS are presumed to be based on such propositions, which in turn reflect a set of research questions, reviews of the literature, and new hypotheses or propositions. Second, working the data from the 'ground up': this strategy emerges from finding theory through data. Some part of the data suggests a useful concept; such an insight can become the start of an analytical path. This is an inductive approach to data analysis in order to support a grounded theory (Corbin & Strauss, 1990, 1998). Third, developing a case description where the strategy emerges from organising the CS according to some descriptive framework. And fourth, examining plausible rival explanations, whereby the strategy emerges from trying to define and test plausible rival explanations, and generally working in combination with all the previous strategies.

The case study reported in the previous chapter was designed and developed by considering a strong link between the research questions, the theory and its propositions. At the same time, however, the execution of the case study in the field brought different insights that deserve special consideration. Therefore, for this analysis and discussion, the researcher relies on a combination of two general strategies: one based on theoretical propositions and the other on working from the 'ground up'. The first type of strategy is useful because the orientation of the case study relies on considering two main propositions: one for the methodology and the other for a continuous process. The second type of strategy is useful when the researcher analyses data and considers what theory emerges from them in order to compare this with the first type.

5.2 Case study evidence

The general strategy for discussion is developed through the sources of evidence using the analysis techniques stated in chapter 3 (section 3.3.4.3). This section explains the four sources of evidence: the case study database, using the same structure as the intervention matrix: this source is the foundation of the chain of evidence for this research; the group interviews and their analysis; the

researcher's observations of each theme; and a time series analysis to show the impact of this research on the SME.

However, in order to give the reader an overview of the whole research process, the researcher first presents two analyses based on the research database. First, a summary of how the time was invested throughout the research, which helps in understanding those themes that required more time to perform and in analysing the experiential learning cycle in practice. Second, a brief analysis of the techniques used in the interaction between the researcher and the team throughout the research process in order to understand the approach of the AR in this research After the evidence has been presented, the researcher states all his observations, following the same structure (stage/ phase/sub-phase) as the previous chapter in order to evaluate how the model and methodology worked between the members in practice. Then, the researcher presents an analysis of the group interviews, which were used to detect the performance of the continuous process among the members. Finally, the researcher presents evidence about the impact of this research on CCX.

The database analysis

5.2.1 Introduction

As stated in chapter 3 (section 3.3.4.3), Yin (2014) suggests some principles for data collection. The researcher followed these principles and realised that the research process could bring important data from two of them that could be considered as a source of evidence.

The first principle is related to the creation of a case study database. The researcher built the database from all the information used during the entire research; this information was registered in the intervention matrix and all the files were stored in a main file following the same intervention matrix structure.

The second principle recommends maintaining a chain of evidence to increase the reliability of the information contained in the case study. This chain allows an external observer to follow the evidence from the initial research questions and

propositions to the conclusions. In the intervention matrix, the reader can plot the history of the case study by following the path (stage/phase/sub-phase/theme) of this information: main inputs, main activities, technique, participants, main outputs-evidence (work files), date and duration.

A segment of the intervention matrix is shown in Table 30 as an example. All the information in the matrix is a source of evidence for the AR process. However, due to confidentiality issues, the original files cannot be included in this document but are available from the researcher if requested by the examiners.

In the following sections, the researcher presents the analyses of the time invested and the different research techniques used during the AR process.

5.2.2 Findings

5.2.2.1 Analysis of the time invested

The researcher recorded all the time invested in all the activities during the AR process in order to enhance the research discussion. Table 31 shows a summary of the use of time during the AR intervention.

Reviewing the table, it can be seen that the researcher invested the following time distribution (in descending order): 59.09% in the Managing Complexity Process, 28.31% in the Organisational Levelling and 12.61% in the Preparation stages.

In the Preparation stage, the researcher mainly spent time on the Context phase (76.02%) and the rest of the time was employed in the Relationship phase (23.98%). In the Context phase, time was invested mainly in team and researcher awareness (79.23%).

In the Organisational Levelling stage, the researcher spent all the time on the Levelling phase. Within this phase, the time was spent mainly on the System Levelling sub-phase (91.97%).

Table 30: Intervention matrix structure (Preparation stage - example)

STAGE	PHASE	SUB-PHASE	THEME	MAIN INPUTS	MAIN ACTIVITIES	TECHNIQUE	PARTICIPAN	MAIN OUTPUTS	EVIDENCE	DATE	ACTIVITY	DURATION
THE PREPARATION	THE RELATIONSHIP	THE ENGAGEMENT (0.0)	First approach		Prepare first approach					April 29th	Prepare conference with CEO	1
				Guide for the conference	Virtual meeting	**Meeting**	CEO	Conference guide	PhD_K+_CCX_P0.0_FA V1.0.mmap	02-may	Videoconference with CEO	1.5
			Mutual understanding		Prepare first formal meeting					01-Jul	Prepare meeting with CEO	1
				Brief K+ presentation	First meeting with CEO	Meeting	CEO	Meeting presentation	PhD_K+_CCX_P0.0_KO V1.0.pptx	01-Jul	Meeting with CCX CEO	2.5
		THE FORMAL AGREEMENTS (0.1)	Formalization	Proposed **Non** Disclosure Agreement **(NDA)**	**NDA** reviewing and signature	Workshop Observational Research (WOR)	CEO and Team Leader	NDA signed by researcher	PhD **K+** CCX P0.1 **NDA** V2.0.docx	04-Jul	Prepare NDA document	2
				Proposed Code of Ethics (CE) for research	Code of Ethics (CE) reviewing and signature			Approved/signed Code of Ethics	IRBS Ethical procedures for Research.pdf	07-jul	Prepare CE document	1
				Proposed Informed Consent Agreements (ICA's)	ICA's reviewing and signatures by CEO and Owners			Signed of ICA's	PhD **K+** CCX P0.1 CF PAR V2.0.docx PhD **K+** CCX P0.1 CF ORG V2.0.docx	Jul 07 Sep 12 Oct 06	Prepare Informed Consent agreements	3
		THE AGREED SCOPE (0.2)	Formalization	K+ Methodology (K+ M) Presentation	Introduction about Managing Complexity, **K+ Model**, **K+ M** and Action Research Process to be used.	WOR	CEO	Adjusted K+ Model and Methodology (K+ M) Presentation	PhD_K+_CCX_P0.2 Pres BasiCM V1.0.pptx	07-jul	Prepare scope of work (V1 and 2)	3
				K+ M Scope of work	Reviewing and discussion about: Methodology, its scope of work, intervention, and work Plan.			Approved K+ M Scope of work	PhD_K+_CCX_P0.2_SOW V1.0.docx	07-jul	Final version of Scope of work	1.5
				K+ M Intervention design				Approved Intervention design	PhD_K+_CCX_P0.2_SOW V2.0.docx	Sep 01	Adjust work plan	1.5
				K+ M Work Plan				Approved Work Plan	PhD_K+_CCX_P0.2_INT V2.0.xls	07-jul	Review with CEO of: NDA, CE, ICA's, SOW and WP	2.5
		THE LEADER TEAM (0.3)	Identification	**K+ M** Team Profile and criteria	Analysing of K+ M Team Profile vs current formal and informal leaders.	Meeting	CEO	Approved first **K+ M** Coach Team and Action Research Leader	Internal Organization Chart	09-jul	Review leaders profile	2
					- First identification of formal, informal leaders for the Coach Team - First identification of Action Research internal leader				PhD_K+_CCX_P0.2 CPROF V1.0	09-jul	Review leaders profile with CEO	2
					2nd identification about Coach Team and internal leader			Approved second **K+ M** Coach Team and Action Research	20 Leaders profiles (PDF files) DB_PAEI_CCX.xlsx	Jul 9 Ago 15,20	Define final Coach Team and AR leader	3
			Tuning	Brief K+ presentation			All formal and informal leaders		PhD_K+_CCX_P0.0_KO V1.0.pptx	11-jul	Prepare Formal Kick Off	2.5
				First version of Kick Off	Kick Off execution	WOR		Kick off presentation		11-jul	Review Formal Kick Off with CEO	1.5
									PhD_K+_CCX_P0.3 KO V2.0.pptx	14-jul	Adjust Kick Off presentation	1
										14-jul	Formal kick Off with all team	1.5
		THE CONTEXT	THE TEAM AWARENESS (0.4)	Basic Trainning	Coach Team (CT) Presentation					16-jul	Prepare presentation about Team Building training	3
					- ICA's reviewing and signatures by CT members - Team building training	WOR	Coach Team members (including CEO)	Adjusted Team Building Presentation	PhD **K+** CCX P0.4 Pres TB V1.0.pptx	17-jul	Workshop about Team Building training	2
					Coaching process training	WOR	Coach Team members (including CEO)	Adjusted Coaching Presentation	PhD **K+** CCX P0.4 Pres CO V2.0	Jul 16,17	Prepare presentation about Coaching process training	4.5
										Jul 16,18	Workshop about coaching process training	4.5
				Complexity Management presentation	Training about foundations of Complexity Management based on the Viable System Model **(VSM)**	WOR	Coach Team members (including CEO)	Adjusted Complexity Management Presentation	PhD **K+** CCX P0.4 Pres CM V1.0.pptx	18-jul	Prepare presentation about Complexity Management based on the Viable System Model (VSM)	3
										19-jul	Workshop about Complexity Management based on the Viable System Model (VSM)	2
				K+ Methodology Presentation	Introduction about **K+** Model, and **K+ M**.	WOR	Coach Team members (including CEO)	Adjusted K+ Methodology (K+ M) Presentation	PhD **K+** CCX P0.4 Pres **MAR** V1.0.pptx	20-jul	Prepare presentation about K+ Model, K+ Methodology, Action Research and ELP	3
				Research and Experiential Learning Process presentation	Training about how to managing the Action Research and Experiential Learning Process (agendas and			Adjusted Research and Experiential learning process presentation		21-jul	Workshop about K+ Model, K+ Methodology, Action Research and ELP	2
				Main review (after first cycle)	Review of main concepts related with Complexity, **K+** Methodology and **K+**	WOR	Coach Team members		Only practice	Jan 07	Prepare workshop	1.5
									Only practice	Jan 07,8	Main review	6
		THE RESEARCHER AWARENESS (0.5)	Key Information	Key information summary	Reviewing summary of key information with CT	Meetings	Formal leaders	Key information summary with names of those responsible.	PhD **K+** CCX P0.5 VSM Rinfo V0.1.xlsx	15-jul	Review summary	1
									PhD **K+** CCX P0.5 Guia I1 V2.0.xlsx	15-jul	Collect information and visit the plant	4
				Data base with all files	Reviewing key information	Documentary research	None	Database framework with all files	Folder: /0 Context/05 Key Information/	16-jul	First review of key information	4
										Jul 22,23,24,25, 29,30 Sep 01	Review of key information	11

Table 31: Intervention matrix (summarised by time)

STAGE (STA)	PHASE (PHA)	SUB-PHASE (SUB)	THEME	t (THEME)	t (SUB)	% (SUB)	t (PHA)	% (PHA)	t (STA)	% (STA)
THE PREPARATION	THE RELATIONSHIP	THE ENGAGEMENT	First approach	2.5	6	0.88%	20.5	3.02%	85.5	12.61%
			Mutual understanding	3.5						
		THE FORMAL AGREEMENTS	Formalisation	6	6	0.88%				
		THE AGREED SCOPE	Formalisation	8.5	8.5	1.25%				
	THE CONTEXT	THE LEADER TEAM	Identificaction	7	13.5	1.99%	65	9.58%		
			Tuning	6.5						
		THE TEAM AWARENESS	Basic Trainning	31.5	31.5	4.64%				
		THE RESEARCHER AWARENESS	Key Information	20	20	2.95%				
THE ORGANISATIONAL LEVELLING	THE LEVELLING	THE CRITICAL CONSTRAINTS	Identificaction	6.5	14.5	2.14%	180.5	26.61%	192	28.31%
			Containment Plan Development	8						
		THE SYSTEM LEVELING	Containment Plan Execution	166	166	24.47%				
		EXPERIENTIAL LEARNING PROCESS	Preparation and Leveling	11.5	11.5	1.70%	11.5	1.70%		
THE MANAGING COMPLEXITY PROCESS	MEANING (Phase 1.0)	ORGANISATIONAL ETHOS	Organisational Values	2.5	7.5	1.11%	16.5	2.43%	400.75	59.09%
			System nature	2.5						
			Organisational Purpose	2.5						
		ORGANISATIONAL IDENTITY	Organisational Principles	4	9	1.33%				
			System Identity	5						
		EXPERIENTIAL LEARNING PROCESS	Essence and Identity	1.25	1.25	0.18%	1.25	0.18%		
	UNDERSTANDING (Phase 2.0)	ORGANISATIONAL SYSTEM	Organisational Distinctions	3.5	3.5	0.52%	9.5	1.40%		
		EXPERIENTIAL LEARNING PROCESS	Organisational System	1.25	1.25	0.18%				
		PROBLEMATICAL SITUATION	Perceived Reality	3	6	0.88%				
			Complexity Generators	3						
		EXPERIENTIAL LEARNING PROCESS	Problematical Situation	0.75	0.75	0.11%	2	0.29%		
	FOCUSING (Phase 3.0)	EXTERNAL BUSINESS MODEL	Organisational Performance	4.5	24.5	3.61%	72.5	10.69%		
			Environment Design (E)	20						
		EXPERIENTIAL LEARNING PROCESS	External Business Model	0.5	0.5	0.07%				
		INTERNAL BUSINESS MODEL	Operations Design (O)	3	5	0.74%				
			Meta-System Design (M)	2						
		EXPERIENTIAL LEARNING PROCESS	Internal Business Model	1.5	1.5	0.22%				
		ORGANISATIONAL FOCUS	Organisational Alignment	43	43	6.34%				
		EXPERIENTIAL LEARNING PROCESS	Organisational Focus	1.5	1.5	0.22%	3.5	0.52%		
	EXECUTING (Phase 4.0)	MANAGEMENT PROCESS	Execution Structure	17.5	294	43.35%	294	43.35%		
			Execution Management	276.5						
		EXPERIENTIAL LEARNING PROCESS	Management Process	1.5	1.5	0.22%	1.5	0.22%		

Finally, in the Managing Complexity Process stage, the researcher invested time in each phase, in descending order as follows: 74.9% on Executing, 18.74% on Focusing, 4.2% on Meaning, and 2.42% on Understanding. Within the Executing phase, time was fully employed in the Management Process sub-phase.

In summary, the above data show the clear orientation of this AR process: working with the organisation to build a robust context mainly oriented to the Team and Researcher Awareness sub-phases, and applying the learning in practice in the System Levelling and Management Process sub-phases. The time invested in these four sub-phases corresponds to 79.17% of the total. The researcher spent most of his time with CCX members applying the MetK+ in practice through the experiential learning approach (Jackson, 1995; Kölb, 1984; Reynolds & Vince, 2004; Read et al., 2012). According to Kölb (1984), knowledge is created through the transformation of experience. The results from this study can be related to Kölb's experiential learning cycle using Jackson's (1995) interpretation of the cycle, as follows: with the team's and the researcher's awareness, members were receptive to different types of stimuli; they then filtered the stimuli differently in order to process the information in different ways

and discussed it with the researcher in finally applying the insights in practice, mainly in the Levelling and Executing phases. These data also reflect the experiential learning cycle in the practice of the MetK+, whereby most of the time was used in the concrete experience, reflective observation and active experimentation phases through practice, and less in the abstract conceptualisation and awareness sub-phases.

5.2.2.2 Interaction techniques analysis

The researcher also recorded the different interaction techniques used throughout the AR process in order to review the relation between them and the ModK+ and MetK+. A summary of these data is shown in Table 32.

The data show that the researcher invested time as follows: 65.24% in fieldwork (FW), 25.18% in workshops (WO) during the AR process, 6.63% in meetings (ME), and 2.95% in documentary research (DR) at the beginning.

Looking at the stages, the data show the following: first, in the Preparation stage, the team members and the researcher spent time mainly in workshops (61.4%) and documentary research (23.39%); second, in the Organisational Levelling stage, time was used mainly in fieldwork (91.97%); and finally, in the Managing Complexity Process stage, time was spent mainly on fieldwork (70.45%) and workshop (25.1%) interaction techniques.

These data show a research process oriented to fieldwork and workshop interaction techniques. As Lewin states (1946), theory can be tested through practical interventions in action. Blaxter et al. (2001) also state that in the AR method members improve their situation by taking action based on learning from experience. Using most of the fieldwork time to create a change, these results also confirm Checkland's (1999) point of view: from the start, researchers have not simply tried to observe action as external watchers, but have taken part in the change process. These data confirm this approach from the interactions between the team and the researcher in the daily life of CCX in creating a change. These data also reinforce the use of the experiential learning cycle in this

Table 32: Intervention matrix (summarised by research technique)

STAGE	PHASE	SUB-PHASE	THEME	TECHNIQUE	Time
THE PREPARATION	THE RELATIONSHIP	THE ENGAGEMENT	First approach	ME	2.5
			Mutual understanding	ME	3.5
		THE FORMAL AGREEMENTS	Formalisation	WO	6
		THE AGREED SCOPE	Formalisation	WO	8.5
	THE CONTEXT	THE LEADER TEAM	Identificaction	ME	7
			Tuning	WO	6.5
		THE TEAM AWARENESS	Basic Trainning	WO	31.5
		THE RESEARCHER AWARENESS	Key Information	DR	20
THE ORGANISATIONAL LEVELLING	THE LEVELLING	THE CRITICAL CONSTRAINTS	Identificaction	ME	6.5
			Containment Plan Development	ME	8
		THE SYSTEM LEVELLING	Containment Plan Execution	FW	166
THE MANAGING COMPLEXITY PROCESS	MEANING (Phase 1.0)	ORGANISATIONAL ETHOS	Organisational Values	WO	2.5
			System Nature	WO	2.5
			Organisational Purpose	WO	2.5
		ORGANISATIONAL IDENTITY	Organisational Principles	WO	4
			System Identity	WO	5
	UNDERSTANDING (Phase 2.0)	ORGANISATIONAL SYSTEM	Organisational Distinctions	WO	3.5
		PROBLEMATICAL SITUATION	Perceived Reality	WO	3
			Complexity Generators	WO	3
	FOCUSING (Phase 3.0)	EXTERNAL BUSINESS MODEL	Organisational Performance	WO	4.5
			Environment Design (E)	WO	20
		INTERNAL BUSINESS MODEL	Operations Design (O)	WO	3
			Meta-System Design (M)	WO	2
		ORGANISATIONAL FOCUS	Organisational Alignment	WO	43
	EXECUTING (Phase 4.0)	THE MANAGEMENT PROCESS	Execution Structure	ME	17.5
			Execution Management	FW	276.5
		PROCESS SURVEYS	TOTAL	WO	19.75

research (Kölb, 1984); or, in Lewin's (1946) words, the iterative cycle of action and reflection. The social event behind this research was studied in the field, an approach argued by Lewin (1946). Through the interactions between the members and the researcher, the latter realised the 'ground' that shaped the 'figure', the observed phenomenon (Fuenmayor, 2012) and, by these interactions, the researcher could develop the AR process according to the culture in a way that would enhance the adoption of the process. Through the AR approach, the researcher was also able to explore the following three aspects of the organisational culture (Schein, 1990): the artifacts (processes, methods, etc.), the value adopted, and the basic beliefs evident through people's behaviour. Thus, and according to Lewin (1946), theory can be developed and tested by practical interventions in action, using the MetK+ to orient actions and enhance the adoption of a process through an iterative cycle of action and reflection to provoke a change in CCX (Coghlan & Brannick, 2005; Midgley, 2000). According to Gill and Johnson (2010), this AR approach intended, not only to contribute to existing knowledge, but also to help people in CCX solve practical concerns and enable them to deal with their problematical situation by directing energy into the

action, which means making things happen in real-life situations. Thus, AR helped in exploring new beliefs in action (Checkland, 2010). The researcher presents in Figure 62 a summary combining the analyses of the time invested and the interactions techniques, based on time.

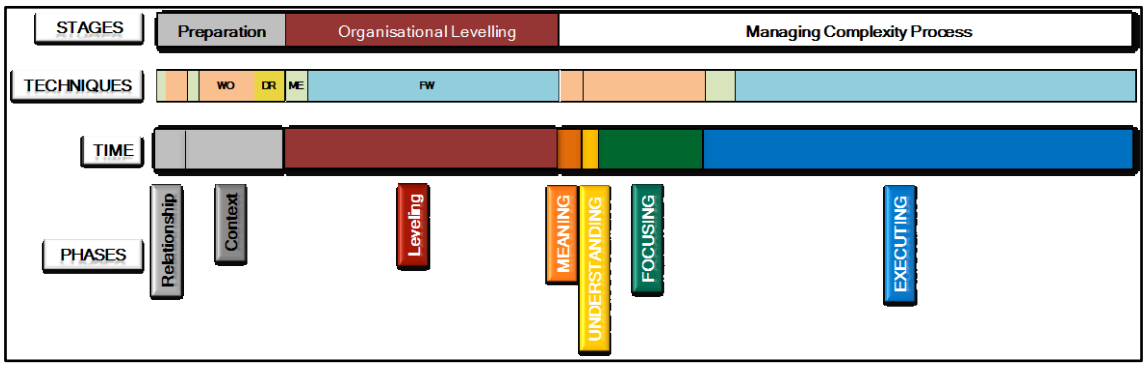


Figure 62: Summary of time invested and interactions techniques analyses

The researcher's observations

5.2.3 Introduction

The researcher's observations were related to the performance of the MetK+ and ModK+ in practice. These observations were developed during the entire research process and are presented here, following the same structure as the MetK+ (stages, phases, sub-phases and themes). First, the researcher states each observation at the theme level. Then, the researcher discusses all the observations in the discussion sections of this chapter using an explanation building technique in order to reflect on the theoretical propositions developed in chapter 3. Here, the researcher also uses a 'tracker' in each phase in order to help the reader.

5.2.4 Findings

The researcher presents his observations below (Tables 33, 34, 35, 36, 37, 38, 39 and 40), following the same sequence and numbering used in chapter 4.

Stage: Preparation

5.2.4.1 The relationship

Table 33: Researcher's observations in the Relationship phase

Sub-Phase	Theme	Researcher's observations
4.1.1 Engagement	4.1.1.1 First Approach	The first approach designed for CCX was determinant to start a relationship based on mutual understanding, trust and respect.
		The CEO´s perspective was very helpful as a means of gaining an initial understanding of the SME's main challenges, in order to build a bridge between the ModK+ approach and the organisation's reality.
		The explanation of only the first level (phase) of the ModK+ related to the business reality and using business language served as a means for explaining the foundations of the ModK+ to the CEO. The researcher ensured the CEO´s understanding, in order to capture his interest and gain his focus.
		Beyond understanding the ModK+ and its impact, the CEO's main reason for agreeing to participate in the development of this research was the researcher's commitment to achieving results through the AR process. This was expressed directly by the CEO at the end of the first videoconference.
	4.1.1.2 Mutual Expectations	The CEO was not fully aware of the implications of growing complexity and change in the environment and their relation with and impact on organisational management.
		An in-depth explanation of the MetK+ using the intervention matrix helped the CEO to gain a systemic understanding of the research approach and its requirements. At the same time, the matrix gave more confidence to the CEO in supporting this research as the vehicle for necessary change in his organisation.
		Using basic questions (what, why, how, when and where) to explain the approach, the researcher and the CEO discussed the general scope of the research and, based on this, both explored the first general boundaries for the research.
		For the coordination and better execution of the research project, it was important to review and finalise, from the beginning, all the logistical aspects to be considered for the intervention: schedules, access, facilities, and safety requirements
4.1.2 Formal Agreements	4.1.2.1 Formalisation	The formalisation of agreements from the beginning fostered a climate of trust and respect.
		Open discussion was a key factor in the research agreements with stakeholders because they saw them as bilateral agreements for generating a higher level of trust, commitment and disposition.
		The involvement of HR Manager was a key factor in gaining the signed consent of everyone involved.
4.1.3 Agreed Scope	4.1.3.1 Formalisation	Using the intervention matrix and scope of work documents, the CEO had a basic understanding of the 'operationalisation' of the basic theoretical framework behind the ModK+ and its principles.
		Scope of work validation, based on mutual understanding, was the foundation of another explicit boundary for the research. This agreement enhanced communication between the organisation and the researcher in order to reduce possible future conflicts.
		The CEO gained more confidence in the intervention to be developed through the review, adjustment and validation of the scope of work.
		The previous review of the documents with the CEO also helped in adjusting them in order to explain the research approach in a simple and understandable way to staff. Here, the CEO was very helpful, because he knew all the profiles of the management team.

5.2.4.2 The context

Table 34: Researcher's observations in the Context phase

Sub-Phase	Theme	Researcher's observations
4.2.1 Leader Team	4.2.1.1 Identificaction	The leadership of formal leaders (based on the organisational chart) does not correspond with the most influential people in CCX. Leadership must be recognised among the members of a group and this recognition gave legitimacy to the final leader team.
		The composition of the final leader team, based on the VSM, was very useful in order to be aware of all the systems of the VSM.
		Regardless of the composition of the final leader team, it was important to involve more people in the first stage. This broad understanding of the intervention and its principles promoted a common language within the organisation.
		Cross-referencing the information from psychometric testing, evaluations, HR Manager's point of view and the researcher's observations regarding all the possible leaders (formal and informal) was very helpful in integrating the final leader team for the research.
		The two periods of the open selection process for the leader team improved members' confidence due to transparency and the legitimacy of the process.
	4.2.1.2 Tuning	In order to present a legitimate research project to all stakeholders, the formal start of the research process was of great importance.
		In this formal presentation of the research process, the researcher confirmed his commitment to the impact and results of the AR process. This commitment improved members' confidence and overcame any possible apathy still remaining.
		Among the members, the impact of using dialogue instead of a very formal presentation created a more relaxed environment, which promoted greater transparency between the researcher and the team.
4.2.2 Team Awareness	4.2.2.1 Basic Training	The group diversity had an influence on the basic training in this SME. The trainning had been designed to have a practical orientation, i.e., to bear a close relation to members' reality. The basic training, based on members' reality, allowed the merger of both the organisation's and the researcher's perspectives.
		The use of didactic tools (films, metaphors, group dynamics, games, practical examples, etc.) not only fostered learning in a simple way, but also team building between the members.
		From the beginning, the members of the extended team enhanced their common language and mutual understanding as a team throughout the K+ training sequence.
		The dialogue that emerged from the basic training also helped the researcher and the organisation to review paradigms throughout the training process.
		The module sequence used in basic training helped to move from team building to gaining mutual understanding. This process was very useful in improving relationships between the team members and the researcher.
4.2.3 Researcher Awareness	4.2.3.1 Key Information	The previous coordination of an agenda was very helpful for the researcher and members in preparing information and focusing on the analysis of each system of the VSM in an effective way and in a friendly environment.
		Using the VSM theory as a conceptual framework, the review of key information was highly valuable; the sequence used to do this (E, O, M) helped the researcher and the members in having a basic systemic approach to the organisation. Through this effort, the researcher achieved his first VSM map and preliminary diagnosis.
		The use of data to explore perceived reality in this phase was very useful in supporting preliminary discussions, as the organisation and the researcher agreed that the SME's reality was based more on primary data rather than solely on people's perceptions.
		The researcher triangulated the information above with that of the data and this helped discussion from multiple perspectives. The researcher and leaders analysed the perceived reality from each perspective and, at the end, these were merged into one.

Stage: Organisational Levelling

5.2.4.3 Levelling

Table 35: Researcher's observations in the Levelling phase

Sub-Phase	Theme	Researcher's observations
4.3.1 Critical Constraints	4.3.1.1 Identificaction	It is necessary to use a different 'means of contrast' in order to explore reality differently. If leaders do not review their own paradigms to face new challenges, they will continue to act in the same way and even expect different results. Leaders' paradigms help them to interpret everyday reality and these affect how leaders act in practice.
		Previous basic training was not enough for the leader team for them to identify critical constraints for themselves. The inertia from their previous paradigms was much greater than their understanding of new ones.
		The management team was able to review their own paradigms using the VSM guidelines as a 'means of contrast' and thus could distinguish the critical constraints that threatened the system's viability in the short term. To use an analogy, the VSM was the 'lenses' through which the management team perceived and shared the SME's reality very differently from using an everyday approach and thus they were able to realise the current high level of risk.
		Using the VSM, the leaders worked to understand the critical constraints differently. This process increased their systemic understanding of the organisation's reality and increased the team's confidence in the VSM and the intervention itself.
	4.3.1.2 Containment plan development	The researcher developed a detailed containment plan and shared it with the leader team through dialogue and discussions. The researcher integrated all the contributions, which were recognised publicly and so generated a greater sense of ownership of the plan among the contributors.
		The open dialogue process with the extended team also had several effects: they became aware of the critical situation of the company, had an opportunity to contribute to the plan and assimilate it, and, finally, had a clear idea of all the actions to be taken.
		The involvement of all the operations workers in the containment plan had a similar significant synergy in the organisation. These workers also became aware of the situation and it was clear to them that their specific contributions to the goals related to customer service and product quality in facing this problem.
		The organisation had a weakness related to follow-up processes resulting from inertia. Therefore, it was important for all members to use a basic but formal follow-up process for the containment plan. The members reinforced their confidence in being able to reverse the situation when they knew about the follow-up process.
4.3.2 System Levelling	4.3.2.1 Containment plan execution	At this time, the members and the researcher focused all their energy and attention on the critical constraints, in order to reverse the critical situation to a healthy one.
		In this phase, application of the VSM principles to systems 1, 2, 3 and 3* gave a clear focus and greater speed to the change.
		The agreed basic rules (S2), accompanied by the follow-up, quickly had an impact on the management of complexity and improved the system's requisite variety. These basic rules also had a strong impact on the working environment by promoting healthier and more effective team interactions.
		Clarification of all the critical channels improved the communication and coordination between the team members and the performance of CCX's VSM.
		Using the VSM and its principles, organisational redesign was crucial among the leaders, in order to for them to assume more autonomy and responsibility. This structural redesign was supported with clear definitions of the critical roles and their responsibilities.
		The handling of KPIs, using TOC (Throughput, Operational Expenses and Inventories) as the foundation of the cash flow management approach, facilitated a clear focus and follow-up for all members in an easy and manageable way.
		Using the VSM, the team improved operations flows, and thus customer service, through integrated systemic operations scheduling.
		The leaders focused the commercial and operations efforts based on value attributes that are appreciated by customers. These attributes were the determinants for shifting focus to increase demand.
		The second involvement of the whole operations team generated a clear understanding of the specific actions to be taken and improved their commitment to overcoming critical constraints.
		In this critical phase, the effect of a systematic follow-up process alerted the members about its importance to organisational change.
		In a relatively short amount of time, The CEO delegated several aspects that had previously relied on him. The confidence to do this relied on his previous understanding of the implications and benefits of the VSM.

Stage: The Managing Complexity Process

5.2.4.4 Phase: Meaning

Table 36: Researcher's observations in the Meaning phase

Sub-Phase	Theme	Researcher's observations
4.4.1 Organisational ethos	4.4.1.1 Organisational Values	The team clearly understood the notion of transcendence and the impact of the value system on the organisation's culture and cohesion through this process .
		The process used, from individual values to the organisational value system based on evident behaviours, had a dual effect: it enhanced the distinction and appropriation of values and team building between members.
		Team building was enhanced by the sense of mutual recognition acquired among all the team members. This recognition renewed trust and mutual respect within the team.
		Organisational values are certainly an attractor in the organisation. The members reinforced their sense of belonging and loyalty in relation to the system to which they belonged through the development of the value system.
	4.4.1.2 Organisational Purpose	The identification of organisation purpose through its key relationships to stakeholders improved people's sense of transcendence when they could recognise their influence as a system. The members realised that their influence, impact and responsibility were much greater when they understood their organisation as a system interacting with its environment.
		The team achieved an initial systemic understanding of their organisation through purpose identification based on key relationships.
		At the end of the session, the team members also reflected upon their major contribution to the company as a community, which had an impact beyond what they had imagined.
	4.4.1.3 The nature of the system	In order to confirm the nature of the system, using the VSM through the S1s dispelled any doubt when defining it.
		The team members were then clearly aware of the business in which they were working through the explicit and precise identification of the nature of the system.
		The above identification helped them to reassess all the S1s in order to consider their correct importance. Using this process, the team avoided confusion and were able to reassess their priorities.
		For all the members of the meta-system, such identification encouraged a greater awareness of their necessary support of all S1s.
		The identification of the nature of the organisation was also essential to distinguishing the boundaries of the system-in-focus.
4.4.2 Organisational Identity	4.4.2.1 Organisational Principles	Through clarifying the guiding principles for a change process, the team discovered that behind each management style were beliefs rooted in their culture that drove them to act in a certain way.
		The team members reflected on their own current beliefs and paradigms when using the basic principles of the VSM to contrast them. In addition, this reflection enhanced their interest in addressing organisational management from a very different perspective.
		When the team members had reviewed the basic principles of the VSM through practical examples, they seemed easy to understand to them using the graphical relationship of guidelines presented in chapter 3..
		The team was very interested in business metrics for assessing the impact of the change process, because these metrics gave them a specific result to achieve when guiding the actions.
		The definition of the metrics also helped the team to focus, because the most important variables to attend to were determined for each of the three main organisational metrics.
	4.4.2.2 System Identity	The detailed identification of key relationships using the VSM had a dual effect on the team: it helped them understand these relationships as part of the system's identity, and they developed a systemic perspective of the interactions between all the participating entities.
		The sequence used (Operations, Meta-system and Environment) in this section to explore identity was didactic, so that the team could explore identity relationships in a systemic way.
		Using the concepts with a sequence to define the operations value chain allowed the team to achieve a clearer understanding of the relationships between all the entities participating in the S1s.
		When reviewing organisational identity in a plenary session using the VSM, the team clearly understood the interactions between stakeholders.

5.2.4.5 Phase: Understanding

Table 37: Researcher's observations in the Understanding phase

Sub-Phase	Theme	Researcher's observations
4.5.1 Organisational System	4.5.1.1 Organisational Distinctions	The members' perceptions, individualy and as a team, changed when they understood the organisation through the VSM. This allowed them to distinguish much more clearly the system's interactions and the organisation's current design.
		Based on the identified relationships of organisational identity, the team refined their organisational VSM map and thus were also able to reflect on their problematical situation.
		The team resized their viewpoint in regard to the perceived problematical situation when using the Pareto principle to detail the most critical and relevant entities of the system-in-focus. Through this process, they also shared their viewpoints of the most critical aspects and thus fostered greater empathy between themselves when understanding the implications of each system of the VSM.
		The team improved their systemic understanding through the identification of detailed and relevant entities in the system-in-focus. At the end of the session, they discussed how useful it was to have the organisation's "map" because, like a road map, this "map" allowed them to understand their whole "territory".
		Developing a detailed VSM with the suggested sequence also allowed the team mental order by the simple and practical construction of the CCX's VSM.
4.5.2 Problematical Situation	4.5.2.1 Pereceived Reality	Comparing the external and internal perceptions with the VSM was useful to the team in reflecting on their current beliefs and paradigms to interpret their reality.
		The team developed empathy amongst themselves when integrating the perceptions of reality and, at the same time, understanding the challenges in the VSM systems. The VSM was a 'vehicule' for sharing understanding.
		However, have only perceptions was not enough to diagnose the problematical situation, the members tended to confuse it with undesirable effects.
		The team realised their organisation's performance when exploring the external customers' perceptions but, above all, this exploration helped them to focus their efforts towards the meaningful attributes that were really appreciated by the customers.
		The review of integrated perceptions (external and internal) allowed team members to resise and understand their perceived reality.
	4.5.2.2 Complexity Generators	In order to perform an organisational diagnosis, the members could clarify the difference between their reality perceptions and the problematical situation.
		The use of the VSM in developing an organisational diagnosis was critical in distinguishing perceptions and the SME's problematical situation.
		The team members use the VSM map to locate and analyse the problematical situation and obtained systemic understanding of complexity generators.
		The team achieved greater understanding of the challenges to be faced by carrying out a final synthesis to understand the dynamic between the complexity generators.

5.2.4.6 Phase: Focusing

Table 38: Researcher's observations in the Focusing phase (first part)

Sub-Phase	Theme	Researcher's observations
4.6.1 External Business Model	4.6.1.1 Organisational Performance	It is possible to assess organisational performance in a systemic and easy way using three organisational metrics proposed by the TOC. The team related their previous indicators to the TOC metrics in a clear and simple way. In addition, this integration gave more sense to the monitoring and management of current business metrics.
		The leaders achieved a clearer perspective of business performance when reviewing historical performance. This allowed them to understand and accept the scenario in which they found themselves and, in turn, this served as a starting point for defining expected results.
		The definition of the goals to be achieved in each business metric by the management team generated favourable aspects: to improve a business language, to reinforce mutual understanding, and to stimulate understanding of the challenges faced, in order to enhance the organisation's viability.
		The team generated greater confidence and commitment when they began designing the business models (external and internal) based on specific goals. The team defined the goals in a way that made them highly challenging but possible to achieve.
	4.6.1.2 Environtment Design	The team linked the problematical situation and the business metrics with the external business model design. The participants realised that the environment was ultimately the decision of the organisation and it was possible to design it in order to generate the requisite variety.
		The strategic orchestration approach allowed the members to rethink the organisation's business model. This approach renewed the organisational beliefs about the current business model and the leaders changed some perceptions: from just a single company to a real business network, which opened more possibilities than the traditional perspective.
		The value innovation approach allowed the members to rethink variety attenuation from the environment based on specific attributes that markets appreciate. The members reflected on their beliefs using this approach.
		The value attributes were determinants for the leaders to foster a focused approach to the organisation's environment.
		The sequence followed simplified the external business model design in a practical, simple and logical way.
		In order to guarantee the necessary cash flow, the team followed a sequence to define commercial targets, which helped them to validate their feasibility and increase the team's confidence in achieving them.
		Using the organisation's VSM map, the team conducted systemic discussions through all the environment design processes. This brought them to a clear understanding of the dynamics between the selected environment and its relation to the operations and meta-system.
4.6.2 Internal Business Model	4.6.2.1 Operations Design	The sequence developed facilitated a dialogue for operations design in a simple way. This sequence promoted a systemic understanding of operations design.
		The operations design needed deep and clear understanding among the members. These discussions were reflected in specific definitions of the roles, responsibilities, indicators, communication channels and interaction rules between CCX's members.
		Working on all the elements necessary for operations design allowed the team not only understanding, but also awareness of how to operate it.
		A key result of this theme was the integration and cohesion that emerged in the operations team through the development of this process. The design of this process facilitated empathy and trust among the members to communicate more effectively.
		The VSM principles and guidelines for seeking autonomy in S1s were the fundamental criteria for guiding operations design in a sustained way.
		An important factor in operations design was the focus on clarifying interactions with the meta-system, in order to increase operations autonomy.
	4.6.2.2 Meta-System Design	The sequence developed facilitated a dialogue process in meta-system design in a simple way. This sequence promoted systemic understanding of meta-system design.
		The VSM principles and guidelines seeking cohesion and identity in the system were the fundamental criteria for guiding meta-system design in a sustained way.
		Through this process, the participants in meta-system design had greater awareness of their role in bringing support to S1s, in order to increase the requisite variety and improve the cohesion and identity of the whole system.
		Meta-system design also emphasised clear understanding among members through in-depth dialogue. These discussions were also reflected in specific definitions of roles, responsibilities, indicators, communication channels and interaction rules displayed in the design.

Table 39: Researcher's observations in the Focusing phase (second part)

Sub-Phase	Theme	Researcher's observations
4.6.3 Organisational Focus	4.6.3.1 Organisational Alignment	The sequence used to integrate the strategic scorecard facilitated understanding of a strategic approach. The strategic objectives were the common starting point for connecting the three different strategic thinking levels; these objectives helped as a pivot or centre for the correlation between the strategic and operational levels.
		The role of each employee influenced her/his understanding at each strategic thinking level. The researcher observed that each level was more understandable, as follows: it was easier to understand the strategic level when working with people involved on S4 and S5; the tactical level was easier when people work on S3, S3* and S2; and the operational level is clearer when people operate in S1s.
		It was wise to work on different levels with different members, depending on their role; this facilitated communication and even understanding.
		The organisational alignment helped, in a decisive way, to clarify the leaders' accountability and responsibilities. The alignment process was a vehicle that facilitated specific understanding of the responsibilities to be covered. This understanding was further refined using the VSM map as a means to validate the impact of such responsabilities across the system.
		The use of paraphrasing by the members in the workshops also helped in the assimilation of concepts, particularly in understanding abstract processes.
		The use of team dynamics using transitional objects during the sessions enhanced the levels of understanding and assimilation of this complex theme.
		The workshop design fostered team members' understanding, empathy, cohesion and coordination through in-depth dialogue amongst them.
		The researcher observed that, in this SME, it was difficult to make ideas more concrete by putting them in writing in order to implement them. Typically, in these types of organisations, is common only to discuss actions in daily operations. The ability to synthesise actions by writing has not been fully developed.
		For several reasons, the alignment process was complex for this SME: first, people had a greater focus on the short term; second, it was not common for people to follow a defined and detailed method for executing actions; third, it was not natural, in the maturity of their organisational level (Adizes, 1999) to work in such an organised way; and finally, the integration of a complete strategic scorecard required skill in managing an abstract process with a systemic visualisation.
		These reasons hindered the full assimilation of the method but not of the alignment logic, this logic for the six levels was more intuitive and easy to understand, but not the entire method for performing this logic.
		The final integration with the extended team enhanced the shared understanding of the process and approach in order to foster a coordinated execution. The extended team stated by the end of the workshop that they had understood the explicit connection between the vision to be achieved and the specific actions to be carried out in daily practice. Thus, the team was becoming aware of the practical value of the strategic approach.
		The whole alignment process helped the team to rethink some of their paradigms and beliefs regarding progress. The reflections occurred mainly in relation to the practical need for: common focus, specific and coordinated actions, responsibilities, performance evaluation, a systemic approach to implementation and, finally, empathy and the necessary commitment as a real team to improve the whole system.

5.2.4.7 Phase: Executing

Table 40: Researcher's observations in the Executing phase

Sub-Phase	Theme	Researcher's observations
4.7.1 Management Process	4.7.1.1 Execution Structure	Recognising the inertia regarding follow-up in this SME, the preparation of the minimum necessary conditions for implementation facilitated the assimilation of a new executing culture for the team members.
		The researcher designed a basic structure for the minimum necessary conditions for follow-up and this fostered a dialogue between him and the team members in order to understand, co-design and enhance the ownership of the new conditions for execution.
		A simple and practical orientation of these minimum necessary conditions also fostered their assimilation based on usability, as provided by the members.
		Preparing the necessary conditions contained in itself a systemic view of the execution because they coordinated the monitoring between the three levels of strategic thinking: strategic, tactical and operative..
		In developing a final dialogue with the extended team, the execution structure favoured a shared understanding. This structure enhanced the importance of a coordinated follow-up in order to execute actions as a team that were connected across the three levels of strategic thinking.
	4.7.1.2 Execution Management	The accompaniment of the coach was essential during execution in this theme. Even with a different context (the necessary conditions for the follow-up), the team tended to return to old practices. The researcher's role as a coach was critical in order to boost consistency and adoption in execution.
		When the team members managed the execution in practice, they began to understand the ModK+ as an interconnected and non-linear model. They realised that even the sequence of the MetK + had only the purpose of building a first cycle for the managing complexity process through systemic intervention. What was really important was the continuous management process behind the first and subsequent cycles when facing complexity.
		Coaching during the execution also helped the team members to improve their ability to link actions between the three levels of strategic management, finding the necessary connections that would allow them to link their actions and develop their strategic skills as a team.
		The execution of the management process became a vehicle, which helped the SME to acquire the necessary consistency to execute in a coordinated way. At the end of the first cycle, the follow-up meetings already worked as part of everyday life.
		The team members could identify and validate the results achieved in their daily practice through the follow-up process, which reinforced their wanting to persevere on the learning path.
		Timely and appropriate information was essential for effective follow-up. This enabler greatly helped the team members in their own coordination. In turn, this shared and accessible information was key to fostering a cross-validation environment between people.

All the researcher's observations above are a source of future discussion in this chapter of the multi-methodology and the continuous process. In the next section, the researcher presents another source of evidence: the group interviews.

The group interviews

5.2.5 Introduction

The group interviews were based on Kölb's experiential learning cycle, explained in chapter 2. Bearing cultural differences in mind, the researcher used Jackson's

(1995) stages: the receptivity modality (Kölb's 'concrete experience'), the perceptual modality (Kölb's 'reflective observation'), the cognitive modality (Kölb's 'abstract conceptualisation'), and the behaviour modality (Kölb's 'active experimentation') to design a question for each and reviewed them with the CEO and HR Manager before conducting the group interviews. Using Kölb's cycle, a learning process can start in any of the stages. For this data collection, the researcher decided to follow a path starting in the abstract conceptualisation stage. The questions designed were as follows:

1. Cognitive modality / Abstract conceptualisation:
    a) Which topic(s) first captured my attention?
    b) Which concepts are clear to me in order to apply them in my daily life?
2. Behaviour modality / Active experimentation:
    a) Where or in what cases have I applied these concepts in my life?
3. Receptivity modality / Concrete experience:
    a) When I applied these concepts in my daily life, what kind of changes did I observe, based on this experience?
4. Perceptual modality / Reflective observation:
    a) What kind of learning has this experience given me?

In order to apply the questions in a group interview, different focus group sessions were developed, using a technology that allows a whole group to answer the same question at the same time in both anonymous and non-anonymous modes. The researcher selected the anonymous mode in order to address ethical issues and create an environment in which people would feel free to express their ideas. This technology uses boards for each participant. These boards are connected to a laptop in order to generate a single database of all the answers.

The group interviews were developed as follows:

1. In the Preparation stage, the researcher applied three group interviews related to the basic training in the following workshops: teamwork, coaching approach, and managing complexity.

2. The Organisational Levelling stage converged with the application of the ModK+ and, because of this, the researcher decided not to conduct interviews at this stage.
3. In the Managing Complexity Process stage, the researcher conducted group interviews at each sub-phase covering the whole of the ModK+.

The interviews conducted are shown in Table 41.

Table 41: Summary of experiential learning interviews

STAGE	PHASE	SUB-PHASE
THE PREPARATION	THE RELATIONSHIP	THE ENGAGEMENT
		THE FORMAL AGREEMENTS
		THE AGREED SCOPE
	THE CONTEXT	THE LEADER TEAM
		THE TEAM AWARENESS
		THE RESEARCHER AWARENESS
		EXPERIENTIAL LEARNING PROCESS (3)
THE ORGANISATIONAL LEVELLING	THE LEVELLING	THE CRITICAL CONSTRAINTS
		THE SYSTEM LEVELLING
THE MANAGING COMPLEXITY PROCESS	MEANING	ORGANISATIONAL ETHOS
		ORGANISATIONAL IDENTITY
		EXPERIENTIAL LEARNING PROCESS
	UNDERSTANDING	ORGANISATIONAL SYSTEM
		EXPERIENTIAL LEARNING PROCESS
		PROBLEMATICAL SITUATION
		EXPERIENTIAL LEARNING PROCESS
	FOCUSING	EXTERNAL BUSINESS MODEL
		EXPERIENTIAL LEARNING PROCESS
		INTERNAL BUSINESS MODEL
		EXPERIENTIAL LEARNING PROCESS
		ORGANISATIONAL FOCUS
		EXPERIENTIAL LEARNING PROCESS
	EXECUTING	MANAGEMENT PROCESS
		EXPERIENTIAL LEARNING PROCESS

There follows the procedure used to analyse the data:

1. For each of the 10 group interviews, the researcher created a database from the original answers from the participants.
2. The researcher analysed all the answers in order to identify patterns behind each question.
3. After pattern-matching, the researcher estimated the frequency of each pattern in relation to the total. The frequency was expressed in terms of percentages.
4. Finally, using the Pareto principle, the researcher presents only those of around 80% frequency, considered in descending order in the next section.

5.2.6 Findings

Table 42 and Table 43 present the patterns referred to above. The tables provide a title that refers to each group interview and which is shown in the same colour as that used in the graphical representation of the MetK+. The tables summarise all the patterns based on the participants' answers regarding their perceptions of learning throughout the research project. The researcher uses these patterns in the following discussion.

The impact of the case study

5.2.7 Introduction

The final source of evidence is the analysis of the impact of the case study on the business. As stated, CCX integrated its past indicators into three organisational metrics: throughput, inventories and operating expenses. From the start, the CCX managerial team decided to monitor four core aspects related to the organisational metrics, as follows. First, in order to monitor throughput, the managerial team decided to review the total sales, seeking at least the break-even point. Second, in order to evaluate the operating expenses, two major factors of influence were considered: rejections, because, according to CCX's financial scheme, rejections have an impact on income but mainly on cost, as they require an over cost to solve them; and the leather yield, because this impacts directly on the total invoicing and on the raw materials (hides) that are the main operative cost in this industry. Finally, the main factor related to inventories is customer service, which has an impact in two ways: internally, on the general inventories throughout the whole of the production process; and externally to the customer in order to trigger more demand. Thus, these were the four time series analysed through the research process as key variables for reviewing business performance.

Kölb's Learning Stage	ELP Questions	Teamwork Development	Coaching Development	Managing Complexity	Organisational Essence and Identity	Organisational System
Cognitive modality / Abstract conceptualisation:	**Which topic(s) first captured my attention?**	A clear identification of teams and their members in the organisation (42%). The integration between team members through group dynamics (16%). Diagnosing as a team (16%). The importance of a common focus in teamwork (16%).	The coaching concepts and their tools (36%). The relation between leadership and the coaching approach (29%). The team dynamic using a film (29%).	The use of the VSM to address complexity in a simple way (70%). Team identification using the VSM systems (20%).	The necessary congruence between personal and organisational values (38%). The new nature of the business (23%). The workshop about the value system (23%).	Using the VSM in practice through a map (63%). Understanding the organisation as a system (38%).
	Which concepts are clear to me in order to apply them in my daily life?	The importance of a common focus in teamwork (36%). The relation between leadership and team building (36%). The importance of team building to improve cohesion (18%).	The relation between a vision and coaching to achieve it (21%). The relation between coaching and synergy (21%). The coaching cycle (21%). The importance of self-awareness in coaching (21%).	Team identification using the VSM systems (67%). The use of the VSM to address complexity in a simple way (17%).	The necessary congruence between personal and organisational values (30%). Self-awareness of personal congruence (30%). Empathy between members (20%).	Using the VSM in practice through a map (75%).
Behaviour modality / Active experimentation:	**Where or in what cases have I applied these concepts in my life?**	In our organisation (40%). In our team (33%). In my personal approach (13%).	In my family (25%). In my personal approach (25%). In our organisation (25%). In our team (25%).	In my personal approach (50%). In my family (25%). In our organisation (25%).	In my family (25%). In my personal approach (63%). In our organisation (13%).	In our organisation (33%). In our team (33%). In my personal approach (22%).
Receptivity modality / Concrete experience:	**When I applied these concepts in my daily life, what kind of changes did I observe, based on this experience?**	An improvement in team focus (30%). Better results as a team (20%). An improvement in productivity (20%). Awareness and confidence within the team (20%).	More synergy between members (63%). Motivation and focus within the team (25%).	New rules for interactions (40%). Role clarification for teamwork (40%). The relation between the VSM and a shared focus (20%).	Increasing congruence between members (50%). Increasing confidence between members (17%). Increasing empathy between members (17%).	Better results in teams and in the organisation (50%). Better interactions between teams (33%).
Perceptual modality / Reflective observation:	**What kind of learning has this experience given me?**	The relation between focus-teamwork-results (45%). The relation between teamwork and synergy improvement (45%).	Self-awareness as a leader (36%). The importance of listening to team members (27%). The coaching approach and its impact on motivation (18%).	Better coordination for better results (50%). The use of the VSM to address continuous change (25%). The use of the VSM to establish priorities (25%).	Reflecting on personal purpose (50%). Valuing teammates (33%). Relation between self-awareness and improvement (17%).	Better organisational understanding using the VSM map (30%). Self-awareness of how to interact between teams (25%). The relation between focus and better results (25%).

Table 42: Summary of interview group patterns (first part)

Kölb's Learning Stage	ELP Questions	Problematic Situation	External Business Model	Internal Business Model	Organisational Focus	Management Process
Cognitive modality / Abstract conceptualisation:	**Which topic(s) first captured my attention?**	Integral diagnosis of a system (46%). Better organisational understanding using the VSM map (23%). Better understanding of the nature of the business using the VSM (15%).	Understanding of the interaction between the environment and the organisation using the VSM map (45%). A clear commercial focus (33%). The orchestrator node concept applied to CCX (22%).	Utility of the VSM map for design (36%). The clarification of roles and responsibilities among members (21%). The workshop design (intuitive) (21%). Focus on strategy (14%).	Clear definitions from the vision to specific activities and responsibilities (64%). The link between the three strategic levels and their metrics (18%). The emphasis on follow-up (9%).	Clear responsibilities for the follow-up process (44%). Formal structure for execution (33%). Performance evaluation (11%).
	Which concepts are clear to me in order to apply them in my daily life?	Better organisational understanding using the VSM map (50%). Integral diagnosis of a system (25%).	The orchestrator node concept applied to CCX (43%). Clear focus using business metrics (33%).	Internal business model to promote synergy (43%). Systems approaches and their effects on synergy (29%). Focus on strategy (14%).	Clear definitions from the vision to specific activities and responsibilities (60%). The link between the three strategic levels and their metrics (40%).	The follow-up process and its necessary discipline (33%). The relation between follow-up and results (33%). The relation between the follow-up process and continuous focus (11%).
Behaviour modality / Active experimentation:	**Where or in what cases have I applied these concepts in my life?**	In our organisation (50%). In my personal approach (33%).	In our organisation (50%). In my personal approach (50%).	In my personal approach (43%). In our team (43%).	In my personal approach (67%). In our team (33%).	In our organisation (67%). In my personal approach (33%).
Receptivity modality / Concrete experience:	**When I applied these concepts in my daily life, what kind of changes did I observe, based on this experience?**	In the process of assimilating (67%). Focusing on a problematic situation as a team (33%).	The increasing focus on results (50%). In the process of assimilating (50%).	Awareness of team performance (38%). The increasing synergy between members (25%). Better attitudes between members (25%).	Better working environment (50%). The relation between alignment and results in practice (33%).	The improvement in results based on the follow-up process (33%). Better performance of the teams (33%). Improving leaders' confidence (25%).
Perceptual modality / Reflective observation:	**What kind of learning has this experience given me?**	The importance of diagnosing the organisation as a system (33%). The relation between a shared problematic situation and the organisation's focus (33%). Better understanding of the organisation as a system (17%). A need to reinvent the organisation (17%).	The relation between focus and better results (60%). Personal confidence (40%).	Increase in a strategic approach (38%). Increasing reflection among members (23%). Increase in systems thinking in the organisation (15%). Improved confidence (8%).	The importance of the alignment process in obtaining results (38%). The need to review personal focus (37%). The importance of a shared focus and results (25%).	The relation between the follow-up process and the possibility of continuous adjustment (40%). The effect of the follow-up process on improving results (30%). The necessary consistency in the follow-up process (30%).

Table 43: Summary of interview groups patterns (second part)

5.2.8 Findings

Figure 63 presents the total sales in square decimetres (leather is sold based on surface) on the 'Y' axis and months on the 'X' axis. This figure shows three curves: blue represents the real 2013 total sales; red shows the sales estimated for 2014; and green represents the real total sales. Based on these curves, it is possible to observe that the 2013 sales were higher than the 2014 real sales from August to December, and the real 2014 sales were higher than the estimated sales. The orange line represents the starting point of the case study, which was, at the beginning, oriented to the Preparation and Organisational Levelling phases, which allow people to reorient their approach to the market with real sales above those expected. This impact on the business was favourable to achieving its break-even.

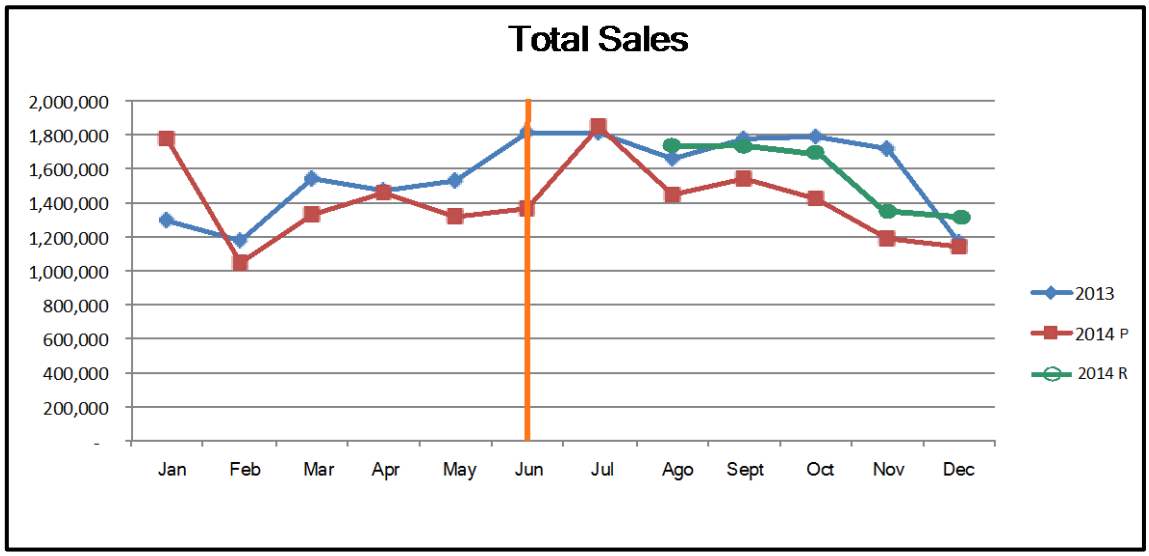


Figure 63: Time series of CCX's total sales

Figure 64 shows the weeks of the year on the 'X' axis and the percentage of rejections on the 'Y' axis: the total sides of leather rejected divided by the total sides produced per week. In this figure, the orange line represents the starting point of the case study. This figure shows two curves: the blue one is related to real weekly rejections and the black represents the trend of the data. The black curve shows a value of around 13% in week 17 (before the case study) and the curve shows a value of around 5%. The rejections dropped more than 50% through the systemic intervention of the MetK+.

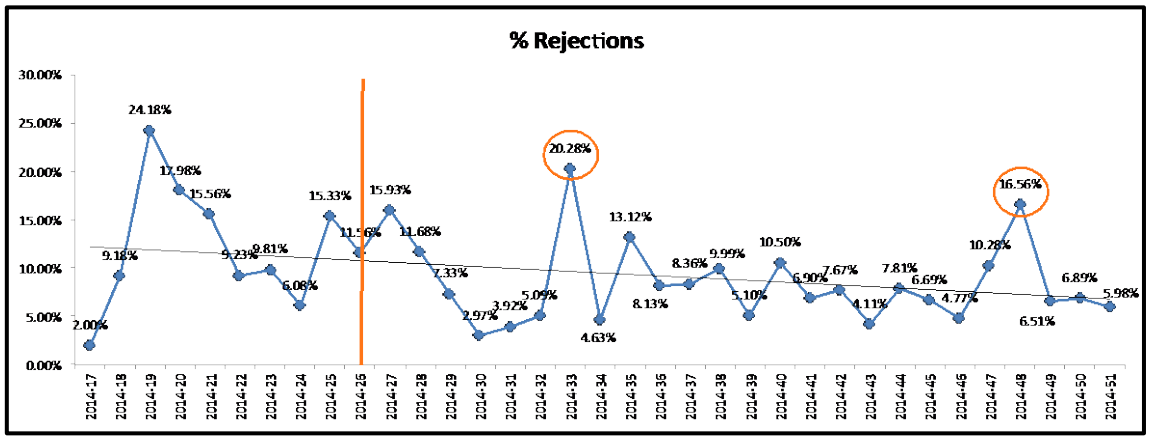


Figure 64: Time series of CCX's rejections

Figure 65 shows the weeks on the 'X' axis and, on the 'Y' axis, the percentages reflecting the division between the surface of the leather measured at the end of the production process (finishing) vs. the same measure in the process called 'wet blue' (the process in which the hide is finally tanned). This division as a percentage reflects the yield of the leather, whereby higher is better. The orange lines again reflect the starting point of the case study, the blue curve shows the data through time, and the black curve presents the trend of this data. Again, all the efforts for change had a positive impact on this indicator. At the beginning of the case study, the yield was around 94% and, at the end, this value was around 98%. This small difference means more income and, importantly, a lower cost in hides.

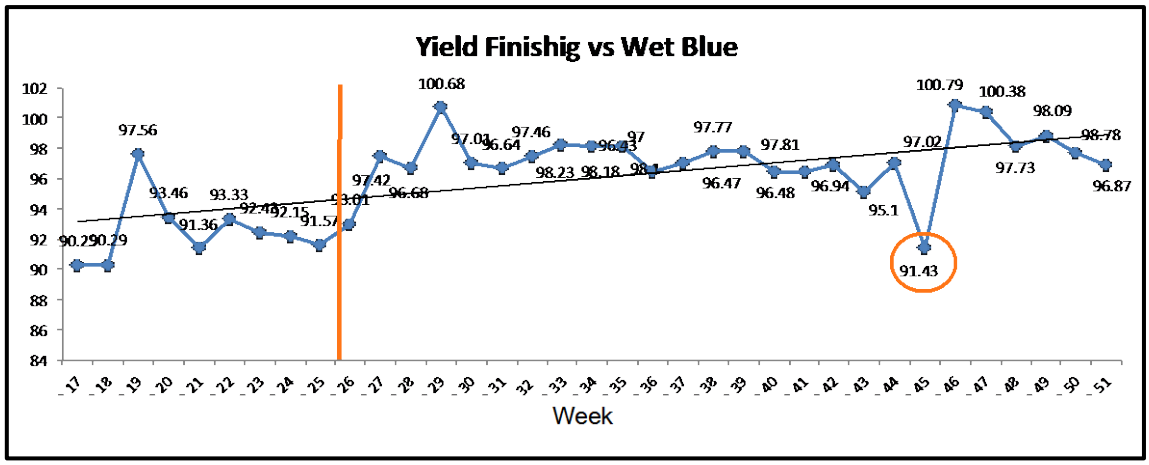


Figure 65: Time series of CCX's yield: finishing vs. 'wet blue'

Finally, Figure 66 presents weeks on the 'X' axis and, on the 'Y' axis, the percentage that reflects the total leather delivered by operations divided by the total leather requested by the customer each week. This figure presents data from week 37: prior to this week, customer service was less than 80%; after week 37, the customer service average was around 90%, as shown by the black curve. This indicator shows a trend growing to 100% in the last four weeks. Although customer service was not at a consistent 100% during the AR, it improved by almost 15%.

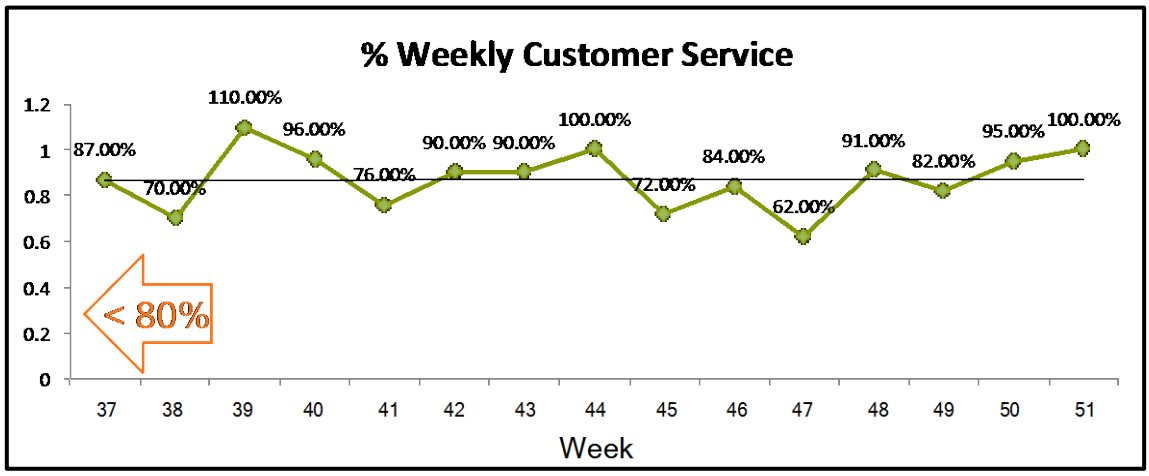


Figure 66: Time series of CCX's customer service

All the above indicators improved from the Levelling phase and were enhanced in the Managing Complexity Process phase. In this SME, it was necessary to apply the Levelling phase due to the existing critical conditions and the level of CCX's risk. Some authors argue regarding the importance of supporting organisations in survival conditions in order for them to move to the next stage in their growth (Adizes, 1994, 1999; Lewis & Churchill, 1983; Lipi, 2013). For instance, Lewis and Churchill (1983) argue that to move from the survival to the success stage, an organisation should demonstrate that it is a workable business entity, that it has enough customers and that it can satisfy them sufficiently with its products or services to keep them. It is necessary to move from mere existence to having a healthy relationship between revenue and expenses: to generate enough cash to break even and to stay in business in order to finance growth. The trend for the previous four business indicators shows an impact on business performance which allowed CCX to move from the survival stage to the

next stage of growth as a company. Thus, the Levelling phase helps in catalysing the necessary critical change to move from the survival to the growing stage, whereby the Managing Complexity Process stage was the vehicle for keeping the change process moving.

5.3 Discussion of the multi-methodology

5.3.1 Introduction

Following the above section on the evidence considered in this study, this section uses the evidence to discuss the proposition related to the need for a multi-methodology approach, which states that a systemic multi-methodology (with methods, techniques and tools) specifically designed for SMEs facilitates the adoption of STAs in the daily practice of organisational management.

In this section, the researcher presents an analysis of significant aspects of the use of the multi-methodology approach in framing the MetK+. This is followed by an analysis of his observations in order to discuss how the MetK+ addressed the main methodological challenges stated in chapter 3 to work as a whole in order to manage complexity in SMEs.

As stated, the technique used for this analysis is explanation building. The following method was used to perform the analysis.

1. The researcher considered five groups of analysis, as shown in Figure 67, and related these to the main methodological challenges discussed in chapter 2. Two of the groups are the main approaches: the VSM and the SSM; the other three groups are complementary approaches: Strategy Amplifiers, Strategy Attenuators and the K+ Sequences. These five groups cover all the elements of the MetK+.

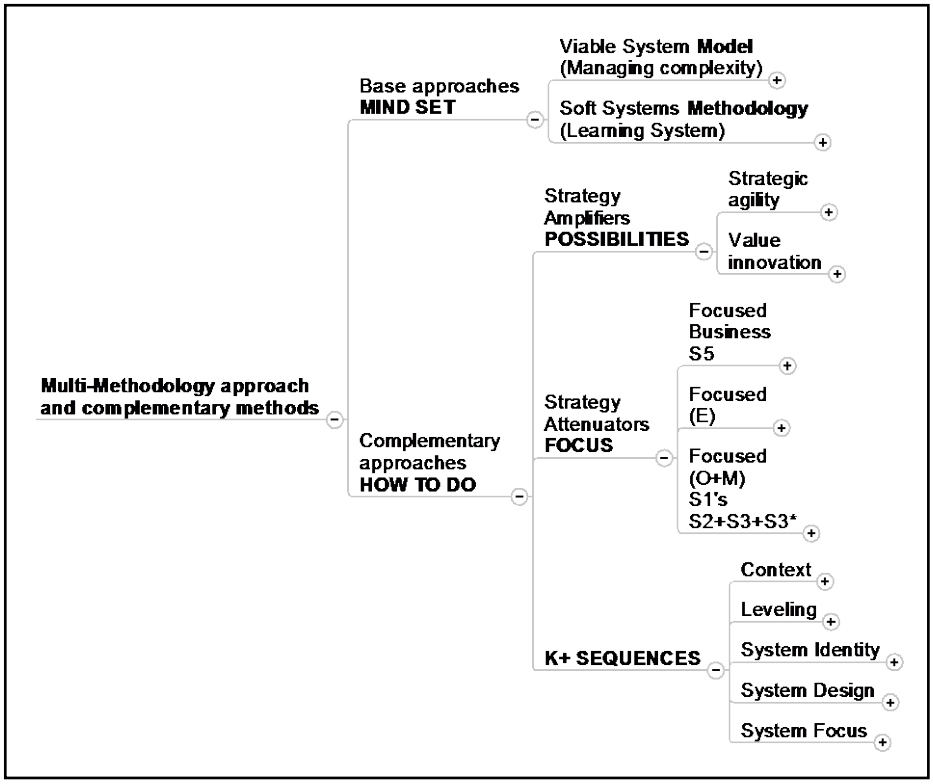


Figure 67: Groups of analysis for the observations

2. Using the above five groups of analysis, the researcher analysed each observation and set it in a specific group (first pattern level).
3. In a second detailed analysis, observations were distinguished by sub-pattern (second pattern level) based on the methodological effect in practice for each observation in the performance of the MetK+.
4. The second pattern level became the foundation for understanding the impact of each group of analysis on the MetK+ as a whole and thus in building an explanation based on sub-patterns.

This analysis showed the following distribution of the researcher's observations by group: 25% related to the VSM, 22% to SSM, 2% to Strategy Amplifiers, 8% to Strategy Attenuators and 43% to K+ Sequences.

The following sections present first the analysis of the multi-methodology approach and then the explanation building for each group of analysis based on the sub-patterns identified.

5.3.2 The multi-methodology approach and the MetK+

When a multi-methodology proposition is aimed at adoption in practice, in order to frame the multi-methodology for an intervention, Midgley (2000) suggests that, according to the CDM, it is important to clarify the context when designing the multi-methodology. Two important elements in the context of this study were the challenges facing SMEs (section 2.4.4) and the gaps in the research (section 2.6.4). In order to address the challenges identified and consider the research gaps, the context was a determinant of the multi-methodology design because it helped the researcher design and orient the combination of methodologies and methods to address the context and integrate different approaches (Midgley, 2000, 2015) in one single methodology for SMEs: the MetK+.

In addition, as a pluralist approach to mixing methods, the CDM suggests three interrelated elements of design: systemically interrelated research questions expressing the purposes of an intervention that evolve over time, each of which might need to be addressed using a different method or part of a method (Midgley, 2013). The researcher used these three elements in his design, specifically in the approach to addressing each theme, and linked the three elements to provide a clear idea of how to develop each theme by considering a specific context in a particular moment of the process.

The researcher developed the ModK+ and MetK+ as the foundation of a systemic intervention. The MetK+ designed for a systemic intervention helped CCX members to improve their comprehensiveness in performing purposeful actions for improvement to create change in relation to a reflection of boundaries (Midgley, 2000). Table 42 and Table 43 show evidence of this, in patterns such as: ‘Better organisational understanding using the VSM map’ and ‘Better understanding of the organisation as a system’.

Using a systems methodology, even methods developed outside systems paradigms can be used as part of a systemic intervention (Midgley, 2000). For this research, there was no need to claim that the researcher was operating across paradigms with CCX members because the researcher encouraged learning about ideas from other paradigms; thus, the primary emphasis was on

the learning process, which allowed CCX members to apply different methods in practice that addressed different challenges in a specific context (Midgley, 2000).

5.3.3 The viable system model and the MetK+

The first group of analysis to be presented from the researcher's observations is related to the VSM, the impacts of which on the MetK+ have four main aspects (sub-patterns/second level): to review paradigms and beliefs, to share understandings about the system, and to design and diagnose the organisation. The following sections explain each of these aspects.

5.3.3.1 The impact on beliefs and paradigms

Any management system depends on the human beings in the organisation; they are the real drivers of any management approach. In order to improve a management system, it is necessary to think first of the people who perform it. People act according to their beliefs (Fuenmayor, 2012, 2015; Mascorro, 1995); thus, it is necessary to challenge these beliefs in order to trigger a learning process to manage complexity with a different way of thinking. The first necessary impact of the VSM on the MetK+ is related to a deep rethinking of the current paradigms and beliefs in an SME. Some authors (Beer, 1985; Espejo & Reyes, 2011; Espinosa & Walker, 2013; Hoverstadt, 2008) show the VSM guidelines and principles when explaining the model in order to design and diagnose a system but not with any specific purpose regarding how to challenge current paradigms and beliefs and identify a gap between current and pretended culture using the VSM. Following the onto-epistemology of this research (Fuenmayor, 2012), a key issue for the MetK+ was how to adopt the VSM approach in the organisation's culture. For this reason, the guidelines and principles of the VSM were utilised following the principles integration approach shown in chapter 2 (Figure 20). This graphical integration was used as a transitional object (Midgley et al., 2013) in order to contrast the organisation's current culture and, at least, start the learning cycle (Jackson, 1995; Kölb, 1984) to explore new ways of approaching complexity in SMEs.

The reviews and analyses of the VSM principles and guidelines were performed as follows: in the Preparation stage during the engagement with the CEO, the training process and when reviewing key information; in the Organisational Levelling stage for the understanding of critical constraints and focusing on the 'here and now' systems in the content plan; and in the Managing Complexity Process stage in three of the four phases: Meaning - to review and define the ethos and identity of the system; Understanding - to understand the organisational system and to distinguish perceptions from complexity generators; and Focusing - to design the E+O+M, as these principles and the VSM map were the cornerstone for this work.

In summary, the principles and guidelines were used 12 times during the research process. However, in cross-referencing this information with the group interview matrices (Tables 42 and 43), this analysis shows the most significant occasions for the leader team members. This significance is based on the impact of the VSM guidelines on the members' personal approach. These occasions were: Managing Complexity training, the Meaning phase, the Understanding phase, and the Focusing phase in each of the three designs (E+O+M). The common denominator in all these occasions was the team-building work in a workshop that allowed the team members to share and explore their own paradigms and beliefs using the VSM guidelines as a transitional object. Using the VSM principles and guidelines helped people to identify the gap between their current culture and the culture promoted by the VSM.

For the new MetK+, it is highly recommended to focus on each group of principles, depending on the phases, as follows: covering in the training phase a summary of all the principles with an emphasis on the relationships between them; in the Meaning phase, sharing the Sense and Identity groups of principles; in the Understanding phase when reviewing the problematical situation; and, in the Focusing phase, the Coupling group when designing the Environment and the Operational and Managerial group of principles when designing the Operations and Meta-system.

When the above guidelines are used as a transitional object between the members, they will have an impact on the organisation's culture because they

formally trigger the learning process, starting with a new “Abstract conceptualisation” (Kölb, 1984) of their learning cycle as a team. These reviews help members to achieve different and real “Aha!” moments (Hoverstadt, 2008) regarding their paradigms, beliefs and even their own culture.

5.3.3.2 The impact on shared understandings

Some authors (e.g., Midgley et al., 2013) argue that a distinguishing feature of problem structuring methods (PSMs), as a subset of participative methods, is the use of models as ‘transitional objects’ to structure members’ engagement and provide a focus for dialogue. Usually, these models are qualitative and are constructed collectively in a workshop. Franco (2006) also argues that PSMs have the potential to improve the quality of conversations between members in order to achieve shared understanding and increase their commitment. In this way, the VSM played a key role in facilitating the process of negotiation towards agreement through discussion and the development of a shared understanding. However, a ‘shared understanding’ does not necessarily imply consensus or agreement between members; it may be an agreed understanding of the differences between members' perspectives (Checkland & Scholes, 1990). Checkland (2000) argues that systems models are used in order to cope with the complexity in everyday life and to understand the interactions between key relationships. Systems ideas are intrinsically concerned with these relationships, and systems models are a sensible choice. In using systems insights, a model needs to be drawn in a form that allows the system to adapt to changing circumstances.

On the other hand, Midgley (2000) argues that a common theme in all forms of systems thinking is the aspiration to comprehensive understanding. The purpose of any system approach is related to increasing comprehensiveness in order to think systemically. However, because no one view of the world can ever be comprehensive, the boundary concept becomes crucial. However, comprehensive coverage is not the key issue: the key is to engage in a continuous process of learning and reflection, building new skills over time.

If the purpose of the VSM is to increase the viability of a system in relation to its environment (Beer, 1985, 1995), it is necessary to develop the ability to comprehend the whole system-in-focus (E+O+M) and all its relationships and interactions (boundaries). Thus, the VSM map as a 'transitional object', as a model of an organisation, fosters the ability to comprehend the system (Midgley et al., 2013). For the MetK+, one way to increase this ability is through the formal use of the VSM 'map' as a transitional object during the research process. In this research, the VSM map was used as a tool that allowed people to deepen the analysis of their points of view, in order to share insights about different aspects of managing complexity as well as developing team building. The key issue was not only to develop and understand the organisation´s VSM map, but also to use it to share understanding and challenge current culture.

During the research process, the VSM map was mainly used as a transitional object in three phases of the Managing Complexity Process stage. First, the building of the VSM map started in the Meaning phase, when members worked on all the key relationships in order to understand the identity and ethos of the system. It was easier for the leader team to understand these relationships systemically using the VSM and this effort became the first version of this map. Second, based on the first version, the second version of the VSM map was detailed in the Understanding phase. The leader team connected the key relationships with all the entities detailed in the systems and so built a detailed understanding of the system-in-focus. Using the second version of the VSM map, the leader team could analyse and evaluate the problematical situation in depth using systemic understanding. Third, in the Focusing phase, the second version of the VSM map was used to review and design the Environment, Operations and Meta-system. The members reviewed the effect of the current design compared with the new design to understand systemically the implications of the structural changes in the organisation as a system.

Cross-referencing this analysis with the group interviews matrices, the impact of the VSM map is expressed in different patterns in the following sub-phases: Organisational System, Problematical Situation, the External Business Model and the Internal Business Model (O+M). The patterns are: 'Using the VSM in practice through a map'; 'Better understanding of the organisation as a system';

‘Better organisational understanding using the VSM’; ‘Understanding of the interaction between the environment and the organisation using the VSM map’; and the ‘Utility of the VSM map for design’.

For the new version of the MetK+, it is highly recommended to consider exploiting the potential of the VSM map further as a transitional object in order to share understanding and increase comprehensiveness. This map can be built using the same sequence but with a complementary approach: continuously refining the boundaries of the system-in-focus, as follows.

In the Meaning phase, exploring identity helps to understand the key relationships as a system (Espejo & Reyes, 2011) and to set the first understanding of system boundaries (Midgley, 2000). People then develop their first systemic understanding of the system at the first level of detail. This can be the first version of the VSM map and its boundary critique. In the second phase (Understanding), the members can use the first version to build a second detailed version of the VSM, in which they unfold each relationship in order to build the first full version of the VSM map (second system boundary critique). Using the second version, people can understand the current complexity in their organisation when they explore, understand and validate their problematical situation with a systemic understanding towards agreements about purposeful actions. Once the problematical situation is understood, this VSM map is the basis for working, in the Focusing phase, on the design of all the necessary structural changes in the system when designing the Environment (third system boundary critique), Operations and Meta-system (fourth system boundary critique). Using the VSM map in the Business Model sub-phases, people can understand three correlated aspects: the current design and its problematical situation, how a new design could cope with these challenges, and how it could increase the viability of the system.

Thus, the second impact of the VSM on the MetK+ is the use of the VSM map as a transitional object to enhance the comprehensiveness (Midgley, 2000; Midgley et al., 2013) of the system-in-focus. Based on this, the members can build and share their meanings and understandings as well as enhancing their team building. The organisation’s VSM fosters purposeful actions between members

during the intervention based on greater comprehension of relationships and interactions in order to manage complexity (Espejo & Reyes, 2011).

5.3.3.3 The impact on organisational design

The third impact of the VSM on the MetK+ as a whole is related to organisational design (Beer, 1995; Espejo & Kuropatwa, 2011; Espejo & Reyes, 2011; Espinosa & Walker, 2011, 2013) using the principles and guidelines to develop the structural analysis, but working with people to understand and define all the necessary aspects in order not only to understand the new design, but also to operate it. Thus, the question behind each design is: Do the people know, understand and have all the necessary elements to perform the design? In other words, as Checkland (2000: S15) argues:

> What would bring it (the learning process) to an end, and lead to action being taken, was the development of an accommodation among people in the situation that a certain course of action was both desirable in terms of this analysis and feasible for these people with their particular history, relationships, culture and aspirations.

Fuenmayor (2001, 2012, 2012a, 2012b, 2012c, 2015) argues that a body of knowledge needs to have historical sense among the members and this historical sense is related to the organisation's culture. For the MetK+, it is necessary to connect the 'new' design with a historical sense and with the organisation's culture. Kotter and Heskett (1992) developed a study in more than 200 companies in order to define key cultural success factors for better performance. They found that culture had a major and deep impact on an organisation's performance. One of their final conclusions states that corporate culture might perhaps be a main factor in determining the success or failure of companies in the following decade. Schein (1990) also states that we cannot understand development, change and learning unless we consider culture as a primary source of resistance to change. In addition, if managers are not conscious of the culture to which they belong, this culture will manage them. For Schein (2010), culture is composed of three elements: artifacts, the values adopted and basic beliefs. In the MetK+, basic beliefs and values are explored in the Meaning phase but some core artifacts are developed in the design phase to enable definition of all the necessary elements for understanding how the new design will operate in

practice in order to integrate all the elements of the organisation's culture. Thus, for the MetK+, the design of the system goes beyond just the identification of structural changes; it is also necessary to understand how to implement them.

The VSM was used for design purposes in all three stages during the research process. In the Preparation stage, the VSM was used to design and define the leader team. In the Organisational Levelling stage, the VSM was employed to set the core structural changes in order to perform the content plan. Finally, in the Managing Complexity Process stage, the VSM was used to review and design all the structural changes in the business model: externally for the Environment and internally for the Operations and Meta-system.

The purpose was the same in every design: understanding also how to perform it. This understanding was mainly translated into agreements on how to work on the following: roles and responsibilities, key indicators, communication channels, basic interaction rules, changes in business processes and working methods.

When reviewing the above uses of the VSM in the design and cross-referencing them with the group interviews analysis, the analysis shows the impact on the members in the External and Internal Business Model sub-phases. The patterns are: 'Understanding of the interaction between the environment and the organisation using the VSM map'; 'Utility of the VSM for design'; 'The clarification of roles and responsibilities among members'; ' Internal Business Model to promote synergy'; 'Personal confidence'; 'Systems approaches and their effect on synergy'; 'The increasing synergy between members'; and 'Improved confidence'.

Almost all artifacts (necessary elements) come from the Meta-system, mainly from S2 in this SME. The structural changes need to review and define the S2 in detail in order to set all the artifacts to perform the new design. For the new version of the MetK+, it is highly recommended to identify (in the Context phase) the status of these elements from the beginning in order to enhance all of them through the intervention when running the MetK+. This means, for instance, the leader team defining who is responsible for the basic interaction rules from the

beginning, and this person integrating, monitoring, updating and communicating all the rules throughout the process to everyone involved.

Ultimately, the purpose of this design approach is not only to understand structural changes, but also how to adopt the new design in daily practice among the members in their own culture in order to promote synergy and address complexity. We face an era of a high rate of change, in which organisations and human beings need to adapt to new and changing environments. It is necessary to improve the synergy between team members because of the rate of change, but mainly because of the human beings who perform the change.

5.3.3.4 The impact on organisational diagnosis

Different VSM methodological approaches examine the diagnosis process in relation to organisational structures and the effects of complexity on an organisation´s behaviour in order to identify structural improvements at a given time. According to Espejo and Reyes (2011: 113), "Diagnosing is like producing a snapshot of structural relations at the time observations are made". Other VSM approaches focus on understanding the social process behind a diagnosis. Espinosa and Walker (2011) explain the process lived by human beings in order to understand a diagnosis and deal with a complex situation. However, none of these approaches focuses on the culture (the 'ground') in a way that could explain a diagnosis as an effect of culture. If the purpose of this research is to develop a process for managing complexity, it is important to understand the culture from which the diagnosis emerges in order to understand the interpretive platform (Fuenmayor, 2012) that could explain the behaviours behind the diagnosis. Even the gaps between current and expected culture are part of the diagnosis.

Thus, the fourth impact of the VSM on the MetK+ is related to organisational diagnosis. From the perspective of the MetK+, the diagnosis of a system is not only the identification and definition of a problematical situation, but also the shared understanding of that situation. With this shared systemic understanding, the members reflect, as a team, upon their problematical situation (Checkland, 1999, 2000) in order to enhance their purposeful action to intervene (Midgley, 2000) in the system to perform a change. However, in order to reflect upon the

shared problematical situation, in terms of the MetK+, the members need to distinguish the differences between their own perceptions of the shared problematical situation. The VSM, with its principles and guidelines, helps to distinguish these differences.

However, the starting points in the MetK+ for performing a diagnosis as a team are the internal and external perceptions, because they are manifestations of the organisation's culture; they are the 'ground' (Fuenmayor, 2012) upon which people perform their actions, i.e., the 'figure'. Starting from perceptions, but using the VSM principles and guidelines, people can build a 'bridge' between their individual perceptions and their shared problematical situation as a system; using the VSM, people can understand and validate it as a team.

Through the research process, a diagnosis process to increase the comprehensiveness of the members was performed: in the Engagement sub-phase, the diagnosis started with an understanding of the CEO's perspective; in the Context phase, the diagnosis process continued implicit in the training process about managing complexity and the review of key information by the researcher, using VSM principles and guidelines to understand a pre-diagnosis of the situation; the researcher performed the first full diagnosis in this case study in the Levelling phase and he shared it with team members in order to develop the content plan; and finally, the main full diagnosis of the MetK+ was performed as a team in the Problematical Situation sub-phase with the internal and external exploration of perceptions, and a comparison between them and the VSM principles and guidelines, in order to identify the complexity generators.

Cross-referencing this information with the group interviews, the analysis shows an impact of the diagnosis process in the Problematical Situation sub-phase. The patterns that reflect this impact are: 'Integral diagnosis as a system'; 'Focusing on a problematical situation as a team'; 'The importance of diagnosing the organisation as a system'; and 'The relation between a shared problematical situation and the organisation's focus'. These patterns show the impact regarding the systemic understanding of the diagnosis, its utility in sharing a problematical situation, and members being able to share focus or purposeful action as a team.

For the new MetK+ approach, with regard to diagnosing the organisation, the sequence will be almost the same: exploring the internal and external perceptions to better understand the organisation´s culture (the 'ground'). With this work, the members can contrast and filter their own beliefs and behaviours (the 'figure') with the VSM principles and guidelines in order to understand and validate their shared problematical situation and foster purposeful actions (Checkland, 1999).

For the MetK+, it is also important to consider the diagnosis of the system-in-focus as a process in which the purpose is to understand systemically the diagnosis of the culture as the 'ground' for the diagnosis of a problematical situation and to recognise cultural gaps through a reflection process. People not only need to identify a problematical situation, they also need to comprehend it from their own culture in order for the situation to be meaningful to them (Fuenmayor, 2012). Checkland (2000: 11) also argues that: "It was thus important always to gain an understanding of the culture of the situations in which our work was done".

As a graphical summary, the researcher locates the uses of the VSM (shown in green diamonds) in the MetK+ in Figure 68.

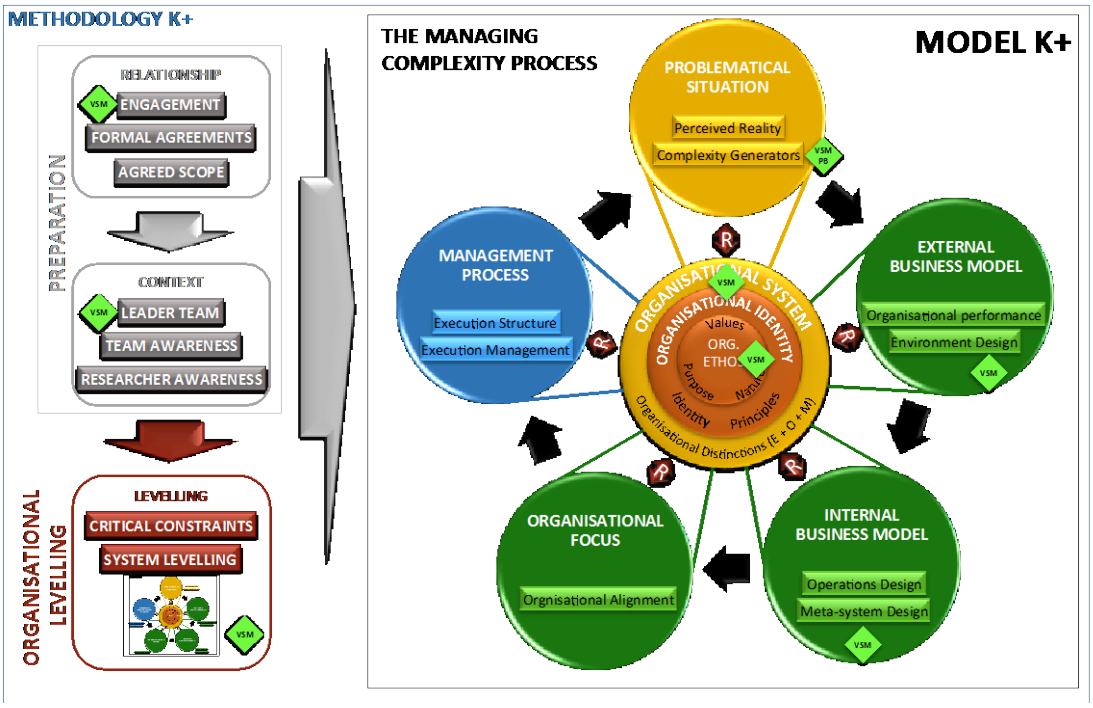


Figure 68: Applications of the VSM in the Methodology K+

5.3.4 Soft systems methodology and the MetK+

The next group of analyses relates to the impact of SSM on the MetK+. Checkland (2000) argues that four key thoughts have driven the overall shape of the development of SSM and its direction: first, at a higher level, every situation is a human situation, in which people are attempting to take purposeful action that has a meaning for them and thus model purposeful human activity systems as sets of related activities that could demonstrate the emergent property of purposefulness; second, when modelling purposeful activity while exploring real-world action, there are many possible interpretations of 'purpose', and the first choice to be made is related to the most relevant interpretation for exploring the situation; third, SSM is an inquiry process that helps to work with the idea of a problematical situation, which is useful for building models of concepts of purposeful activity which seem relevant to making progress in tackling a problem situation. A model is a source of questions to ask of a real situation and thus SSM emerges as an organised learning system; and fourth, considering models of purposeful activity in order to work on information systems. The following review of SSM impact on the MetK+ is based on these thoughts as patterns for the second-level analysis.

5.3.4.1 The impact on purposeful action

In the VSM literature, some authors give the purpose of a system (Beer, 1995; Espinosa & Walker 2011; Espejo & Reyes, 2011, Hoverstad, 2008) as an answer to the question: What does the system do? For others, the purpose is related also to people's interpretations (Midgley, 2000, 2013; Fuenmayor, 2001, 2012, 2012b, 2012c; Checkland, 1981, 1990, 1999, 2000, 2010a). Both perspectives are considered in the MetK+ because they can be complementary. We can see from the VSM perspective that, at the higher level, the purpose of a system is to be viable through time, fully developing what it does in order to couple with its environment. If this happens in reality, every key relationship could be maintained and the organisation can then aspire to this purpose and promote the common good in its relationships, enhancing a social role for the SME. However, in an organisation, a purposeful action means finding something to do as a team, in

order to achieve the required system viability. From this perspective, members need to make a choice (Checkland, 2000) about the purposeful action. However, if this is connected to the VSM as a model when comparing their perceptions at a given time, they can understand their problematical situation as the foundation for their purposeful action to increase the system's viability.

One characteristic of human beings is their readiness to attribute meaning to what they observe and experience in the world (Fuenmayor, 2012). The mind needs meaning. However, every human being tends to see the world in a particular way. Given this creation of an interpreted world, human beings form intentions; they make a choice based on their interpretation of a situation i.e., they can take purposeful actions in response to how they experience the world (Checkland, 2000; Fuenmayor 2012a, 2012b, 2012c). Checkland and Poulter (2010) state that, as well as containing different worldviews, all problematical situations have an important characteristic: they always contain people who are trying to act purposefully, with intention; not simply acting by instinct. The meaning attributed by individuals and groups leads to forming particular intentions and undertaking particular purposeful actions. In order to understand a purposeful action, it is necessary to understand the meanings, interpretations and intentions behind the choice of a problematical situation that ultimately trigger the purposeful action.

On the other hand, Beer (1995) states that an observer is someone who recognises the purpose of a system based on her/his perception of what the system does. Thus, purpose is a convention between human beings. Beer (1995) also argues that, of the many ways of characterising an enterprise, the most useful is as a viable system. The purpose of survival is a very special one, because it closes in on itself in order to preserve identity. Of all the observers of a viable system, the most significant is inevitably the system itself. Thus, the purpose of a system is to maintain its viability in order to preserve its identity, although human beings are the ones who make any system perform through their own choices about the purposeful action.

Thus, the key point about purposeful action is, for the MetK+, related to using the VSM to understand how meanings, interpretations and intentions could be seen from the VSM perspective in order to identify a problematical situation that

threatens the viability of a system at a given time. Thus, the purposeful action of seeking viability is the outcome that emerges when perceptions are seen through the ‘lenses’ of the VSM.

In addition, the purposeful actions of the MetK+ come from a shared focus as a team and, when this focus is more explicit and clearer for everyone, the purposeful actions become more coordinated, measurable and explicit to everyone involved. Some authors (Bossidy & Charan, 2002; Kerr et al., 2002; Kim & Mauborgne, 2005) suggest a relation between the shared focus necessary and the effective execution of purposeful actions; the MetK+ uses this approach, which, in this case, had a positive impact on the team and the business.

During the research process, there were different attempts to identify purposeful actions in different moments. In the Relationship phase, when the researcher and the CEO stated their commitment to gaining results and when the researcher and the team reviewed the scope of work together. In the Context phase, when the researcher shared with members the approach and scope of the research and his commitment to results. In the Levelling phase, when the team worked on a content plan in seeking the same purpose: survival. In the Meaning phase, when the extended team explored their value system and purposes in the light of every key relationship. And, finally, in the Focusing phase, when members set metrics in order to evaluate their performance and when the leader team defined its coordinated execution of all the purposeful actions.

Reviewing the group interview matrices, the analysis shows a number of findings regarding purposeful actions. In the Organisational Ethos and Identity sub-phases, the patterns were as follows: ‘The new nature of the business’; ‘The necessary congruence between personal and organisational values’; and ‘Increasing congruence between members’. In the External and Internal Business Model sub-phases, the patterns were: ‘A clear commercial focus’; ‘Clear focus using business metrics’; ‘The increasing focus on results’; ‘The relation between focus and better results’; and the ‘Increase in a strategy approach’. Finally, in the Organisational Focus sub-phase, the pattern was ‘Clear definitions from the vision to specific activities and responsibles’.

For the new MetK+ the researcher considers using the same approach to establish purposeful actions: in the Relationship and Context phases, the scope of work is established with a commitment to gaining results; the Levelling phase includes working to a shared content plan for the purpose of survival; in the Meaning phase, members should explore their purposes in the light of every key relationship; and, in the Focusing phase, members should set all the required agreements, from the vision to the process and projects, in looking to the coordinated execution of all the purposeful actions.

5.3.4.2 The impact on the problematical situation

Checkland (1999) argues that SSM declines to accept the idea of 'the problem': it works with the notion of a situation in which various actors may perceive various aspects as problematic. A problematical situation depends on people's interpretations and these depend on their *Weltanschauung* (a German word meaning 'world view') (Checkland, 1999). Fuenmayor (2001, 2012, 2012a, 2015) argues that how people interpret the world depends on their historical and cultural background: the 'ground'. In order to understand how people interpret a situation as problematic, it is necessary to understand the ground that shapes such points of view. Even if the VSM is useful in managing complexity, the key point is: What appears complex for people in organisations? Can the VSM be useful as a model with which to compare reality? The first step to solving a problem is to define it. For the MetK+, a shared problematical situation for SMEs is: How to manage complexity in order to evolve and last over time? However, the 'specific' problematical situation depends on each SME's context. However, one aspect is a shared problematical situation as a system and another is what each interprets about her/his problematical situation depending on her/his 'ground'. Thus, it is necessary to understand people's perceptions and interpretations of a problematical situation in order to validate it using the VSM theory. The shared problematical situation then becomes a starting point of a focused organisation. Using the VSM map in an SME and following the VSM principles, people can integrate a final diagnosis of the system. The key point is not only to realise this diagnosis, but also to connect it with people's 'ground' to understand it beyond simply their interpretations.

In the MetK+, the first impact was related to the identification of a problematical situation that appeared at the following times: in the Relationship phase when exploring the problematical situation perceived by the CEO; in the Context phase when reviewing key information with the leaders; in the Levelling phase when understanding the critical constraints for the content plan; and a final integration in the Understanding phase when the leader team explored its perceived reality and set the complexity generators using the VSM theory to state the system's diagnosis.

Cross-referencing the information with the group interviews matrices, the relevance of the impact of the way in which the MetK+ addressed the problematical situation is stated in the sub-phase with the same name. The patterns were: 'Integral diagnosis as a system'; 'Focusing on a problematical situation as a team'; 'The relation between a shared problematical situation and the organisation's focus'; 'The importance of diagnosing the organisation as a system'; and 'A need to reinvent the organisation'.

For the new MetK+, it is important to consider that, behind the exploration of a problematical situation, we need to understand the culture from which such perceptions emerge in order to clarify the VSM diagnosis. The key point is to explore all the perceptions from the key relationships; to try to understand them and to build a 'bridge' between them and the VSM complexity generators so that people understand their perceptions using the VSM model as a new set of 'lenses' to contrast their perceptions with the complexity generator and focus on the shared problematical situation to manage complexity as a system.

5.3.4.3 The impact on the learning cycle

Checkland (2010a) argues that the SSM approach is a process of inquiry, which, through social learning, works its way to taking actions to improve. He also states that the notion of 'a solution' is inappropriate in a methodology that orchestrates a process of learning, as this is a never-ending process. To this extent, the methodology as a whole articulates an investigation of the meanings that key actors in a situation attribute to the reality they perceive. The MetK+ was

presented to the organisation as a never-ending process. The CCX members were always aware that the research was oriented to developing the first complete learning cycle, because the most important issue was an ongoing process for following learning cycles.

Reviewing the stages of the SSM as a learning system (Checkland, 2000), the researcher found the following aspects. The first stage is related to identifying a problematical situation when exploring the real world, such as the complexity of relationships, and this stage was addressed in the previous section. The second stage is related to exploring relationships via models of purposeful activities based on explicit world views. For the MetK+, a major difference is related to the model, which must be considered in order to compare it with the perceived reality. In the MetK+, the key point is to use the VSM as just such a model i.e., the 'lens' through which reality must be seen for the purpose of managing complexity to the benefit of all stakeholders. The VSM enhances understanding when exploring relationships. The third stage is structuring inquiry by asking about a perceived situation using the model as the source of the question. Again, the use of the VSM was a determinant when the researcher structured the inquiry, comparing the perceived situation with the VSM theory. In the fourth stage, of people taking actions in order to improve a situation, the researcher needed to integrate complementary methodologies in order to coordinate such actions based on gaining insights. Finally, the MetK+ was designed and disseminated as a never-ending inquiry process, which helped CCX members to understand the process behind the first learning cycle in this research.

In section 5.2.2.1 of this chapter, the researcher also reviewed the learning cycle from the perspective of Kölb's (1984) stages. This analysis also presented the MetK+ learning cycle from this perspective. Both SSM and the Kölb cycle are learning cycles that were used to guide the design of the ModK+ and MetK+ for the systemic intervention in practice.

In addition, and according to some authors (Bossidy & Charan, 2002; Kerr et al., 2002; Kim & Mauborgne, 2005), the follow-up process is oriented mainly to execution. However, a follow-up process could imply the underlying presence of a learning cycle, as follows: week 1, in which people review and adjust the

strategy, can be related to Kölb's 'abstract conceptualisation'; from weeks 2 to 12, pure execution could be related to Kölb's 'active experimentation' and 'concrete experience'; and week 13, in which people assess in depth the progress of the system, could be related to Kölb's 'reflective observation' (Kölb, 1984)

Cross-referencing this information with the group interviews matrices, some patterns are related to the impact of the learning cycle, as follows: 'The emphasis in follow-up'; 'The relation between follow-up and results'; 'The relation between the follow-up process and continuous focus'; 'The improvement in results based on the follow-up process'; 'The relation between the follow-up process and the possibility of continuous adjustment; and 'The effect of the follow-up process on improving results'.

For the new MetK+ the researcher needs to explain, in depth and from the beginning, the learning cycle approach of the research to everyone involved. He should also assist people to identify the application of the learning cycle in practice in order to raise their awareness of the experiential learning behind the systemic intervention. As a graphical summary, the researcher locates the uses of the SSM (shown in yellow diamonds) in the MetK+ in Figure 69.

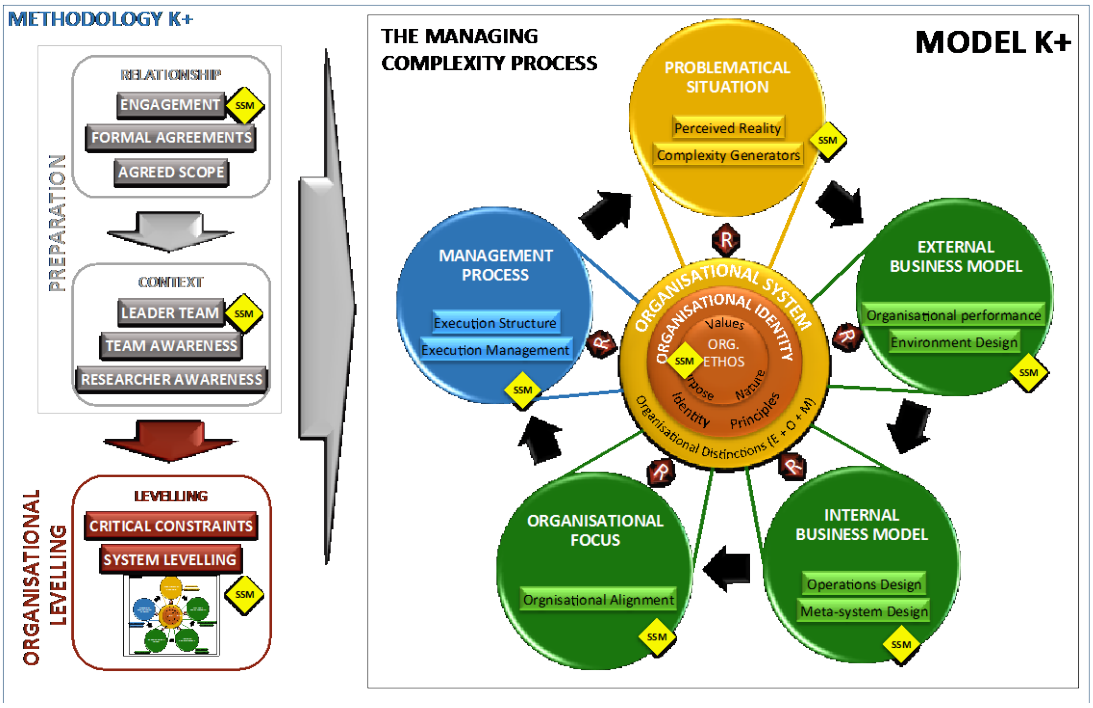


Figure 69: Applications of the SSM in the Methodology K+

5.3.5 The K+ sequences

The VSM and its principles are very useful in the world of the thoughts (Checkland, 1999) in the conceptual world. Novices, however, need a 'bridge', the length of the bridge related to the experience required to apply the principles in practice. These principles are even difficult to apply for people related to the systems thinking world, and much more so for novices in cybernetics in an SME (Espinosa, 2015a).

In order for novices to apply the VSM and its principles, the researcher developed different 'enablers' to help the learning process. Some important enablers were called 'K+ sequences' in this research (section 3.3.2.3), and were aimed at building a 'bridge' between the VSM and daily practice. These sequences helped people to acquire concrete experience in applying principles using the sequence as a learning tool. Throughout the MetK+, the researcher tried to explain each theme in a very detailed way. The purpose of this detail is to help the reader to draw a more accurate idea of 'how' to use the MetK+ with the aim of improving learning. The following K+ sequences played a key role in the learning cycle:

- Context Phase: K+ Training sequence
- Meaning Phase: K+ Value System, K+ System Purpose and K+ System Identity sequences
- Understanding Phase: K+ Organisational Distinctions sequence
- Focusing Phase: K+ Environment Design, K+ Operations Design, K+ Meta-system Design and K+ Organisational Alignment sequences.

The K+ sequences were aimed at facilitating understanding and assimilation of different systems thinking concepts in practice, like a 'bridge' between the abstract concepts and their application in the field. When cross-referencing the information of the group interviews with the K+ sequences, the analysis shows the following results.

The purposes of the K+ training sequence were: to build a strong relation between the researcher and the team, enhance the team building between members and understand the basic approach of the research. These objectives

were achieved based on the interview patterns of the training modules regarding the changes observed by the members, such as: ‘More synergy between members’; ‘ Motivation and focus within the team’; and ‘The use of the VSM used to address complexity in a simple way’.

Based again on people’s answers, the K+ Value System sequence had an impact on the empathy, cohesion and team building between members. People expressed a number of comments related to the impact of this sequence, for instance: ‘The necessary congruence between personal and organisational values’; ‘Self-awareness of personal congruence’; ‘Empathy between members’; Increasing congruence between members’; ‘Increasing confidence between members’; and ‘Increasing empathy between members’. The group dynamics changed significantly after this K+ sequence.

The sequences of the K+ System Purpose, the System Identity and the Organisational Distinctions are linked because they are all related to the key relationships, although at different levels of detail. These sequences are aimed directly at increasing comprehensiveness based on the use of the VSM to understand the system dynamics. Some patterns of the group interviews evidenced this impact, for instance: ‘Understanding the organisation as a system’, and ‘Better organisational understanding using the VSM map’.

All the design K+ sequences (Environment, Operations and Meta-system) facilitated understanding, synergy and, mainly, design assimilation in order to operate designs in practice. Based on people's answers, these sequences had the following impacts on the members: ‘Understanding the interaction between the environment and the organisation using the VSM map’; ‘Internal business model to promote synergy’; ‘The clarification of roles and responsibilities among members’; ‘The workshop design (intuitive)’; ‘Internal business model to promote synergy’; ‘Improved confidence’; and ‘Personal confidence’.

The K+ Organisational Alignment sequence facilitated the development of this complex theme smoothly due to the current culture in the SME. Despite the difficulty in integrating all the elements in organisational alignment, the members performed their alignment towards a shared focus in a coordinated way. They

expressed comments related to, for instance: ‘Clear definitions from vision to specific activities and responsibilities’; ‘The link between the three strategic levels and their metrics’; ‘The relation between alignment and results in practice’; ‘The importance of an alignment process in obtaining results’; ‘The importance of a shared focus and results’; and ‘Better working environment’.

All the sequences achieved their purpose in facilitating members' understanding of the application of the systems thinking approach in daily practice.

As a graphical summary, the researcher locates the uses of the K+ sequences (shown in orange diamonds) in the MetK+ in Figure 70.

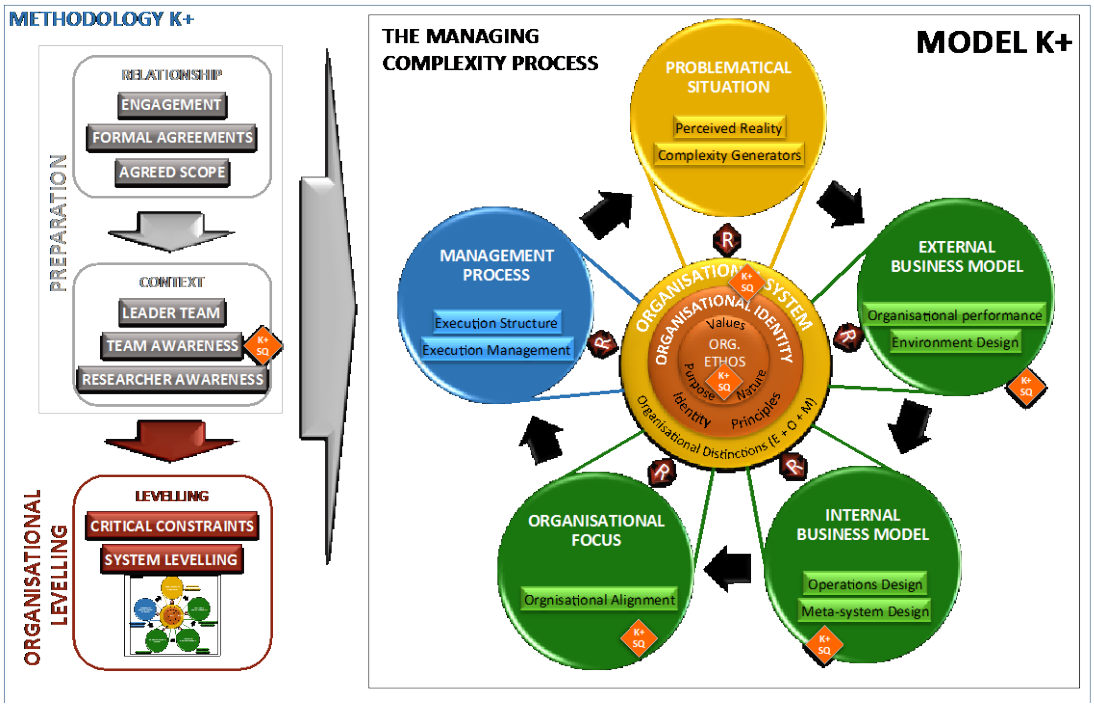


Figure 70: Applications of the K+ Sequences in the Methodology K+

5.3.6 Complementary approaches

As stated in chapter 3, the use of the VSM is mainly oriented to diagnosing and designing organisational structural changes. However, there is a gap between identification and a clear understanding of how to perform these changes in practice. Most of the complementary approaches were considered in order to fill this gap.

The main impacts of these approaches on the MetK+ are also their effect on people's paradigms and beliefs and on driving strategic attenuators and amplifiers in the system-in-focus. The following sections present this analysis.

5.3.6.1 Strategic attenuators

The process behind the MetK+ is related to sharing meaning and understanding through dialogue between members. For the MetK+, just as it is important to expand possibilities, it is also important to focus efforts. In this continuous process, the strategic attenuators help people to focus their strategic efforts. For this purpose, strategic attenuators were used in four phases of the research process. In the Levelling phase: the TOC approach was used to understand critical constraints and define critical KPIs in order to perform a focused content plan. The TOC approach was also employed to overcome critical constraints when the content plan was performed. In addition, the value innovation (VI) approach was used to focus commercial targets on the content plan, based on the value attributes. In the Meaning phase: the TOC was used to establish the business metrics approach. In the Understanding phase: the TOC was used to validate priorities in the problematical situation identified. In the Focusing phase: first, the TOC was used to define business performance; BMG was applied in the environment review to define: attributes, segments, relationships and channels with the customers; and VI was employed again to focus on commercial targets; second, in the internal business model, the TOC was used as the main approach to work on complexity generators; third, in the organisational focus, the BSC approach was used in order to understand the different levels to structure the organisation's strategy and the systemic process to link all the levels and perform them. Finally, in the Executing phase, the BPF was used to frame the follow-up process in order to coordinate actions between members.

In summary, all the above methods had the purpose of focusing the business strategically in three ways: first, as a business, whereby the strategic attenuators worked to focus improvement through establishing the complexity generators' priorities (TOC-Critical Constraints) in order to achieve the expected results (TOC-Business Performance) (Goldratt, 1991, 1997); second, the strategic

attenuators were used to focus the desired environment: setting all key interactions with the markets (BMG-Key Relationships) based on the specific value offer (VI-Commercial Focus) (Kim & Mauborgne, 2005; Osterwalder & Pigneur, 2005); and finally, in the interaction between Operations and the Meta-system, the strategic attenuators were applied for greater focus (TOC-Focused Improvement) and coordination between members with regard to all purposeful actions (BSC-Managerial Alignment) and a formal process to monitor all of them (BPF-Strategic Follow-up) (Kaplan & Norton, 1997, 2001; Kerr et al., 2002).

The impact of these complementary approaches on the members is reflected in the following patterns. As a business, the patterns are: 'The relation between alignment and results in practice'; 'Clear focus using business metrics'; 'The increasing focus on results'; and 'Performance evaluation'. In relation to the environment, the patterns are: 'Understanding of the interaction between the environment and the organisation using the VSM map' and 'A clear commercial focus'. In the Organisational focus, the patterns are: 'Clear definitions from the vision to specific activities and responsibilities'; 'The link between the three strategic levels and their metrics'; 'The relation between alignment and results in practice'; 'The importance of the alignment process in obtaining results'; and 'The importance of a shared focus and results'. In the Management process, the patterns are: 'The emphasis on follow-up'; 'Clear responsibilities for the follow-up process'; 'Formal structure for execution'; 'The follow-up process and its necessary discipline'; 'The relation between follow-up and results'; 'The relations between the follow-up process and continuous focus'; 'The improvement in results based on the follow-up process'; 'The relation between the follow-up process and the possibility of continuous adjustment'; and 'The effect of the follow-up process on improving results'.

Based on the members' perceptions of the impact of the strategic attenuators, the researcher can confirm the importance of all these approaches in the challenge of managing complexity as a process. However, beyond these specific attenuators, the key point here is to understand the purpose of each attenuator as a complement to managing complexity. Every organisation can have different strategic attenuators; the key point is to understand the context and purpose of

each as a complement to managing complexity. Based on this, each organisation can complement its own MetK+ using the CDM (Midgley, 1990).

The impact of the TOC on a business shows the need for a complementary approach that helps the VSM and SSM in order to focus improvement, not only based on people's perceptions, but also in an approach that helps people to challenge their culture when they are more specific in defining the focus of the business (Goldratt, 1991). Ultimately, the purpose of this kind of approach is related to enhancing ‘Business-focused improvement’.

In considering the environment, it is not enough, in practice, to know that its choice is an SME’s decision; it is also necessary to design a specific selected environment to couple with and its key interactions with the organisation. The patterns show the importance of the BMG and VI in helping people to define, understand and focus on the environment (Kim & Mauborgne, 2005; Osterwalder & Pigneur, 2005). In today’s complex world, the purposes of these kinds of complementary approach are related to the ‘Value Offer’ to the ‘Focused Environment’.

In terms of the relation between Operations and the Meta-system, the patterns show a significant impact between the members of the BSC and BPF approaches (Kaplan & Norton, 1997, 2001; Kerr et al., 2002). The main purposes of these approaches, in seeing them as complementary, are related to the need for ‘Managerial Alignment’ and its necessary ‘Strategic Monitoring’.

Ultimately, the VSM and SSM were complemented in the world of ‘How’, but not in the realms of ‘Why’ and ‘What’. In order to move from the principles of these main approaches to practice, the MetK+ is complemented by approaches that help with “Business-focused Improvement” through a “Value Offer” to the market, a “Focused Environment” and all necessary structures for better coordination as a team to perform “Managerial Alignment” and its “Strategic Monitoring”. Based on their perceptions, the members appreciated all these approaches. These approaches had a major impact, showing the world of ‘How’, in practice, as a team. For the new MetK+, all these strategic purposes were the same thus far.

As a graphical summary, the researcher locates the uses of the Strategic attenuators (shown in pink diamonds) in the MetK+ in Figure 71.

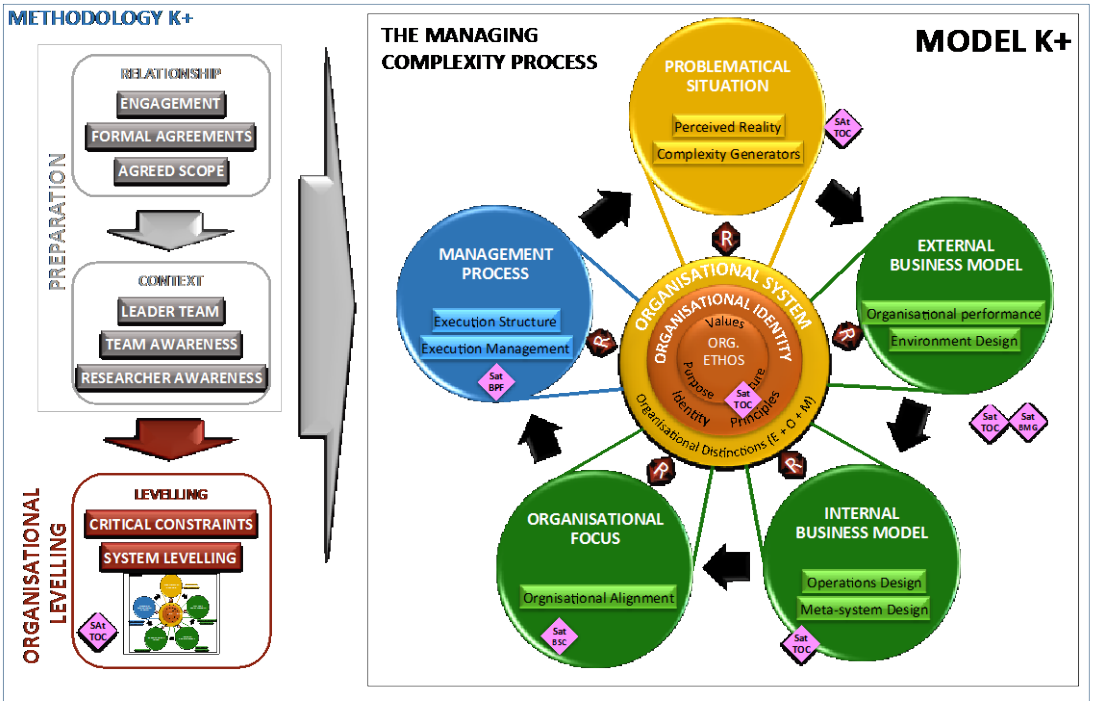


Figure 71: Applications of the Strategic attenuators in the Methodology K+

5.3.6.2 Strategic amplifiers

Strategic amplifiers have the opposite purpose to that of attenuators: to help people to expand and explore possibilities and amplify strategic options. For the MetK+, just as it is important to focus purposes, it is also important to expand possibilities (Kim & Mauborgne, 2005). Strategic amplifiers have the purpose of enhancing the strategic agility of an SME, but instead see the network only as a single company, seeking in this network a value innovation proposal to increase markets (Ruelas-Gossi & Sull, 2006). The complementary approaches to amplifying business variety are mainly oriented to developing new markets based on value innovation.

Strategic amplifiers were used in the MetK+ in different phases. In the Levelling phase, the value innovation approach mainly helped people to review the value offer to the market. In the Meaning phase, strategic orchestration was used to

analyse the nature of the business. In the Understanding phase, value innovation was used to analyse the CCX value offer. In the Focusing phase: first, the strategic orchestration approach was used to consider the business as an orchestrator node, in order to identify possibilities in the business network they already had; second, the value innovation approach was employed in order to explore new possible product markets for the business based on the orchestrator node concept; and third, strategic orchestration was used in the organisational focus in order to review the SME's vision and strategies.

The impact of these approaches based on people's perceptions are presented in Tables 42 and 43, as follows. In the External Business Model sub-phase: 'The orchestrator node concept applied to CCX' and 'A clear commercial focus'. The combination of exploring new business and markets based on 'Strategic agility' and 'Value innovation' had a significant impact on CCX's business model and commercial focus.

For the new MetK+ approach, the use of strategic amplifiers is the same. The VSM and SSM are complemented with 'How' approaches that are mainly oriented to business and market development, in order to seek the current and future viability of the system-in-focus.

Ultimately, strategic amplifiers are used to expand people's mindset, which is, at the same time, challenged by these approaches. On the other hand, strategic attenuators are used in order to acquire focus. Both complementary approaches at least trigger the learning cycle process through challenging current beliefs (Fuenmayor, 2012) in order to improve viability over time.

It is important to observe that the MetK+ is based on systems thinking approaches and thus all complementary strategic attenuators and amplifiers are used only for specific purposes (Midgley, 2000). In the end, however, STAs are the basis for framing and orienting each complementary approach. In other words, the performance of the MetK+ as a learning system relies on STAs, which give meaning to all the 'How' complementary approaches.

As a graphical summary, the researcher locates the uses of the Strategic amplifiers (shown in blue diamonds) in the MetK+ in Figure 72.

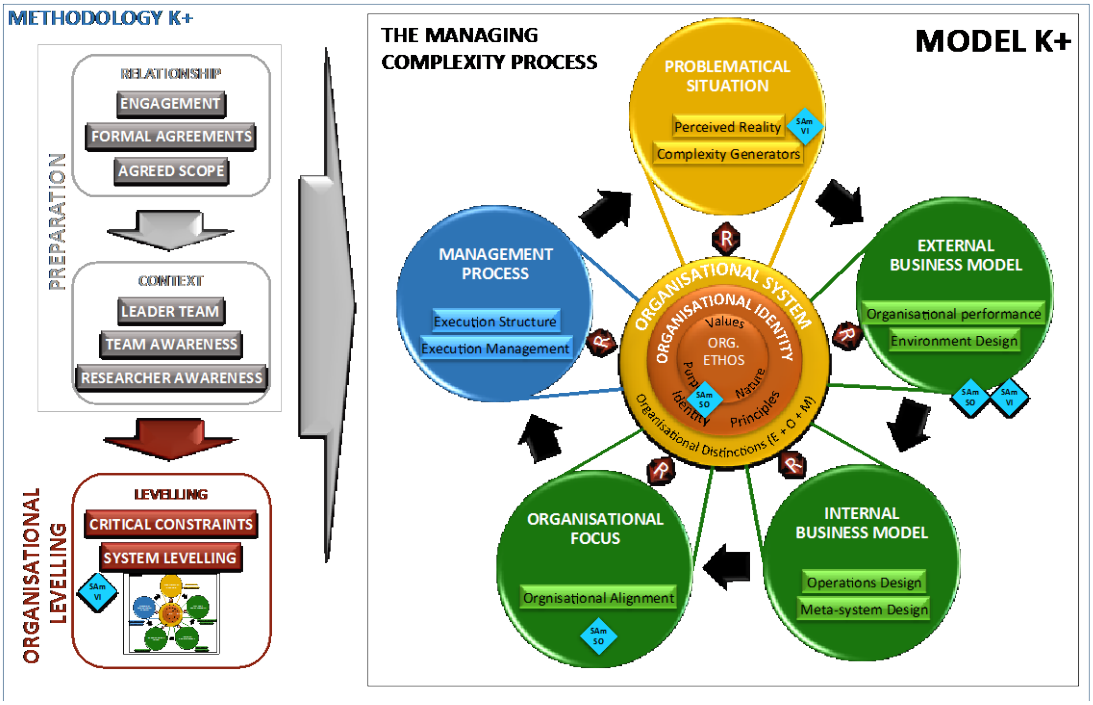


Figure 72: Applications of the Strategic amplifiers in the Methodology K+

5.3.7 Summary

Through this discussion, the researcher has built an explanation from his observations and, through this analysis, it is possible to make the following summary. First, the two pillars of research acted as follows: the VSM supported the ModK+ and MetK+ in diagnosis and design and through its strong influence on people's beliefs and the way in which people understood their organisation as a system in order to improve the SME's ability to manage complexity. Second, the SSM facilitated the adoption of a learning cycle in practice through experiential learning. The complementary approaches 'did their job' i.e., they influenced people`s beliefs regarding the business model in order to attend to the SME's specific challenges. Third, the K+ sequences facilitated the understanding and adoption of systems thinking concepts for novices in practice. The original conception and integration of previous elements of the ModK+ and MetK+ were tested in practice and worked for the people concerned. However, for the initial development of the entire MetK+ in practice, the intervention of an agent with

knowledge of systems thinking approaches was necessary in order to support personnel in the adoption of this process. As a summary, Figure 73 provides an overview of the overall MetK+ with its two pillars: complementary approaches and the K+ sequences.

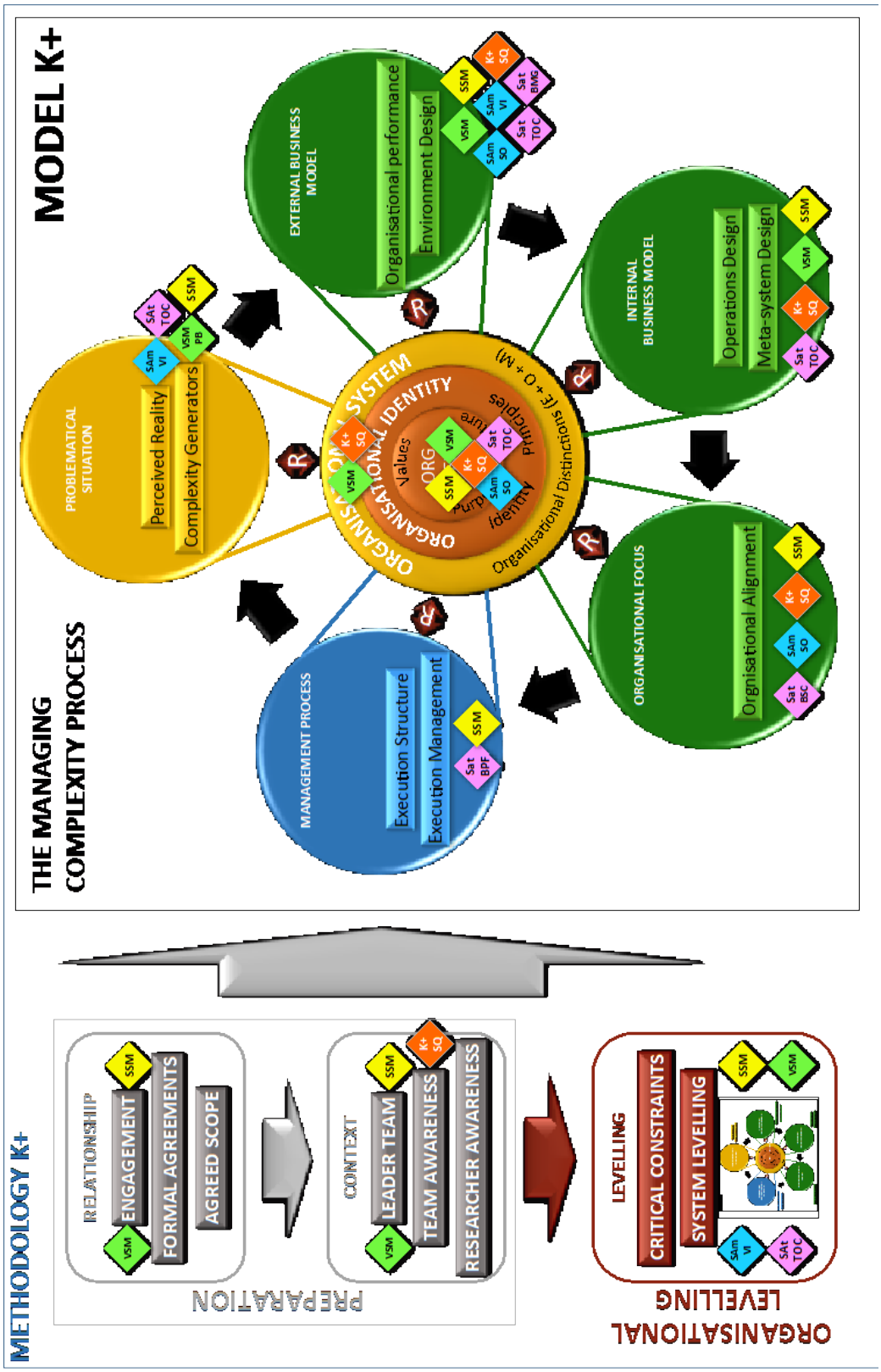


Figure 73: Summary of the Methodology K+ and the approaches used.

5.4 Discussion of the continuous process

5.4.1 Introduction

The above discussion of the multi-methodology focused on the performance of the methods framed under the CDM (Midgley, 1990) in order to manage complexity in SMEs. Here, the discussion is focused on the second proposition: the ongoing strategic process created between people when adopting the MetK+ in order to increase their ability to manage complexity in an SME. With this idea on mind, this discussion considers all the sources of evidence in the research in a narrative that analyses the flow of the MetK+ as a whole (Yin, 2013).

The MetK+ distinguishes three different stages of research because each answers a different purpose. First, the process behind the Preparation stage had two purposes: to enhance the relationships between the organisation (Franco, 2006) and the researcher and to explore sufficient context (Midgley, 2000) to start a robust AR process. Second, the execution of the process behind the Organisational Levelling depended on the risk to the likelihood of the company surviving, the purpose being to help the company achieve break-even. Third, the real continuous process started in the final Managing Complexity Process stage. In the following section, the researcher discusses the whole research process through its three different stages, using the triangulation of the sources of evidence to support the findings (Yin, 2009, 2014).

5.4.2 The research process

The following narrative highlights the most significant aspects of the case study during the research process (Yin, 2014). This narrative is mainly based on the four sources of evidence discussed in section 5.2. All the sources are integrated in a narrative for the purpose of showing the most significant aspects of the process based on the impact upon the people involved.

Stage: Preparation

5.4.2.1 The Relationship phase

In this phase (23.98% of the total stage time), the research was developed through meetings regarding the engagement between the researcher and the organisation (29.3%) and workshops relating to the agreements (70.7%).

Based on an initial understanding of the organisation's challenges (from the CEO's perspective), the researcher explained the foundations of the MetK+ using business language. This approach enabled the building of a bridge between the researcher and the organisation (Franco, 2006). This bridge was strengthened by the researcher's commitment to the impact of the research and thus he gained the CEO´s interest and focus. This commitment had a significant impact on people`s confidence in the research process. The CEO was also aware of the systemic effect of complexity on his organisation and showed great interest in a deeper understanding of the intervention and its implications. This, indirectly, triggered the first discussion of the boundaries of the research (Midgley, 2000).

Open discussion of the agreements reinforced the organisation's confidence in the research (Franco, 2006). In addition, the formalisation of the agreements with the support of internal leaders fostered trust, commitment and disposition between the organisation and the researcher as a team. The researcher (using the theoretical framework to build the agreed scope) could then state the research boundary, which fully defined the mutual expectations for the research. This definition generated greater confidence and commitment of the CEO to the process.

In this phase, the researcher addressed the expected objective: to build a strong relationship with the SME's members. There were four main aspects that enhanced the relation: first, the different boundaries established in order to define the expected scope for everyone involved (Midgley, 2000); second, the agreements made during this phase (Franco, 2006); third, the use of different transitional objects used to discuss the research approach during the phase (Midgley, 2013); and fourth, the use of the VSM as the core approach oriented to management in order to address increasing complexity (Beer, 1995).

Unfortunately, the group interviews started in the Context phase. For this reason, the researcher could not capture all the comments in this phase. In summary, this phase gives the MetK+ the necessary enhanced relationship and shared scope to start the process of change.

5.4.2.2 The Context phase

In this phase (76.02% of the total stage time), the research process was mainly oriented to the sharing of mutual understanding (Checkland, 1999) between the selected leader team (20.8%) and the researcher through the basic training workshops (48.4%) and documentary research to review key information (30.8%) for the researcher and raise team awareness.

In considering the formal and informal leaders, the process to integrate the final leader team based on the VSM approach provided a wide understanding, common language and confidence. This open selection process gave legitimacy to the final leader team (Franco, 2006). When the researcher used a formal kick-off to start the research, the use of open dialogue also enhanced the relation and understanding between the researcher and the organisation. The researcher's express commitment to gaining results enhanced the legitimacy of the research process for all the members.

During the training, the researcher paid attention to group diversity by using a practical orientation and didactic tools in workshops (Midgley et al, 2013). The K+ training sequence (Teamwork, Coaching and Managing Complexity) helped to improve team building and dialogue to promote mutual understanding, and the group members could also explore their own paradigms. In the Teamwork module, the main effects for the members on changes were: an improvement in team focus and productivity, better results as a team, and awareness and confidence inside the team; the main learning in this module was: the relation between focus-teamwork-results and synergy improvement based on team building. For the Coaching module (Echeverria, 2006), the main effects on changes were related to the improvement in synergy and focus between team members. The main learning was: self-awareness about the coaching role in leadership, the importance of listening, and the coaching effects on team

motivation. Finally, for the Managing Complexity module, the most significant concept for the team members was related to the use of the VSM to face complexity in a simple way; the main effects on changes were related to the new rules for interactions, role clarification during teamwork, and the relation between the VSM and focus. The main learning was related to the understanding of better coordination as a system to improve results and using the VSM approach to face continuous change and complexity.

Related to the reviewing of key information, the researcher performed the first exploration of the data through the agenda (based on the VSM) and thus built his first systemic approach for the organisation. This approach, based on the data, supported an in-depth discussion between the researcher and the leaders in order to explore both perspectives and merge them into one.

In this phase, the most significant aspects that emerged from the interactions between the SME members and the researcher were as follows. First, the way the leader team was defined generated legitimacy for the team in order to drive change (Kim & Mauborgne, 2005; Kotter, 2012) and more confidence between the SME members and the researcher. Second, the sequence selected for the training process that emerged from the specific context of the people's interactions (Midgley, 2000), as this sequence helped members to enhance the necessary team building and their awareness of teamwork, coaching and complexity management in order to trigger the learning cycle, starting with their abstract conceptualisation (Kölb, 1984). Finally, the researcher's awareness was a determinant in establishing the first diagnosis but mainly in realising the need to deploy the Levelling phase in order to address the critical condition required to survive (Adizes, 1994, 1999; Lewis & Churchill, 1983; Lipi, 2013). In summary, this phase gives the MetK+ a shared awareness of all the change agents (including the researcher) challenging their beliefs in order to start the change process.

Stage: Organisational Levelling

5.4.2.3 The Levelling phase

The research process in this phase was oriented to containment plan definition (8.03% through meetings) and execution (91.97% through fieldwork) with members.

At this stage of the intervention, the basic training was not enough for the leader team to identify critical constraints (Goldratt, 1991, 1997); it was highly recommended that the leader team used the VSM and its principles in order to contrast their current paradigms (Espinosa & Walker, 2011, 2013) when analysing these critical constraints and to overcome inertia by using a different approach. Using this process, the leader team improved their systemic understanding of the organisation and its critical challenges (Midgley, 2000; Midgley et al., 2013). The leader team also enhanced their confidence through their involvement in developing the containment plan. The open dialogue with the extended team and the entire organisation in order to understand this plan and its follow-up promoted better understanding of the situation, as well as greater commitment (Franco, 2006).

The combination of the VSM principles and guidelines and key attractors (Cornejo, 1997), the value proposal (Kim & Mauborgne, 2005), critical constraints and KPIs (Dettmer, 1997; Goldratt, 1991) brought a significant focus to the levelling process. The work on organisational design (roles, responsibilities, formal channels, and basic rules) to clarify the key interactions improved the autonomy, responsibility and work environment between the members. The leaders explored new paradigms of practice (Fuenmayor, 2012) through the consistency of the follow-up process (Bossidy & Charan, 2002; Kerr et al., 2002), even in this critical phase.

In this phase, some key aspects favoured the flow between the participants and the research. First, awareness of the critical condition prompted the need for a deep and open dialogue between members (Franco, 2006) in order for them to reconsider their current beliefs (Fuenmayor, 2012). Second, this phase helped people to enhance their basic understanding of the organisation as a system and thus their comprehension of their critical condition (Beer, 1995; Midgley, 2000). Third, based on better systemic understanding and use of the VSM and its principles as core transitional objects, the members could reflect on their core

attractors (Beer, 1995; Cornejo, 1997; Goldratt, 1997) as a team to overcome their situation. Finally, a key factor in this phase was the structure redesign to operate this phase. One factor to be considered was the experience of the researcher in driving this critical phase. At this stage, the team was not fully prepared to drive this stage by themselves. This is an important factor to be considered when deploying the MetK+ because, in this stage, people need some external support because they are accustomed to seeing their condition in the same way. In summary, this phase gave the MetK+ the chance to stabilise the SME's critical condition and for it to be viable in moving towards growth and development.

Stage: Managing Complexity Process

The continuous process for managing complexity in SMEs starts here, with the four phases of the ModK+. In this stage, the time was used by phase as follows: Meaning (4.2%), Understanding (2.42%), Focusing (18.47%) and Executing (74.9%). The first three phases were developed through workshops and the last was performed very closely with people, mainly through fieldwork using the AR method in practice.

5.4.2.4 Phase: Meaning

The research process in this phase was oriented to organisational ethos (45.45% of the total time), in which members shared their values, purposes and the nature of the organisation, and towards organisational identity (54.55%), whereby members shared their principles and the identity of the system-in-focus.

The value system (Padaki, 2000; Schein, 2010) that emerged from the mutual recognition of members' values based on their evident behaviours (Mascorro, 1995) was an attractor (Cornejo, 1997) in the organisation and had an impact and transcendence on the cohesion, team building and sense of belonging (Fuenmayor, 2013a, 2013b, 2013c) using the K+ Value System sequence. Following the value system, the members identified the purposes of the organisation using the key relationships and built the first deep systemic

understanding of their organisation (Espejo & Reyes, 2011). Through the K+ System Purpose sequence, the members rethought their sense of transcendence (Fuenmayor, 2012) and thus their level of responsibility and commitment to the organisation. Finally, in this sub-phase, the members enhanced their understanding of the whole business and its boundaries (Midgley, 2000) through the definition of the nature of the system using the S1s of the VSM as the base. This identification helped the meta-system leaders to have a deeper understand of their aim in supporting the S1s.

The team members contrasted their own beliefs and paradigms and explored new ones when reflecting on the VSM guiding principles through practical examples (Espinosa, 2015a). The team fostered their interest and focus with their definition of the basic business metrics from the beginning. Using the VSM and the K+ System Identity sequence to detail the identity relationships, the team improved their systemic understanding of the dynamics as a viable system (Espejo & Reyes, 2011).

In this phase, the most significant concepts (from the group interviews matrices) for the team members were related to the necessary congruence between personal (self-awareness) and organisational values and the identification of the new nature of the business as a system. The main effects on changes were related to the increased congruence, confidence, and empathy between the members. From the whole of this process, the main learning was related to a deep reflection upon personal purpose and improvement and the valuing of teammates in pursuing better results.

In this phase, the main effects on CCX members were increasing cohesion between them and their first systemic understanding of their SME as a system (Beer, 1995; Cornejo, 1997; Kotter, 2012). Here the K+ sequences played a significant role in facilitating people in applying different systems concepts in practice (Midgley, 2000), in taking their impact on people's cohesion and beliefs into account (Fuenmayor, 2012), and the comprehension of the SME as a system (Midgley, 2000). Starting the systemic view of the SME from the key relationships (TASCOI) facilitated people`s understanding of their system (Espejo & Reyes, 2011), as this approach facilitated the establishment of the first boundaries of the

system by the SME's members (Midgley, 2000). This phase clarified for everyone involved their organisational ethos and identity as part of their own culture. These reflections also reinforced the explanation building of the researcher's observations related to the impact of the VSM on beliefs and paradigms in order to rethink the SME's 'ground' (Beer, 1995; Fuenmayor, 2012). In summary, this phase gives the process behind the MetK+ a platform for managing complexity based on a shared ethos and identity as a system among an SME`s members.

5.4.2.5 Phase: Understanding

The researcher and the organisation invested almost one-third of the time in working on the organisational system (36.84%) and the rest in understanding the problematical situation (63.16%) through workshops with the members in order to discuss these aspects in more depth.

In the Organisational System sub-phase, the members enhanced their comprehensiveness of their organisation as a system (Midgley, 2000) by using the VSM in practice through the K+ Organisational Distinctions sequence. Through this comprehensiveness about the system dynamics, the main effects on change (based on group interviews matrices) were related to the improvement of the interactions between the members and the achievement of better results within teams and in the organisation. From this process, the main learning for the team members was related to the impact of the VSM map based on relevant entities (using the Pareto principle) to understand the organisation in a simple way. Another learning was the personal awareness of the members in understanding their interactions and, finally, the members learned the relation between focus (on each system) and better results as a system. The VSM map as a transitional object (Midgley et al., 2013) helped members to improve their team building through these discussions.

In relation to the Problematical Situation sub-phase, when the members reviewed their integrated perceptions (Checkland, 1999) as a team, this helped them to review their organisational beliefs, enhance the empathy between them, and resize their problematical situation. However, perceptions are not enough to state a problematical situation; using the VSM map and its principles, the members

could filter their own perceptions towards a shared problematical situation (Checkland, 1999) and synthesise it when defining the complexity generators and challenges implicit in them. Through this process, the most significant concepts, based on group interviews (Tables 42 and 43), for team members were related to the importance of understanding an integral diagnosis as a system and the reinforcement of the organisation and business understanding with this process. The main effects on changes from the members' perspective were how to focus on a problematical situation as a team and the rest of the effects were on the process of assimilation because of the major personal impact. From this process, the members' main learning was better understanding of the importance of the organisation's diagnosis as a system in order to focus on a shared problematical situation and a possible need to reinvent their system-in-focus.

This phase was a determinant in enhancing people's systemic understanding based on the VSM. The K+ sequence designed for this purpose played a significant role in developing this effort with a more user-friendly approach (Midgley et al., 2013). The first complete version of the VSM map gave people an outlook on their environment and organisation (Beer, 1995) with a detailed idea of their key relationships (Espejo & Reyes, 2011) in order to use this map as a transitional object for future in-depth discussions. In relation to the problematical situation, there were three key aspects: first, the possibility of deepening the organisational culture or 'ground' in order to better understand the interpretive platform (Fuenmayor, 2012) that supports people's behaviours; second, the possibility of people contrasting their perceptions with external ones and both with the VSM theory and thus rethinking for themselves their problematical situation as a system (Beer, 1995); these aspects are related to the explanation building from the researcher's observations in terms of the SSM and its impact on the problematical situation and the impact of the VSM on shared understandings and an organisational diagnosis. In summary, this phase gives the process behind the MetK+ a continuous possibility of adjusting the system-in-focus and deepening analysis of the problematical situation associated with it.

5.4.2.6 Phase: Focusing

In this phase, the time was invested as followed: in the External Business Model sub-phase: 33.79%; in the Internal Business Model sub-phase: 6.9%; and in the Organisational Focus sub-phase: 59.31%. All these sub-phases were developed using workshops as a means of discussing all the topics among the members.

In the first External Business Model sub-phase, by using business language, the management team understood how to evaluate the organisation's performance in an easy and systemic way through the TOC approach to articulating business metrics (Goldratt, 2009). The members realised their main business challenges (OECD, 2007a) and thus could project expected goals, which gave them more confidence in and commitment to the change process (Kotter, 2012; Kotter & Heskett, 1992). In addition, the Strategic Orchestration (Ruelas-Gossi & Sull, 2010) and Value Innovation (Kim & Mauborgne, 2005) approaches fostered in-depth reflections upon current beliefs (Fuenmayor, 2012) and the new paradigms further enhanced their systems thinking. Following the previous reflections and using the VSM organisational map, the members articulated the environment design through a practical K+ Environment Design sequence. In this sub-phase, the most significant concepts (based on group interviews matrices) for the team members were related to the orchestrator node concept in order to enhance the understanding of the interaction between the environment and the organisation, emphasising the clear commercial focus. The main effects on change based on this sub-phase were related to an increasing focus on results and, again, in the process of assimilating because of the personal impact of this work. The members recognised that the main learning was the improvement in personal confidence and its effect on the relation between focus and better results.

Related to the Internal Business Model sub-phase, the VSM principles were the core of the Operations and Meta-system designs (Beer, 1995). However, the organisation's members were the ones who put all the designs into practice, so it was highly recommended to hold a detailed dialogue between them in a practical and systemic way using the K+ Operations and Meta-system Design sequences, in order to share the understanding of the design, define clear interactions between them, and develop all the necessary elements to operate in such a new way (Beer, 1995). Through this process, the meta-system's members enhanced their awareness of their role in increasing the support to S1s in order to reinforce

the cohesion and identity of the system-in-focus (Beer, 1995). In this sub-phase, the most significant concepts (based on the group interviews matrices) for the team members were related to the usefulness of the VSM map in performing an intuitive design (K+ Operations and Meta-system sequences), and so defining very clear roles and responsibilities to promote synergy. The main effects on change were related to the awareness of team performance and the improvement of synergy and better attitudes between members. From this process, the main learning from the members' perspective was the increased strategic approach and the reflection between members using the systems thinking approach.

In the Organisational Focus sub-phase, the logic behind the alignment process (Kaplan & Norton, 1997) was easy to understand but the whole method was not, the latter seeming complicated to the leader team. However, using the K+ Organisational Alignment sequence, the researcher improved this process after he designed a workshop for each strategic-level audience, using different team dynamics to promote the interaction and dialogue in each group towards the final integration of the organisational alignment, which linked all three strategic levels (Schwaninger, 2006a). Sharing this integration with the extended team, they understood one of the most significant concepts (based on the group interviews matrices) of this sub-phase: the real value of the alignment process in connecting the vision to everyday activities through the link between all three strategic levels and so rethinking their own paradigms (Fuenmayor, 2012; Schwaninger, 2006a) related to the shared focus, responsibility and necessary coordination to improve system viability. From the members' viewpoint, the main effects on change were related to a better working environment and the understanding of the relation between alignment and results in practice. From this process, the main learning of the team was related to the importance of a shared focus between members through the alignment process to obtain results and, again, an in-depth reflection upon the personal approach.

In this phase, one key factor of the research was the establishment of detailed organisational metrics to evaluate the performance of the system and thus the impact of the change process (Goldratt, 1997; Kerr et al., 2002; Kotter, 2012). This effort worked as an attractor to people in the SME (Cornejo, 1997). In addition, the largest influence on the external design were the complementary

approaches, which were really helpful in encouraging people to rethink their own beliefs and then the business model (Kim & Mauborgne, 2005; Ruelas-Gossi & Sull, 2010). In terms of the external and internal designs, the K+ sequences also helped people to perform the designs in a user-friendly and guided method and to discuss the elements necessary to perform them. The researcher employed the VSM theory to perform the internal design and to enhance the appropriate structures in place. The VSM guidelines were extremely useful in guiding and performing the design of the Operations and Meta-system (Beer, 1995; Espinosa & Walker, 2011); this observation is fully developed in section 5.3.3.3 based on the researcher's observations. Finally, in the Organisational Focus sub-phase, the approach based on working differently with different strategic levels (Schwaninger, 2006a) worked very well but, at the same time, working with the three levels and looking for integration helped members to better understand the process of alignment (Kaplan & Norton, 1997). The K+ Organisational Alignment sequence was significant in terms of novices performing the alignment in this kind of process. A final aspect to consider was the way in which the researcher addressed the integration between people of the alignment between the three levels and the dissemination to everyone else involved (Kaplan & Norton, 1997). In summary, this phase gives the process behind the MetK+ the continuous possibility of adjusting the environment in order to put appropriate structures in place to agree coordinated actions for improving systems viability.

5.4.2.7 Phase: Executing

In this last phase, the research process was fully oriented to the Management Process sub-phase, in which the work was performed in meetings to agree the execution structure (5.95% of the total time) and the fieldwork on the execution management (94.05%).

The execution structure gained more importance in this SME due to inertia regarding follow-up (Adizes, 1994, 1999). Thus, the researcher and the teams worked in order to develop all the necessary elements to perform the execution. Working on this structure, based on simple and practical dialogue, the members and the researcher achieved a better understanding of the execution approach

(Bossidy & Charan, 2002; Kerr et al., 2002), as well as the practical interactions between the three strategic thinking levels (Schwaninger, 2006a).

The execution management in this SME considered three key complementary factors for its performance: first, the consistency and perseverance among the team members to operate it; second, the opportunity and quality of the information to be used; and third, the facilitator's accompaniment (Bossidy & Charan, 2002). All these factors helped the SME to support the process in order to avoid a sense of inertia. The execution management process enhanced understanding of: first, the ModK+ as an organic and non-linear approach (Midgley, 2000); second, the links between the three strategic levels (Schwaninger, 2006a); and third, the necessary discipline to coordinate actions between members (Bossidy & Charan, 2002; Kerr et al., 2002). With this continuous process, the results achieved in practice reinforced the team's perseverance and confidence.

In this sub-phase, the most significant concepts (based on the group interviews matrices) for the team members were related to: the importance of formal and clear responsibilities for the continuous process, the necessary discipline to perform it, and its impact on continuous focus and results. The main effects on changes perceived by the team members were related to the improvement in the results, the leaders' confidence, and, finally, the team's performance based on the follow-up process. For the team, the main learning was the necessary discipline for the follow-up process in order to catalyse a continuous adjustment in organisation strategy and so achieve the expected results.

The Executing phase was the most time-consuming and difficult to perform in practice, the main reason being inertia (Adizes, 1994). The coaching role from the researcher was a key factor in helping people to enhance their systemic understanding of the ModK+ and mainly to be aware of the effect of inertia on the new way of thinking and acting in practice (Adizes, 1999; Espinosa, 2015a; Espinosa & Walker, 2011). During this phase, the researcher was able to observe the learning cycle in practice (Checkland, 1985, 1999, 2010a; Kölb, 1984), as stated in section 5.3.4.3. As Schein (1990, 2010) states: artifacts are part of the organisational culture and all the artifacts (necessary conditions) developed in

this phase facilitated people's understanding, adoption and deployment of deep changes in order to overcome inertia. Finally, a key success factor in this phase was the use of business metrics and indicators to evaluate the SME's performance. The impact of the case study on the business is stated in section 5.2.8. When people reviewed the results through the metrics and indicators, the reviews provided a challenge to the team members to achieve the goal and, at the same time, encouraged people to enhance their team building and improve their results. In summary, this phase gives the process behind the MetK+ the continuous possibility of self-evaluating performance, thus improving team members' experiential learning to address complexity management in practice.

5.4.3 Summary

The duration of this research allowed the development of one learning cycle. Based on this first improvement cycle, the researcher intends that it serves as the foundation for subsequent ongoing processes of improvement supported by the learning cycle. When the researcher analysed the first cycle, he was able to identify certain aspects behind the process and its phases and sub-phases. First, the Relationship and Context sub-phases were developed using a process that facilitated and catalysed the relation between the researcher and the SME and, at the same time, allowed both to share different 'grounds' in order to merge as a team and as the foundation for better understanding of the SME as a system. In the Levelling phase, the direct intervention of the researcher was necessary in order to facilitate and coach the process to overcome the critical condition. Here, the earlier enhancement of the relationship and the confidence it generated was a determinant in people accepting the researcher's orientation at the beginning. Here, those in the SME had trust in the researcher as a change agent. However, during the Levelling process, the results had a positive impact on people's confidence in the research approach and they anticipated the next stage of the intervention in seeking a profound change. The next phase on Meaning greatly improved the SME's cohesion and identity as a system and challenged their beliefs, which was a strong foundation for the following phases. Based on the previously derived meaning, people enhanced their systemic understanding of the business and its reality in a way that encouraged a different type of dialogue between them. In the Focusing phase, people challenged in depth their beliefs

related to their business model and, during this phase, realised the potential of their business. Thus far, the process behind the MetK+ was explored more intuitively using different methods, tools and techniques. However, the Organisational Focus sub-phase was one of the most difficult for the team due to the need, with the approach of the MetK+, for everyone to connect the vision with certain activities. Here, people showed confusion in various moments of this sub-phase and the researcher's role was a determinant in overcoming some of the uncertainty among those taking part. Finally, in the Executing phase, even with the 'artifacts' developed, people were constantly influenced by inertia and old practices. Here, the coaching role of the researcher was again a determinant in overcoming inertia and helping people to enhance their systemic understanding in practice.

Summary

In this chapter, the researcher presented his discussions based on the sources of evidence and was guided by the strategy for discussion. The researcher realised the concept that the MetK+ was designed to facilitate the adoption of STAs in the daily practice of organisational management. The integration of the MetK+ worked in practice to overcome the SME's challenges and enable it to manage its complexity. The researcher also identified the positive and negative aspects of the ongoing process behind the adoption of the MetK+ in order to increase the ability to manage complexity in SMEs through a learning system. Both propositions support the stated theory that the adoption of systems thinking approaches applied on a daily basis increases the ability to manage complexity in SMEs in order to last over time. On the 'soft' side, many of the people's comments show evidence of their increasing cohesion and identity as a team and, on the 'hard' side, the business metrics show evidence of better performance as a business. In the next and last chapter, the researcher establishes the final conclusions of this research.

Chapter 6: Conclusions

Introduction

In this final chapter, the researcher states his conclusions about this research. First, the researcher analyses his research questions, theory and propositions in order to reflect upon the questions and reject or confirm his theory and propositions. Second, the researcher reviews SMEs' challenges and the research gaps identified to consider how the methodology and ongoing process of this research are appropriate to address them. Third, the researcher discusses how the research methodology supported the design of the intervention and how the multi-methodology approach based on the creative design of methods might be useful in integrating the methodology for systemic intervention to manage complexity. Finally, the researcher reflects on his contribution to existing knowledge with this work and the chapter ends with the identification of the next steps for the research.

6.1 The focus of the research

The researcher started his work inspired by how to contribute to the world by considering SMEs as among the most important worldwide enablers of the growth and development of human organisations. SMEs have significant challenges as organisations in society today because, although they have a significant economic and social influence worldwide, just as they do in Mexico, they also face a new era marked by globalisation, which has an impact on the current complexity and thus upon the development of SMEs.

With this in mind, the researcher developed one main research question in the Mexican context related to the need to increase SMEs' ability to understand and manage complexity in order to last over time using systems thinking approaches (STAs) in their daily practice. However, to address the research question, and because of the time available, the researcher focused mainly on building the first full improvement cycle during six months. Thus, considering this and based on

the discussion of the results, the researcher can state that SME managers can increase their understanding to manage complexity using STAs in daily practice. However, in order to manage complexity, managers needed to be accompanied by an external agent in the first cycle to use the STAs. Nevertheless, the SME's managers can address their increasing complexity in daily practice, using STAs, starting form the first cycle. With regard to developing managers' ability, it is necessary to perform and monitor more than one improvement cycle using the learning system, in order to evaluate this process.

In relation to the two secondary research questions, the first is oriented to how a systems thinking methodology can be developed for organisational management in SMEs to be used in daily practice to manage complexity. Based on the discussion, the researcher can state that the integration of the MetK+ considered two pillars, complementary approaches and K+ sequences to address SMEs' challenges using the creative design of methods, which was appropriate as a multi-methodology to be applied in practice to manage complexity. The MetK+ lends support to SME managers in guiding their actions through action research and the development of methods, techniques and tools to perform each theme of the MetK+ according to a specific context. Thus, the MetK+ methods, techniques and tools were useful for novices required to manage complexity in practice. However, although the MetK+ was useful and user-friendly to apply at the level of practice in this research, the SME's managers need to increase their ability to manage complexity in practice without an external agent over time. One cycle of improvement is not enough for an SME's members to manage complexity by themselves.

The next secondary question related to how a continuous strategic process can be developed as a learning system to manage complexity in Mexican SMEs in order for them to coevolve with their environment. With regard to the process, the researcher realised the distinction between the three MetK+ stages as follows: the Preparation stage, which relates to the relationship and necessary context, is necessary at the beginning of a systemic intervention but not as an ongoing process; the Levelling phase is necessary only when an SME remains in a critical condition of survival and the activities in this phase are not necessarily a process; the ongoing process starts when the intervention moves to the Managing

Complexity Process stage using the Model K+. To remind the reader, this third stage has four phases: Meaning, Understanding, Focusing and Executing. The Meaning phase at the centre of the ModK+ reflects the ethos and identity of the system-in-focus and is the basis upon which rest the other three more dynamic phases whereby the ongoing process appears as a cycle. However, through the Understanding and Focusing phases, the process is related more to the world of thoughts; however, the Executing phase is more oriented to the experiential learning cycle in practice, running as an ongoing process. With this in mind, the researcher returns to the secondary question of the ongoing process and learning and can state that the learning process behind the MetK+ operated for the SME in two ways: in the first learning and improvement cycle, in which the researcher facilitated the first implementation of the MetK+, it was necessary to 'build' many of the elements of the learning system and thus the first improvement cycle resembles an intervention rather than an ongoing process. However, with the first improvement cycle, as the foundation for the learning system, the 'process comes to life' as an ongoing process from the second improvement cycle and beyond. Based on the group interviews, the researcher can confirm that the SME's members experienced the learning system from the very first cycle, passing through all the stages of Kölb's and Checkland's learning cycles. However, in practice, the first learning and improvement cycle allowed the SME's members to overcome the critical condition identified and move to a scenario of growth and development.

In order to analyse the stated theory, it is first recommended to review the two propositions. The first proposition states that a systemic multi-methodology intervention (with methods, techniques and tools to apply it) specifically designed for SMEs will be very helpful in facilitating the adoption of STAs in the daily practice of SMEs' organisational management. This proposition was useful in designing the intervention and, when this systemic intervention was applied, the researcher's observations and the group interviews confirmed the usefulness of the MetK+ in applying STAs and enhancing their adoption. There are two aspects at the core of such usefulness: first, to design the MetK+ by considering the practical level of methods, techniques and tools; and second, the integration of the two pillars and all the complementary approaches in a single methodology which guides a learning process when it is applied in practice.

The second proposition states that it is necessary in an ongoing strategic process to adopt a systemic methodology in order to increase the ability to manage complexity in SMEs. It is not enough simply to implement the systemic intervention using a multi-methodology in practice; it is also necessary to develop a methodology but to think of an ongoing process based on a learning system in order to help SME stakeholders develop the ability to manage complexity. As stated, in the first cycle, the process and learning cycle were applied when the SME's members 'built' the first cycle; however, it is necessary for future research to apply the MetK+ over a longer period of time in order to evaluate if, through a number of improvement cycles, an SME's members are able to develop their ability without the intervention of an external agent by using all the guidelines, methods, techniques and tools of the MetK+. Thus, this proposition was partially tested in the first cycle with the researcher's support but it is necessary to test it in more improvement cycles. The systemic intervention of the first cycle was useful to the SME in overcoming its critical condition and in improving the business key performance indicators in addressing complexity in the context of the SME selected.

Based on the above propositions, the researcher can review the stated theory: the adoption of STAs applied on a daily basis increases the ability to manage complexity in SMEs in order to last over time. Based on the discussion chapter, the researcher can partially confirm this theory because, due research duration, instead of 'adoption' the word must be 'use' i.e., the use of STAs applied on a daily basis increases the ability to manage complexity in an SME. With the facilitation of the researcher and through the action research in this case study, the SME's members could understand and use STAs in daily practice to manage complexity in a critical condition and in the Managing Complexity Process by looking to and achieving better business performance. It is necessary to perform more than one improvement cycle in order to develop managers' ability to address complexity by themselves.

In addition to the focus of the research, the approach used in chapter 1 links the research problem with the research questions and these with the theory and propositions according to a scope of work to focus the research. In linking all

these elements, the researcher was able to focus the research from the beginning.

6.2 The challenges and gaps identified in the research

The first challenge for this research was to identify how to promote seeking the common good when people are coping with increasing complexity in SMEs and how this could work with other systems thinking approaches in order to manage complexity. The emphasis on the Sense guidelines and the Meaning phase encourage SME members to consider the social role of the SMEs beyond a purely instrumentalist approach.

In addition, the researcher developed an analysis related to the specific challenges that SMEs need to face. Looking at these challenges, the researcher realised the need to integrate STAs with other approaches in order to address current complexity; not only in the world of 'What to do', but also in the realm of 'How to do' it. The clarification of the specific context of SMEs through the challenges they face also strengthened the focus of the research because, through these challenges, the researcher could design the approaches chosen to integrate the multi-methodology.

The challenges clarify the research path to be followed by seeking new ways of thinking to address them. Based on the analysis of new ways of thinking, the researcher was then able to identify some gaps in the literature regarding the managing of complexity in SMEs when considering specific challenges. There were two gaps identified in the Context phase: first, the need to strengthen the relationship between the researcher and the organisation. The main effect when attending to this gap was the openness in the relationship between the SME's members and the researcher, which allowed increasing confidence in gaining effectiveness from the beginning of the research; the second gap in the Context phase was a need to work initially and in depth on the SME's context in order to understand the historic and cultural background. The MetK+ addressed this gap and the results were an in-depth understanding from the beginning that allowed the researcher to identify the critical condition and quickly integrate efforts with the team to address it. In addition, this understanding of the historic and cultural

background allowed the researcher to better guide the Managing Complexity Process stage.

In the Levelling phase, one gap was identified that was related to the identification of an SME's critical condition. The actions to be implemented are different in a critical condition than a regular one. The MetK+ includes this important phase because if, in a critical condition, the change is not oriented to critical constraints but to the high-speed implementation of critical actions, the organisation can go bankrupt. In this case study, if the researcher had omitted this phase, the speed of the Managing Complexity Process stage would not have been sufficient to address the SME's critical condition. In a critical condition that the SME had to survive, this Levelling phase was of significant importance to addressing complexity in order to move from survival to the condition of growth and development.

In the Meaning phase, the gap was centred on how to explore the organisation's meaning for stakeholders as an interrelated system that promotes the common good. When the researcher addressed this gap, there were three positive effects for the process: the first was the increasing cohesion and identity of the SME's teams; the second was an in-depth reflection of their current beliefs which triggered at least the intention to explore new ways of thinking and acting in the SME; and third, the sense of transcendence for the SME's members when they realised the boundaries of their system and all the relationships involved. These three positive effects enhanced the SME's interpretive platform as the basis for new behaviours in the system.

In the Understanding phase, the researcher identified one gap that not only related to understanding, but also to making a problematical situation and a diagnosis meaningful for all the stakeholders involved based on their historic and cultural background. When the researcher addressed this gap using the MetK+, he observed that the SME's members ability to share their perceptions of 'their' reality facilitated an environment of mutual trust and respect and, at the same time, the power relationships became less strong because of the empathy between the members. In addition, the way in which the MetK+ addressed the problematical situation allowed members to reflect, not only based on their

perceptions, but also on other internal and external perceptions filtered by the VSM theory in an open dialogue that facilitated rethinking current beliefs and paradigms in order to distinguish undesirable effects from complexity generators and make a meaningful diagnosis.

Two gaps were identified in the Focusing phase. The first gap was related to the design of an environment that would allow SMEs to achieve expected results. When the researcher addressed this gap using the MetK+, he integrated different complementary approaches precisely to help the SME's members to identify how to perform the design. Through this process, the members reflected in depth about the business model and the potential for different possibilities for business growth and development. In this phase, the complementary approaches significantly enhanced the business vision of the SME's members. The second gap was related to the process of alignment in order to coordinate actions linking the three strategic levels. When the researcher addressed this gap, it was easy to understand the logic behind this approach but difficult for the SME's members to perform this method even with all the enablers in place. The alignment method needed close support in order to perform it in the SME. However, after the process of alignment, the SME's members realised the importance and relevance of the link between the three strategic levels and the benefits of working on a strategy from a vision through explicit and specific activities.

In the Executing phase, the last gap was related to the management of the implementation of daily work. When the researcher addressed this gap, he found that all the enablers worked well; however, the main challenge was to break the sense of inertia and another was to help people to connect the different elements of the ModK+ to real life. As a result of these challenges, the accompaniment of the researcher (or an external agent) was crucial in order to overcome old practices in execution. However, the SME's members realised the impact of the follow-up process on team building and business performance based on the results achieved.

6.3 The methodology for the research

The researcher established the research concepts at the beginning and how they were related. Using this information, the researcher could identify, in a systemic way, the interaction between all the research concepts in order to improve the research design. Another key aspect in the research design was the distinction of the methodology for the research from the methodology for intervention and the need to develop a model as the basis for framing the methodology for the intervention. With this insight, the researcher facilitated the research design because each aspect has a different purpose for the systemic intervention but they are, at the same time, complementary.

At the philosophical level, the researcher chose an onto-epistemology based on interpretive systemology, an interpretivist paradigm and theory using the inductive approach. At the philosophical level, the main inspiration for this research came from Professor Ramses Fuenmayor and his work related to how the ‘ground’ and ‘figure’ work together in any given situation. Using this approach, the researcher can conclude that understanding the ‘ground’ and sharing it among the SME’s members enhanced the holistic vision of both and the ability to better perform the systemic intervention.

At the methodological level, the key point was the decision regarding the multi-methodology approach based on the challenges and research gaps identified and the need to consider the two pillars: the VSM to manage complexity and the SSM to design the learning cycle. This section was influenced by Professor Gerald Midgley and his work on theoretical and methodological pluralism and the creative design of methods to apply the multi-methodology approach. In addition to the grounded theory behind Midgley’s work, the researcher realised that Midgley’s approaches are very intuitive to apply in practice. Following Midgley’s suggestions, the design of the systemic intervention became more flexible and useful in addressing and responding to different specific contexts in real life.

At the practical level for the research methodology, the action research (AR) allowed the intervention to involve the SME in an implicit change process in order to transform its reality through to the research process. In addition, AR developed through a case study (CS) allowed the consideration of holistic and meaningful

characteristics in real-life events for this research. In practice, the CS was also useful in framing and guiding the AR intervention.

6.4 The methodology for the intervention

The comparison of VSM methodologies was useful in identifying common ‘building blocks’ and further clarifying the research gaps. This section was influenced by Doctor Angela Espinosa and her work about how to adopt a methodology to manage complexity. Here, the main gap was related to the adoption in practice of a methodology for novices; although the MetK+ was designed for this purpose, it is necessary to test it with more improvement cycles in order to confirm its usefulness in the adoption of the process. In the first cycle, the MetK+ integrates the elements in order to address complexity and this is intended to have an impact on people’s beliefs, team-building abilities and business performance.

For the intervention, it was important to develop the model before the intervention, as the ModK+ represents a way of thinking and the MetK+ explains a way of acting based on the model. The model was the foundation for driving the intervention. As a way of thinking, the ModK+ can also be useful in the design of other systemic interventions. The MetK+ can also be useful in designing another intervention considered from stage to sub-phase level, because it is precisely at the theme level that the future user of this multi-methodology can integrate her/his own methods to address complexity in a specific context.

The results of how the different elements of the MetK+ worked in practice to the intervention were addressed in chapter 5. This section was influenced by Professor Stafford Beer and his work which was the backbone to addressing complexity and thus, the VSM theory was the core approach for doing so in SMEs. The VSM theory was the foundation that drove each phase of the MetK+. The researcher can confirm through this research that the VSM was helpful in diagnosing and designing organisations; in looking at an organisation through the VSM’s ‘lenses’, the diagnosis and design became intuitive even for novices once they recognised the VSM theory in practice. In addition, the researcher used the

VSM guidelines to challenge the current beliefs and ‘ground’ in the SME and this process triggered learning cycles in the participants involved during the research. The graphical integration of guidelines and principles used as a transitional object was of great help to people in understanding in a more user-friendly way some of the relevant theory of interpretive systemology and the VSM theory and the relation between them using real examples in practice. The use of the VSM as a transitional object was a determinant in triggering further in-depth dialogue between participants in a more sustained way because the dialogue not only depended on people’s opinion, but also on their reflection using the VSM with significant differences in teams’ dialogues when sharing understandings.

In relation to SSM as the second pillar for enhancing the learning system, the researcher realised that using the VSM in combination with SSM allowed the SME’s members to share and understand more easily the purposeful actions involved and the problematical situation. The VSM facilitated the SME’s members in identifying the purpose of the system and in clarifying purposeful actions when people performed the Understanding and Focusing phases using the VSM. With regard to the problematical situation, the use of the VSM also facilitated the SME´s members in clarifying the difference between undesirable effects and complexity generators in order to share the problematical situation of the system. Finally, regarding the learning cycles, the researcher could, through the AR, confirm the four stages of the learning cycle in practice, in which most of the time was invested in concrete experience and active experimentation. The practice triggered different learnings in different people at different times, which was precisely the importance of the researcher’s accompaniment in the learning process from the beginning. The coaching role of the researcher during the execution was a determinant in helping people to reflect on their learning because, in practice, learning occurs individually in different moments and circumstances.

In terms of the strategic attenuators (SAts) and amplifiers (SAms), the researcher needs to clarify two aspects: first, the SAts and SAms selected for this research were aimed at the SME’s challenges i.e., the SAts and SAms will not necessarily be the same in other interventions; second, the selection of the methods for each amplifier and attenuator depended on the specific context of the research i.e., the

methods selected and used in this research will not necessarily be the same in other interventions. In this research, the SAts and SAms selected complemented the change process in accordance with their design, both had an impact on people's beliefs in the business model and both facilitated the application of the VSM theory in practice in daily life.

Most of the K+ sequences were conceived as enablers in order to apply different systems thinking approaches in practice. The K+ sequences facilitated the SME's members' understanding using the impact of the STAs to address increasing complexity. The K+ sequences acted as guides to link different STAs in practice. Without the K+ training sequence, the other K+ sequences can be used in other systemic interventions because they are related to STAs and can be useful in different contexts because they do not depend on a specific situation. The K+ sequences also complemented the MetK+ in the realm of 'how to perform' the different themes of the ModK+ in practice and fulfilled their purpose because their effect was reflected mainly in the group interviews and the researcher's observations.

Finally, the business metrics to evaluate the impact of the research were a critical factor for the people involved, as the results based on these metrics show the impact of all the efforts upon business performance. The consistent monitoring of business results gave more confidence to the people involved and their confidence in the MetK+ to continue the implementation of the change process.

6.5 The contributions to knowledge

The researcher envisages the five main contributions to knowledge as follows. The first contribution is related to the process followed to distinguish theoretically and practically: the methodology for the research, the model as a way of thinking, the methodology for the intervention, the relation among them and the way of working using these three interacting elements in a systemic intervention to create a change.

The second contribution is related to the process of building a model and multi-methodology for a systemic intervention to manage complexity through the four levels, and the process behind their application in practice in order to promote the use of the STAs in daily practice with impact on people and organisation.

The third contribution is related to the use of the VSM. There has been very little about the use of the VSM as an ongoing process in SMEs and no work has used it in combination with critical systems approaches in the context of a formal multi-methodological approach. The integration of the VSM with other systems and non-systems approaches, using the creative design of methods as the multi-methodology for the integration, is another contribution to knowledge.

The fourth contribution is related to the knowledge behind the first complete improvement cycle as a foundation for running subsequent improvement cycles. This knowledge is mainly related to all the didactical tools designed and used from the first improvement cycle which purpose aims to the adoption of the ongoing process to manage complexity in practice. All these didactical elements were designed in order to use them by novice people, as tools to perform the ongoing process to manage complexity by themselves.

The final contribution is related to the approach to evaluate the impact of the systemic intervention in the people involved (through group interviews) and in the business (through business metrics) and how this evaluation promotes more synergy among SME's members and more business orientation.

6.6 The next steps for research

The first next step for this research is related to simplification. In terms of adoption, the researcher designed a very detailed MetK+ seeking to use it as a guide to support the implementation of the first cycle and to help people develop the subsequent improvement cycles. However, future research needs to consider how to distinguish the philosophical and methodological levels from the practical one in order to simplify the ModK+ and MetK+.

One challenge appears at the philosophical level: the combination of interpretive systemology and VSM theories. The use of the onto-epistemology selected in this research enhanced understanding of the cultural and historical background of the SME and this understanding was a determinant in better guiding the intervention. Exploring the combination and impact of both theories deserves special consideration.

Two challenges appear at the methodological level. The first challenge is the use of the ModK+ and MetK+ to frame other systemic interventions in different contexts. The second is related to the implementation of the MetK+ over a longer time period in order to evaluate whether all the elements built in the first improvement cycle are enough to help people adopt this methodology in practice as an ongoing process.

Finally, one challenge appears at the practical level: the need in future research to enhance the design of the performance evaluation of the systemic intervention from the ‘soft’ and ‘hard’ sides i.e., from the people´s perspective and from the aspect of business performance.

Summary

The researcher has recognised that the ModK+, the MetK+ and the implicit learning process are related to sharing meanings and understandings through dialogue between people. This dialogue is enhanced in the MetK+ between two elements: first, a need to comprehend a phenomenon (Comprehensiveness) and second, a need to focus energy depending on the phenomenon (Focus). In addition, a dialogue from comprehension to focus and vice versa, enhances peoples synergy (Team-building) and, ultimately, the relation between these elements promotes a learning process (Learning), as presented in Figure 74.

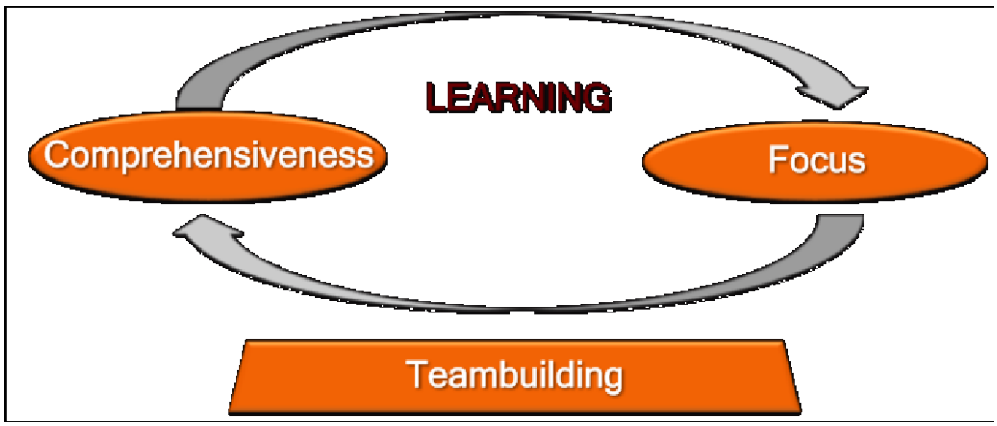


Figure 74: Key elements behind the Model K+

In the end, this research aimed to a systemic intervention to manage complexity in Mexican SMEs in order to last over time. Through this journey, the researcher developed different complementary elements to perform a systemic intervention aiming to the adoption of an ongoing process which enhances people team-building using a learning system, where SME's members can discussed from the comprehensiveness to focus and vice versa, in order to create a change.

Bibliography

ACHTERBERGH, J. and VRIENS, D., 2002. Managing viable knowledge. *Systems Research and Behavioral Science,* 19(3), pp. 223-241.

ACKOFF, R.L., 2006. *Planificación de la empresa del futuro.* México: Limosa.

ACKOFF, R.L., 1981. *Creating the Corporate Future.* New York: John Wiley & Sons.

ADIZES, I., 1999. *Managing corporate lifecycles.* Prentice Hall Press.

ADIZES, I., 1996. *The pursuit of prime.* Boston: Knowledge Exchange.

ADIZES, I., 1994. *Ciclos de vida de la Organización.* Madrid: Ediciones Diaz de Santos.

ADIZES, I., 1992. *Mastering Change: the power of mutual trust and respect.* Adizes Institute Publications.

ANDRADE, H., DYNER, I., ESPINOSA, A., LOPEZ-GARAY, H., SOTAQUIRA, R., 2000. *Pensamiento sistemico: Diversidad en busqueda de unidad.* Universidad Industrial de Santander.

ANDREWS, K.R., 1994. *The concept of corporate strategy.* 3rd edn. Homewood: Irwin.

ANSOFF, H.I., 1988. *The New Corporate strategy.* New York: John Wiley & Sons.

ARGYRIS, C. and SCHÖN, D.A., 1996. *Organisational Learning II: Theory, Method and Practice.* 2nd edn. Massachusetts: Addison Wesley.

ASHBY, W., 1956. *An introduction to Cybernetics.* London: Chapman & Hall LTD.

ASSIMAKOPOULOS, N.A., 2000. Structured Total Systems Intervention systemic multi-MEthodology of VIable Systems and. *Human Systems Management,* 19(1), pp. 61-69.

AVISON, D. and FITZGERALD. G, 2006. *Information Systems Development: Methodologies, Techniques and Tools.* 4th edn. Berkshire: Mc Graw Hill.

BACON, B., 2001. Self Management Leadership, *Self Management Leadership*, Jan 26-27th 2001, pp. 10.

BANNOCK, G., BAXTER, R.E. and DAVIES, E., 1998. *Dictionary of Economics.* London: Profile Books.

BATES, S., 2013. Theory of Constraints, *Advanced Manufacturing Methods*, 2013 2013, pp. 1-33.

BECK, D. and COWAN, C., 1996. *Spiral Dynamics: Mastering Values, Leadership, and Change.* Blackwell publishing.

BECKFORD, J.L.W., 1992. Passing on a Family Business, Or a Family Business Passing on - an Application of the Viable System Model. *Systems Practice,* 5(5), pp. 543-560.

BEER, S., 1995. *The heart of entreprise.* Chichester: John Wiley & Sons.

BEER, S., 1985. *Diagnosing the system for organisations.* Chichester: Wiley.

BEER, S., 1981. *Brain of the firm.* 2nd edn. Chichester: John Wiley & Sons.

BEER, S., 1984. The Viable System Model: Its Provenance, Development, Methodology and Pathology. *The Journal of the Operational Research Society,* 35(1), pp. 7-25.

BLACK, J., 2015. Quietism and Convergence, WHITE ROSE PHILOSOPHY POSTGRADUATE FORUM, ed. In: *Quietism and Convergence*, May 23rd 2015.

BLACKBURN, R. and JENNINGS, P., 1996. *Small firms: contributions to economic regeneration.* London: SAGE.

BLAXTER, L., HUGHES, C. and TIGHT, M., 2001. *How to research.* 2nd edn. Buckingham: Open University Press.

BOHORQUEZ, L. and ESPINOSA, A., 2016. Theoretical approaches to managing complexity in organizations: A comparative analysis. *ProQuest,* , pp. 1-21.

BOISOT, M., 2011. Knowledge Management and Complexity. *The SAGE Handbook of Complexity and Management.* London: SAGE.

BOISOT, M. and MCKELVEY, B., 2011. Complexity and Organization-Environment Relations: Revisiting Ashby's Law of Requisite Variety. *Tha SAGE Handbook of Complexity and Management.* London: SAGE.

BONILLA, R., 2012. *Grupo Dinamicas_Espiral.* Yahoo! Groups: .

BONILLA, R., 2010. *Top Leaf: the Leadership Forum for the Road Ahead.* León, México: Tecnos Consultores.

BONOMA, T.V. and JOHNSTON, W.J., 1978. The Social Psychology of Industrial Buying and Selling. *Industrial Marketing Management,* 17, pp. 231-225.

BOSSIDY, L. and CHARAN, R., 2002. *Execution: the discipline of getting things done.* New York: Crown Business.

BOSWELL, J., 1973. *The rise and decline of small firms.* London: Allen & Unwin.

BRAGA, B., POPE, B. and DRUYAN, A., 2014. *Cosmos: A Spacetime Odyssey.* Cosmos Studios.

BRECKENRIDGE, R.S., 2008. Managing complexity and change in SMEs: frontiers in European Research, Poul Rind Christensen, Flemming Poulfelt (Eds.). Edward Elgar Publishing, Williston, VT (2006). *Journal of International Management,* 14(2), pp. 207-208.

BRICENO, A., ROSANA, P. and TERAN, O., 2011. A Design for Indicators and an Information System for a Research and Development Organization in Free Technologies: Application of the Viable System Model. *Revista De Ciencias Sociales,* 17(1), pp. 81-93.

BRITTON, G.A. and PARKER, J., 1993. An Explication of the Viable System Model for Project-Management. *Systems Practice,* 6(1), pp. 21-51.

BRYMAN, A., 2012. *Social Research Methods.* 4th edn. New York: Oxford University Press.

BURGESS, N. and WAKE, N., 2012. The applicability of the Viable Systems Model as a diagnostic for small to medium sized enterprises. *International Journal of Productivity and Performance Management,* 62(1), pp. 29-46.

BURRELL, G., MORGAN, G., 1979. *Sociological paradigms and organisational analysis: elements of the sociology of corporate life.* London: Heinemann.

BUSINESS DICTIONARY, 2013, 2013-last update, Business Dictionary [Homepage of WEB Finance], [Online]. Available: http://www.businessdictionary.com/definition/ [March 2013, 2013].

CARDOSO, P., 2011. *Facilitating self-organization in non-hierarchical communities. A methodology for regeneration programs.*, University of Hull.

CHAN, J.W.K., 2011. Enhancing organisational resilience: application of viable system model and MCDA in a small Hong Kong company. *International Journal of Production Research,* 49(18), pp. 5545-5563.

CHANDLER, A.D., 1976. *Strategy and structure: chapters in the HIstory of the industrial enterprise.* Cambridge: M.I.T. Press.

CHECKLAND, P., 2000. Soft Systems Methodology: A Thirty Year Retrospective. *Systems Research and Behavioral Science,* 17, pp. S11-S58.

CHECKLAND, P., 1999. *Systems thinking, Systems Practice.* New York: John Wiley & Sons.

CHECKLAND, P., 1988. The case for “holon”. *Systems Practice,* 1(3), pp. 235-238.

CHECKLAND, P., 1985. From Optimizing to Learning: A Development of Systems Thinking for the 1990s. *Journal of the Operational Research Society,* 36(9), pp. 757-767.

CHECKLAND, P. and HOLWELL, S., 1998. *Information, systems and information systems : making sense of the field*: Wiley, Chichester

CHECKLAND, P. and POULTER, J., 2006. *Learning for Action.* Chichester: John Wiley & Sons, LTD.

CHECKLAND, P. and POULTER, J., 2010b. Soft Systems Methodology. In: M. REYNOLDS and S. HOLWELL, eds, *Systems Approaches to Managing Change: A Practical Guide.* Springer, pp. 191-242.

CHECKLAND, P. and SCHOLES, J., 1990. *Soft Systems Methodology in Action.* Chichester: John Wiley & Sons.

CHECKLAND, P., 2012. Four Conditions for Serious Systems Thinking and Action. *Systems Research and Behavioral Science,* 29(5), pp. 465-469.

CHECKLAND, P., 2010a. Researching real-life: Reflections on 30 years of action research. *Systems Research and Behavioral Science,* 27(2), pp. 129-132.

CHECKLAND, P., 1995. The heart of enterprise Stafford Beer. *Futures,* 12(5), pp. 421-424.

CHECKLAND, P., 1989. Reviewed Work: Dealing with Complexity by Robert L. Flood, Ewart R. Carson. *The Journal of the Operational Research Society,* 40(7), pp. 699-700.

CHOI, C.J. and HILTON, B., 2005. Knowledge resources: Critical systems thinking, viable system model and 'gifts'. *Systems Research and Behavioral Science,* 22(6), pp. 561-564.

CHRISTENSEN, P.R. and POULFELT, F., 2006. *Managing complexity and change in SMEs: frontiers in European Research.* Cheltenham, UK: Edward Elgar Publishing.

CHRISTOPHER, W.F., 2007. *Holistic management: managing what matters for company success.* John Wiley & Sons.

CHRISTOPHER, W.F., 2011. A new management for enduring company success. *Kybernetes,* 40(3-4), pp. 369-393.

CHURCHMAN, C.W., 1979. *The Systems Approach.* New York: Delta Books.

CLEMSON, B., 1994. The Vsm Toolbox - Software for the Viable System Model. *Systems Practice,* 7(3), pp. 281-296.

CNN EXPANSION, 2013-last update, Cuanto pesan las Pymes en Mexico. Available: www.cnnexpansion.com/fotogalerias/2013/02/28/el-aporte-de-las-pymes-en-mexico?newscnn2=1363265594 [March 14th 2013, 2013].

COGHLAN, D. and BRANNICK, T., 2005. *Doing Action Research in Your Own Organization.* 2nd edn. London: SAGE Publications.

COMMITTEE OF INQUIRY ON SMALL FIRMS, GREAT BRITAIN., 1972. *Small firms: report of the Committee of Inquiry on Small Firms / Chairman: J. E. Bolton.* London: H.M.S.O.

CORBIN, J. and STARUSS, A., 1998. *Basics of qualitative research: techniques and procedures for developing grounded theory.* 2nd edn. Thousand Oaks: sage.

CORBIN, J. and STRAUSS, A., 1990. Grounded Theory Research: Procedures, Canons and Evaluative Criteria. *Zeitschrift für Soziologie,* 19(6), pp. 418-427.

CORNEJO, A., 1997. *Complejidad y caos: guía para la administración del siglo XXI.* Mexico DF: Ediciones Castillo.

CRESPO, M., 2016. *Sistemología Interpretativa: Modelo aplicativo de la teoría de organizaciones.* Unpublished material edn.

CYERT, R.M. and MARCH, J.G., 1992. *A behavioral theory of the firm.* 2nd edn. Cambridge, Mass: Blackwell Business.

DEKKERS, R., 2009. Collaborations in industrial networks: The co-evolutionary perspective. *Dispersed Manufacturing Networks.* Springer, pp. 77-105.

DETTMER, H.W., 1997. *Goldratt's Theory of Constraints: a systems approach to continuous improvement.* Milwakee: Quality Press.

DINAN, S., 1999. *Summary of Spiral Dynamics.* The National Values Center.

DOMINICI, G. and PALUMBO, F., 2013. Decoding the Japanese Lean Production System According to a Viable Systems Perspective. *Systemic Practice and Action Research,* 26(2), pp. 153-171.

DONAIRES, O.S., PINHEIRO, M.G., CEZARINO, L.O., OSTANEL, L.H. and MARTINELLI, D.P., 2010. Systemic Model for Diagnosis of the Micro, Small and Medium Enterprises from Two Cities from the Countryside of the State of So Paulo in Brazil. *Systemic Practice and Action Research,* 23(3), pp. 221-236.

DRESCH, A., LACERDA, D.P. and MIGUEL, P.A.C., 2015. A Distinctive Analysis of Case Study, Action Research and Design Science Research. *Revista Brasileira de Gestão de Negócios*, 17(56), pp. 1116-1133.

DRUCKER, P.F., 1954. *The practice of management.* New York: Harper & Row.

DSS RESEARCH, November 1st 2011, 2011-last update, World population growth over time. Available: http://blog.dssresearch.com/?p=229 [April 24th 2016, 2016].

DUARTE, E., 2008-last update, Claves para alargar la vida de las PYMES. Available: http://www.cnnexpansion.com/emprendedores/2008/09/05/bfcomo-alargar-la-vida-de-las-pymes [Month, 2012].

DYSON, R.G., 2004. Strategic development and SWOT analysis at the University of Warwick. *European Journal of Operational Research,* 152(3), pp. 631-640.

EASTERBY-SMITH, M., THORPE, R. and JACKSON, P., 2012. *Management Research.* London: SAGE Publications LTD.

ECHEVERRÍA, R., 2006. *Ontología del lenguaje.* Buenos Aires: Ediciones Granica.

EL ECONOMISTA, February 18th 2015, 2015-last update, Solo 11 de cada 100 nuevos negocios sobreviven en México. Available: http://eleconomista.com.mx/industrias/2015/02/18/solo-11-cada-100-nuevos-negocios-sobreviven-mexico [April 25th 2016, 2016].

EMERGING TECHNOLOGY ADVISORS, Octobre 20th 2014, 2014-last update, Predicting the Future: The Role of the Modern CTO. Available: http://blog.emergingtechnologyadvisors.com/predicting-the-future [April 22nd, 2016].

EPSTEIN, E.M., 1977. The social role of business enterprise in Britain: an American perspective. Part II. *Journal of Management Studies,* 14(3), pp. 281-316.

ESCOBEDO, C., 1998. *GE Follow-up process.* León, México.

ESPEJO, R. and HARNDEN, R., 1989. *The Viable System Model: interpretations and applications of Stafford Beer's VSM.* Chichester: John Wiley & Sons.

ESPEJO, R. and MENDIWELSO, B., 2011. An argument for active citizenship and organisational transparency. *Kybernetes,* 40(3), pp. 477-493.

ESPEJO, R. and REYES, A., 2011. *Organizational Systems (ebook-Dawsonera).* 1st Edition. edn. DE: Springer Verlag.

ESPEJO, R., 1981. Professor Checkland's review of The heart of enterprise. *Futures,* 13(1), pp. 70-71.

ESPEJO, R. and KUROPATWA, D., 2011. Appreciating the complexity of organizational processes. *Kybernetes,* 40(3-4), pp. 454-476.

ESPINOSA, A., 2015b. *Distinction between Methodology for the research and Methodology for the Intervention.* Hull, UK.

ESPINOSA, A., 2015a. *Insights from the Irish Eco-village project.* Hull, UK.

ESPINOSA, A., 2014. *A methodology for supporting strategy implementation based on the VSM: A case study in a LA multi-national.* Manuscript for a Journal edn. Bogota.

ESPINOSA, A. and WALKER, J., 2013. Complexity management in practice: a Viable System Model intervention in an irish eco-community. *European Journal of Operational Research,* 224(1), pp. 209-218.

ESPINOSA, A. and WALKER, J., 2011. *Complexity approach to sustainability: a theory and application (ebook-Dawsonera).* GB: World Scientific Pub Co Pte.

ESPINOSA, A., HAMDEN, R. and WALKER, J., 2008. A complexity approach to sustainability - Stafford Beer revisited. *European Journal of Operational Research,* 187(2), pp. 636-651.

ETERNAD, H. and WRIGHT, R., February 2003. Internationalization of SMEs: Toward a New Paradigm. *Small Business Economics,* 20(1), pp. 1-4.

FISHER, C., 2007. *Researching and writing a dissertation: a guidebook for business students.* 2nd edn. Harlow: Financial times Prentice Hall.

FLOOD, R. and JACKSON, M., 1991. *Critical Systems Thinking: Directed readings.* Chichester: John Wiley & Sons.

FLOOD, R.L., 1998. Action Research and the Management and Systems Sciences. *Systemic Practice and Action Research,* 11(1), pp. 79.

FLOOD, R.L., 1988. Management of complexity. *Transactions of the Institute of Measurement and Control,* 10(3), pp. 115-116.

FLOOD, R.L., 1988. Situational complexity, systems modelling and methodology. *Transactions of the Institute of Measurement and Control,* 10(3), pp. 122-129.

FLOOD, R.L. and ZAMBUNI, A.A., 1990. Viable Systems Diagnosis. 1. Application with a Major Tourism Services Group. *Systems Practice,* 3(3), pp. 225-248.

FLORES, J., March 20th 2013, 2013-last update, México necesita menos PYMES. Available: http://www.forbes.com.mx/mexico-necesita-menos-pymes/ [April 25th 2016, 2016].

FRANCO, L.A., 2006. Forms of Conversation and Problem Structuring Methods: A Conceptual Development. *The Journal of the Operational Research Society,* 57(7, Special Issue: Problem Structuring Methods), pp. 813-821.

FRANCO, L.A., O'BRIEN, F. and BELL, P., 2011. Supporting strategy: Contributions from OR. *Journal of the Operational Research Society (2011) 62, 815–816,* 62, pp. 815-816.

FRANKFORT-NACHMIAS, C. and NACHMIAS, D., 2008. *Research methods in the social sciences.* 7th edn. New York: Worth Publishers.

FUENMAYOR, R., 2015. *Interpretative Systemology on the practice.* Mérida, Venezuela.

FUENMAYOR, R., 2012c. *Chapter three: The Tunnel.* HUll.

FUENMAYOR, R., 2012b. *Chapter two: Systems approach.* Hull.

FUENMAYOR, R., 2012a. *Chapter one: The Setting.* Hull.

FUENMAYOR, R., 2012. The path of Interpretative Systemology, pp. 1-11.

FUENMAYOR, R., 2001c. The Oblivion of Churchman's Plea for a Systems Approach to World Problems. III The Fall of the Modern Constellation. *Systemic Practice and Action Research,* 14(1).

FUENMAYOR, R., 2001b. The Oblivion of Churchman's Plea for a Systems Approach to World Problems. II The Rise of the Modern Constellation. *Systemic Practice and Action Research,* 14(1).

FUENMAYOR, R., 2001a. The oblivion of Churchman's Plea a Systems Approach to World Problems. I The Inseparability of Systems Thinking and World Issues in the Modern Epoch. *Systemic Practice and Action Research,* 14(1).

FUENMAYOR, R., 2001. *Interpretando Organizaciones...* 1st edn. Mérida, Venezuela: Universidad de los Andes.

GANZERT, C., MARTINELLI, D.P. and DELAI, I., 2012. Intelligence systems methodology: a systemic approach to the organizational intelligence function. *Knowledge Management Research & Practice,* 10(2), pp. 141-152.

GILL, J. and JOHNSON, P., 2010. *Research methods for managers.* 4th edn. London: SAGE.

GOLDRATT INSTITUTE, 2009. *The Theory of Constraints and Thinking Processes.* New Haven: AGI Goldratt Institute.

GOLDRATT, E., 1997. *Critical Chain.* Great Barrington: The North River Press.

GOLDRATT, E., 1991. *La meta: un proceso de mejora continua.* Mexico DF: Ediciones Castillo.

GONZÁLEZ, O., 2011-last update, Pymes generan 72% del empleo en México. Available: http://www.eluniversal.com.mx/articulos/64360.html [Day, 2012].

GREGORY, W.J. and ROMM, N., 2001. Learning through Intervention in Group Process. *Management Learning,* 32(4), pp. 453-467.

GREGORY, A.J., 2012. The challege of complexity, *Systems Methodology* 2012, pp. 1-71.

GREGORY, A.J., 2007. Target setting, lean systems and viable systems: a systems perspective on control and performance measurement. *Journal of the Operational Research Society,* 58, pp. 1503-1517.

GUIZAR, O., 1998. The Kuantum Business Process Followthru, *Kuantum Strategic Management*, May 8th 1998 1998, pp. 1-13.

GUZMAN, V.R., 2012. *Modelo Alinea: Modelo de Servicio.* Leon: FOCO.

HARWOOD, S., 2011. The management of change and the Viplan Methodology in practice. *Journal of the Operational Research Society,* 63(6), pp. 748-761.

HARWOOD, S.A., 2011. Can a cybernetic lens contribute to the business strategy domain? *Kybernetes,* 40(3-4), pp. 507-527.

HAYNES, M. and STEWART, N.D., 1993. *A Workshop Methodology Based on the Viable System Model of Stafford Beer.*

HAZY, J.K., More than a Metaphor: Complexity and the New Rules of Management. *The SAGE Handbook of Complexity and Management.* London: SAGE.

HEELAN, P.A. and SCHULKIN, J., 1998. Hermeneutical Philosophy and Pragmatism: A Philosophy of Science. *Synthese,* 115(3), pp. 269-302.

HERRMANN, C., BERGMANN, L., HALUBEK, P. and THIEDE, S., 2008. *Lean production system design from the perspective of the Viable System Model.*

HERRSCHER, E., 2006. *Pensamiento sistemico.* Buenos Aires: Ediciones Granica.

HIDALGO, C.A., 2011. The Value in Between: Organizations as Adapting and Evolving Networks. *The SAGE Handbook of Complexity and Management.* London: SAGE.

HILDBRAND, S. and BODHANYA, S., 2011. *The Viable System Model (VSM) and Qualitative Studies: A Research Perspective to Manage in a World of Complexity.*

HILLER, J.S., 2013. The benefit corporation and corporate social responsibility. *Journal of Business Ethics,* 118(2), pp. 287-301.

HODGSON, G.M., 2011. Complexity, Habits and Evolution. *The SAGE Handbook of Complexity and Management.* London: SAGE.

HOLDEN, M. and LYNCH, P., 2004. Choosing the appropriate Methodology: understanding research philosophy. *The marketing review,* (4), pp. 307-409.

HOLMBERG, S.C., 2001. Taking Syntegrity-4 from assumption mode to reflection mode. *Systems Research and Behavioral Science,* 18(2), pp. 127-135.

HOVERSTADT, P., 2008. *The Fractal Organization: Creating Sustainable Organizations with the Viable System Model.* Chichester: John Wiley & Sons, Ltd.

HOWELL, E., January 19th 2015, 2015-last update, How long have humans been on earth? Available: http://www.universetoday.com/38125/how-long-have-humans-been-on-earth/ [April 24th 2016, 2016].

IBEH, K. and KASEM, L., 2011. The network perspective and the internationalization of small and medium sized software firms from Syria. *Industrial Marketing Management,* 40(3), pp. 358-367.

INADEM, 2015, 2015-last update, Direcciones INADEM [Homepage of INADEM], [Online]. Available: https://www.inadem.gob.mx/index.php/coordinacion-general-de-planeacion-estrategica-evaluacion-y-seguimiento [04/25, 2016].

INDA, A., 2000. *El mapa.* Mexico DF: Organización de los Estados Americanos.

INEGI, 2015. *Esperanza de vida en los negocios* Boletín de prensa Núm. 087/15. Aguascalientes, México: INEGI.

INEGI, 2011. *2009 Economic Census: Micro, Small, Medium, Large, stratification of establishments.* 330.972. Mexico city: National Institute of Statistic and Geography (Mexico).

ING, D., 2012. Reorient systems thinking beyond "parts and wholes" towards "learning and coevolving", *Rethinking Systems Thinking: Learning and Co-Evolving with the World*, Nov 2012 2012.

ISON, R.L., MAITENY, P.T. and CARR, S., 1997. Systems methodologies for sustainable natural resources research and development. *Agricultural Systems,* 55(2), pp. 257-272.

IT GOVERNANCE INSTITUTE, 2007. *Control Objectives for Information and related Technology.* V 4.1 edn. Rolling Meadows: IT Governance Institute.

JACKSON, M., 2004. *Systems thinking: creative holism for managers (ebook-Dawsonera).* Sussex: John Wiley & Sons Ltd.

JACKSON, M., 2003. *Systems Thinking: Creative Holism for Managers.* West Sussex: John Wiley & Sons, Ltd.

JACKSON, M., 2000. *Systems approaches to management.* New York: Kluwer Academic / Plenum.

JACKSON, M., *Systems Thinking Creative Holism for Managers.* West Sussex: John Wiley & Sons, Ltd.

JACKSON, T., 1995. European management learning: A cross-cultural interpretation of Kölb's learning cycle. *The Journal of Management Development,* 14(6), pp. 42.

JACKSON, M.C., 1992. The Soul of the Viable System Model. *Systems Practice,* 5(5), pp. 561-564.

JACKSON, M.C., 1988. Systems methodologies as complementary tools for managing situational complexity. *Transactions of the Institute of Measurement and Control,* 10(3), pp. 155-159.

JACKSON, T., 1995. European management learning: A cross-cultural interpretation of Kolb's learning cycle. *Journal of Mgmt Development,* 14(6), pp. 42-50.

JAQUES, E., , In Praise of Hierarchy. Available: https://hbr.org/1990/01/in-praise-of-hierarchy [05/27, 2015].

JOHNSON, R.B. and ONWUEGBUZIE, A.J., 2004. Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher,* 33(7), pp. 14-26.

JORGE MIGUEL, C.R., 2007. An ex-post comparative analysis of SME formation in Brazil and Mexico: Towards a research agenda. *Int Journal of Emerging Mkts,* 2(2), pp. 144-165.

KAPLAN, R.S. and NORTON, D.P., 1997. *Cuadro de mando integral.* Barcelona: Ediciones Gestion.

KAPLAN, R.S. and NORTON, D.P., 2001. *The Strategy Focused Organisation: How Balanced Scorecard Companies thrive in the New Business Environment.* Boston: Harvard Business School Press.

KERR, S., ULRICH, D. and ASHKENAS, R., 2002. *The GE Work-Out.* New York: McGraw-Hill.

KEYS, P. and MIDGLEY, G., 2002. The Process of OR, Part Special Issue Editorial. *Journal of the Operational Research Society,* 53, pp. 123-125.

KIM, W.C. and MAUBORGNE, R., 2005. *Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant.* Boston: Harvard Business Scholl Press.

KINDON, S., PAIN, R. and KESBY, M., 2007b. *Participatory Action Research Approaches and Methods: connecting people, participation and place.* London: Routledge.

KÖLB, D.A., 1984. *Experiential Learning: Experience as the Source of Learning and Development.* Englewood Cliffs, New Jersey: Prentice Hall, Inc.

KOTTER, J.P., 2012. *Leading Change.* Cambridge, USA: Harvard Business Review Press.

KOTTER, J.P. and HESKETT, J.L., 1992. *Corporate Culture and Performance.* New York: The Free Press.

KUZNETSOV, Y. and DAHLMAN, C., 2008. *Mexico´s transition to a knowledge based economy: challenges and opportunitites.* Washington DC: The World Bank Institute.

LEONARD, A., 1992. A Viable System: An introduction. *Transactions of the Institute of Measurement and Control,* 14(1), pp. 4-8.

LEONARD, A., 2009. The Viable System Model and Its Application to Complex Organizations. *Systemic Practice and Action Research,* 22(4), pp. 223-233.

LEWIN, K., 1946. Action Research and Minority Problems. *Journal of Social Issues,* 2(4), pp. 34-46.

LEWIS, V.L. and CHURCHILL, N.C., 1983. The Five Stages of Small Business Growth. *Harvard Business Review,* 61(3), pp. 30-50.

LI, S.K. and JONES, G., 2010. A Study of the Effect of Functional Subcultures on the Performance of Hong Kong Construction Companies. *Systemic Practice and Action Research,* 23(6), pp. 509-528.

LIKER, J.K., 2004. *The Toyota way.* New York: Mc Graw Hill.

LIPI, R., 2013. The Growth Performance of Small Business under the view of Life-cycle Model . *Management Research and Practice,* 5(4), pp. 58-67.

LIVAS, J., 2011. *The intelligent Organisation (Part I).* Javier Livas edn. Monterrey, México: https://www.youtube.com/watch?v=7COX-b3HK50.

LÖFSTEDT, U., 2001. Competence development and learning organizations: a critical analysis of practical guidelines and methods. *Systems Research and Behavioral Science,* 18(2), pp. 115-125.

LOZANO, J., 2012. *Toyota Production System.* Workshop edn. Leon.

LUHMAN, J. and CUNLIFFE, A., 2013. Complexity Science. In: J. LEHMAN and A. CUNLIFFE, eds, *Key Concepts in Organization Theory.* London: SAGE Publications Ltd, pp. 25-27.

MACLEAN, D. and MACINTOSH, R., 2011. Organizing at the Edge of Chaos: insights from Action Research. *The Sage handbook of complexity and management.* London: SAGE.

MAGUIRE, S., ALLEN, P. and MCKELVEY, B., 2011. *The Sage handbook of complexity and management.* London: SAGE.

MARCH, J.G. and OLSEN, J.P., 1975. The uncertainty of the past: Organisational Learning under Ambiguity. *European Journal of Political Research,* 3(2), pp. 147-171.

MASCORRO, J., 1995. *The principles of being.* León, México.

MASON, R. and MITROFF, I., 1981. *Challenging Strategic Planning Assumptions: Tehory, Cases and Techniques.* New York: John Wiley & Sons.

MATHEWS, K.M., WHITE, M.C. and LONG, R.G., 1999. Why Study the Complexity Sciences in the Social Sciences? *Human Relations,* 52(4), pp. 439-462.

MATTSSON, L.G., 1987. Management of Strategic Change in a 'Markets-as-Networks' Perspective. *The Management of Strategic Change.* Oxford: Basil Blackwell.

MATURANA, H. and VARELA, F., 1992. *The tree of knowledge.* Third edn. Boston: Shambhala.

MCDEVITT, L.G., CARRIE, A.S. and BITITCI, U.S., 1997. *Viable performance measurement systems.*

MERALI, Y. and ALLEN, P., 2011. Complexity and Systems Thinking. *Tha SAGE Handbook of Complexity and Management.* London: SAGE.

MIDGLEY, G., 2015. *Distinction between Methodology for the research and Methodology for the Intervention.* Hull, UK.

MIDGLEY, G., 2011. Theoretical Pluralism in Systemic Action Research. *Syst. Pract. Action res,* 24, pp. 1-15.

MIDGLEY, G., 2000. *Systemic Intervention: Philosophy, Methodology, and Practice.* New York: Kluwer Academic / Plenum Publishers.

MIDGLEY, G., 1990. Creative methodology design. *Systemist,* (12), pp. 108-113.

MIDGLEY, G. and ET AL., 2013. *Towards a new framework for evaluating systemic problem structuring methods.* Journal article edn. European Journal of Operational Research.

MINGERS, J., 2006. *Realising Systems Thinking: Knowledge and Action in Management Science.* New York: Springer.

MINGERS, J. and GILL, A., 1997. *Multimethodology: The Theory and Practice of Combining Management Science Methodologies.* Chichester: John Wiley & Sons Ltd.

MINGERS, J., 2005. 'More Dangerous Than an Unanswered Question Is an Unquestioned Answer': A Contribution to the Ulrich Debate. *The Journal of the Operational Research Society,* 56(4), pp. 468-474.

MINGERS, J., 2001. Combining IS Research Methods: Towards a Pluralist Methodology. *Information Systems Research,* 12(3), pp. 240-259.

MINGERS, J., 2000. Variety is the spice of life: combining soft and hard OR/MS methods. *International Transactions in Operational Research,* 7(6), pp. 673.

MINGERS, J. and BROCKLESBY, J., 1997. Multimethodology: Towards a framework for mixing methodologies. *Omega,* 25(5), pp. 489-509.

MINISTRY OF THE INTERIOR, 2009. *Mexican Official Journal of the Federation (June 30 2009).* Organ of the Constitutional Government of the Mexican United States edn. Mexico city: National.

MITLETON-KELLY, E. and RAMALINGAM, B., 2011. Organisational Learning and Complexity Science: Exploring the Join Potential. *The SAGE Handbook of Complexity and Management.* London: SAGE.

MORALES, I., 2011. Las Pymes en México, entre la creación fallida y la destrucción creadora. *Economía Informa,* 366, pp. 39-48.

MUNRO, I. and MINGERS, J., 2002. The Use of Multimethodology in Practice-Results of a Survey of Practitioners. *The Journal of the Operational Research Society,* 53(4), pp. 369-378.

NAUGHTON, J., 1977. *The Checkland Methodology: a Reader's Guide.* 2nd edn. Open University Systems Group.

NEW OXFORD AMERICAN DICTIONARY, A Dictionary of Business and Management: Process [Homepage of Oxford University Press], [Online]. Available: http://www.oxfordreference.com/view/10.1093/acref/9780199684984.001.0001/acref-9780199684984-e-5029?rskey=1pJ6As&result=4 [2013, 2103].

NEWTON, P., 2015. *Managing Project Scope.* www.free-management-ebooks.com.

NONAKA, I. and TAKEUCHI, H., 1995. *The knowledge-creating company: how Japanese companies create the dynamics of innovation.* New York: Oxford University Press.

NORMANN, R. and RAMIREZ, R., 1993. From Value Chain to Value Constellation: Designing Interactive Strategy. *Harvard Business Review,* 71(4).

OECD, 2014. *Financing SMEs and Entrepreneurs 2014.* Organisation for Economic Co-operation and Development.

OECD, 2013. *Mexico: Key Issues and Policies.* Organisation for Economic Co-operation and Development.

OECD, 2012. *Latin American Economic Outlook 2013.* Organisation for Economic Co-operation and Development.

OECD, 2010. *SMEs, Entrepreneurship and Innovation.* Organisation for Economic Co-operation and Development.

OECD, 2009. *Top Barriers and Drivers to SME Internationalisation.* Organization for Economic Co-operation and Development.

OECD, 2008. *Removing Barriers to SME Access to International Markets.* Organisation for Economic Co-operation and Development.

OECD, 2007b. *SMEs in México, Issues and Policies.* Organization for Economic Co-operation and Development.

OECD, 2007a. *Getting it Right: OECD Perspectives on Policy Challenges in Mexico.* Organisation for Economic Co-operation and Development.

OECD, 2005. *OECD SME and Entrepreneurship Outlook 2005.* Organisation for Economic Co-operation and Development.

OFFICE OF GOVERNMENT COMMERCE, 2011. *Information Technology Infrastructure Library.* Office of Government Commerce.

OFICINA DEL PREMIO NACIONAL DE CALIDAD, 2010. *Modelo Nacional para la Competitividad, Micro y Pequeñas Empresas.* Ciudad de México: Secretaria de Economía.

OFICINA DEL PREMIO NACIONAL DE CALIDAD, 2008. *Modelo Nacional para la Competitividad, Medianas y Grandes Empresas.* Ciudad de México: Secretaria de Economía.

OLIGA, J., 1988. Methodological Foundations of Systems Methodologies. *Systems Practice,* 1(1), pp. 87-112.

ORMEROD, R.J., 1997. The design of organisational intervention: Choosing the approach. *Omega,* 25(4), pp. 415-435.

OSENSEIS, Absolut zero. Available: http://www.osenseis.com/cero-absoluto-absolute-zero/ [November 04, 2016].

OSTERWALDER, A., 2004. *The Business Model Ontology: a proposition in a Design Science Approach*, Universite de Lausanne.

OSTERWALDER, A. and PIGNEUR, Y., 2009. *Business Model Generation.* Amsterdam: Alexander Osterwalder and Yves Pigneur.

OVIATT, B.M. and MCDOUGALL, P.P., 2005. Defining International Entrepreneurship and Modeling the Speed of Internationalization. *Entrepreneurship Theory and Practice,* 29(5), pp. 537-554.

OXFORD DICTIONARIES, February 2nd, 2015-last update. Available: http://www.oxforddictionaries.com/definition/english/ [January 27th, 2015].

PADAKI, V., 2000. Coming to grips with organisational values. *Development in Practice,* 10(3&4), pp. 420-435.

PADILLA, G., 2014. *Cash Flow Management.* Leon, Mexico.

PAIN, R., KINDON, S. AND KESBY, M., 2007a. Participatory Action Research: Making a Difference to Theory, Practice and Action. *Participatory Action Research Approaches and Methods.* London: Taylor & Francis Ltd.

PALACIOS, R., 1998. *A systemic approach to understanding SME development: applying TSI in the Mexican context*, University of Lincolnshire and Humberside.

PARETO, V., March 11st 2015, 2015-last update, Principio de Pareto [Homepage of Wikipedia.org], [Online]. Available: http://es.wikipedia.org/wiki/Principio_de_Pareto [March 15th, 2015, 2015].

PASS, C., LOWES, B. and DAVIES, L., 2000. *Dictionary of economics.* 3rd edn. London: Collins.

PAUCAR-CACERES, A., 1999. *Measures of performance: The three Es' of soft systems methodology and the indices of performance of the viable system model.* .

PAUCAR-CACERES, A., 2009. Measuring the Performance of a Research Strategic Plan System Using the Soft Systems Methodology's Three 'Es' and the Viable System Model's Indices of Achievement. *Systemic Practice and Action Research,* 22(6), pp. 445-462.

PERENEYI, A., SELVARAJAH, C. and MUTHALY, S., 2011. Investigating the firm life-cycle theory on Australia SMEs in the ICT Sector. *Journal of Asia Entrepreneurship and Sustainability,* 7(2), pp. 13-41.

PEREZ-RÍOS, J., 2012. *Design and Diagnosis for Sustainable Organisations: The Viable System Method.* Heidelberg: Springer.

PERSOON, T.J., ZALESKI, S. and FRERICHS, J., 2006. Improving Preanalitic Processes Using the Principles of Lean Production (Toyota Production System). *Clinical Chemistry,* 125, pp. 16-25.

PETKOV, D., PETKOVA, O., ANDREW, T. and NEPAL, T., 2008. On the process of combining soft systems methodologies and other approaches in systemic interventions. *Journal of Organisational Transformation & Social Change,* 5(3), pp. 291-303.

PETTIGREW, A. M., WHIPP, R. and ROSENFELD, R., 1987. Understanding Strategic Change Processes: Some Preliminary British Findings. *The Management of Strategic Change.* Oxford: Basil Blackwell.

PETTIGREW, A.M. and WHIPP, R., 1991. *Managing Change for Competitive Success.* Oxford: Blackwell Publishers Ltd.

PHILLIBER, S., SCHWAB, M., SAMSLOSS, G., 1980. *Social research: Guides to a decision-making process.* Itasca, IL: Peacock.

PHILLIPS, E. and PUGH, D., 2010. 8 The PhD process. *How to get a PhD: a handbook for students and their supervisors.* Fifth edn. Berkshire: McGraw Hill Open University Press.

PICKERING, A., 2002. Cybernetics and the Mangle. *Social Studies of Science,* 32(2), pp. 413-437.

PITTAWAY, L., ROBERTSON, M., MUNIR, K., DENYER, D. and NEELY, A., 2004. Networking and innovation: a systematic review of the evidence. *International Journal of Management Reviews,* 5-6(3-4), pp. 137-168.

PORTER, M.E., 2004. *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* New York: Free Press.

PROJECT MANAGEMENT INSTITUTE, 2000. *A guide to the Project Management Body of Knowledge.* 2000 Edition edn. Pennsylvania, USA: Project Management Institute.

PROMEXICO (MINISTRY OF ECONOMY), 2013-last update, PYMES, eslabón fundamental para el crecimiento en México. Available: www.promexico.gob.mx/negocios-internacionales/pymes-eslabon-fundamental-para-el-crecimiento-en-mexico.html [April 2nd 2013, 2013].

RAMAGE, M. and SHIPP, K., 2009. *Systems Thinkers.* London: Springer.

READ, M., GEAR, T. and VINCE, R., 2012. Group inquiry to aid organisational learning in enterprises. *Journal of the Operational Research Society,* 63, pp. 736-747.

REASON, P. and BRADBURY, H., 2006. *Handbook of Action Research.* London: SAGE.

REED, M.I., 1985. *Redirections in Organisational Analysis.* London: Tavistock.

REEDY, P., 2012. An Introduction to Ethics, *Philosophical issues in research*, November 2012.

REVANS, R., 1998. *ABC of Action Learning.* London: Lemos & Crane.

REYNOLDS, M. and HOLWELL, S., 2010. *Systems Approaches to Managing Change: A Practical Guide.* London: Springer.

REYNOLDS, M. and VINCE, R., 2004. Critical Management Education and Action-Based Learning: Synergies and Contradictions. *Academy of Management Learning & Education,* 3(4), pp. 442-456.

RICHARDSON, K.A., GREGORY, W.J. and MIDGLEY, G., 2007. Editorial introduction to the special double issue on Complexity Thinking and Systems Theory. *E:CO,* 9(1-2), pp. vi-viii.

RIDDERSTRALE, J. and NORDSTROM, K., 2000. *Funky Business.* Madrid: Prentice Hall.

ROSENKRANZ, C. and HOLTEN, R., 2011. The variety engineering method: analyzing and designing information flows in organizations. *Information Systems and E-Business Management,* 9(1), pp. 11-49.

RUELAS-GOSSI, A., 2009. Estrategia 2.0 - Orquestación. Expansión del valor 360 grados. *Harvard Business Review*, pp. 24-27.

RUELAS-GOSSI, A. and SULL, D., 2010. Strategic Orchestration. *Business Strategy Review,* (4), pp. 58-64.

RUELAS-GOSSI, A. and SULL, D., 2006. Orquestación estratégica. La clave para la agilidad en el escenario global. *Harvard Business Review*, pp. 42-52.

SAUNDERS, M., LEWIS, P. and THORNHILL, A., 2003. *Research Methods for business students.* 3rd edn. Essex: Pearson Education Limited.

SCHEIN, E., 2010. *Organizational Culture and Leadership.* 4th ed. edn. US: Jossey Bass Ltd.

SCHEIN, E., 1990. Organizational culture. *American Psychologist,* 45(2), pp. 109-119.

SCHENDEL, D. and HOFER, C.W., 1979. *Strategic Management: a new view of business policy and planning.* Boston: Little, Brown and Company.

SCHÖN, D., 1991. *The reflective practitioner: how professionals think in action.* London: Basic Books.

SCHWANINGER, M., 2006b. Design for viable organizations: The diagnostic power of the viable system model. *Kybernetes,* 35(7/8), pp. 955-966.

SCHWANINGER, M., 2006a. *Intelligent Organizations: Powerful Models for Systemic Management.* Berlin: Springer.

SCHWANINGER, M., 2006c. Theories of viability: a comparison. *Systems Research and Behavioral Science,* 23(3), pp. 337-347.

SCHWANINGER, M., 2004. What can cybernetics contribute to the conscious evolution of organizations and society? *Systems Research and Behavioral Science,* 21(5), pp. 515-527.

SCHWANINGER, M., 2000. Managing complexity - The path toward intelligent organizations. *Systemic Practice and Action Research,* 13(2), pp. 207-241.

SENGE, P.M., 2006. *The fifth discipline: the Art and Practice of The Learning Organisation.* 2nd edn. London: Random House.

SENIK, Z.C., SCOTT-LADD, B., ENTREKIN, L. and ADHAM, K.A., 2011. Networking and internationalization of SMEs in emerging economies. *Journal of International Entrepreneurship,* 9(4), pp. 259-281.

SHAW, D.R., SNOWDON, B., HOLLAND, C.P., KAWALEK, P. and WARBOYS, B., 2004. The viable systems model applied to a smart network: the case of the UK electricity market. *Journal of Information Technology,* 19(4), pp. 270-280.

SKYRME, D., 1997. Multimethodologies - The Knowledge Perspective. In: J. MINGERS and A. GILL, eds, *Multimethodology: The Theory and Practice of Combining Management Science Methodologies.* Chichester: John Wiley & Sons Ltd, pp. 217-248.

SUTTON, D.C., 1991. The Viable System Model - Interpretations and Applications of Beer, Stafford VSM - Espejo,R, Harnden,R. *R & D Management,* 21(4), pp. 339-341.

SUTTON, R.I. and STAW, B.M., 1995. What Theory is Not. *Administrative Science Quarterly,* 40(3), pp. 371-384.

TEJEIDA-PADILLA, R., BADILLO-PINA, I. and MORALES-MATAMOROS, O., 2010. A Systems Science Approach to Enterprise Resources Planning Systems. *Systems Research and Behavioral Science,* 27(1), pp. 87-95.

THE HULL UNIVERSITY BUSINESS SCHOOL, 2005. *Ethical procedures for research and teaching.* Hull: Research Ethics Committee.

THURSFIELD, D., 2012. Key concepts, *Philosophical issues in Business and Management*, November 2012, pp. 1-10.

TROCHIM, W.M.K., 1989. Outcome pattern matching and program theory. *Evaluation and program planning,* 12(4), pp. 355-366.

TSUCHIYA, Y., 2007. Autopoietic viable system model. *Systems Research and Behavioral Science,* 24(3), pp. 333-346.

ULRICH, W., 2006-last update, A brief introduction to Critical Systems Heuristics (CSH). Available: http://www.ecosensus.info/about/index/html [April 2014, 2014].

ULRICH, W., 1996. *A Primer to Critical Systems Heuristics for Action Researchers.* Hull, UK: University of Hull, Centre for Systems Studies.

ULRICH, W., 1983. *Critical Heuristics of Social Planning: A New Approach to Practical Philosophy.* Chichester: John Wiley & Sons.

VINCE, R., 1998. Behind and Beyond Kölb's Learning Cycle. *Journal of Management Education,* 22(3), pp. 304-319.

WARREN, L., 2004. A systemic approach to entrepreneurial learning: an exploration using storytelling. *Systems Research and Behavioral Science,* 21(1), pp. 3-16.

WATTS, M., 2009. Collaborative Implementation Network Structures: Cultural Tourism Implementation in an English Seaside Context. *Systemic Practice and Action Research,* 22(4), pp. 293-311.

WEST, D., STANSFIELD, M.H., 2001. Structuring Action and Reflection in Information Systems Action Research Studies Using Checkland's FMA Model. *Systemic Practice and Action Research*, 14(3), pp. 251-281

WHYTE, W.F., 1991. *Participatory Action Research.* Newbury Park: SAGE Publications, Inc.

WIENER, N., 1948. *Cybernetics, or control and communication in the animal and the machine.* New York: Wiley;1948.

WILBER, K., 2000. *A theory of everything.* Boston: Shambhala Publications.

WILBY, J., 2015. *Distinction between Methodology for the research and Methodology for the Intervention.* Hull, UK.

WILLIAMSON, O.E., 1975. *Markets and hierarchies: analysis and antitrust implications.* New York: Free Press.

YIN, R.K., 2014. *Case Study Research: Design and Methods.* Fifth edn. Thousand Oaks, California: SAGE Publications, Inc.

YIN, R.K., 2009. *Case Study Research: design and methods.* Fourth edn. London: SAGE.

YIN, R.K., 2013. *Case study research: design and methods.* 5th edn. London; Los Ángeles, California: Sage.

ZHAO, G.J., YU, X.S. and CHANG, D.P., 2005. *An attempt to build an organizational structure based on "viable system model".*

ZHONG QIU-YAN, QU GANG and BAO XIAO-NA, 2006. *Application of managerial cybernetics in interorganizational coordination in condition of environmental uncertainty: An empirical study.*

ZHU, Z., 2000. Dealing with a Differentiated Whole: The Philosophy of the WSR Approach. *Systemic Practice and Action Research,* 13(1), pp. 21-57.