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Design of a Sustainable Competitiveness Evaluation and Execution System (SuCEES)

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Resumo

"Ser competitivo" é o principal motivo pela qual as empresas melhoram continuamente o seu desempenho e inovam os seus processos, produtos e serviços. As últimas décadas revelam um aumento do número de empresas expostas a situações de falência e insolvência, independentemente da sua dimensão, sector ou presença no mercado. Na verdade, este é um fenômeno, que tem vindo a ser uma preocupação comungada pelas empresas, sejam grandes ou *start-ups*. Entende-se que para sobreviver e ter sucesso, os líderes empresariais devem estar cientes das tendências do mercado para poderem projetar ambientes de competitividade futuros e antecipar práticas para responder aos desafios diários. Neste contexto, a diferença entre estratégias bem-sucedidas ou falhadas reside na capacidade de visão do futuro e do conhecimento acerca do desempenho real da empresa e de sua força competitiva no presente. Com este intuito, modelos de avaliação empresarial e abordagens de planeamento estratégico devem ser utilizados de forma sistemática e integrada, incorporando dados fiáveis e indicadores apropriados, para definir estratégias, objetivos e metas adequados e oportunos. No entanto, isto não é suficiente, um dos principais modos de falha do planeamento estratégico é a incapacidade das empresas em implementar as ações necessárias para atingir esses objetivos, fato conhecido por "*execution gap*". O objetivo desta investigação é contribuir para a melhoria do processo de planeamento estratégico das empresas e, consequentemente, potenciar o aumento da sua competitividade e a redução da sua exposição a situações de falência. Com esta finalidade, desenvolveu-se a abordagem SuCEES (*Sustainable Competitiveness Evaluation and Execution System*) que é um sistema integrado assente em uma definição alternativa de competitividade sustentável, baseada nos conceitos de resiliência, inovação e sustentabilidade. Composta por uma componente de avaliação e outra de execução: i) permite medir o posicionamento competitivo das empresas, sua vantagem competitiva e o risco de perda dessa competitividade, via pontuação de sete critérios de competitividade, e; ii) apoia na definição dos objetivos estratégicos, na sua transposição para metas e ações operacionais necessárias, bem como na obtenção de resultados, por meio de ferramentas de monitorização e controlo. SuCEES foi validado pela participação de um grupo de peritos e através de dois estudos de caso, realizados nas empresas Electrolux Polónia e Visteon Portugal.

Keywords: Planeamento estratégico, competitividade sustentável, resiliência, inovação, monitorização da performance, Balanced Scorecard, EFQM, Shingo.

Abstract

To be competitive is the major reason why companies continuously improve their performance and innovate their processes, products and services. The recent decades revealed an increase number of companies that felt into bankruptcy, independently of their size, sector or market status. In fact, this is a phenomenon, which have been a concern among big companies and even start-ups. It is understood that to survive and to succeed, business leaders need to be aware about trends to be able to visioning future competitiveness environments, and to anticipate actions to respond to each daily challenges. In this context, the difference between successful or failed strategies lies on knowing, not only the trends, but also the actual performance of the company and its competitive strength. To do so, strategic planning and evaluation frameworks and models should be used in a systematic and integrated way, based on reliable data and appropriate indicators, to define suitable and timeless strategies, objectives and goals. However, this is not enough, one of the major failure modes of strategic planning is companies' inability to implement proper actions to achieve those goals, fact known as the "execution gap". The aim of this research is to contribute to the improvement of companies' strategic planning process and, consequently, to boost their competitiveness and to reduce their exposure to bankruptcy. With this purpose, SuCEES (Sustainable Competitiveness Evaluation and Execution System) was designed, which is an integrated system founded on an alternative definition of sustainable competitiveness based on resilience, innovation and sustainability concepts. Composed by evaluation and execution frameworks it: i) allows the measurement of companies' competitiveness positioning, competitive advantage and competitiveness risk, by scoring seven competitiveness drivers, and; ii) supports the definition of companies' strategic objectives, their translation into operational targets and actions needed, as well as the achievement of results, through monitoring and control tools. SuCEES was validated by the participation of a pool of experts and through two case studies, conducted in companies Electrolux Poland and Visteon Portugal.

Keywords: Strategic planning, sustainable competitiveness, resilience, innovation, performance measurement, Balanced Scorecard, EFQM, Shingo.

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List of Abbreviations and Symbols

ANSI - American National Standards Institute

APICS - American Production and Inventory Control Society

APICS SCC - American Production and Inventory Control Society – Supply Chain Council

AS – Social Accountability

BCG – Boston Consulting Group

BMG - Business Model Generation

BSC – Balanced Score Card

BPR – Business Process Reengineering

BSI - British Standards Institution

CA – Competitive Advantage

CARG - Compound Annual Growth Rate

CCOR - Customer Chain Operations Reference

CIPD - Chartered Institute of Personnel and Development

CP – Competitiveness Positioning

CPI – Common Performance Indicator

CPM – Competitiveness Positioning Matrix

CR – Competitiveness Risk

DEA - Data Envelopment Analysis

DCOR - Design Chain Operations Reference

DJSI – Dow Jones Sustainability Index

EFQM – European Foundation for Quality Management

EIP - Embedded Innovation Paradigm

EMAS - EU Eco-Management and Audit Scheme

ERP - Enterprise Resource Planning

FGI – Finished Goods Inventory

GRI – Global Reporting Initiative

HERO - HEalthy and Resilient Organization

HRO's - High Reliability Organizations

KPI – Key Performance Indicators

ICT – Information and Communications Technology

IoT - Internet of things

IPE - International Position Evaluation System (from Mercer)

ISO –International Organization for Standardization

IT - Information Technology

ITIL -- Information Technology Infrastructure Library

ITSM - IT Service Management

LARG – Lean, Agile, Resilient and Green

NOC - Network Operations Center

OECD - Organization for Economic Co-operation and Development

OGC - Office for Government Commerce

OHSAS - Occupational Health and Safety Assessment Services

PDCA – Plan, Do, Check and Act

PESTLE - Political, Economic, Social, Technological, Legal and Environmental

PFG – Potentialities, Fragilities and Goals

PLC - Product Life Cycle

PLCOR - Product Lifecycle Operations Reference

PMI – Project Management Institute

PMM - Performance Measurement and Management

RACI - R = Responsible; A = Accountable; C = Consulted; I = Informed

RCS – Real Competitiveness Strength

R&D - Research and development

SC – Sustainable Competitiveness

SCC - Supply Chain Council

SCM – Sustainable Competitiveness Model

$SCM_{(2)}$ – Supply Chain Management

SCOR – Supply Chain Operations Reference

SDDP - Strategy Development and Deployment Process

SIP - Structural Innovation Paradigm

SIPOC - Suppliers, Input, Process, Output, Customers'

SLA - Service Level Agreements

SPM - Strategy Performance Management

SRI - Stanford Research Institute

SuCEES – Sustainable Competitiveness Evaluation and Execution System

SWOT – Strengths, Weaknesses, Opportunities and Threats

S&P - Standard & Poor's

TBL – Triple Bottom Line

TIM – Total Innovation Management

TPS - Toyota Production System

TQM – Total Quality Management

TRIZ – Theory of Inventive Problem Solving

WIP – Work in Progress

5 S – Sort, Straighten, Shine, Standardize and Sustain

7 S - Strategy, Structure, Systems, Shared Values, Style, Staff and Skills

1 Introduction

This chapter has the purpose to introduce the research's aim, objectives and scope, as well as its motivation; how the document is structured, underlining the thesis's most relevant aspects; and also to share the main conclusions of this research.

1.1 Research Context

Nowadays companies are more exposed to market changes and more vulnerable to customers' demand and competitors' aggressiveness. This fact increases companies' pressure to survive and to avoid bankruptcy or insolvency. According to Kim Gittleson (2012) *"The average lifespan of a company listed in the S&P 500 index of leading US companies has decreased by more than 50 years in the last century, from 67 years in the 1920s to just 15 years today, according to Professor Richard Foster from Yale University, by 2020, more than three-quarters of the S&P 500 will be companies that we have not heard of yet.* Also Fortune 500 has a similar view about this issue, Mark J. Perry (2014) said that *"almost 88% of the companies from 1955 till 2014 have either gone bankrupt, merged, or still exist but have fallen from the top Fortune 500 companies."* Considering Jim Collins (2009) *"Every institution, no matter how great, is vulnerable to decline. There is no law of nature that the most powerful will inevitably remain at the top. Anyone can fall and most eventually do"*.

Indeed there are a relevant number of cases that are evidences of this reality, namely big companies from different economic sectors that never imagine could fall into bankruptcy, like WorldCom (2001), Enron (2001), Arthur Andersen (2002), Parmalat (2003), Refco (2005), Delta Air Lines (2005), Lehman Brothers (2008), General Motors (2009), Blockbuster (2010), Kodak (2012), among others.

Although, small businesses and start-ups have high failure rates as well. According to the American Small Business Administration "*50% of businesses fail during the first year in business and just 66% of small businesses will survive their first 2 years"*. Taking into account U.S. Bureau of Labor Statistics just *"about 50% of all new businesses survive 5 years or more, and about one-third survive 10-years or more"*, and according to Bloomberg cited by Eric T. Wagner (2013), *"8 out of 10 entrepreneurs who start businesses fail within the first 18 months"*.

It seems obvious that even if a business is doing well on most levels, one major problem can lead to its decline. Or a combination of multiple minor problems can end up being too much for a business to handle. On other hand, startup companies have also low rates of success. It is difficult to be one of the few that survives; it takes capable leadership, adequate financing, well-defined goals, effective business practices, and more than a little bit of luck. Actually, management, marketing, or financial reasons are the main causes of companies' failure, but additional elements also intervene, such as: external business environment, which includes competition increase, insurance and general costs of doing business; Financing: like loss of capital, inability to protected new capital and high debt; internal business conditions: regarding management mistakes, location, loss of clients and trade credit problems; Tax: which includes problems with the tax administration; Disputes with a particular creditor: concerning foreclosures, lawsuits, and contract disputes; Personal: taking into account illness and divorce; Calamities: like fraud, theft, natural disasters, and accidents, and; Other aspects related to buying time and involuntary bankruptcy filings (Levratto, 2013). Failure is in fact at everyone's door waiting for the right moment to come. Even start-up companies have high rates of failure, due to absence of a deep dialogue with customers, no real differentiation in the market; inability to clearly present their value propositions; lack of leadership skills; inability to define a profitable business model with proven revenue streams (Eric T. Wagner, 2013).

Since this issue still a real transversal problem that affects any company, independently of its size or economic sector, it is considered an interesting field of research that inspired the aim and objectives of this dissertation, regarding that companies should be aware about potential market disturbances and be able to take actions to eliminate or reduce the causes of bankruptcy or competitiveness loss.

Taking into account this research field, it is relevant to be aware that organizational resilience may be a powerful way to develop competences and practices to overcome disturbances within turbulent and instable environments, through the ability to manage risks and be prepared for future uncertainty (Burnard & Bhamra, 2011). Additionally, companies are currently trying to ensure their competitiveness through innovation. However, to be capable to conduct effective work and capture real value with innovation, an appropriate an implementable innovation strategy is needed (Lendel & Varmus, 2011). Regarding Porter & Linde (1995), companies need to think in a totally different way regarding how they relate environment issues with industrial competitiveness to face the reality of modern competition, which means that success must involve innovation-based solutions that promote both environmentalism and industrial competitiveness.

Considering the above, where concepts like resilience, innovation, environment and strategy are pointed as concepts that companies should adopt to be able to react in anticipation to disturbances, to be ahead of competitors and to obtain differentiation, is it possible to design a model or system that could help companies on their competitiveness challenges based on these principles in an integrated way?

It is assumed that companies introduce changes into their organizations through their strategies. In fact, to be ahead or prepared to react to competitors aiming the achievement of positive results and generating stakeholder's satisfaction, is the fundamental reason that drives companies to apply strategic planning processes. *"Strategic planning concept is the need for a framework to comprehensively understand industry structure and the behavior of competitors and to translate these into operational strategic recommendations"* (Michael E. Porter, 1983).

Does it make sense to assume strategic planning process as the fundamental instrument to accommodate the design of the above model or system? The answer is: why not?

Nevertheless, strategic planning processes' activities, definitely are recognized as a powerful approach for companies' survival and growth. In spite of the existing tools available to support management teams on their strategic planning activity, not always it is clear which tools are more suitable for each context. This is a source of inefficiency that can cause ineffectiveness. But there are more reasons that are sources of strategic planning failure. Briefly it can be assumed that there are two major assumptions that have high influence on strategic planning success, namely:

- Clear and universal definition of competitiveness (at a firm point of view) with a standardized and recognized measurement method (Feurer, and Chaharbaghi, 1994; Balkyte, A., & Tvaronavičiene, M, 2010); and
- An integrated method to allow an effective alignment between strategic evaluation and operational execution (the execution gap – Steven Covey[1], 2013).

[1] http://drivingimprovedresults.com/stephen-covey-execution-gap/

1.2 Thesis Aim, Objectives and Questions

1.2.1 Aim

According to the above, this research has the intention to be a contribution for companies' value creation and increase of their competitiveness, reducing their exposure to bankruptcy.

Therefore, the aim of this research is to provide companies with an alternative approach for their strategic planning process and its implementation, taking into account new concepts and definitions, as well as integrating models, frameworks and tools.

This aim is an unquestionable added value, considering that the majority of companies have not clarified the concept of competitiveness, do not dominate the cause-effect relationship of competitiveness factors (the impact on results, due to improvements on competitive factors), do not apply systematically strategic planning practices, as well as do not use appropriately and in an integrated way the existent evaluation models, strategic approaches and tools. Additionally, most of the companies have reduced concerns about sustainability as well as monitoring maturity which leads to unreliable data and conduce to unsound decisions and consequently unsuitable strategies (see Chapter 2 and Chapter 3.3.2). Thus, the purpose of this dissertation is to develop a model able to clarify and measure competitiveness, based on new principles and on a sustainable manner, as well as to develop a system able to integrate evaluation events with execution activities, both with the intention to share a single approach capable to boost the application of strategic planning processes by companies and to support them to increase their competitiveness and their awareness to sustainability based on the Triple Bottom Line principle (economic, social and environmental).

This research has also the purpose to contribute to academic knowledge's development, as well as to be an added value to the real business context.

1.2.2 Objectives and Questions

Considering the research aim, there are two objectives to achieve, in concrete:

- The establishment of an alternative competitiveness definition based on new concepts and principles; and

- The development of a system able to establish a virtuous cycle integrating strategic evaluation and execution's activities, considering several models, approaches and tools.

To fulfil the objectives above, this research has several challenges which can be translated into three major questions, which in turn can be deployed in secondary questions, namely:

Q1 – Is it possible to design an alternative definition of sustainable competitiveness, able to incorporate the concepts of resilience, innovation and sustainability in a logical and integrated manner?

Q1.1 – Does it make sense to assign competitiveness factors according to principles of resilience and innovation?

Q1.2 – Can sustainability, in terms of the current competitiveness assumption (assumed as a time-based dimension), be converted into a more added value scale, considering the Triple Bottom Line principle?

Q1.3 - What kind of benefits can this alternative definition generate for organizations?

Q2 – Is it possible to create a model that allows objective assessment of companies' competitiveness positioning, advantage and risks?

Q2.1 - Is it possible to define measurable evaluation criteria and concrete indicators?

Q2.2 - In the context of this alternative concept of sustainable competitiveness, is it possible to measure competitive advantage based on a direct comparison of the company's performance?

Q2.3 – Does it make sense to consider risk evaluation in the model and how could that be done?

Q2.4 - Is it possible to establish in the model a relationship between resources and results?

Q2.5 - Could this model be used for benchmarking purposes?

Q3 - Is it possible to build a strategic planning system able to overpass the traditional failure modes, combining these alternative model's concepts and being suitable to the real business context?

Q3.1 - Is it possible to structure a consistent and cyclical approach to diagnosis, definition, execution and strategic monitoring, incorporating the sustainable competitiveness model?

Q3.2 – Is this system able to consider (or make a coexistence with) conventional strategic tools that traditionally support strategic planning processes?

Q3.3 – In what way can this system be applied in distinguished contexts (government/ public vs. private sectors; specific economic sectors or clusters, …)?

Q3.4 – Is this system a useful alternative for strategic planning processes and can it be a real contribution/ encouragement to increase the adoption of strategic planning practices by organizations?

Q3.5 – Are there implementation factors or pre-condition needed to assure the success of the system's application?

Q3.6 – Can this system be considered differentiator and in what way does it generates benefits and added value to companies?

1.3 Research Scope and Guidelines

1.3.1 Scope

It is very important to clarify the boundaries of this research. In fact, the scope of this dissertation is not about companies' strategy definition. Therefore, the research is not focused and does not cover discussion or study about types of strategies that could be applied by companies, or which kind of strategy is more appropriate/ suitable under certain circumstances. The research focus is only on the process, supporting companies to better identify their opportunities to improve, define their strategy and helping them to execute it.

Another important aspect to highlight is the fact that this research was not focused on the definition of management and operational practices, instead on evaluation requirements that must be attested through evidence, corresponding to the outcome of those practices.

It is also relevant to underline that for validation purposes of the research; they were just considered dimensions that could be covered in an acceptable time frame according to the

dissertation horizon. Therefore, the case studies' scope was limited to the application of the evaluation component of the research, also due to confidentiality reasons alleged by the companies.

1.3.2 Guidelines

According to what was mentioned above, company's competitiveness definition could be based or include new concepts as resilience, innovation and sustainability (based on triple bottom line concept - also known by TBL), and should be measurable in an objective matter (preferentially quantitatively). Doing so, companies would be able to better understand competitiveness and what are their evaluation criteria, to increase their ability to score their competitiveness, to enable a better focus where to improve, as well as to allow better ways to do benchmarks and identify competitive advantages. Taking into account all of this considerations we conclude that an alternative definition for competitiveness could be done, but it should incorporate distinguished aspects to be considered a real added value, otherwise it would be just one more definition to confuse even more the managers and companies. In fact, this opportunity is reinforced by the experts' opinion (see Chapter 3.3.2.1). Therefore, and considering the two assumptions of strategic planning failure, this distinguish definition of competitiveness should be based on new concepts and principles, as well as a contribution to reduce strategic execution gap (a foundation to allow the integration between strategic evaluation and execution).

Additionally, the design of a system based on the above alternative competitiveness definition, able to contribute to overpass strategic planning failure modes, taking into account the mentioned improvement outlines for strategic execution success (see Chapter 2.1.3), should be a cyclical approach, with the capacity to evaluate strategy and execute strategy in an integrated way. It should be founded on solid competitiveness drivers and supported by indicators able to be measured. As a suitable instrument to real business environment, the system need to consider external factors (market circumstances and changes) that can influence companies' advantage, therefore enabling risk exposure reduction. And finally able to give feedback on a continuous routine (in terms of actions implementation and targets achievement, as well as identifying problem trends or deviation causes – if occur – allowing the realization of preventive and corrective actions in a timely manner).

1.4 Content and Structure

For a better understanding of how this dissertation is structured, hereby we present the following Figure 1.1, which shows the thesis's eight Chapters, establishing a relation with the research methodology; presents the four Annexes (which correspond to core elements of this research[2]) and mentions the two groups of Appendixes just available in digital format (Part A – System's templates and calculations regarding experts' and case studies' inputs; and Part B – Experts' and case studies' data collection).

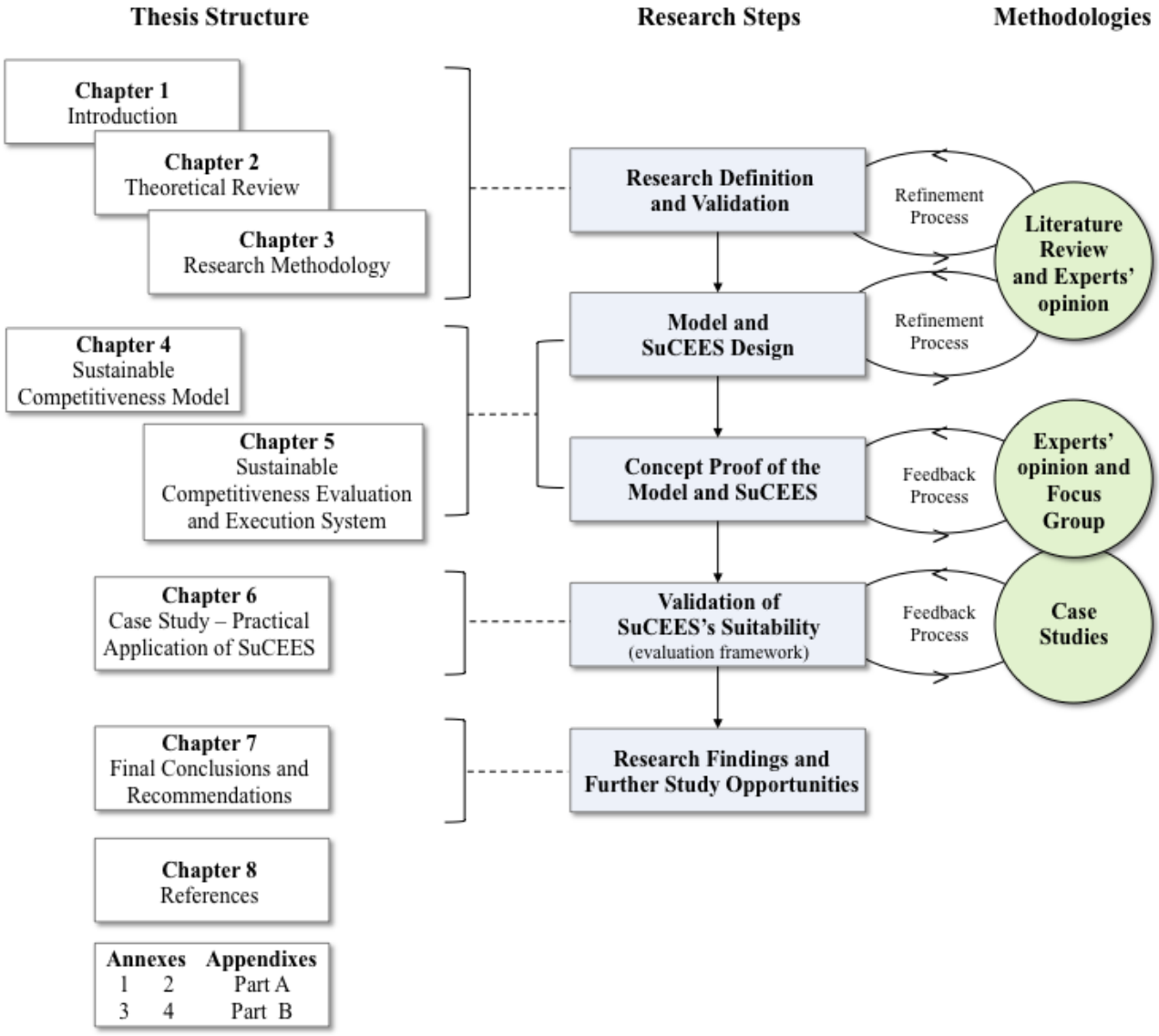


Figure 1.1 - Dissertation structure and its relation to research methodology

NOTE – Appendixes are just available in digital format

[2] To see in detail all proficiency level requirements please go to Appendixes A3 and A4

1.5 Chapter Highlights

According to the research field defined, its aim and objectives, it was developed an alternative definition for sustainable competitiveness, as well as an integrated system to support Strategy Development and Deployment Processes (SDDP). Therefore, the outcomes of this research are:

- Sustainable Competitiveness Model (SCM); and
- Sustainable Competitiveness Evaluation and Execution System (SuCEES).

The Sustainable Competitive Model (SCM) is able to merge, in a single definition, resilience, innovation and sustainability concepts. It promotes its measurement based on seven competitiveness drivers, about three components: Competitiveness Positioning (CP), Competitive Advantage (CA) and Competitiveness Risk (CR), through structured evaluation criteria and data collection templates. This evaluation allows the identification of improvement opportunities, by several analysis tools, and also permit the calculation of a composed index, called Real Competitive Strength (RCS) which can be considered as a ranking value.

The Sustainable Competitiveness Evaluation and Execution System:

SuCEES
Sustainable Competitiveness Evaluation and Execution System

Is based on the Sustainable Competitiveness Model, has a cyclical approach including four stages (the 4 A's Cycle) and is founded on two frameworks: Evaluation and Execution, which have several tools. A pool of experts validated both outcomes of this research and the evaluation framework of SuCEES was applied in two real business contexts (case studies), in Electrolux Poland and in Visteon Portugal. In the end it was possible to answer positively to nearly all of the research questions and to conclude that the system is differentiator, suitable and an added value. However, it was considered complex and demanding taking into account that the majority of companies' still have reduced monitoring maturity. Therefore, less demanding evaluation requirements and criteria should be developing to establish different levels of SuCEES's application, enabling the enlargement of its suitability to a wider range of companies. With this purpose, it was also developed an approach to evaluate companies' Monitoring Readiness, allowing the identification of their suitable SuCEES application level. Another conclusion is that the application of the model for benchmark purposes, only make sense if applied in the same economic sector, due to specific competitiveness variables. Finally, this research has generated

several opportunities for further studies in academic and business terms, as well as improvements on the model and system themselves (see Figure 1.2).

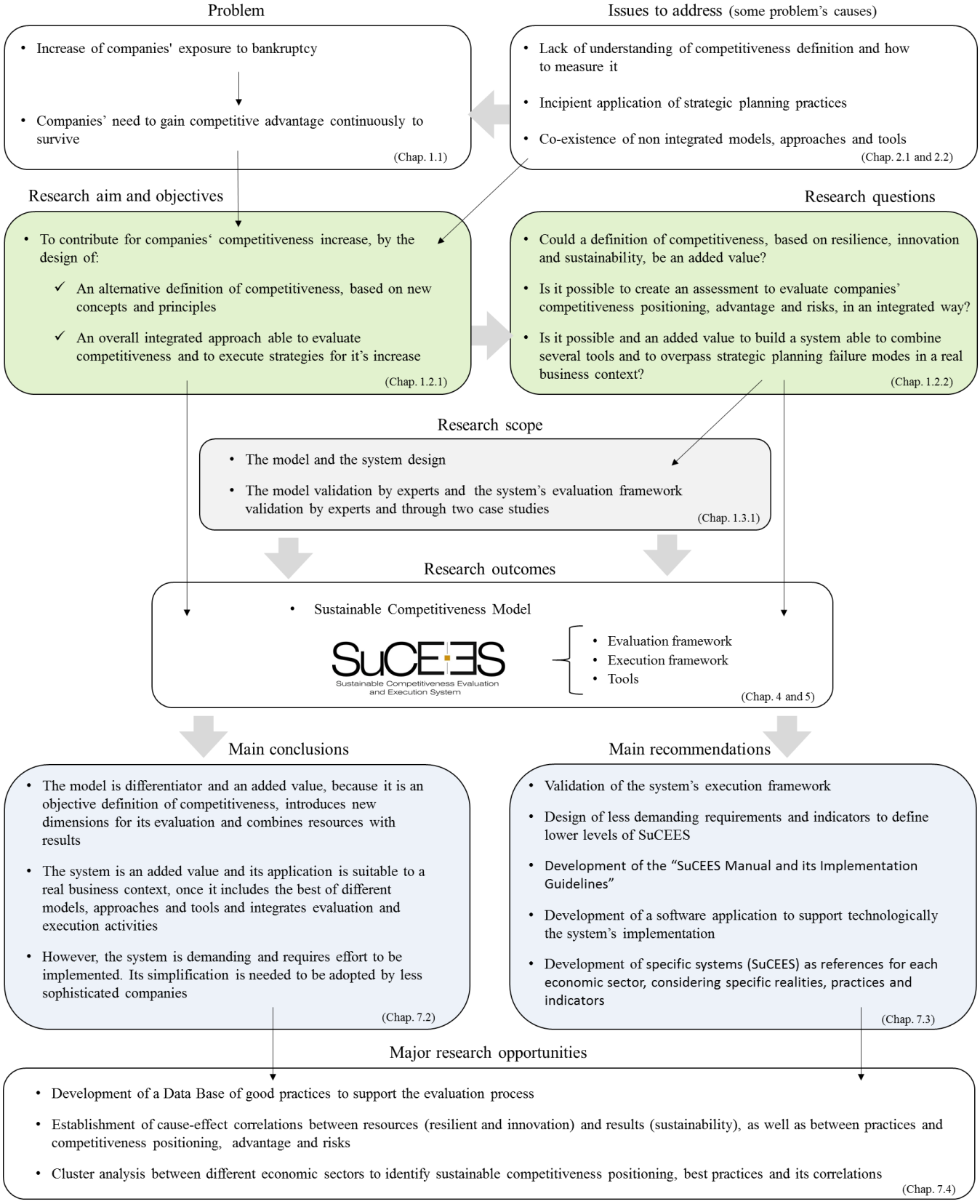


Figure 1.2 – Research content summary

Underlines

Every institution, no matter how great, is vulnerable to decline and to fall into bankruptcy.

Currently the lifespan of a company listed in the S&P 500 index of leading US companies is just 15 years and 80% of entrepreneurs who start businesses fail within the first 18 months.

Thus, this research aims to be a contribution for companies' value creation and increase of their competitiveness, reducing their exposure to bankruptcy.

Literature review and experts' opinion revealed that companies still don't have a clear definition about competitiveness and how to measure it.

There is an opportunity to develop an alternative definition for competitiveness regarding new concepts like resilience, innovation and sustainability that could be a contribution to clarify this issue.

Majority of companies don't apply strategic planning processes in a proper way, systematically and with an appropriate and efficient usage of strategic approaches and tools, even in an integrated manner concerning evaluation and execution activities (there still implementation failures).

The scope of this research is not about companies' strategy definition, so it does not cover discussion or study about types of strategies or which kinds of strategies are more suitable.

Therefore, this research developed the Sustainable Competitiveness Model (SCM) and the Sustainable Competitiveness Evaluation and Execution System (SuCEES).

Both of research's outcomes were validated by a pool of experts and through the execution of two case studies (application of the evaluation framework of SuCEES in Electrolux Poland and in Visteon Portugal) and considered differentiators, suitable and an added value for companies.

Nevertheless, the model was considered complex considering the monitoring maturity of the majority of the companies.

There were recognized many opportunities to improve the model and the system, as well as identified several fields for further research and study.

Constitui uma abordagem metodológica muito interessante ao tema da "competitividade sustentável" das organizações. O foco na resiliência e na inovação organizacional, como drivers de competitividade sustentável, diferencia esta metodologia das abordagens clássicas, frequentemente não integradas, mais focadas no desempenho dos "sistemas de gestão" e menos nos fatores que alavancam a organização criando capacidade de esta se manter rentável no futuro. Com efeito, a abordagem proposta de integração dos fatores "posicionamento competitivo", "vantagem competitiva" face aos concorrentes diretos e "risco de mercado", possibilitando uma visão holística e dinâmica dos instrumentos e das práticas de gestão atuais e da capacidade da organização prever, adequadamente reagir e, ela própria, ser promotora da mudança no seu entorno de negócio, poderá ser um contributo válido para a avaliação prospetiva desses fatores de competitividade, constituindo assim uma mais valia para a organização. Significativa é, também, a relevância dada aos aspetos ligados à cultura organizacional, em alguns casos de forma inovadora (e.g. a inclusão da cultura ética) e à qualidade da liderança na organização.

Assinatura: José Eduardo de Figueiredo Soares

2 Literature Review

To develop this research and fulfill its aim and objectives, a wide range of themes were subject of literature review to obtain a reliable state-of-art. In fact, different opinions of researchers, as well as scientific and applied knowledge were considered, covering themes like strategic planning and competitiveness, resilience, innovation, sustainability, business management approaches, models and tools, as well as monitoring and measurement practices.

2.1 Strategic Planning and its challenges

The effervescent business environment that companies' are living currently, due to globalization, financial instability, political uncertainties, added to the high speed of technological evolution, internet of things[3], big data[4] development, among others, which leads to an increasing sophistication of customers (with faster and even more demanding expectations), and to a higher level of competitors' aggressiveness, introduce in organizations a constant need for change. The pressure to reduce decision time cycles and to be able to react and anticipate competitors, aligned with market needs and trends, are requisites to survive and the key for success.

With these aim companies' should be able to recognize their business vulnerabilities and to understand the signs of weaknesses implied to crises' situations (Faustenhammer & Gössler, 2011), as well as the capacity to foresee new business opportunities and to define their strategic vision, taking into account their resources' limitations and potentialities (McManus, Seville, Brunsdon, & Vargo, 2007). This attitude requires the ability to explore alternative strategies and the talent to lead/ manage resources to new projects (Hamel & Valikangas, 2003). In such a context, it is vital to define appropriate strategies to face this challenges and to do so, companies

[3] Internet of things (IoT) – *"internetworking of physical devices, vehicles, buildings and other items, embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. According to "the Global Standards Initiative, 2013", IoT is the infrastructure of the information society".* (https://en.wikipedia.org/wiki/Internet_of_things)

[4] Big data – "*term for data sets that are so large or complex that traditional data processing applications are inadequate to deal with them. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, updating and information privacy. Analysis of data sets can find new correlations to spot business trends, prevent diseases, combat crime and so on".* (https://en.wikipedia.org/wiki/Big_data)

should use strategic planning processes, as well as strategic tools which allow the evaluation of their current competitiveness and support the definition of their business goals, operational targets and actions needed to achieve their objectives.

Research in this field is very extensive and has been a concern among many investigators and scholars. However, basic principles still are source of failure and new concepts and definitions caused some controversy, but are also an opportunity for new approaches design and alternative developments.

2.1.1 Management and Strategic Planning Concepts

After the initial theories about strategy, based on the principles of war, expressed by Sun Tzu (The Art of War) and the Industrial Revolution (transition to new manufacturing processes in the period from about 1760 to sometime between 1820 and 1840), according to (Kiechel III, 2012), the robustness of management principles appear with Peter Drucker who develop a more humanistic vocabulary for management and said *"There is only one valid definition of business purpose: To create a customer"* (Peter Drucker, 1946, 1954 and 1964).

Only in the early seventies strategy was identified as the primary work of executives (KR. Andrews, 1980), Ansoff, Declerck, and Hayes (1976) elaborated strategic management mode systematically, and was revealed how managers should use intuition and relationships in their work (Mintzberg, 1990).

The concept of competitiveness was mentioned, by the first time, in a structured way, by Michael Porter when he states that *"Strategy is about making choices, trade-off; it's about deliberately choosing to be different"*, and outlined the five forces that affect competitive positioning, bringing new rigor to the study of strategy (Porter, 1983a, 1983b, 1995 and 2008). At about the same time Tom Peters supports excellence as a factor that lionizes strong organizational cultures (Peters, 1982) and Peter Drucker offers a systematic approach to the creative process by the introduction of the discipline of innovation (Drucker, 1985).

A few years after, Peter Senge (1990) based on the application of systems thinking, brings the concept of learning organization and for the first time the importance of measuring nonfinancial performance was pointed by Robert Kaplan and David Norton through the presentation of the Balanced Scorecard principle (Kaplan and Norton, 1992).

According to Porter (1996) strategy is a crucial tool for companies to differentiate from competitors and create a sustainable advantage. In accordance, Andrews, cited by Langfield-

Smith, K. (1997) proposed two phases of strategic management model in formulation and implementation of corporate strategy, which allow a clearer understanding about the importance of strategy definition and its execution, and John Kotter described the art of persuading people and organizations to change (Kotter, 1995), introducing the importance of change management to be successful in strategy implementation.

The decade of two thousand starts with a reinforcement of the need to gain competitive advantage by Clayton Christensen saying *"If you do what worked in the past, you will wake up one day and find that you've been passed by"*, and explaining how innovation can be an advantage but also how disruptive technologies cause great firms to fail (Christensen, 1997).

According to the summarized presentation of evolution in time of strategic and management principles, there is no doubt about the importance of strategic planning adoption by companies. According to Jarzabkowski & Balogun (2009), *"strategic planning processes is the process of identifying and implementing the firm's strategic initiatives"*, on the other hand Barringer & Bluedorn (1999) present the concept of *"planning flexibility, which is the ability of a firm to deviate from its formal strategic plan in response to emerging opportunities or threats"*. Nevertheless, strategic planning can be a source of competitive advantage (Kukalis, 1989, Miller and Cardinal, 1994 and Powell, 1992) however, a source of sustainable competitive advantage may be found through the interaction of strategic planning and planning flexibility (Grant, 2003).

Apart the above, regarding Reeves and Deimler (2011) the new competitive advantage is based on adaptability, namely: the ability to read and act on signal, the ability to experiment, and the ability to mobilize. Another perspective given by Dibrell, Craig, & Hansen (2011b) is innovativeness, which means that firms' emphasis their strategy on innovation.

2.1.2 Fundamental Strategic Tools

As shown, several definitions and principles concerning strategy have been assumed and still under research. Associated to this knowledge, many tools have been also design to support strategic processes and activities. Aware of this fact, a review of the fundamental tools mainly used and internationally recognized, is considered relevant for the present research. Thus, a selected pool of tools related to strategic analysis is presented as following.

2.1.2.1 PESTLE Analysis

Strategic planning success depends mainly on the quality of the decisions and, consequently, on the scope and reliability of data and its analysis. One tool currently recognized to support the definition of strategic objectives is the PESTLE analysis (political, economic, social, technological, legal and environmental). Francis Aguilar is pointed as its creator, once he presented PEST Analysis in his book, "Scanning the Business Environment" in 1967.

PESTLE analysis[5] is a framework to analyze macro-environmental factors, being a support to understand market growth, decline or trends, business positioning and risks, as well as operations' opportunities. Table 2.1. shows the analysis criteria of each of its components.

Table 2.1- PESTLE's analysis criteria[6]

Political	Economic	Social	Technical	Legal	Environment
• New state tax policies for accounting • New employment laws for employee handbook maintenance • Political instability in a foreign partner country	• International economic growth • Changes in interest rates	• Shift in educational requirements and changing career attitudes • Population growth rate	• Automated processes in the industry • Rate of innovation • Changes in technology incentives	• Discrimination laws • Health and safety laws • Consumer protection laws • Copyright and patent laws	• Changes in weather and climate • Laws regarding pollution and recycling • Waste management • Use of green or eco-friendly products and practices

2.1.2.2 VRIO Framework

One of the most recent management tool is the VRIO framework, which is a business analysis approach that supports vision statement, internal & external analysis, strategic choices and strategic implementation. This tool should be used as a framework in evaluating companies' resources and capabilities, and address four key questions, namely: Value, Rarity, Imitability and Organization (Barney and Hesterly, 2010).

- The Question of Value: "Is the firm able to exploit an opportunity or neutralize an external threat with the resource/capability?"
- The Question of Rarity: "Is control of the resource/capability in the hands of a relative few?"
- The Question of Imitability: "Is it difficult to imitate, and will there be significant cost disadvantage to a firm trying to obtain, develop, or duplicate the resource/capability?"

[5] https://en.wikipedia.org/wiki/PEST_analysis
[6] CIPD. Retrieved 2009-10 21; and CIPD - Chartered Institute of Personnel and Development

- The Question of Organization: "Is the firm organized, ready, and able to exploit the resource/capability?" "Is the firm organized to capture value?"

2.1.2.3 SWOT Analysis

One of the most famous management tools is the SWOT analysis[7], which is a structured planning method that evaluates the four elements of a business or project, namely:

- Strengths: "characteristics of the business or project that give it an advantage over others"
- Weaknesses: "characteristics that place the business or project at a disadvantage relative to others"
- Opportunities: "elements that the business or project could exploit to its advantage"
- Threats: "elements in the environment that could cause trouble for the business or project"

This tool involves identifying the internal and external factors that are favorable and unfavorable to the business or project, and is a useful method to support management on the definition of strategic guidelines (see Figure 2.1).

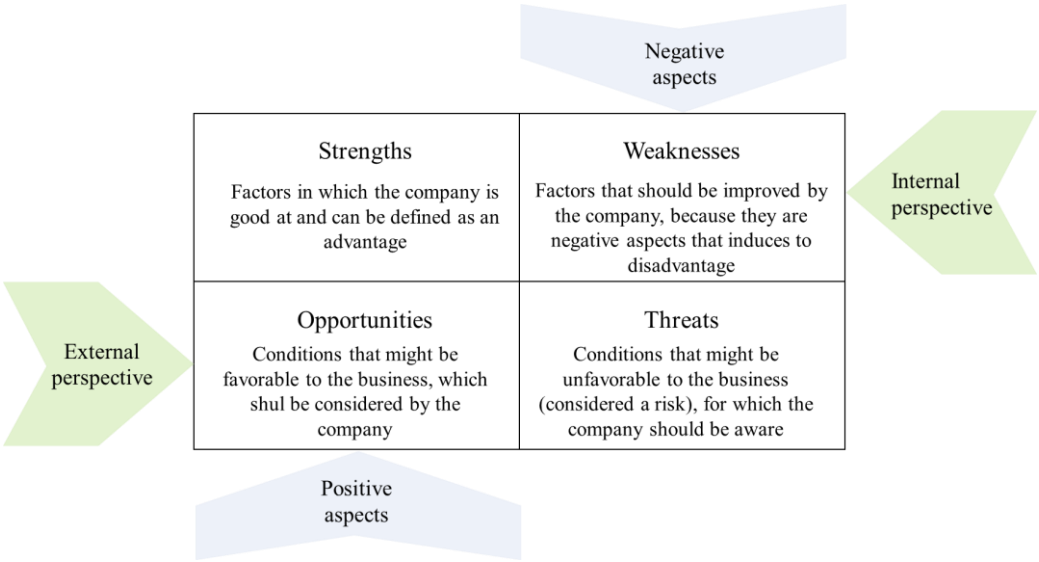


Figure 2.1 - SWOT analysis, adaptation from published versions

[7] http://en.wikipedia.org/wiki/ SWOT_analysis

Its origins remain obscure, however some authors credit SWOT to Albert Humphrey, who led a convention at the Stanford Research Institute (now SRI International) in the 1960s and 1970s.

2.1.2.4 Michael Porter's Five Forces Model

Another commonly known strategic tool is the Porter's five forces analysis[8], which is a framework to analyze a company's exposure to its business environment, allowing the identification of competition advantages and risks, as well as the establishment of strategic orientations.

This tool determines competitive intensity and therefore attractiveness of an Industry through the analysis of the five forces shown in Figure 2.2.

Michael Porter was its creator and explained the concept behind the tool in his book "How competitive forces shape strategy", Harvard Business Review, in 1979.

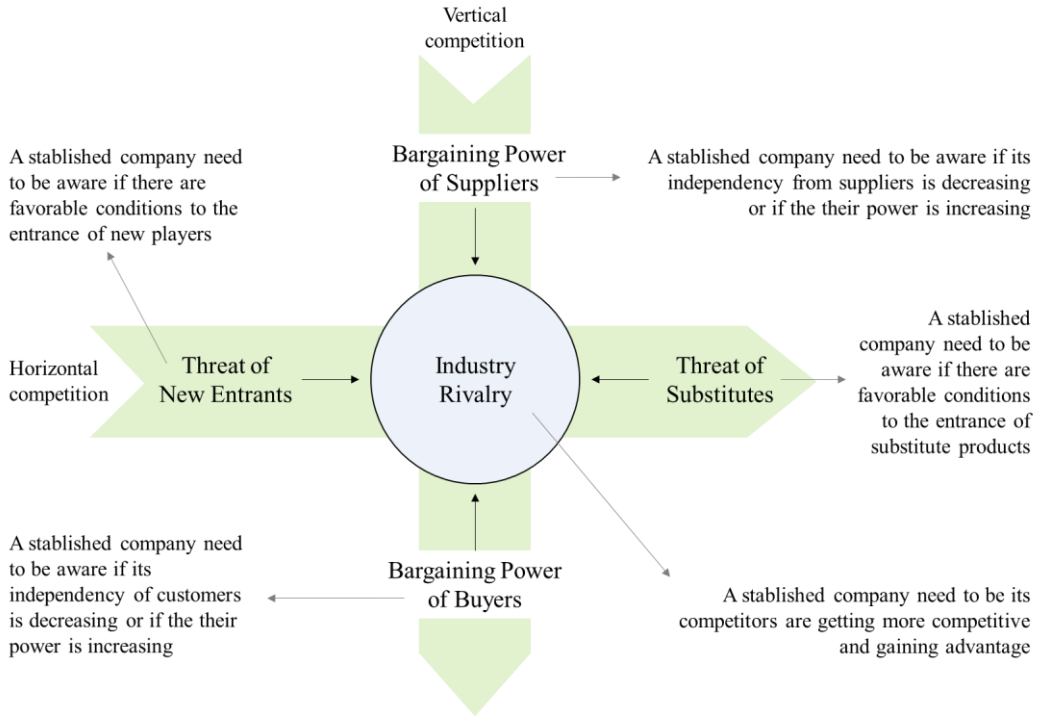


Figure 2.2 - Porter's Five Forces, adaptation form the published versions

[8] https://en.wikipedia.org/wiki/Porter%27s_five_forces_analysis

2.1.2.5 *Michael Porter's Value Chain*

The relevant contribution of Michael Porter in terms of management principles, concepts and tools is huge. In fact, he mentioned in his competitive strategies paradigm another very useful strategic tool, designated as the Value Chain[9], see Figure 2.3.

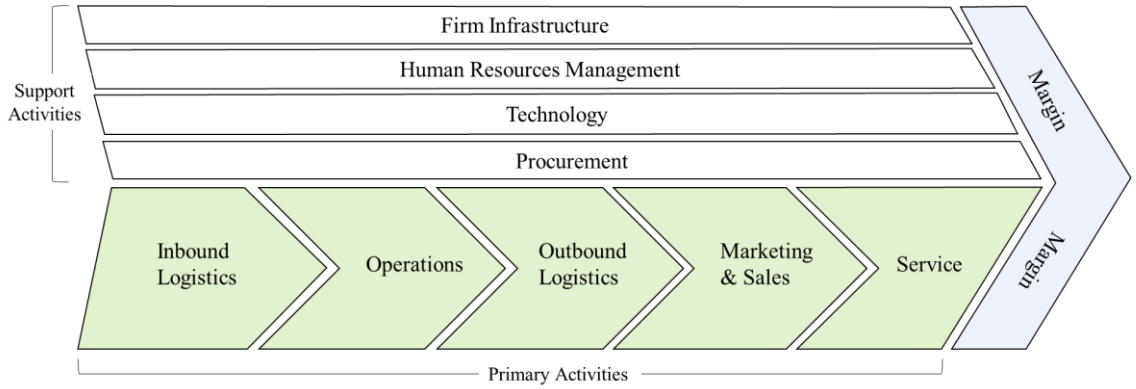


Figure 2.3 - Porter's Value Chain

The concept of value chains as decision support tools, arise at the first time in 1979. However, he just describe it and popularized it in his 1985 best-seller, *"Competitive Advantage: Creating and Sustaining Superior Performance"*, where he assume that a value chain is a set of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market. The value chain of an organization translates the processes of its business, illustrating the company's system and its breakdown into subsystems each with inputs, transformation processes and outputs, which involve the acquisition and consumption of resources (money, labor, materials, equipment, buildings, land, administration and management, as well as the creation of products and services. The way the activities of the value chain are conducted determines costs and impacts on profits.

2.1.2.6 *Business Model Generation*

The design of business models is recognized as an important way to structure the key elements of a business and therefore a useful tool to support companies on their strategy definition. The Business Model Canvas[10], initially proposed by Alexander Osterwalderis in 2008[11], is a tool that fits in this kind of approaches. It is a visual chart with elements describing company's product's

[9] https://en.wikipedia.org/wiki/Value_chain

[10] https://en.wikipedia.org/wiki/Business_Model_Canvas
[11] http://nonlinearthinking.typepad.com/nonlinear_thinking/2008/07/the-business-model-canvas.html

value proposition, infrastructure, customers, and finances (see Figure 2.4). Its nine building blocks allow a full visualization of the key elements of a start-up or a new business venture, or a business that has hit a stagnant point in an aggressive competitive environment.

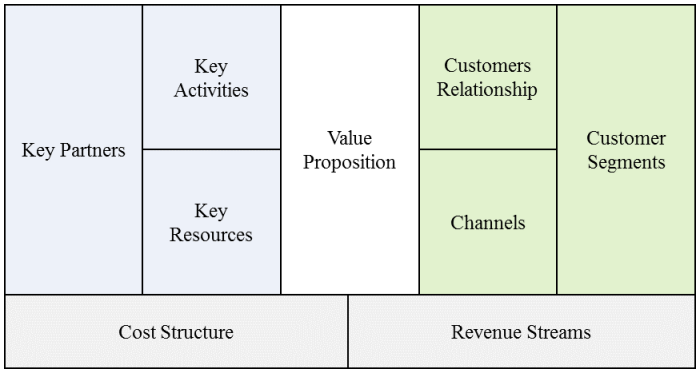


Figure 2.4 - Business Model Canvas

2.1.2.7 BCG Matrix

The international management consultancy firm BCG – Boston Consulting Group as created in 1970 the growth–share matrix (see Figure 2.5), mostly recognized as the BCG Matrix[12], to help companies to analyze their business units (product lines). The ability to cross-market growth perspective with market share positioning, allows a combined analysis of two fundamental issues, essential to help managers on their strategic decision-making process.

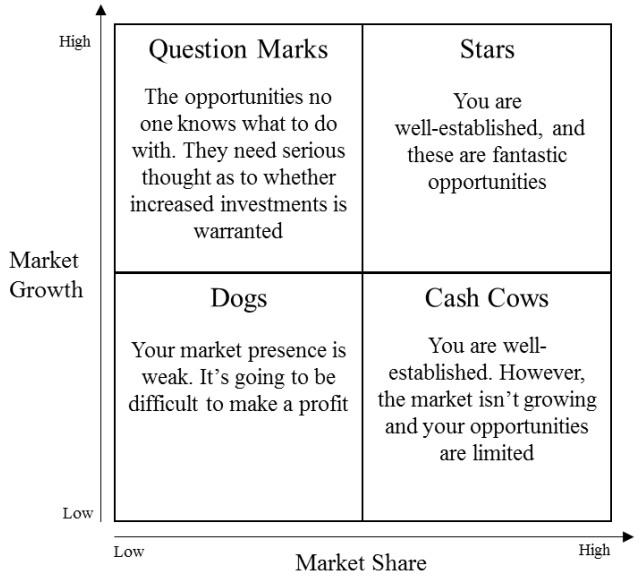


Figure 2.5 - BCG Matrix

[12] https://en.wikipedia.org/wiki/Growth%E2%80%93share_matrix

2.1.2.8 McKinsey 7S Framework

Another interesting analysis tool is the McKinsey 7S Framework. This approach is useful to identify needs of realignment to improve performance and is based on seven elements of assessment (see Table 2.2).

Table 2.2 - Seven elements of McKinsey 7S Framework[13]

Elements	Description
Strategy	*"the plan devised to maintain and build competitive advantage over the competition"*
Structure	*"the way the organization is structured and who reports to whom"*
Systems	*"the daily activities and procedures that staff members engage in to get the job done"*
Shared Values	*"called "superordinate goals" when the model was first developed, these are the core values of the company that are evidenced in the corporate culture and the general work ethic"*
Style	*"the style of leadership adopted"*
Staff	*"the employees and their general capabilities"*
Skills	*"the actual skills and competencies of the employees working for the company"*

2.1.3 Strategic Planning Failure Modes

As stated before, companies' reach their competitiveness establishing the right and suitable strategies. To do so companies apply strategic planning processes and use several corporate and strategic tools. However, commonly this practices are not successful, due to different reasons.

In fact, according to Rudd et al. (2008) there is a need for a greater understanding of the possible mediators of the relationship between the formal strategic planning process and firm performance, and regarding Bradley C. et al. (2013), *''Examining how strategies are created, implemented, and executed is a relatively recent practice.''*, which assume the need for a more deeply inside organizations observation and following companies' strategic processes as they unfold, with the purpose of improving successful approaches.

According to Klag & Langley (2014) there are four reasons why strategic planning processes fail (see Table 2.3):

[13] http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/enduring-ideas-the-7-s-framework

Table 2.3 - Reasons of strategic planning process failure - Adapted form (Klag & Langley, 2014)

	Critical time points of strategic planning process failure			
	Launch but no planning *the launch period during which the planning does not properly get off the ground*	**Planning but no plan** *the planning period subsequent to the launch if the plan does not reach completion*	**Plan but no execution** *the period after plan completion if the plan does not get executed*	**Execution but no impact** *the period after execution begins if outcomes are viewed as ineffective or non-existent*
Failure Symptom	Aborted launch	Midstream stall	Shelved plan	Ineffective or no strategic outcomes
Potential Causes	• *Lack of faith by participants and/or senior leadership in the relevance or likely impact of the activity.* • *Lack of credibility of the facilitator as perceived by participants* • *Lack of clear understanding by participants of how the activity will be connected to the planning process and subsequent actions*	• *Organizational flux that diverts attention away from planning* • *Lack of committed, credible, and/or capable leadership of the process* • *Ambiguity around who is responsible for the process* • *The organization is unfamiliar with strategic planning and sees it as ''alien''*	• *Lack of mechanisms for follow-up, and commitment to, implementation* • *Plan is a purpose unto itself; fulfils an externally imposed ritual function* • *Plan that is not''implementable'' due to attempts to please all stakeholders, creating ambiguity and inflation*	• *Cyclical planning that does not reflect novel or sound thinking* • *A plan that is obsolete is executed anyway* • *Financial incentives are too closely tied to planning targets*

A survey of more than 400 global CEOs, conducted in 2015 and published by Harvard Business Review, conclude that *"executional excellence was the number one challenge facing corporate leaders in Asia, Europe, and the United States, heading a list of some 80 issues, including innovation, geopolitical instability, and top-line growth. We also know that execution is difficult. Studies have found that two-thirds to three-quarters of large organizations struggle to implement their strategies"*.

Steven Covey (2013) has also researched about how to be strategically more effective and also about this subject to which he named the *"Execution gap"* phenomenon[14]. His major conclusion was that there is a great opportunity for organizations to increase their productivity by closing the gap between their key objectives and daily execution, considering the following findings:

1. *"Workers don't know their organization's highest priorities. Only 44% of U.S. workers surveyed said they clearly understand their organization's most important goals.*
2. *Workers don't translate their organization's highest priorities into action. Only 19% of U.S. workers have clearly defined work goals, and only 9% believe that their work has a strong link to their organization's top priorities.*

[14] http://drivingimprovedresults.com/stephen-covey-execution-gap/

3. *Workers don't embrace their organization's highest priorities. Only 19% feel a strong level of commitment to their organization's top priorities.*
4. *Workers don't stay on track with their organization's highest priorities. They report spending only 49% of their time on activities they believe are directly linked to their organization's key priorities. U.S. workers spend 32% of their time on other activities that demand their immediate attention, but have little relevance to their organization's most important goals. And 19% of their time is spent on petty politics and bureaucracy. Only 12% report their individual performance is reviewed monthly with their manager.*
5. *Workers don't collaborate well on their organization's highest priorities. Just 31% feel they can express themselves honestly and candidly at work and only 34% say they work together in a "win-win" atmosphere.*
6. *Overall, U.S. workers gave their organizations a score of 51 out of 100 for their collective lack of focus and execution on truly important goals."*

Also Gary L. Nielson et al. (2008), define that what matters most to strategic execution is: *"Information (54%); Decision rights (50%), Motivators (26%) and Structure (25%)"*. According to them, there are five elements of strong execution:

1. *"Everyone has a good idea of the decisions and actions for which he or she is responsible;*
2. *Important information about the competitive environment gets to headquarters quickly;*
3. *Once made, decisions are rarely second-guessed;*
4. *Information flows freely across organizational boundaries; and*
5. *Filed and line employees usually have information they need to understand the bottom-line impact of their day-to-day."*

Nonetheless, most managers neglect the strategy execution approach, because they are used to believe that strategy and execution are distinct from one another. Therefore, it is extremely important to assume "S*trategy as a Choice Cascade"* and the need to create a virtuous strategy cycle (Roger L. Martin, 2010). Based on this assumption, the choice-cascade model is based on an encouraged information exchange between up and downstream, promoting a deployed alignment of goals, actions and choices (decision making boundaries).

Nevertheless, this vertical perspective should be combined with a horizontal perspective, allowing managers to rely on colleagues in other functions and units, reducing the host of dysfunctional behaviors that undermine execution (Donald Sull et al., 2015). Regarding this issue, also SIPOC

concept (a companies' transversal vision) can be considered. Here we find another execution failure mode, which can be understood as companies' flexibility/ agility. Accordingly, there are the following five myths (Donald Sull et al., 2015):

1. *"Execution Equals Alignment"* – In fact, vertical alignment is not enough. Their study revealed that *"Only 9% of managers say they can rely on colleagues in other functions and units all the time, and just half say they can rely on them most of the time"*;

2. *"Execution Means Sticking to the Plan"* – The way that market conditions and costumers' expectations change, companies must be agile to anticipate or meet this changes and be able to gain/ maintain competitive advantage. *"No plan can anticipate every event that might help or hinder a company trying to achieve its strategic objectives. Managers and employees at every level need to adapt to facts on the ground, surmount unexpected obstacles, and take advantage of fleeting opportunities"*;

3. *"Communication Equals Understanding"* – For most managers, communication regards to pass a message. *"Part of the problem is that executives measure communication in terms of inputs (the number of e-mails sent or town halls hosted) rather than by the only metric that actually counts how well key leaders understand what's communicated.";*

4. *"A Performance Culture Drives Execution"* – Setting targets to strategy execution is fundamental, however a correct balance between target achievement recognition and internal cooperation is critical to assure a healthy culture and companies' values. *"Performance is critical, of course, but if it comes at the expense of coordination, it can undermine execution"*; and

5. *"Execution Should Be Driven from the Top"* – Taking into account the Strategy as a Choice Cascade, mentioned above, this myth has a similar perspective. It should be build decision-making boundaries at all organizational levels. *"Concentrating power at the top may boost performance in the short term, but it degrades an organization's capacity to execute over the long run"*.

When we talk about execution we should be focused on implementation, which means that some change will occur. Through a survey of 1,500 change management executives, led by IBM at Oct 2008, it was possible to conclude that change management and project management are strategic planning process' success factors, once:

- *"Only 40% of projects met schedule, budget and quality goals;*
- *Best organizations are 10 times more successful than worst organizations;*

- *Biggest barriers to success listed as people factors: Changing mindsets and attitudes – 58%;*
- *Corporate culture – 49% Lack of senior management support;*
- *Underestimation of complexity listed as a factor in 35% of projects."*

Finally, it is important to highlight that another cause of strategic planning failure is the usage of models, approaches and tools in a non-suitable, non-integrated or non-systematic way. Main companies use evaluation models such as EFQM, Shingo Prize, GRI, among others; strategic tools as PESTLE, SWOT analysis, BCG matrix, Michael Porter's 5 forces and Value Chain, Balanced Scorecard, etc.; as well as business approaches like LARG, 6-sigma, SCOR, ISO standards, ...; without getting the right benefits or the best return of its investment. Therefore, it is indeed relevant to consider in which way the development of a system to support strategic planning processes considering the failure modes mentioned, can gain from the advantage of each of these models, approaches and tools.

Aligned with the above, also de experts involved in this research share the same opinion about the importance of the adoption of strategic planning practices by companies, and also have a similar perception about its failure modes (see Chapter 3.3.2). The most relevant conclusions are:

- Just top companies apply strategic planning processes, but even so there remain some difficulties in its execution;
- The majority of companies don't apply this practice (at all or in a systematic way), as well as the usage of strategic tools is not common or if so these are used in a non-structured way; and
- Motivations/ causes of failure are related to lack of knowledge, communication and commitment.

Regarding all the above perspectives, findings and opinions, it is possible to consider that there are two major dynamics that influence strategic planning failure, namely: Knowledge and Culture; and Methods and Systems, which have internal responsibilities and external circumstances' sources. Thus, four factors are relevant to underline, due to their impact on this subject: Leadership, Misunderstanding of Definitions and Principles, Evaluation Process and its integration with the Execution Process, as shown in Figure 2.6.

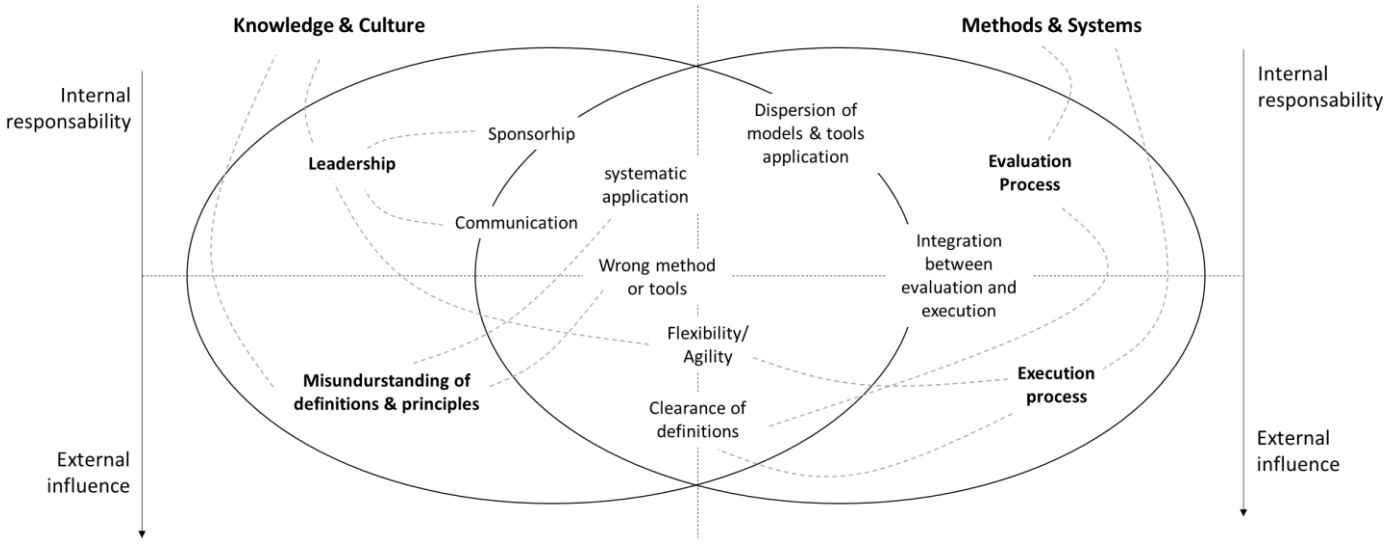


Figure 2.6 - Strategic Planning Failure Modes

Considering what was exposed, the development of a system able to contribute to reduce strategic planning failure modes, is without doubt an opportunity for research and development.

2.2 Competitiveness and Sustainability

As mentioned before strategic planning is still not a systematic and widespread tool within companies, there are significant examples of failure, and between researchers also exist controversy about the best approach to adopt, strategic planning (in a formal way) or planning flexibility. Anyhow, independently on the strategic planning process adopted it is clear that the definition of a company's strategy should aim the achievement of goals to increase its competitiveness. Nevertheless, the appearance of new concepts and principles like: competitiveness intelligence, strategy performance management – SPM (Bisbe and Malagueño, 2012), flexible planning (Dibrell, Craig, & Neubaum, 2014), agile organization (Weber & Tarba, 2014), leadership, resilience, innovation, sustainability, among others, are an opportunity to improve conventional definitions. Regarding this point, definition of competitiveness is also not totally clear and still exist ambiguous understanding about its content and concrete measurement. Assuming that competitiveness must be considered as a foundation (the business pillar), once it represents the final objective of any company, the presence of new concepts and definitions that could also be considered in strategic planning approaches, are also a reason and motivation to develop an alternative definition of competitiveness and to develop a framework more integrated and adapted to the organizations' new challenges.

2.2.1 Competitiveness definition and its importance to strategic planning

In spite the several definitions of competitiveness *"a universal and exact definition for competitiveness does not exist. As a result, competitiveness means different things to different organizations"* (Feurer and Chaharbaghi, 1994). On other hand, current concepts of firm competitiveness do not seem to compete and are not universal enough to apply universally as a way of understanding companies' operations on the market (Flak and Grzegorz, 2015). The most recognized definitions for competitiveness are on a national or regional context; these ones are standardized and universally accepted. In fact, if we consider OECD or Word Bank analysis it always has a national perspective. Analogously, also the IMD World Competitiveness Center[15] and the Word Economic Forum[16] have a higher focus on this perspective, where competitiveness is defined as a set of institutions, policies, and factors that determine the level of productivity of a country (Global Competitiveness Report from the World Economic Forum, 2009–2010).

However, at a firm level, according to the National Competitiveness Council of Ireland[17] competitiveness *"refers to the ability of firms to compete in markets"*, which can be transposed into the ability of enterprises to successfully sell goods and services on national and international markets. Nevertheless, different authors give other perspectives for competitiveness at a firm point of view. According to Edmonds, T. (2000), competitiveness is *"the ability to produce the right goods and services of the right quality, at the right price, at the right time, meeting customers' needs more efficiently and more effectively than other firms"*. Another definition given by Olszewska B. and Piwoni-Krzeszowska E. (2014) assume two perspectives of the concept: *"static – as a certain condition imaging the capabilities of the company in relation to competitors"*, or *"dynamic – as the company's ability to use their own potential and external conditions, as well as improving their current position toward competitors"*. The ability to achieve and sustain competitive advantage is another definition considered (Gorynia, 2004) and according to Lombana (2011) the concept of competitiveness is used *"to determine the ratio of the enterprise characteristics to those of its competitors, resulting from many internal features and the ability to deal with the external environment"*.

Taking into to account the amount of definitions, several attempts to define the term of competitiveness were made (Cetindamar, Kilitcioglu, 2013). UK government, through a benchmark at 2013, has proposed to define a single entity's competitiveness as *"the ability to produce the right products of the right quality and at the right price and time"*. On the other hand, the European Union has developed a formula, according to which a firm's competitiveness is

[15] http://www.imd.org/wcc/#
[16] https://www.weforum.org/
[17] http://www.competitiveness.ie/about-us/our-work/

determined by its *"ability to support the potential that helps meeting the needs of customers through efficient supply of products and services, on increasingly better price and non-price conditions and of a better quality than those offered by competitors"* (Annoni, Dijkstra, 2013). Nevertheless, at the same time all the definitions of competitiveness present in the literature indicate that this is a feature of the company, which is of a multidimensional character (Iarosii, 2013; and Flak, O., & Głód, G., 2015) and can be structured in nine factors (Sauka, 2015) – see Figure 2.7.

According to Erol, BJ Sauser, M Mansouri, (2010), competitiveness depends on attributes frequently recognized as enterprise resilience qualities, namely agility, flexibility, adaptability and connectivity, and to John Cantwell (2003) *"Competitiveness derives from the creation of the locally differentiated capabilities needed to sustain growth in an internationally competitive selection environment. Such capabilities are created through innovation"*, it is possible to assume that concepts like resilience and innovation (which are factors subject of resources' management), can base an alternative definition of competitiveness and establish principles to define a new framework for strategic planning.

Despite the above, and all the discussions on competitiveness, no clear definition, model of competitiveness or international assessment methods have yet been developed (Balkyte, A., & Tvaronavičiene, M, 2010; Pantea & Gligor, 1987). Additionally, according to Balkyte, A., & Tvaronavičiene, M (2010) *"the agreement to launch the new European Union strategy for smart, sustainable and inclusive growth – "Europe 2020" creates a need of research initiatives to develop the new concept of competitiveness, with much of the research focusing on how sustainable development and competitiveness interact"*. In fact, still regarding these researchers, such need implies the definition of sustainable competitiveness, considering new theoretical models describing the relationships between international globalization, economic growth, sustainable development, wellbeing and competitiveness.

It is also perceptible that currently when companies address competitiveness, they mostly support their discussion on competitive factors. Regarding all these facts and according to the majority opinion of the experts involved in this research, competitiveness is not always well understood and cause confusion, being a source of uncertainty and making competitiveness comparison and benchmarking initiatives more difficult and less reliable, as well as inducting to incipient business strategies, than can cause loss of advantages or even bankruptcy. Experts of this research pointed that (see Chapter 3.3.2):

- A clear and objective definition about competitiveness has a high impact on business and that the perception of managers about it and how to measure it is low;

- There are not a unique and universal accepted definition for competitiveness and a measurable way to translate it into an international and recognized index;
- There are competitive factors defined, but not used on an integrated approach;
- There exists a high potential to improve competitiveness standardization and it would be an added value.

Figure 2.7 – Competitiveness factors – Adaptation of Sauka and Arnis findings (Sauka, 2015)

2.2.2 Competitive Advantage as a result of resources' management

We also can conclude that competitiveness is commonly compared to competitive advantage, which *"refers to the ability gained through attributes and resources to perform at a higher level than others in the same industry or market"* (Christensen and Fahey 1984). According to (Barney 1991 cited by Clulow et al., 2003), *"A firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential player".* So it seems to be obvious that competitiveness is related to advantage creation. Considering Passemard and Calantone (2000), citing Michael Porter. "*Successfully implemented strategies will lift a firm to superior performance by facilitating the firm with competitive advantage to outperform current or potential players ",* we also conclude that competitiveness depends on the companies' capacity to define and implement suitable strategies.

Additionally, taking into account that *"To gain competitive advantage, a business strategy of a firm manipulates the various resources over which it has direct control and these resources have the ability to generate competitive advantage"* (Rijamampianina 2003), and that *"Superior performance outcomes and superiority in production resources reflects competitive advantage"* (Day and Wesley 1988 cited by Lau 2002), which means that the way companies' manage their resources has impact on their performance and therefore on their ability to get competitive advantage, companies' resources are a relevant factor to have in account.

In fact, Vollmann introduced a concept that able companies to consider a more structured view about resources (factors) that should be seen in a correlated interdependency, and has designed the well-known Vollmann Triangle (see Figure 2.8). However, regarding the current circumstances and market dynamics, as well as new concepts and definitions, the foundations of this triangle could be boosted, evolving to a more extensive vision. Indeed we are living in an information society, where big data is already a common concept and knowledge is fundamental to anticipate and create differentiation – therefore suitable strategies; behavior is essential to assure leadership and ethics, as well as to deploy commitment; processes are transversal at all organizational areas and levels; performance evaluation is crucial to reliable decision making; and technology and facilities should be aligned to support all of this factors (resources). Due to the above Cavaco Wheel is a suggestion of an eventual improvement of Vollmann's Triangle (Vollmann et al., 1997).

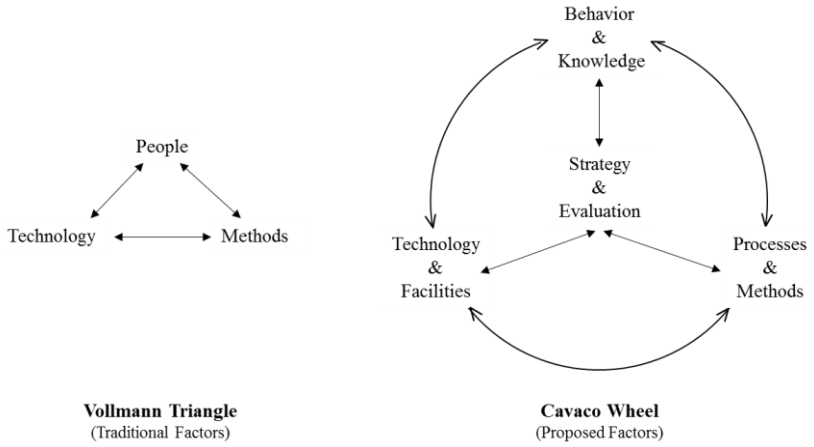


Figure 2.8 - Traditional Vollmann Triangle versus the suggested Cavaco Wheel

2.2.3 Competitive Advantage versus Sustainable Competitiveness

As mentioned, the appearance of new concepts, an inexistence of a clear and universal definition for competitiveness and its measurement, and the accessibility to several strategic tools in a non-integrated approach, cause lack of focus, inefficiencies and are responsible for increase the cost of strategic planning processes. Therefore, two fundamental concepts (competitive advantage and sustainable competitiveness) are important to consider to improve this issue.

According to Michael E. Porter (2008) *"competitive advantage can arise from many sources, and shows how all advantage can be connected to specific activities and the way that activities relate to each other, to supplier activities, and to customer activities."*, it allows a reflection on new factors that contribute to create advantage. There is no doubt that companies aim to be more competitive. On a resources' management perspective, as stated before, it could make sense to establish an alternative definition of competitiveness based on resilience and innovation principles. Nevertheless, resources' management (inputs - efficiency) needs to create results (outputs - effectiveness). So, on this point of view, the measurement of the company's outcomes could establish its advantage (it could be the answer for: "The company is more competitive than what?"). On the other hand, how can we assure that the company is really competitive? If we introduce the concept of sustainable competitiveness, taking into account that sustainability in this context is based on a timeframe principle, it means that we are answering to: "Will the company be more competitive tomorrow than it is today?"

Considering the integration of the two previous concepts, a natural definition of sustainable advantage could be: "for how long is the company able to preserve its competitive advantage?". Once competitiveness should be related with the capacity to be better than competitors, which

means that increasing competiveness should be defined as the capacity to increase their relative competitiveness positioning in comparison with the competitiveness positioning of their competitors, and the fact that it could already include the timeframe principle, through the incorporation of resilience and innovation dimensions, it could be possible to assume "Sustainable" based on sustainability principles. Thus, sustainable advantage is the capacity to preserve the advantage gap based on economic, social and environmental results (according to the triple bottom line principle) and the achievement of this new positioning should establish the competitive advantage of the company, where the gap between the two companies, defines the intensity of this advantage. It is important to be aware that this gap of advantage is continuously under pressure, existing a permanent risk of losing competitiveness. At this point, competitiveness risk evaluation criteria (Lee, Kim, & Park, 2012), appears as a very important concept to consider also.

2.2.4 Sustainability as a competitive factor and a performance measure

Beyond what has already been mentioned, in Porter's view, "*Strategic management should be concerned with building and sustaining competitive advantage"*. - Porter, Michael E. (1985). Additionally, if we take into account that *"Empirically, sustained competitive advantage may, on average, last a long period of calendar time. However, it is not this period of calendar time that defines the existence of a sustained competitive advantage, but the inability of current and potential competitors to duplicate that strategy that makes a competitive advantage sustained."* (Jay Barney, 1991), there is an opportunity to consider sustainability not based on a time perspective, as already assumed above.

So, instead of consider sustainability in terms of time, which means, the aptitude to be competitive today and to maintain that advantage in the future, we could develop an integrated concept based on the fact that time frame of competitiveness should be ensured trough the combination of the capability to be resilient (recover performance in time) and the ability to be innovative (increase performance in time). Under this perspective sustainability should have another purpose.

According to Norman & Macdonald (2004), *"Triple Bottom Line" (3BL) accounting has become increasingly fashionable in management consulting, investing, and NGO circles over the last few years. The idea behind the 3BL paradigm is that a corporation's ultimate success or health can and should be measured not just by the traditional financial bottom line, but also by its social/ethical and environmental performance"* this definition of sustainability could be used as another concept to consider in this research, due to its impact on competitiveness.

Following Graham Hubbard (2009) *"The TBL adds social and environmental measures of performance to the economic measures typically used in most organization"*. It seems to make sense to use this principle to evaluate companies' performance (results). However, *"companies are not planning their organizational changes, i.e. engaging with the 'soft issues' and being proactive, in their journey towards becoming more sustainability oriented. This is shown by the incongruity between the recognized barriers to change and the strategies proposed to overcome them. This incongruity might be one of the causes limiting the incorporation and institutionalization of sustainability in companies"*. (Lozano, 2013). Once again, we conclude that a clear definition of competitiveness is a field of research, however not enough to assure strategic planning practices' successful. Implementation of definitions and concepts need to be supported by systems that allow their real execution.

2.3 Resilience and Innovation

As mentioned, the aim of any company is to achieve and maintain competitive advantage. According to Teixeira and Werther Jr. (2013) *"Apart from the pat answer that innovation is critical to organizational survival, we argue that it is the innovation process and how companies manage it that forms the foundation of a resilient organization"*. It is interesting to notice the establishment of a relation between resilience and innovation. In fact, their findings pointed out that *"resilient organizations not only anticipate the needs of buyers but do so by creating an innovation orientation within the firm's culture, … the competitive advantage is not so much innovation per se but the organization's ability to continuously create competitive advantages based on innovations"*. Therefore, it seems relevant to consider both of these principles.

2.3.1 Resilience Principles

A range of disciplines including materials science, ecology, organizational theory, economics, risk management, sociology, psychology, among others, have been discussed the resilience concept. Although, according to Erol, Sauser, & Mansouri (2010) *"each discipline provides a different definition and a perspective on resilience, the common aspect among these definitions is that resilience is a response to unexpected or unforeseen changes and disturbances, and an ability to adapt and respond to such changes"*.

Regarding Fiksel (2003), there are four system characteristics that contribute to resilience, as shown in Table 2.4.

Table 2.4 - System Characteristics, which contribute to Resilience – Adaptation from (Fiksel, 2003)

System Characteristics	How the characteristics contribute to Resilience
Diversity	Through the existence of redundancies within the states and with the availability of new states, namely alternatives for products, suppliers, processes, facilities, and resources
Cohesion	Through the existence of unifying relationships among entities supporting the effort to sustain the current state or to change to a new state without network rupture
Adaptability	Through the ability to adapt effectively to new states through operations restructuring and strategies alignment between entities
Efficiency	Through the competence and with the ability to sustain performance with modest resource consumption.

Nevertheless, the characteristics above, the important question is: how can a company increase its resilience? Rice and Caniato (2003) state that resilience increase can be obtain by building redundancy or developing flexibility, see Table 2.5.

Table 2.5 - Capabilities to increase Resilience - Adaptation from (Rice and Caniato, 2003) and (Sheffi and Rice, 2005)

Redundancy	Flexibility
Maintaining capacity to respond to disruptions, largely through investments in capital and capacity prior to the point of need, which means, including excess of capacity requirements	Investments in infrastructure and resources before they actually are needed. Flexibility entails restructure previously existing capacity, which implies, for example, multi-skilled workforce, designing production systems that can accommodate multiple products and real-time changes, adopting strategies to allow responsiveness to changes, …

However, according to Carvalho, Azevedo, and Cruz-Machado (2012), other capabilities should be considered, namely: Visibility, Responsiveness/ Velocity, Collaboration and Competence/ Efficiency.

In Erol et al. (2010) opinion there are external influences (disruptive events, emerging business requirements and changing business environment) and internal characteristics/ capabilities (adaptability, agility, flexibility and connectivity). Taking into account this point of view and the SME's resilience and competitiveness factors mentioned by Gunasekaran, A., Rai, B. K., & Griffin, M. (2011) it is possible to compile resilience and competitiveness characteristics and factors, as shown in Figure 2.9.

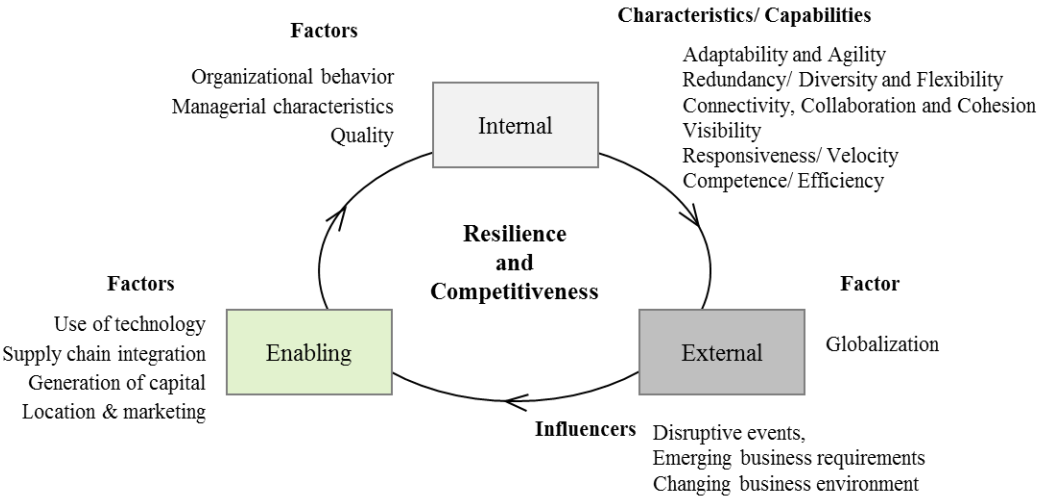


Figure 2.9 - Resilience and competitiveness characteristics/ capabilities and factors

Nevertheless, resilience can be approached on a strategic and also on an operational perspective. Nascimento and Cruz-Machado (2014) defined a conceptual model of strategic resilience based on 12 components (see Figure 2.10).

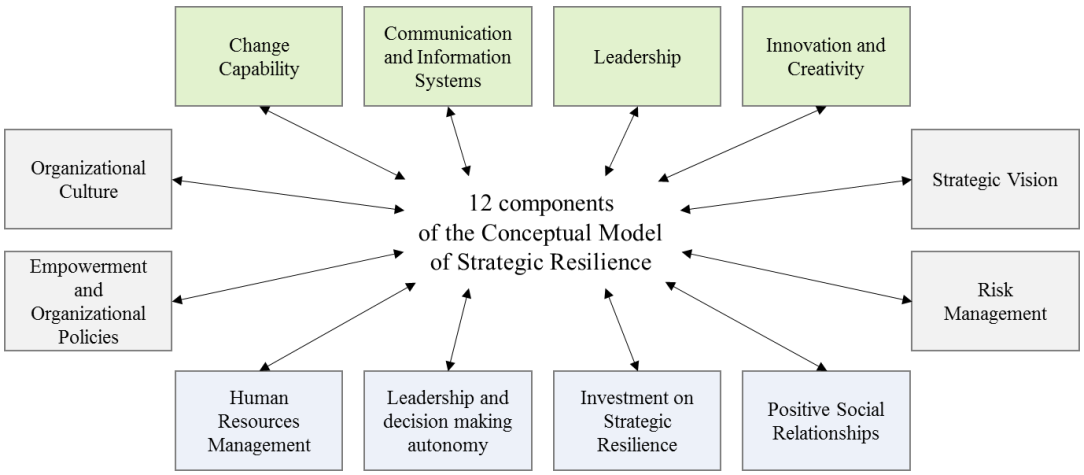


Figure 2.10 - Conceptual Model of Strategic Resilience - Adaptation from (Nascimento and Cruz-Machado, 2014)

Due to its increasing importance, resilience concept has been recently developed and had attract the attention of international standard bodies, namely BSI (British Standard Institute) and ISO (International Organization for Standardization), which established guidelines for Resilient Organizations (BS 65000 and ISO 22316, respectively). In accordance to this standards (*www.bsigroup.com*; *www.iso.org*), three domains are critically important in achieving organizational resilience in both large and small companies, in concrete: Operational Resilience; Supply Chain Resilience and Information Resilience. Additionally, the qualities of

resilient organizations are: Strategic Adaptability – to handle changing circumstances successfully; Agile Leadership - to take measured risks with confidence and to respond quickly and appropriately to opportunities and threats; and Robust Governance – accountability across organizational structures, based upon a culture of trust, transparency and innovation, remaining true to their vision and values. Finally, they assume that building a resilient organization comprises three fundamental elements: Product Excellence (product, service or solution) – their capabilities to match markets' requirements and comply with their regulatory environment; Process Reliability - embedding best practices ensuring that they 'do the basics right' consistently through the strength and reliability of their processes (R&D, manufacturing, supply chain, quality, environment, health and safety, information security and business continuity must be robust and compliant), while still leaving scope for innovation and creativity; and People Behavior - alignment between customer expectations and employee engagement, encouraging employees' behavior to become an integral part of their job and their organization's culture. According to Ponomarov & Holcomb (2009) and Caralli, Allen, & White (2010) resilience is an important issue concerning risk management and companies' supply chain. Carvalho, H., & Machado, V. C. (2007) designed the principles to create resilient Supply Chains, based on a framework which considers the *"... following variables and respective inter-relationships: disturbance negative effects, performance loss, resilient practices and capabilities"*, where these *"... variables are related to resilient practices that companies use to avoid or minimize the disturbances negative effects"*. Their framework assumes that for *"... each failure mode, state variables can be combined to obtain a surrogate measure for failure mode severity and recovery time", considering the resilience triangle"*, as shown in Figure 2.11. (Carvalho, H., & Machado, V. C., 2012).

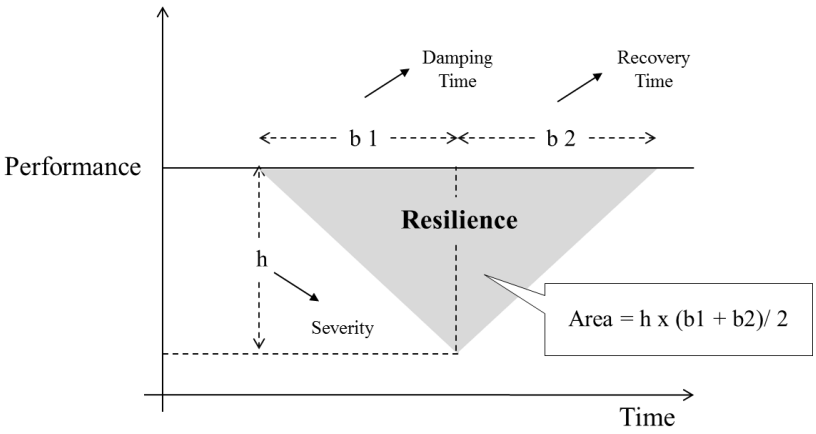


Figure 2.11 - Resilience Triangle - Adaptation from Carvalho, H., & Machado, V. C., 2012

The Resilience Triangle concept arises from Tierney and Bruneau (2007) disaster research, and represents the loss of functionality due to damage and disruption, allowing the visualization of the magnitude of the disturbance negative impact on system performance. The depth of the triangle (h) shows the severity or magnitude of loss damage, i.e., the disturbance severity, and the length of the triangle (b) shows the damping time (b1) and the recovery time (b2).

The smaller the triangle is, the more resilient the system is. According to Ta, Goodchild, and Pitera (2009) companies' actions, behaviors, properties and networks all contribute for reducing the resilience triangle area. In this sense, and considering Carvalho, Tavares, and Cruz-Machado (2012) *"the aim of the resilient practices has two manifolds: i) to recover the desired values of the states of a system that has been disturbed, within an acceptable time period and at an acceptable cost;* and *ii) to reduce the effectiveness of the disturbance by changing the level of the effectiveness of a potential threat"*.

It is possible to conclude that *"Resilience is not simply a matter of building resilient capabilities, but it is related to the balance between capabilities and vulnerabilities that may promote a company's true competitive advantage"* (Pettit, Fiksel and Croxton, 2010).

2.3.2 Innovation Concepts

Innovation has been assumed as a critical component for companies' differentiation, as well as a key factor to achieve competitive advantage. According to Peter Drucker (2004) *"Innovation is the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture started by a lone individual in the family kitchen. It is the means by which the entrepreneur either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth"*

He also argues that "*What all the successful entrepreneurs … have in common is not a certain kind of personality but a commitment to the systematic practice of innovation"* namely *"the effort to create purposeful, focused change in an enterprise's economic or social potential"*.

He introduced the principle of systematic innovation by stating that*" most innovative business ideas come from methodically analyzing seven areas of opportunity, some of which lie within particular companies or industries and some of which lie in broader social or demographic trends*." (see Figure 2.12).

However, *"Once you've identified an attractive opportunity, you still need a leap of imagination to arrive at the right response, call it "functional inspiration"*.

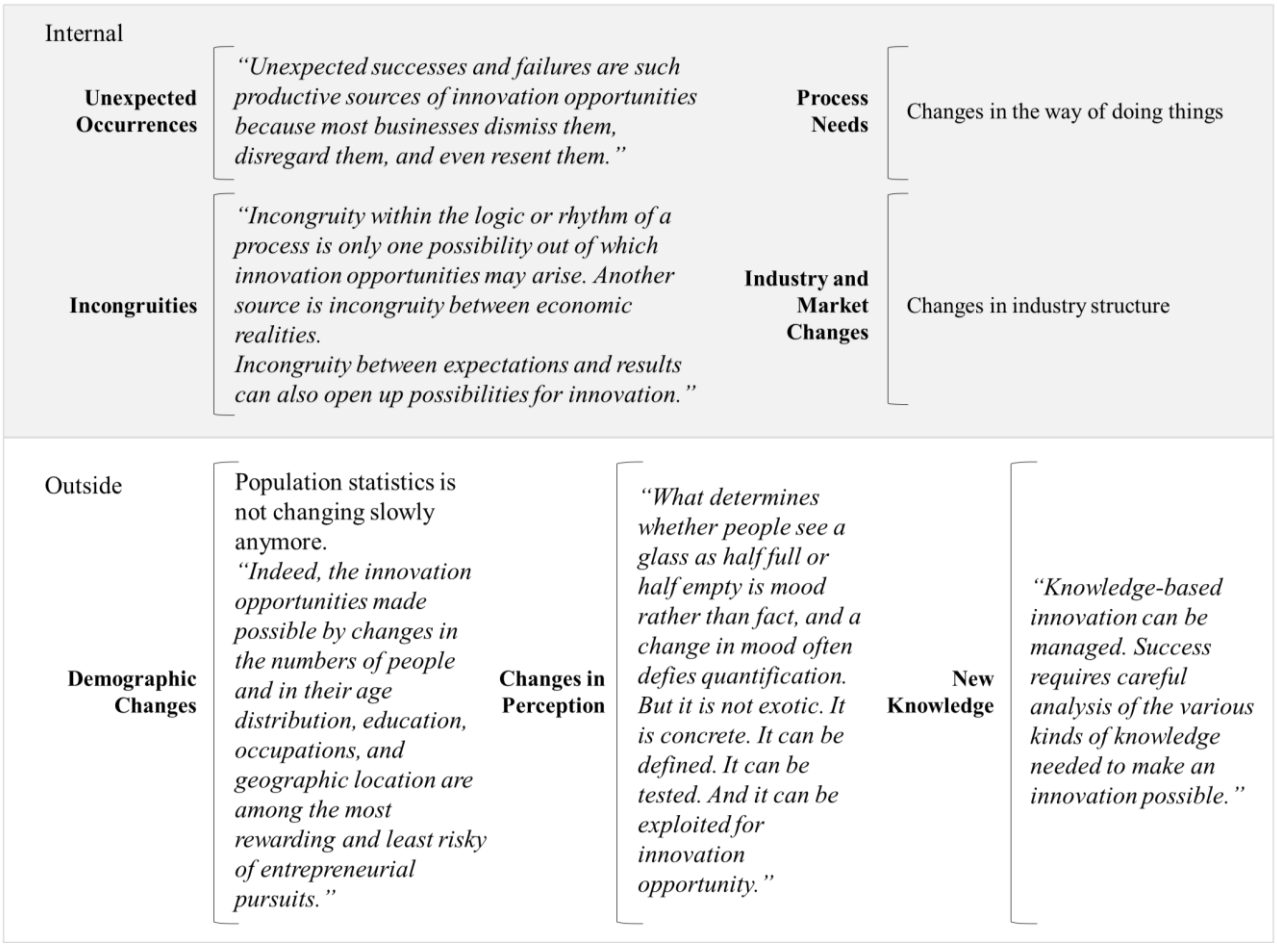


Figure 2.12 - Sources of innovation opportunities – adaptation from Peter Drucker, 2004

Taking into account these sources of innovation opportunities, a systematic innovation approach can be held considering the innovation value chain (*"innovation as a chain of linked activities — from generating new ideas through to commercializing them successfully"*, namely based on *"Generating ideas inside; Generating ideas outside; Cross-pollinating ideas inside; Selecting promising ideas; Developing ideas into products/ services, and; Diffusing proven ideas across the company"* (Julian Birkinshaw, Cyril Bouquet and J.-L. Barsoux, 2011).

Still according to these researchers, for a successful innovation approach it is important to understand the five Innovation Myths and to be aware about six Innovation Drivers (see Table 2.6).

Table 2.6 - Innovation Myths and Drivers - Adaptation from Julian Birkinshaw, Cyril Bouquet and J.-L. Barsoux, 2011

5 Innovation Myths		6 Innovation Drivers	
The Eureka Moment	*"Most innovation efforts fail not because of a lack of bright ideas, but because of a lack of careful and thoughtful follow-up. Smart companies know where the weakest links in their entire innovation value chain are, and they invest time in correcting those weaknesses rather than further reinforcing their strengths."*	Shared under-standing	*"Sustained innovation is a collective endeavor built on a shared sense of what the company is becoming — and what it is not becoming. It is also about creating a culture to support innovation — for example, by destigmatizing failure and celebrating successes."*
Build it and they will come	*"Online forums are not a panacea for distributed innovation. Online forums are good for capturing and filtering large numbers of existing ideas; in-person forums are good for generating and building on new ideas. Smart companies are selective in their use of online forums for innovation."*	Alignment	*"Besides promoting values that support innovation, organizations also have to address structural impediments (such as silos) and realign contradictory systems and processes."* *It is necessary to create a positive environment to experiment ideas.*
Open innovation is the future	*"External innovation forums have access to a broad range of expertise that makes them effective for solving narrow technological problems; internal innovation forums have less breadth but more understanding of context. Smart companies use their external and internal experts for very different types of problems."*	Tools	*"Employees need the training, concepts and techniques to innovate."*
Pay is paramount	*"Rewarding people for their innovation efforts misses the point. The process of innovating - of taking the initiative to come up with new solutions — is its own reward. Smart companies emphasize the social and personal drivers of discretionary effort, rather than the material drivers."*	Diversity	*"Innovation requires a degree of friction. Bringing in outsiders — new hires, experts, suppliers or customers — and mixing people across business units, functions and geographies helps spark new ideas."*
Bottom-up innovation is best	*"Bottom-up innovation efforts benefit from high levels of employee engagement; top-down innovation efforts benefit from direct alignment with the company's goals. Smart companies use both approaches, and are adept at helping bottom-up innovation projects get the sponsorship they need to survive."*	Interaction	*"Organizations need to establish forums, platforms and events to help employees build networks and to provide opportunities for exchange and serendipity to happen."*
		Slack	*"Employees need some access to slack resources, not least in terms of timeout from their regular activities to experiment and develop new ideas. This also requires focus — both personal and organizational — on eliminating nonvalue-adding activities."*

Since the above, it is clear that innovation should be considered a continuous process properly aligned with the company's corporate strategy. Therefore, concepts like strategic innovation and business innovation, appear naturally as fundamental principles to obtain sustainable innovation.

According to Mohanbir Sawhney, et al. (2006), "*business innovation is the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system"*. Their findings pointed out 12 dimensions of business innovation ("the

innovation radar"), anchored by *"the offerings a company creates, the customers it serves, the processes it employs and the points of presence it uses to take its offerings to market"*. Assuming strategic innovation as a competitive advantage asset, according to Berghman, Matthyssens, Streukens, & Vandenbempt (2013), learning mechanisms are a way to develop strategic innovation capacity. In fact, *"they are three deliberate learning innovation contributing positively and significantly to the advance of an organization's strategic innovation capacity"*, namely: recognition, assimilation and exploitation (see Figure 2.13).

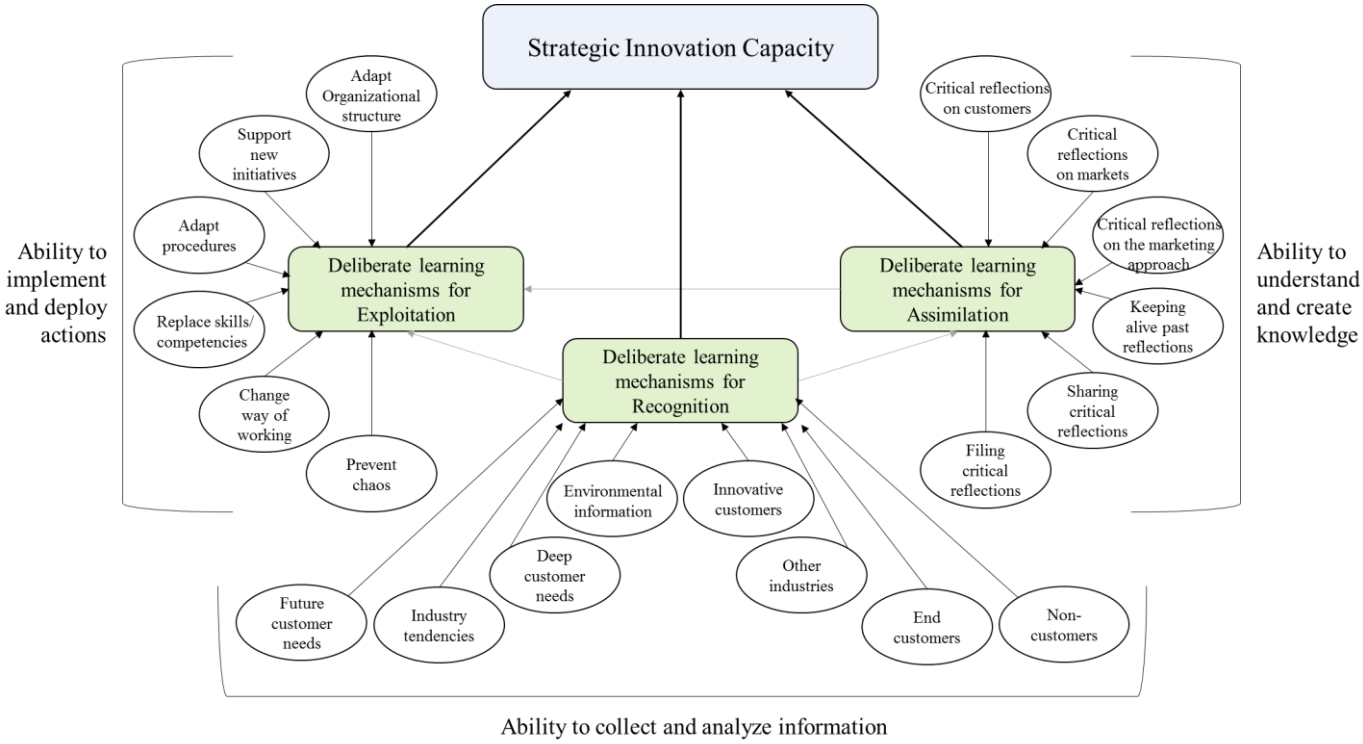


Figure 2.13 - Learning mechanisms to advance companies' strategic innovation capacity - Adaptation from Berghman, Matthyssens, Streukens, & Vandenbempt, 2013

Along of these definitions, other concepts are being increasingly recognized by companies as value creation principles and capable to introduce a broader definition of innovation, aiming business models and processes innovation instead of the traditional approach only focused on product innovation or technological advancement (Markides, 2006; Govindarajan and Kopalle, 2006).

In concrete these concepts are Disruptive Innovation (Christensen, C.M., Overdorf, M., 2000; Yu and Hang, 2010) - the ability to *"deviate from, or even actively alter, the industry rules of the game, in order to offer new and substantially superior customer value, avoiding a total reliance on "lucky shots" and/or to better spread risks"* (Berghman et al., 2013); and Open Innovation – the capacity to *"harness outside ideas to advance their own businesses while leveraging their*

internal ideas outside their current operations" (Henry W. Chesbrough, 2003). Major differences between open innovation and closed innovation are mentioned in Table 2.7.

Table 2.7 - Differences between open and closed innovation principles - Adaptation form Henry W. Chesbrough, 2003

Closed Innovation	Open Innovation
"The smart people in our field work for us"	*"Not all of the smart people work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company"*
"To profit from R&D, we must discover, develop and ship it"	*"External R&D can create significant value; internal R&D is needed to ourselves. Claim some portion of that value"*
"If we discover it ourselves, we will get it to market first"	*"We don't have to originate the research in order to profit from it"*
"If we are the first to commercialize an innovation, we will win"	*"Building a better business model is better than getting to market first"*
"If we create the most and best ideas in the industry, we will win"	*"If we make the best use of internal and external ideas, we will win"*
"We should control our intellectual property so that our We should profit from others' use of our IP, and we should buy others' competitors don't profit from our ideas"	*"Intellectual property whenever it advances our own business model"*

Nevertheless, to strive for sustainable innovation, companies must adopt a Total Innovation Management approach (TIM), which includes all elements of innovation, all innovators, and innovation in all times and spaces (Jin, X. Qingrui. et all., 2006), and evolve from a Structural Innovation Paradigm (SIP) - innovation *"based on solving customer problems and needs "better, faster and cheaper" than competitors through structural changes to a company's business system"* to an Embedded Innovation Paradigm (EIP) (Erik Simanis and Stuart Hart, 2009). EIP can be assumed as an even more demanding open innovation approach, once its *"strategic intent is to establish a durable base of competitive advantage through business model intimacy"* and *"entails the creation of new communities, where "community" consists of diverse people working together to create and sustain interdependent lives"*.

EIP consists of the following three core attributes:

- Latent potential focus – *"latent potential exists within today's diverse economies, formal and otherwise, for generating an infinite number of new varieties and forms of business enterprise and markets"*;
- Relationship-based value – *"relationships between people, places and things create the context from which community members define themselves and create their aspirations"*;

- Transformational stakeholder engagement – *"new stakeholder behavior, habits and identities necessary for realizing a new enterprise and strategic community intent"*.

Despite the above, according to Muge Ozman (2011), open innovation should be applied along the industry life cycle. Considering Vernon's (1966) Product Life Cycle (PLC) - cited by Magee, S. P. (1977), based on the classical S-curve pattern, which illustrate the innovation diffusion (*"the progress of product/process innovations along the stages of introduction, growth, maturity and decline"*), the innovation life cycle model (A-U model) developed by Abenarthy and Utterback, 1978 (also based on four stages), as well as the innovation lifecycle framework of Dismukes, Bers and Sekhar (2012) - structured into six-periods - it is possible to establish a relation between innovation adoption/ performance or competitive advantage and time (J. Hinks, M. Alexander, G. Dunlop, 2007). In fact, products, processes and business innovation (translated into results or achievements – performance) can be compared to the S-curve behavior, and its replication over time (Kevin Kelly, 2011), can assume the principle of continuous innovation (Irani & Sharp, 1997; Chapman & Corso, 2005), which is *"the ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, exploitation and exploration"* (Boer, H. and Gertsen, F., 2003) - see Figure 2.14.

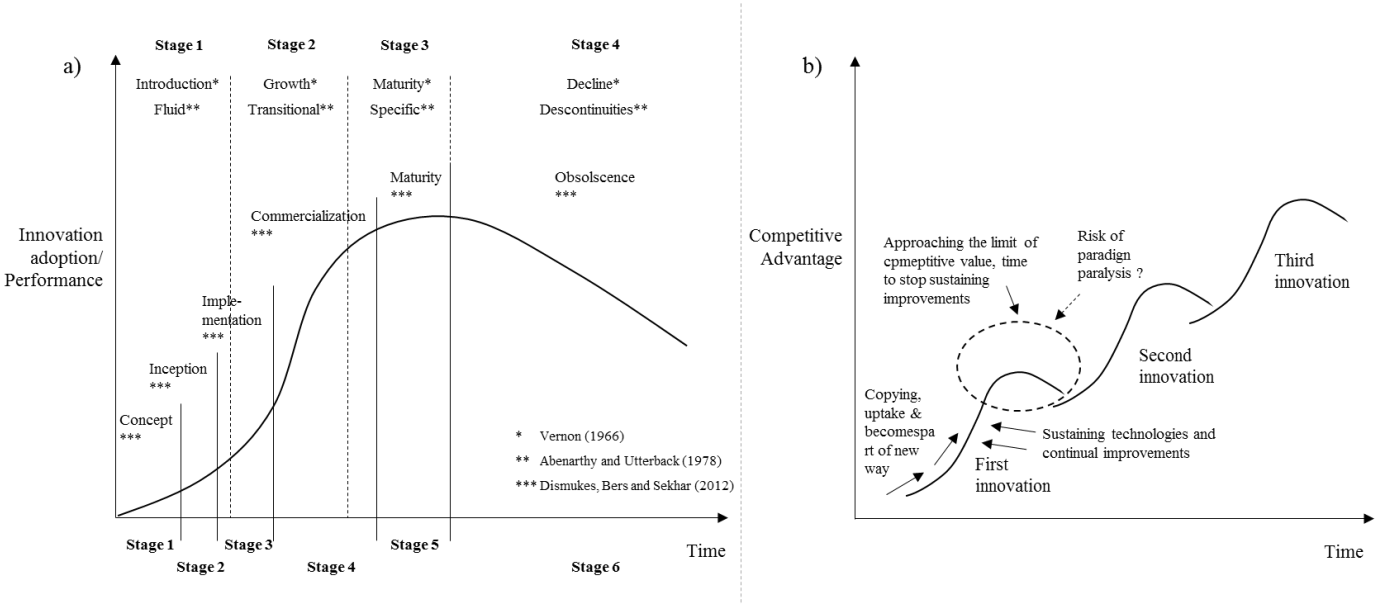


Figure 2.14 - a) Innovation S-curve - adaptation from Vernon (1966), Abenarthy and Utterback (1978) and Dismukes, Bers and Sekhar (2012); b) Continuous innovation S-curve behavior, adaptation from Kevin Kelly (2011) and J. Hinks, M. Alexander, G. Dunlop (2007)

Considering the assumptions above and making an analogy with the Resilience Triangle (see Figure 2.11), we can theoretically assume the following Innovation Triangle (Figure 2.15).

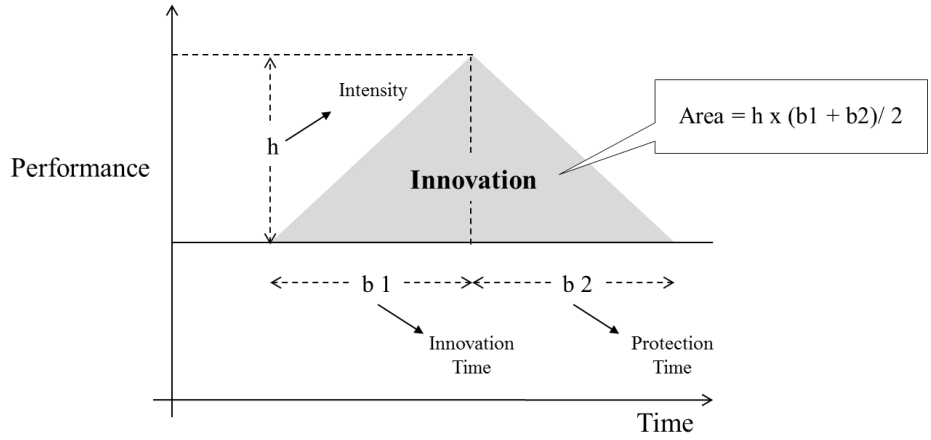


Figure 2.15 - Innovation Triangle

The Innovation Triangle allow the visualization of the innovation's impact on performance, taking into account the intensity (h) of innovation applied during the time expend on the development of new products, processes or on changing the business (innovation time – b1), as well as the capability to maintain this innovation as a market value (translated into competitive advantage) during the time of decline (protection time – b2). It seems that innovation is without any doubt a critical approach that any company concerned to achieve competitive advantage must apply in a systematic way. In spite its complexity, it involves careful judgment and a deep understanding of the particular challenges a company is facing, as well as a completely cultural change, where not only mistakes are accepted, but where is made a concerted effort to learn from them, turning mistakes into assets.

2.4 Business Management Approaches and Improvement Methods

With more or less awareness about concepts like resilience or innovation, companies have been applied different approaches and methods to develop and to improve their businesses. From strategy principles till more operational tools, there are a wide range of frameworks that can be used by companies to increase business performance and to obtain more efficiency and effectiveness. Some of the main approaches are:

- Organizational an strategy oriented - like Leadership and Learning Organization principles, BSC (Balanced Scorecard), TQM (Total Quality Management) and BPR (Business Process Reengineering), as well as international standards (ISO 9000 – quality management, ISO 14000 – environmental management, ISO 45000 or OHSAS 18000 –

Occupational health and safety management, ISO 26000 or SA 8000 – social responsibility) and EN15221-1 – facilities management;

- Evaluation focused - as EFQM (European Foundation for Quality Management), Shingo Prize, GRI (Global Reporting Index) and DJSI (Dow Jones Sustainability Index);
- Operational concerned - like $SCM_{(2)}$ (Supply Chain Management), APICS SCC's frameworks, Lean Management, Kaizen, TPS (Toyota Production System), Six-Sigma, LARG Model, TRIZ (Theory of Inventive Problem Solving), DEA (Data Envelopment Analysis) and Project Management (PMI).

Susana Duarte, V. Cruz-Machado (2013), developed a conceptual framework for the evaluation of a lean and green organization`s supply chain, based on a comparison study of 12 business models and where they conclude that a *"number of categories are common in most management frameworks, providing adequate conditions"* for other approaches, namely *"for a lean and green supply chain transformation"*. Taking this finding into account, all of the above approaches and methods are relevant to consider when developing an alternative model of sustainable competitiveness, because all are consolidated tools with important inputs that can be complementarily applied on a single framework, sustaining its features, requirements, demands and criteria. Hereby we mention the most worldwide recognized.

2.4.1 Leadership and Organizational approaches

Companies to increase commitment and business results achievement have adopted leadership principles. In fact, its importance is assumed as a critical issue for any company to be competitive, being an issue of intense research to clarify types of leadership, leadership skills, how to develop leaders, etc. A long list of researchers and models can be mentioned on this field, however for the purpose of this dissertation it is only relevant to understand the concept and to identify the most relevant features that can be applied on a sustainable competitiveness model. Mumford et al. (2000) argued that *"leadership involves a complex form of social problem solving in which a leader's performance is associated with his or her ability to sense the need for change, identify goals, construct viable solution paths, and do so by understanding the complexity of the internal and external environment"*. Nevertheless, Bass and Avolio (1994) introduce the concept of Transformational Leaders, assuming that this kind of leaders *"motivate others to do more than they originally intended and indeed often more than they thought possible. Team spirit is aroused. Enthusiasm and optimism are displayed. They enable their staff to overcome, to break through,*

to see beyond the limitations of their organization: they 'stimulate their followers' efforts to be innovative and creative by questioning assumptions, re-framing problems, and approaching old situations in new ways". Which allow concluding that transformational leaders should have vision, be results-oriented, able to share knowledge, to communicate, delegate and to give feedback, capable to motivate and to recognize merit, to solve problems and conflicts and to energize and promote positive environments.

To do so, it is needed some charism, values, knowledge and emotional intelligence. In this line of thought, strategic leadership concept emerges, where according to Klimoski & Koles (2001) organizations become a reflection of their top managers. Nevertheless, regarding Stephen Covey (1989), they are 7 habits that make people highly effective, namely: *"Be Proactive; Begin with the End in Mind; Put First Things First; Think Win-Win; Seek First to Understand, Then to be Understood; Synergize, and; Sharpen the Saw (balance and renew your resources, energy, and health to create a sustainable, long-term, effective lifestyle)."*, and according to McKee, R.; Carlson, B. (1999) leaders possess a number of common qualities (see Table 2.8).

Table 2.8 - Leadership common qualities (McKee, R.; Carlson, B., 1999)

Leadership skills	Description
Self-awareness	*"Knowledge of your own values, passions, skills, strengths and weaknesses, an ability to admit and learn from mistakes and to seek information to fill knowledge gaps."*
Integrity	*"A strong sense of "what is right" and a demonstration of ethical practices that sets the tone for others. A commitment to teaching by example."*
Courage	*"The strength to act in accordance with your own values and the greater good despite pressures pushing you in other directions. The ability to put the cause before the desire to be popular."*
Confidence	*"A belief in your ability to meet most challenges that come your way"*
Vision	*"A strong sense of where you are going as a person and where you think society, your community and your organization should be going – and how it might get there."*
Enthusiasm	*"A lively interest in the people, issues and events around you, a feeling of excitement about the possibilities, and the energy to guide them towards fruition."*
Innovation	*"The ability to "think outside the box;" take risks and develop new and effective solutions to old and emerging problems"*
Wisdom	*"Intelligence coupled with insight and empathy, as opposed to raw intelligence."*
Adaptability	*"A willingness to be flexible and to respond quickly and effectively to changing circumstances, along with a commitment to continual learning – formal and informal – and the ability to put that learning into practice."*
Strong inter-personal skills	*"An ability to interact and work harmoniously with others, while being prepared to take on individual responsibilities."*
Effective communication	*"A willingness and ability to listen to and understand the thoughts, ideas and concerns of others and to clearly communicate your own. A vision is nothing if it can't be sold to others."*
Belief in others	*"The desire to build the capabilities of others, praise them where appropriate, go into bat for them when appropriate, provide them with helpful feedback and motivate them to do their best."*
Peer respect	*"An ability to inspire respect, allowing a person to capably lead discussions, maintain discipline and encourage the contribution of others."*

Insight	*"The ability to see the big picture, a strong sense the stage attained by followers and intuits problems before they arise or before they become insurmountable."*
Sense of humor	*"The ability to laugh at yourself and relieve tense or stressful situations with humor."*
Competence	*"Others are unlikely to follow the lead of a person who does not appear to know what s/he is doing."*
Delegation skills	*"A willingness to trust others and cede some responsibility."*
Spiritual sensitivity	*"Is the key to a better communication with others, but primarily towards a better understanding of privacy. It marks your positive attitude in life, determines you to seek and to focus on what it is right and not on what it is wrong. Also, it indicates that you are a wonderful person with a rich spiritual life."*

And also can be defined through seven leadership styles (see Figure 2.16).

On other hand, people are embedded in companies' organization and on this field it is relevant to take into account new concepts and organizational models like HRO's - High Reliability Organizations, which according to La Porte and Consolini (1991) are companies that constantly face a high risk of failure, consistently achieve high levels of reliability, as well as *"have reluctance to simplify, sensitivity to operations, commitment to resilience, and deference to expertise"* (Weick et al., 1999).

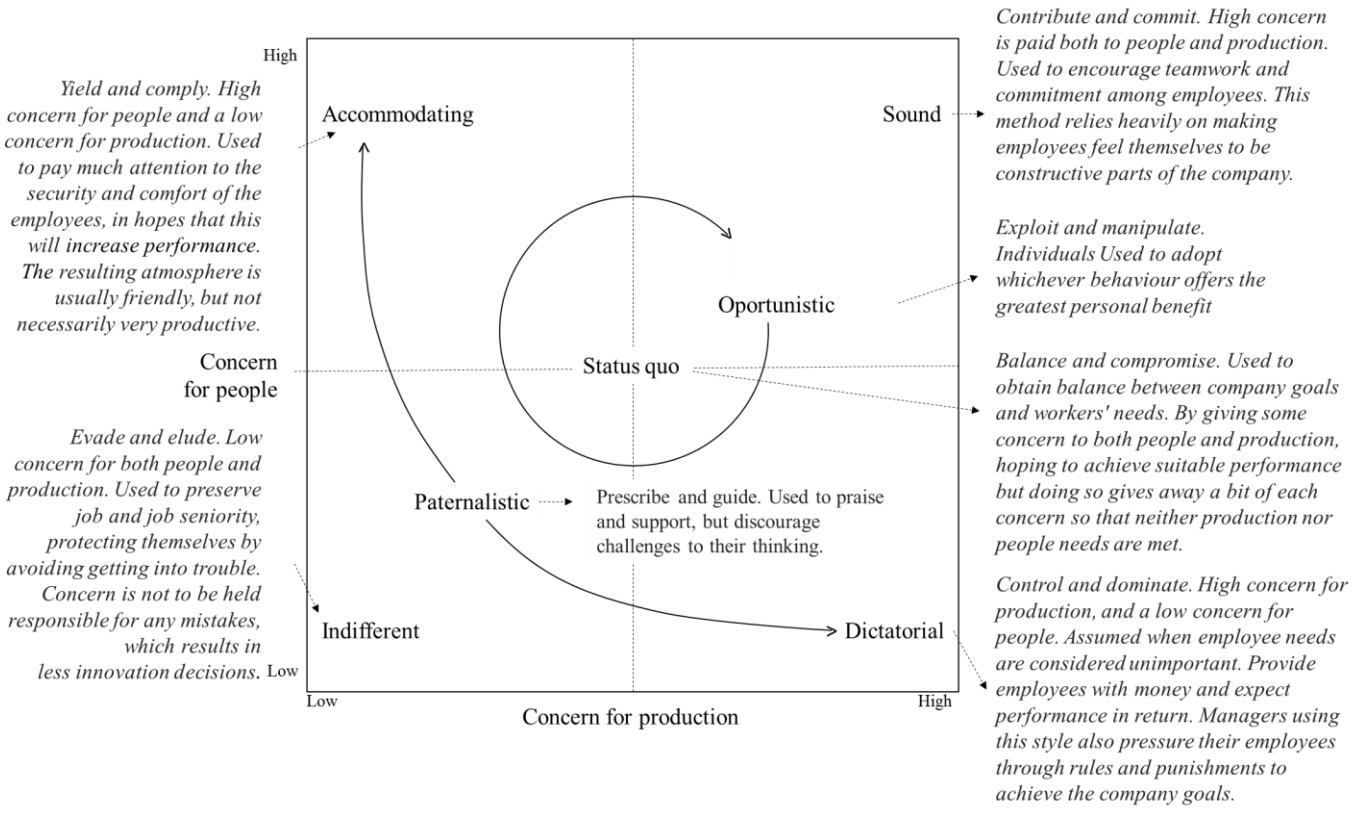


Figure 2.16 - Leadership styles. Adaptation from McKee, R.; Carlson, B., 1999 (managerial grid - The Power to Change)

Salanova et al. (2012), improved this concept and come up with HERO (HEalthy and Resilient Organization) model, assuming that these are companies that are able to face crises and big challenges, with high levels of resilience and capable to learn from disturbances. On this perspective, the process of learning introduces another significant concept, which is the Learning Organization (Zollo and Winter, 2002), where the knowledge management has a crucial role. According to Cheng and Van de Ven (1996) first-order learning concerns *"refinement, efficiency, improvement and exploitation"* (e.g.: *"detecting and correcting quality defects"*) and second-order learning involves *"search, experimentation, innovation and exploration"* (e.g.: *"understanding the underlying causes of problems and discovering the norms and values behind actions"*). Considering the above, it is easy to conclude that organizational models, as well as the leadership environment are critical factors to drive companies to resilience, innovation and therefore to sustainable competitiveness.

2.4.2 EFQM Model and Shingo Prize

Nowadays customers are even more demanding and quality attribute is no longer the only decision maker factor. A combination of properties is the drive of customers choose and its retention, in concrete time, price, post-sales services, relationship, ethics, social and environmental commitment, and also quality. In this point of view, quality control and quality management (ISO 9001) are not able to satisfy customers expectations, therefore total quality management arise to fulfill this gap and to establish a global overview promoting excellence. It was in this context that models like EFQM (European Foundation for Quality Management) and the similar Baldrige Excellence Framework (Baldrige Award) appeared, as well as the Shingo Prize model.

Established in 1991 and translated into an award, the EFQM model[18] can be assumed has an assessment process, based on measurable criteria (with an assessment procedure - RADAR tool), structured in 9 dimensions, where means (leadership, people, strategy, partnerships and resources, as well as processes, products and services) should be properly managed in and efficient way to provide positive impacts on companies' performance (expressed by people, customer and society satisfaction, motivation and recognition, as well as by business financial and commercial results), as shown in Figure 2.17.

[18] www.efqm.org

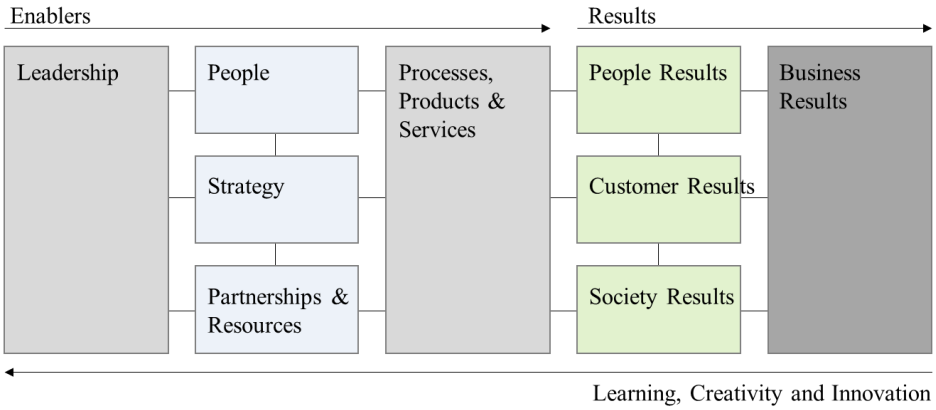


Figure 2.17 - EFQM Model

The first version of Shingo Prize was launched in 1988, and called the Shingo Prize for Excellence in Manufacturing. However, currently this evaluation framework (also translated into an award) evolved to a global enterprise perspective. The Shingo model[19] includes: i) principles of operational excellence (Shingo House), founded on 4 dimensions, each of them held by guiding principles and supporting concepts, and ii) the transformational process (transforming a culture) as shown in Figure 2.18. Similarly, to EFQM, also Shingo Prize has an assessment process and tool (Scoring Matrix), allowing companies' measurement by each of its dimensions and criteria.

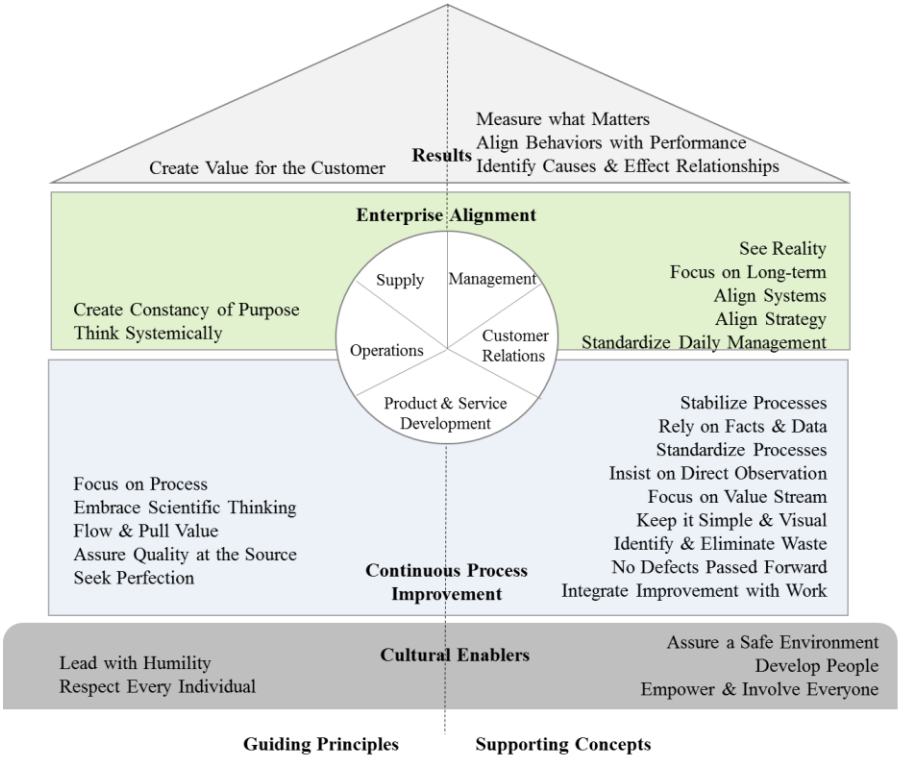


Figure 2.18 - Shingo Prize (Principles of Operational Excellence)

[19] www.shingoprize.org

2.4.3 Balanced Scorecard principles

With the concern of promoting companies' organizational alignment with strategic goals, (Kaplan and Norton, 1996) argued that *"companies are unable to manage what they can't measure"* and developed the Balanced Scorecard principle. Later on they design the Strategy Map and defined *"performance = strategy map (description) + BSC (measurement) + strategy-centred organisation (management)"* (Kaplan and Norton, 2004 and 2005). Currently BSC is one of the most known approaches by managers and its added value is unquestionable, due to its *"great success in the professional and academic world when aligning competitiveness indicators with business objectives"* (Oztaysi, Kaya, and Kahraman, 2011). According to Cao, Zhao, Yang, & Xiong (2015) *"a performance indicator system based on balanced scorecard is the vertical breakdown proceeding from the strategy, it neglects considering the collaborative relationship between the upstream and downstream departments"*, what shown its powerfulness. The BSC is a measurement system that, based on the strategic objectives, is able to deploy those into operational targets (at all organizational levels), as well as into employees targets, structured in 4 perspectives (by nature of each indicator), namely: Financial, Customer/Market; Internal Business Processes and Learning & Growth. Through its Strategic Mapping it is possible to establishing cause-effect relationships between indicators (KPI -Key Performance Indicators, or other appropriate indicators' designation), and to link indicators to initiatives, which drive to targets achievement. Although not focus on strategic or enterprise evaluation, once it's starting point requires already the companies' strategic objectives, BSC is a frame that translates strategy into action (see Figure 2.19).

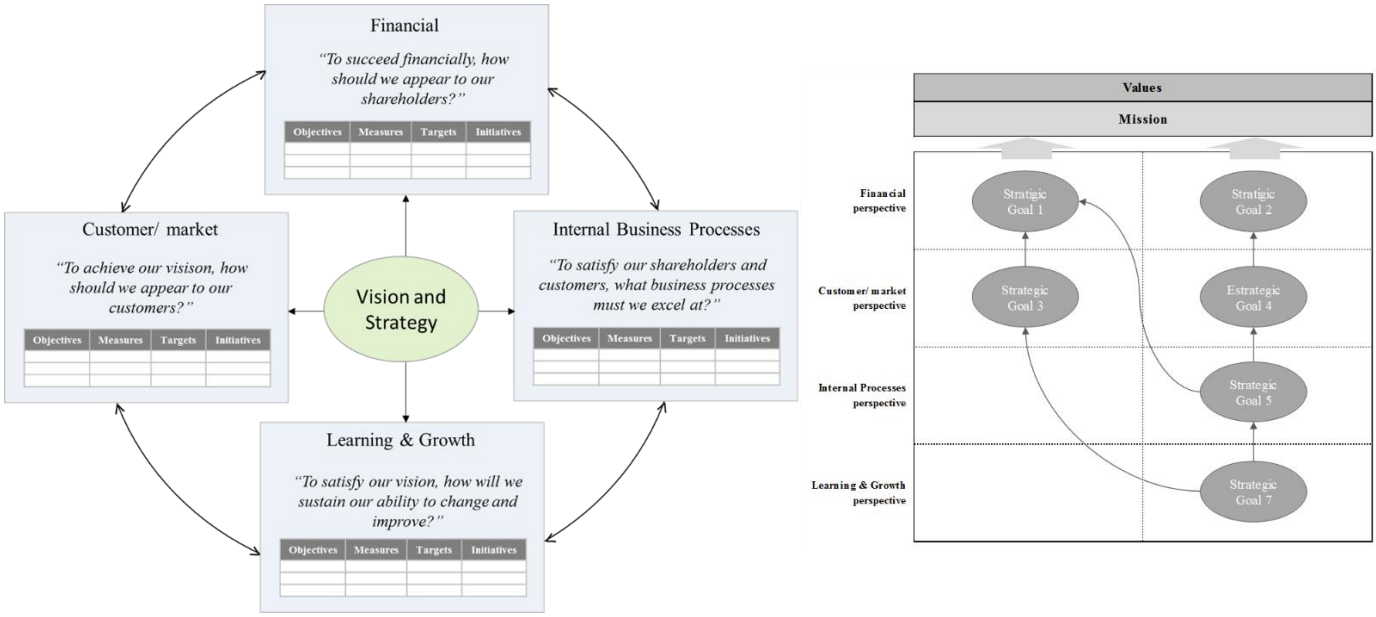


Figure 2.19 - Balanced Scorecard perspectives and Strategy Map - illustrative (Kaplan and Norton, 2004a)

2.4.4 GRI and Dow Jones Sustainability Index

Other relevant approaches that contribute to companies' evolution, progress and competitiveness increase are the GRI - Global Report Index[20] and DJSI – Dow Jones Sustainability Index [21], both assessment framework with qualitative evaluation and quantitative measurement focus. Either GRI or DJSI are mostly oriented to sustainability principles (based on Triple Bottom Line concept) and include a wide range of assessment criteria (see Table 2.9 and Table 2.10).

Table 2.9 - GRI assessment categories

Economic	Environmental		
· Economic performance · Market presence · Indirect economic impacts · Procurement practices	· Materials · Energy · Water · Biodiversity · Emissions	· Effluents and waste · Products and services · Compliance · Transport · Overall	· Supplier environmental assessment · Environmental grievance mechanisms
Social			
Labor Practices and Decent Work	Human Rights	Society	Product responsibility
· Employment · Labor/management relations · Occupational health and safety · Training and education · Diversity and equal opportunity · Equal remuneration for women and men · Supplier assessment for labor practices · Labor practices grievance mechanisms	· Investment · Non-discrimination · Freedom of association and collective bargaining · Child labor · Forced or compulsory labor · Security practices · Indigenous rights · Assessment · Supplier human rights assessment · Human rights grievance mechanisms	· Local communities · Anti-corruption · Public policy · Anti-competitive behavior · Compliance · Supplier assessment for impacts on society · Grievance mechanisms for impacts on society	· Customer heath and safety · Product and service labeling · Marketing and communications · Customer privacy · Compliance

Table 2.10 - DJSI assessment criteria

Corporate Governance	Risk & Crisis Management	Codes of Conduct/ Compliance/ Corruption & Bribery	Supply Chain Management
· Board Structure · Non-Executive Chairman/ · Lead Director · Board Nomination Process · Gender Diversity · Responsibilities & Committees · Board Effectiveness	· Risk Governance · Risks Correlation · Sensitivity Analysis and Stress Testing · Emerging Risks	· Codes of Conduct: Focus · Codes of Conduct: Systems/ Procedures · Corruption & Bribery: Scope of Policy · Codes of Conduct/ Anti-Corruption & Bribery: Business Relationships	· Awareness · Risk Exposure · Risk Management Measures · ESG Integration in Supply Chain Management Strategy

[20] www.globalreporting.org
[21] www.sustainability-indices.com

Corporate Governance (cont.)	Risk & Crisis Management (cont.)	Codes of Conduct/ Compliance/ Corruption & Bribery (cont.)	Supply Chain Management (cont.)
· Executive Compensation – Success Metrics & Vesting · Transparency of Executive Compensation · Disclosure of Median or Mean Compensation of Employees & CEO · Management Ownership Requirements · Corporate Governance	· Risk Culture · Risk & Crisis Management	· Codes of Conduct/ Anti-Corruption & Bribery: Reporting on Breaches · Codes of Conduct/ Corruption	· Opportunities · Transparency · Supply Chain Management
Tax Strategy	**Environmental & Social Reporting**	**Operational Eco-Efficiency**	**Labor Practice Indicators & Human Rights**
· Tax Strategy · Tax Reporting · Taxation Risks · Tax Strategy	· Materiality · Coverage · Assurance · Quantitative Data	· Denominators · Direct Greenhouse Gas Emissions · Indirect Greenhouse Gas Emissions · Energy Consumption · Waste Generation · Water	· Labor KPIs – Diversity, Equal Remuneration, Freedom of Association and Layoffs · Public Commitment to Human Rights · Business and Human Rights · Labor Practice Indicators
Human Capital Development	**Talent Attraction & Retention**	**Corporate Citizenship & Philanthropy**	
· Human Capital Performance Indicators · Training & Development Inputs · Employee Development Programs · Human Capital Return Metrics · Human Capital Return on Investment	· Type of Individual Performance Appraisal · Long-Term Incentives · Employee Turnover Rate · Trend of Employee Satisfaction · Talent Attraction & Retention	· Group-Wide Strategy · Type of Philanthropic Activities · Measuring Benefits	

2.4.5 Supply Chain Management

Logistics is one of the most critical issues on business, due to its direct impact on costs, quality, time and stakeholders' satisfaction. Many research has been done in this field and the most common approach is SCM (Supply Chain management). According to (Li, Ragu-Nathan, Ragu-Nathan, & Subba Rao, 2006) *"higher levels of SCM practice can lead to enhanced competitive advantage and improved organizational performance"*. Considering several researchers SCM has a direct, positive impact on organizational performance. Mentzer et al. (2001) define supply chain as *"a set of three or more entities directly involved in the upstream and downstream flow of products, services, finances, and/or information from a source to a customer"* and to implement a successful supply chain management *"all companies within a supply chain have to overcome their own functional silos and adopt a process approach"* (Lambert, Stock, and Ellram, 1998). *"Supply chain management is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company*

and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole" (Mentzer et al, 2001). Several models are currently being used by companies, none the less five important dimensions can be pointed as transversal and common to the major of them, namely: strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, and postponement. Tan, Lyman, and Wisner (2002) underlined customer service management, just-in-time capability, geographic proximity, supply chain characteristics, information sharing and supply chain integration, as the 6 major supply chain management practices, and the intrenational consultancy firm Deloitte developed the Resilient Supply Chain Framework[22], based on good governance pratices, influencing 4 structural pillars: visibility, flexibility, collaboration and control, supported by people, procceses and technology (see Figure 2.20).

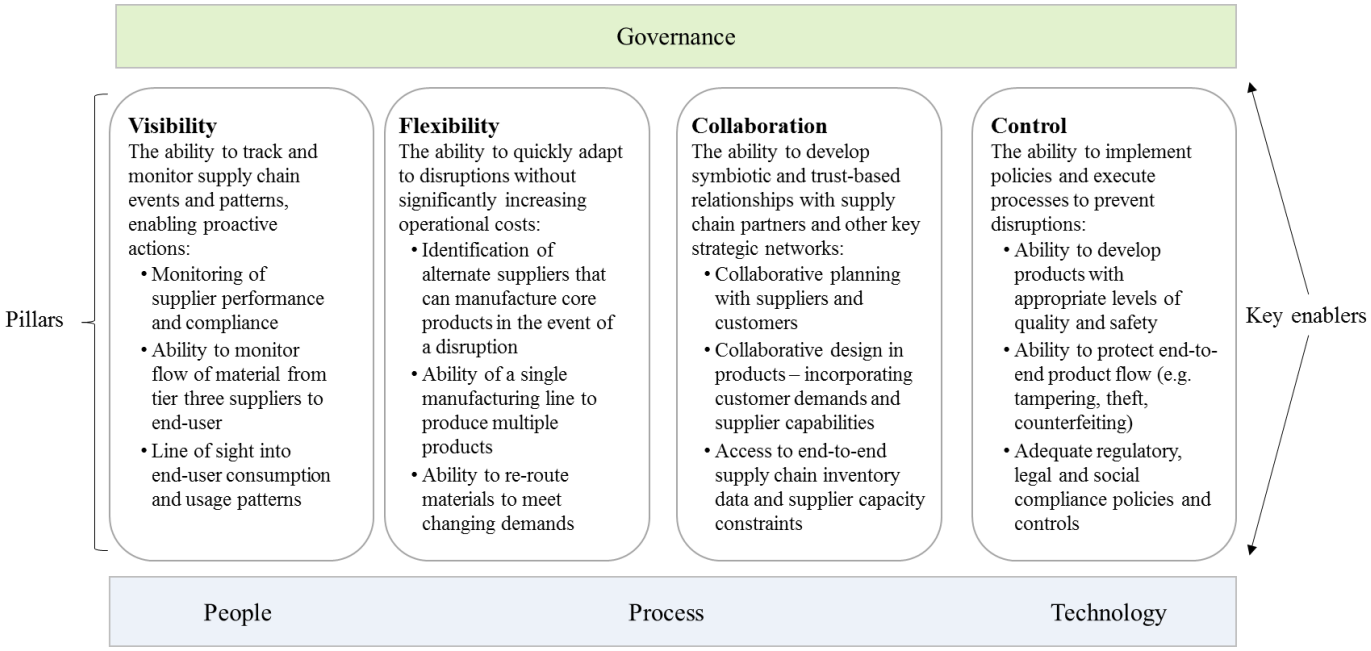


Figure 2.20 - Resilient Supply Chain Framework from Deloitte

Despite the need to assume strategic commitments (among the supply chain entities) it is clear that SCM is mostly focused on operations and about improvement activities and more recently more innovation oriented.

[22] http://www2.deloitte.com/ie/en/pages/deloitte-private/articles/improving-supply-chain-resilience.html

2.4.6 LARG Model

As a result of the continuous drive to achieve higher levels of business efficiency and waste reduction (supported by lean management principles), to increase the ability to quickly respond to new challenges (based on agile and flexible organizations), to face disturbances in a sustained way (assumed by resilience theories) and to be committed with environmental concerns (green management approaches), LARG management arise as a new paradigm, integrating these perspectives, allowing the capture of synergies and reducing divergences. According to Carvalho et al., (2011) LARG management paradigm is beginning to be recognized as a driver to achieve sustainable competitive advantage and is about *"how Lean, Agile, Resilient, and Green paradigms can act together, bringing the best for the organizations work efficiently"* (Duarte & Carvalho, 2016).

Its application on SCM introduce advantage *"related to information frequency and integration level, increasing also the capacity to reduce production lead time and transportation lead time"* (Helena Carvalho, Susana Duarte, V. Cruz Machado, 2011), as well as *"promote waste reduction along with the appropriate response to changes in markets and/or overcome the negative effects of disturbances"* (Carvalho, Azevedo, and Cruz-Machado, 2012b; Carvalho, Duarte, and Cruz-Machado, 2011). According to these researchers 8 drivers can be addressed to the LARG management concept, as shown in Figure 2.21.

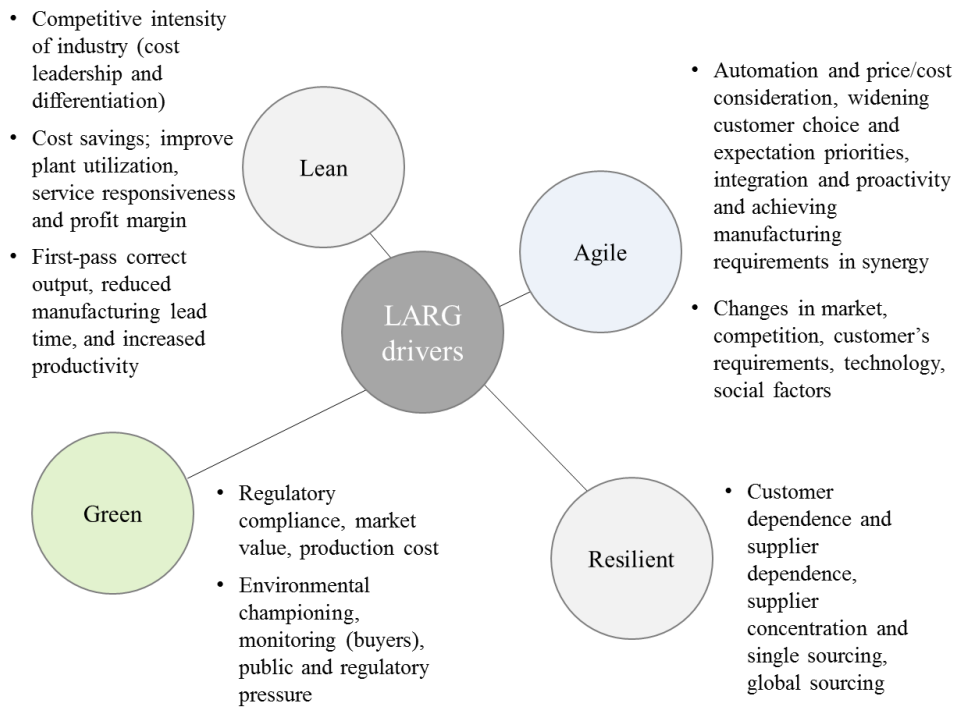


Figure 2.21 - 8 drivers of LARG management concept, adaptation from Carvalho, Azevedo, and Cruz-Machado, 2012b; Carvalho, Duarte, and Cruz-Machado, 2011

Regarding the above, LARG management concept has positive impact on financial aspects, company brand and recognition, environmental protection and commitment, compliance with regulations, stakeholders' satisfaction and motivation, green innovation, supply chain improvement and requirements accomplishment, customer awareness and retention, employee demands and internal empowerment and motivation, market trend anticipation and creation, as well as competitors understanding.

2.4.7 Project Management and Facilities Management

Any initiative that companies' intent to implement can be recognized as a project, because there is a beginning, middle and an end. On other hand, when there is a project to be developed, it is supposed changes will be occurring. To be successful about this change, all aspects of the project need to be properly addressed. This is the reason why project management is so important. One of the most recognized institutions in this field is the Project Management Institute (PMI)[23], which developed guidelines to support managers on this task (PMBOK, 1986[24]). Considering this approach, there are three key activities on project management (planning, execution and monitoring) and ten dimensions that influence the success of a project's implementation (see Figure 2.22).

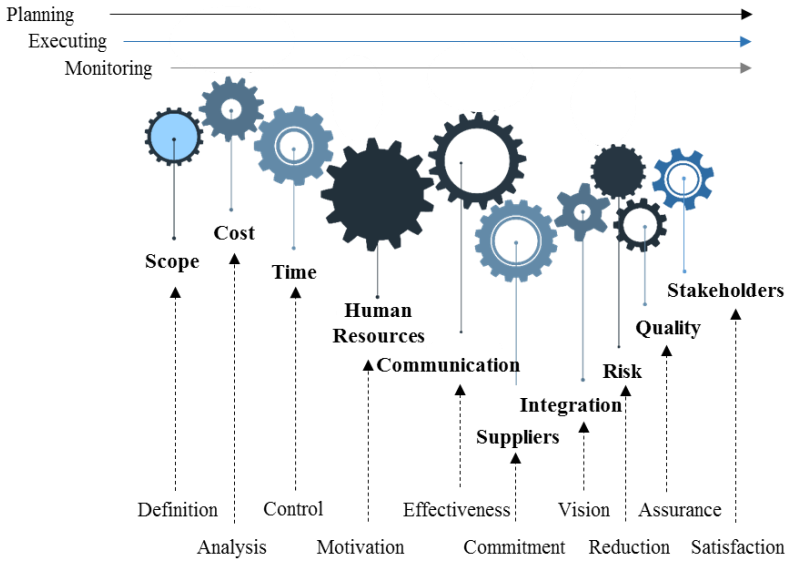


Figure 2.22 - Processes and dimensions that influence the success of a project. Adaptation form PMI standard

[23] https://en.wikipedia.org/wiki/Project_Management_Institute
[24] Transposed in 1999 into a ANSI standard (American National Standards Institute)

Another companies' increasing concern is facilities management[25]. In fact, a more sustained awareness about installations' and infrastructures' security and safety has been assumed by management as basic foundations to generate proper environmental conditions for operations and health, which have influence on companies' competitiveness. The European standard EN15221-1 is a recognized reference to address requirements related to this issue, structured in two dimensions as mentioned in Table 2.11.

Table 2.11 - Requirements summary of EN15221-1 standard

Space & Infrastructure	People & Organization
Accommodation	Health, safety and security
Workplace	Hospitality
Technical infrastructure	ICT
Cleaning	Logistics

2.4.8 ISO Standards

ISO standards are worldwide recognized as fundamental guidelines in several management systems and technical specifications. Due to their structured requirements and the ability to be audited by an independent office, improvements are applied in organizations in a more effective way and certification achievements (third parties' recognition of requirements compliance) increases companies' market visibility fostering their competitiveness. Regarding the research field, it makes sense to consider the standards shown in Table 2.12, which address compliance to quality; environmental; occupational health and safety; and social responsibility management requirements.

Table 2.12 – Requirements/ Guidelines of ISO 9000, ISO 14000, ISO 45000 and ISO 26000

Standard	Objective	Requirements/ Guidelines Summary
ISO 9000 – Quality management (series)[26]	To support companies to meet the needs of customers and other stakeholders	· Context of the Organization · Leadership · Planning · Support · Operation · Performance evaluation · Improvement
ISO 14000 – Environmental management (series)[27]	To help organizations: (i) minimize how their operations negatively affect the	· Environmental policy, aspects and compliance · Environmental objectives and targets · Resources, roles, responsibilities and authorities

[25] https://en.wikipedia.org/wiki/Facility_management
[26] https://en.wikipedia.org/wiki/ISO_9000
[27] https://en.wikipedia.org/wiki/ISO_14000

Standard	Objective	Requirements/ Guidelines Summary
	environment (e.g. cause adverse changes to air, water, or land); (ii) comply with applicable laws, regulations, and other environmentally oriented requirements; and (iii) continually improve in the above. Its elements are very similar to those of EMAS[28]	· Competence, training and awareness · Communication and documentation · Operational control · Emergency preparedness and response · Monitor, measure and evaluation of compliance · Non-conformance, corrective and preventative actions · Records, internal audits and management review
OHSAS 1800 - Occupational health and safety management[29] (future ISO 45000)	To support companies put in place demonstrably sound occupational health and safety performance	· Health and Safety management and training · Risk assessment · Working specificities, protections and hazardous substances and materials · Accident management · Emergency procedures · Hygienic maintenance
ISO 26000 - social responsibility[30]	To guide rather than to share requirements, it clarifies the definition of social responsibility, helps enterprises translate principles into effective actions and shares best practices, assisting organizations in contributing to sustainable development, through the encouragement to go beyond legal compliance	· Concepts, terms, definitions, background, trends and characteristics of social responsibility · Principles and practices relating · Core subjects and issues · Integrating, implementing and promoting socially responsible behavior · Identifying and engaging with stakeholders · Communicating commitments and performance

2.5 Measurement and Indicators

To improve companies, need to measure (internally and externally), otherwise it's impossible to define reliable targets and set appropriate policies, strategies and initiatives. There are numerous kinds of indicators and indexes, as well as assumptions to classify different types of indicators. Nevertheless, on the bottom-line, measurement focus always on efficiency (the way resources are managed – productivity; the effort to achieve effectiveness) and effectiveness (the way results are achieved – quality, time, satisfaction; compliance with requirements, expectations or goals/ plans set).

[28] http://ec.europa.eu/environment/emas/index_en.htm
[29] https://en.wikipedia.org/wiki/OHSAS_18001
[30] http://www.iso.org/iso/catalogue_detail?csnumber=42546

2.5.1 Measurement principles

According to Keeney and Raiffa (1993) there are 5 principles that must be followed when formulating criteria for an assessment model, in concrete: *"Completeness - the criteria must cover all important aspects of the decision-making problem; Operational - the criteria must be meaningful for decision-making analysis; Decomposable - the criteria can be broken down from a higher to a lower hierarchy to simplify the evaluation; Non redundant - there must be no double counting of criteria; and Minimum size - the number of criteria should be as few as is feasible".* These principles are decisive to design successful measurement models, however other factors are also critical, namely monitoring culture, measurement procedures and reporting, analysis and decision-making.

Nevertheless, more structured approaches appear. Davis and Albright (2004) came up with PMM (Performance Measurement and Management system), recommended for facilitating strategy implementation and enhancing organizational performance.

Regarding Franco-Santos et al. (2007) PMM systems play a critical role in managing an organization, including establishing position, communicating direction, influencing behavior, stimulating action, facilitating learning and on strategy implementation. On this line of thought Yanlong Cao et al., (2015) developed a method to construct companies' integrated strategic performance indicator system based on BSC and SIPOC (Supplier, Input, Process, Output, and Customer).

With this approach, companies through BSC achieve a vertical deployment (breakdown) of its strategy, and by SIPOC they obtain a horizontal analysis of transversal departments' relationship, gaining synergies between upstream and downstream interaction as well as along the value stream, which promote the coordinated development and unified action of different departments and avoid mutual conflicts, improving each management level and the corporate strategy execution.

2.5.2 Indicators and specialized indexes

In terms of indicators, as mentioned before, there are many literature listing indicators, on a global point of view - more social and economic (countries and governments, e.g.: OECD, World Bank, World Economic Forum, …), and on an enterprise perspective - since financial, commercial, human resources, manufacturing, logistics till technological indicators.

A worldwide source of information about enterprise indicators (KPI and CPI) is the SAP Community Network Platform, which is a reference on enterprise good practices, due to its experience in broad implementations of ERP and Business Intelligence solutions[31]. Parmenter, D. (2007) developed the Performance Measures Database structured according to the 4 (four) perspectives of Balanced Scorecard.

On other hand, market dynamics introduces the need to specialize kinds of indicators by nature and therefore some models have been created focusing on specific knowledge areas. As examples of these movements we identify the SCOR model (from the SCC - Supply Chain Council of APICS American Production and Inventory Control Society), ISO 22400, Innovation Union Scoreboard (from European Commission) and the Innovation Barometer (from Cotec Portugal), and ITIL (from OGC - Office for Government Commerce from UK).

2.5.2.1 APICS SCC's model

APICS SCC's model[32] include over then 250 metrics categorized in 5 performance attributes: reliability, responsiveness, agility (customer-focused), costs and asset management efficiency (internally focused); considering 4 frameworks, as shown in Figure 2.23.

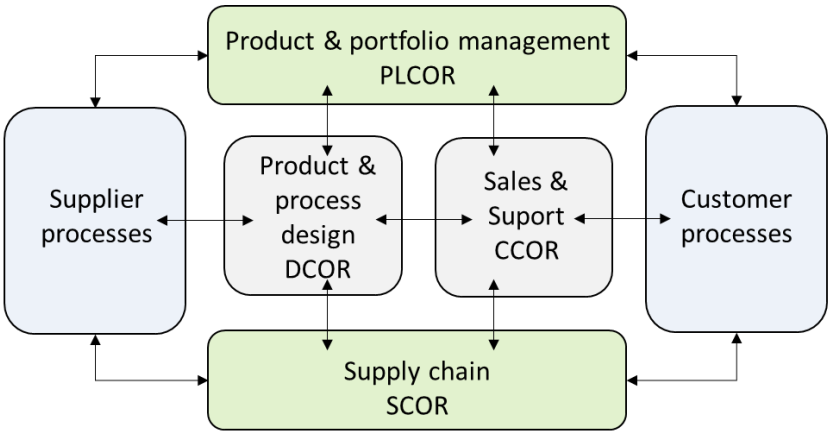


Figure 2.23 - APICS SCC's model

With the purpose to share the most relevant indicators considered by this model, the following Table 2.13 illustrate the composition for each of one of the 4 frameworks.

[31] http://wiki.scn.sap.com/wiki/display/KPI/Business+KPIs
[32] http://www.apics.org/sites/apics-supply-chain-council/products-and-services/apics-scc-frameworks

Table 2.13 – APICS SCC's indicators by framework

SCOR	DCOR	CCOR	PLCOR
· Perfect order fulfillment · Order fulfillment cycle time · Upside supply chain flexibility · Upside supply chain adaptability · Downside supply chain adaptability · Overall value at risk · Total cost to serve · Cash-to-cash cycle time · Return on supply chain fixed assets · Return on working capital	· Perfect product design · Product design chain cycle time · Total design chain cost · Product design chain change cycle time · Design chain fixed assets value	· Assist cycle time · Assists per customer · Average profit per customer · Cost of assists · Cost of selling · Customer chain reaction cycle time · Customer franchise · Customer growth rate · Gross revenue · Customer conversion rate · Lead-to-contract cycle time · Net customer loyalty index · Perfect assists · Perfect contracts · Quote turnaround time · Warranty cost	· Perfect product launch · Customer satisfaction achievement · Product (or brand) loyalty · Time to tipping point · Time to volume · Time to market · Product portfolio value at risk · Upside product launch flexibility · Upside product launch adaptability · Product management cost · Product ROI

2.5.2.2 ISO 22400

The international standard ISO 22400 establish guidance concerning manufacturing operations' KPI. Therefore, it include 34 indicators intended to be examples of the most frequently used in industry in nowadays, which companies can select the one that best corresponds to their business objective (see Table 2.14).

Table 2.14 - ISO 22400 Indicators

ISO 22400 Indicators				
· Worker Efficiency · Production process ratio · Finished goods ratio · Allocation Ratio · Actual to planned scrap ratio · Integrated goods ratio · Throughput rate · First pass yield	· Production loss ratio · Allocation efficiency · Scrap ratio · Storage and transportation loss ratio · Utilization efficiency · Rework ratio · Other loss ratio · Overall equipment effectiveness index	· Fall off ratio · Equipment load ratio · Net equipment effectiveness index · Machine capability index · Mean operating time between failures Availability · Critical machine capability index	· Mean time to failure · Effectiveness · Process capability index · Mean time to restoration · Quality Ratio · Critical process capability index	· · Corrective maintenance ratio · Setup Rate · Comprehensive energy consumption · Technical efficiency · Inventory turns · Critical process capability index

2.5.2.3 Innovation indexes

There are several innovation scorecards, however most of them have a country perspective. As an example, the measurement framework used in European union is the Innovation Union

Scoreboard[33], which is based on 25 different indicators, structured according to 8 innovation dimensions, namely: Human resources; Open; excellent and attractive research systems; Finance and support; Firm investments; Linkages and entrepreneurship; Intellectual assets; Innovators and Economic effects.

In the case of Portugal, Cotec (Portuguese Enterprise's Association for Innovation) has is own innovation barometer[34], which is focused on enterprise innovation measurement and is based on 4 dimensions, including a total of 64 indicators, according to 10 pillars, as shown in the following figure.

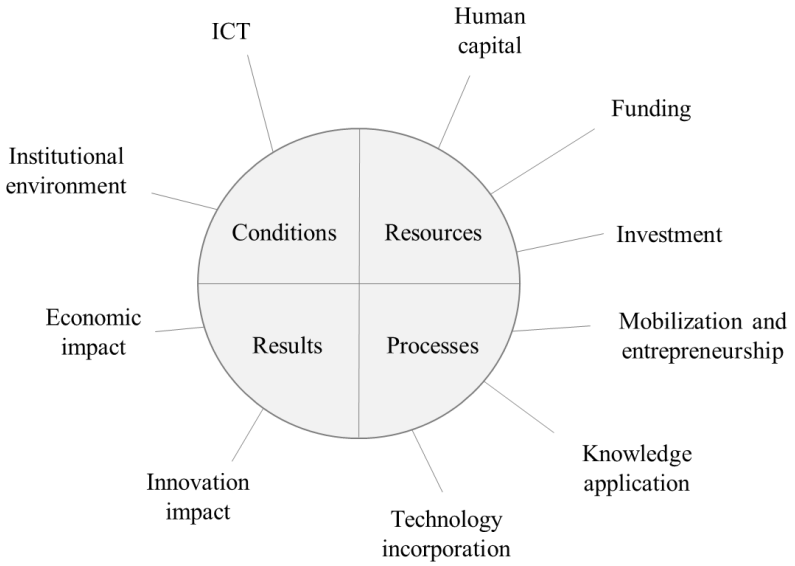


Figure 2.24 - Cotec's innovation barometer (dimensions and pillars)

2.5.2.4 ITIL - Information Technology Infrastructure Library

ITIL is a kind of standard[35] based on a set of practices for ITSM (IT service management). The aim of this reference is the alignment of IT services with the company's business, describing processes, procedures, tasks, checklists and KPI's[36], allowing the establishment of a baseline from which companies can plan, implement, and measure the five core stages of ITSM lifecycle (see Figure 2.25).

[33] http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en
[34] http://barometro.cotecportugal.pt/pt/indicadores/modelo-de-indicadores-de-idi/dimensoes-pilares-e-indicadores-.html
[35] Standard owned by the company AXELOS
[36] http://wiki.en.it-processmaps.com/index.php/ITIL_Key_Performance_Indicators

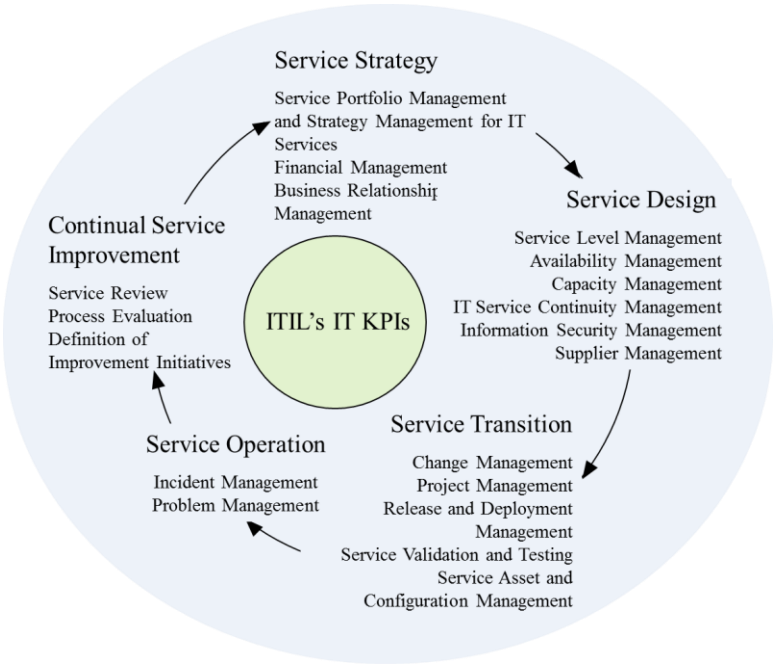


Figure 2.25 - ITIL's structure of KPIs

2.6 Chapter Highlights

The literature review allowed a solid transversal understanding of strategic management principles and concepts, models and approaches, as well as about tools and business indicators that have been developed in the recent decades and are currently recognized by companies as helpful to strategic planning processes and business measurement (see Figure 2.26).

It also permitted to validate the usefulness to the real business context and the added academic interest of this research.

Through this review, it was possible to conclude about: i) strategic planning processes' failure modes; ii) principles and definitions' added-value and limitations; and iii) strategic tools and evaluation models and approaches' overlaps and weaknesses; as well as to obtain an integrated overview of all issues addressed, based on each potentialities and gaps.

In fact, according to Table 2.15, which highlights the key aspects of the most relevant approaches mentioned, it is possible to notice that there are cases of complementarity and also of some overlap between them. However, through an appropriate integration, synergies can be obtained if advantages are enhanced, overlaps eliminated and core features highlighted.

Table 2.15 – Summary and comparison between models, tools and standards - Key aspects

Themes	Type	Scope	Focus	Key findings and limitations
Strategic Planning	Approach/ tool	Strategy	Goals definition and subjacent actions implementation	· Still an incipient practice by the management according to a systematic approach, for the common companies · Execution gap is one of the major reasons for strategy implementation's failure
Competitiveness	Concept/ principle	Global business	Overall business advantage increase	· More solid definition regarding a macro-economic perspective (regional, countries) · Based on competitive factors definitions (on an enterprise point of view) · Lack of a universal definition and calculation method
Resilience	Concept/ principle	Business resources	Attenuate disturbances and recover performance	· Recent concept which introduces the ability to create competitive advantage, through the handling of practices that face disturbances · Companies' reduced perception of the need for a structured approach of this concept
Innovation	Concept/ principle	Business resources	Obtain advantage through products, services and processes	· Recent concept which introduces the capability to create competitive advantage, through differentiation · Companies' reduced knowledge about their practices and its implementation
Sustainability	Concept/ principle	Business impacts	Value creation through economic, social and environmental results	· Worldwide issue and an increasing concern of governments, institutions, companies, suppliers, customers and society in general · TBL principle's implementation by companies is still far from being a massive reality
PESTLE	Tool	Strategy	Business external factors' analysis to support strategy definition	· Added value tool to support strategic decision-making · Addresses mainly external factors with an incipient relation to internal factors
SWOT, Porter's Five Forces and Value Chain	Tool	Strategy	Business internal and external factors' analysis to define guidelines for improvements, risk prevention and opportunities capture	· SWOT analysis introduces some ambiguity (e.g. the way facts are writing, can assume different positions in the matrix); and does not integrate a frame to define strategic goals · Porter's Five Forces model analyze external factors and the company's exposure to their influences, however it does not establish a relation on a more operational level · Porter's value chain structures companies' into core and support activities, allowing a clearer understanding and identification of improvement opportunities
Leadership/ Learning Organizations	Concept/ principle	People and organizational	Empowerment, commitment and motivation increase, to obtain flexible, healthy and results oriented organizations	· Leadership, despite its wide recognition, due to its demand for behavior change, still far from being a fulfilled practice among the generality of companies · Incipient knowledge management practices and the inability of companies to learn from their mistakes and translating those into future successes, still a common reality
EFQM	Model	Global evaluation	Enterprise excellence achievement and its award, based on a ranking scheme	· Comprehensive approach, grounded on evaluation criteria, including a solid scoring method based on practice evidence

Themes	Type	Scope	Focus	Key findings and limitations
Shingo Prize	Model	Global evaluation	Operational excellence achievement and its award, based on a ranking scheme	· Include specific indicators and the assessment is translated into an index · Due to its orientation to the identification of improvement opportunities, it's not totally adequate to define strategic goals and objectives (*it will say they should exist or if they were properly addressed*) · Does not include a monitoring tool to follow improvement actions' implementation
GRI DJSI	Model	Global evaluation	Sustainability promotion through specific indexes and its international recognition	
BSC	Tool	Strategy	Strategy implementation and its organizational deployment	· Assume that strategic goals are already defined · Mainly focused on implementation is a solid instrument to translate objectives into actions · Concerned about implementation's follow-up · Incipient support to set strategic goals (lack of relation with strategy evaluation models)
$SCM_{(2)}$	Approach/ tool	Operations	Supply chain efficiency and effectiveness	· Powerful guide to support companies on structuring and improving their supply chain processes, interactions and relationships · Limited to the specific nature of its focus
LARG	Approach/ tool	Operations	Increase of companies' agility and resilience, assuring waste reduction (leanness) and environmental practices	· Grounded on fundamental competitiveness dimensions · Still mostly oriented to operations, is a solid mechanism to introduce improvements, assuming specific guidelines and best practices · Includes some evaluation frameworks, however is not a monitoring tool to follow-up implementations
Project Management (PMI)	Approach/ standard	Operations	Success assurance of projects' implementation	· Highly specialized in its thematic, is a powerful instrument to assure compliance between projects' objectives and daily deliverables' scope and quality. · Fundamental practice to control projects' costs, deadlines and risks, as well as to increase team performance and motivation · Limited to the specific nature of its focus
Facilities Management (EN 15221-1)	Approach/ standard	Operations	Facilities security and safety	· Highly specialized in its thematic, is a useful instrument to assure compliance with security and safety requirements and legislation, as well as efficiency of installations and infrastructures · Fundamental practice to control risk factors related to facilities · Limited to the specific nature of its focus
ISO 9000 ISO 14000 ISO 45000 ISO 26000	Standard	Management	Compliance to quality, environmental, occupational health and safety, and social responsibility management's requirements, and its certification	· Helpful guidelines to support companies on structuring their overall management practice in each standard's issue · Based on specific requirements (*what to do instead of how to do it*) · Each standard is limited to its focus, however able to be complemented with other ISO standards

Themes	Type	Scope	Focus	Key findings and limitations
ISO 22400	Standard	Indicators	Promotion of companies' performance measurement, based on manufacture operations' KPI's	· Helpful guide to support companies on structuring their indicators · Limited to its focus, however able to be complemented with other standards
APICS model (SCOR, …)	Tool	Indicators	Promotion of companies' performance measurement, based on indicators for supply, design and customer chains, as well as for product lifecycle	· Useful indicators' data base to support management on operational chains performance monitoring · Complemented with fundamental knowledge, assuming a guidance role · Limited to its thematic focus and to its operational level
Innovation indexes	Tool	Indicators	Promotion of innovation practices and the measurement of its impacts through the application of specific indicators	· Useful guidelines to establish innovation indicators and to implement innovation measurement systems · Complemented with references of innovation practices to support companies on their innovation journey · Limited to its thematic focus and incipient definition of its relation to other performance indicators
ITIL	Standard	Indicators	ICT excellence achievement and its certification, based on requirements and indicators	· Powerful guidelines to implement ICT best practices concerning ICT alignment whit corporate strategy, technological infrastructure, equipment and, software, as well as ICT service provision and improvements · Useful range of ICT indicators regarding all cycle of ICT responsibilities · Limited to its thematic focus and incipient definition of its relation to other performance indicators

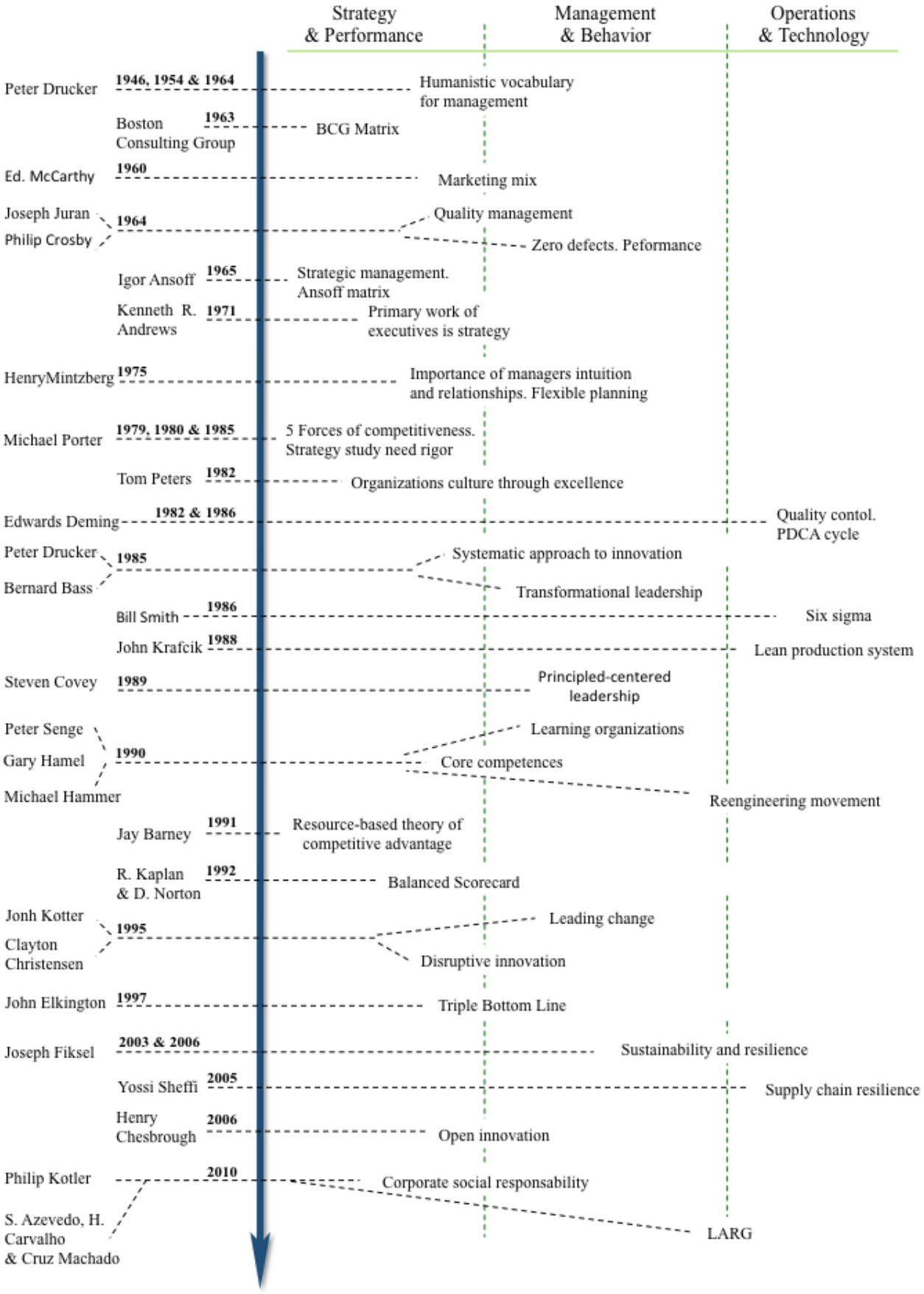


Figure 2.26 – Timeline of the most recognized management concepts and approaches.

Considering the research's aim and objectives, this literature review was crucial to obtain a structured knowledge about the above themes and an adequate understanding of the inherent opportunities for the development of an integrated approach able to contribute to the research's problem solving. Figure 2.27 shows the main alignment between literature review and the research purposes (for more detail see Figure 7.2).

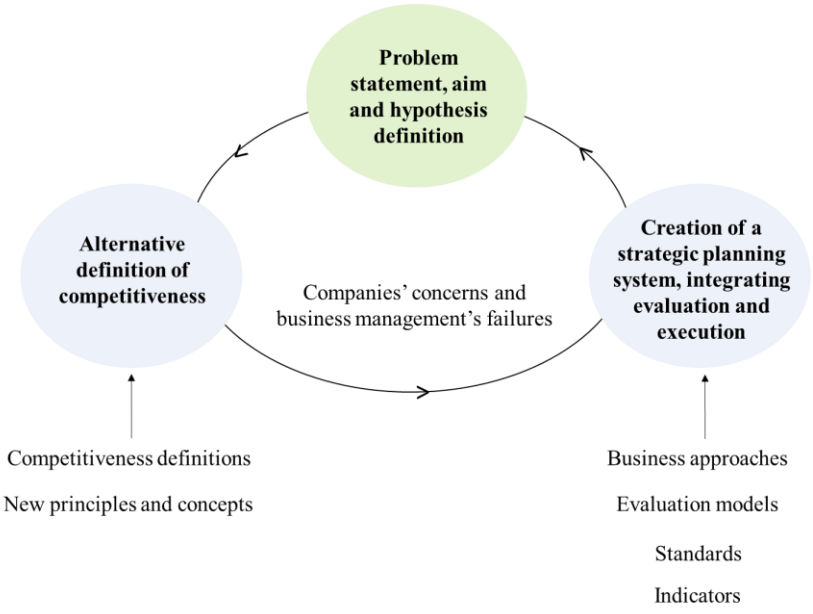


Figure 2.27 - Literature review's input for the research content

Underlines

Strategic planning still is an unquestionable approach to companies that want to be competitive, apart its formal or flexible application.

Strategic planning fails due to low monitoring maturity, incipient knowledge of strategic tools, approaches and definitions; misunderstanding of performance results and of market dynamics; inaccurate definition of strategic goals; lack of sponsorship and effective communication; inadequate organizational alignment and deployment of actions; insufficient empowerment and motivation; and/ or scarcity of impact measurement practices as well as lack of flexibility to react, in time, to changes.

Despite of several definitions for strategic principles and tools from different authors and approaches, as well as different business models to evaluate performance and promote companies' improvement, there is an opportunity to design an integrated framework capable

to provide managers with a single approach to adopt practices of strategic planning in an effective and efficient way, clarifying which tools to use, when and how, reducing uncertainties of its application and increasing management focus.

A single approach should be based on a broad and transversal concept, such as competitiveness, in a measureable way, enabling companies to address their efforts and resources into specific results.

There is an opportunity to clarify the concept of competitiveness and competitive advantage through an alternative definition based on new concepts, such as resilience and innovation, as well as configuring a relation with the definition of sustainability.

Such an approach should be based on a solid and systematic evaluation system able to measure in what way companies are maximizing their means (capability to be resilient and ability to be innovative) to generate sustainable results (economic, social and environmental), resorting to recognized indicators.

This system should be able to be applied to any kind of companies and suitable to any economic sector, assuming a fundamental role on the definition of companies' strategic goals and operational targets, on the establishment of aligned actions/ projects conducting to the achievement of those goals and targets, as well as on the re-evaluation of the defined strategies.

This alternative model and framework should be subject to review and appraisal by experts with different backgrounds and its application should be tested in a real context.

3 Research Methodology

After the presentation of the state-of-art of strategic planning processes, evaluation models, related approaches and tools, the next step needed to go on with the research was the definition of a suitable research methodology. Considering the outlines of this dissertation a deductive approach was considered the most appropriate research method, including the involvement of experts and the use of cases studies (see Figure 3.1).

Therefore, hereby is presented the research methodology used, the experts' involvement and the conclusions obtained, as well as a generic description of the case studies.

3.1 Research methodology selection and application

The selection of the most appropriate research methodology depends on the nature of the research itself and the best way to prove or validate the new knowledge produced. According to Spens and Kovács (2006) for the acquisition of new knowledge they are two possible approaches, namely the deductive and the inductive approaches.

When the creation of new knowledge (theory) is based on literature review (pre-existing theories) and expressed through hypotheses or proposition, which are further tested through empirical approaches to corroborate or contradict previous assumptions, we are facing a deductive approach. On other hand, an inductive approach is applied when a phenomenon is described from informants' point of view by data collection, and the new theory is built from descriptive data, allowing the identification of main variables and relationships between them (Golicic, Davis, and McCarthy, 2005).

Regarding the above, where the aim of this research is the development of an alternative definition of sustainable competitiveness and the design of a system to support strategy deployment processes, based on these alternative definitions and integrating evaluation and execution frameworks, it seems clear that this research has its first foundations on literature review. In fact, it starts with the investigation about existing gaps and failure modes of strategic planning processes and the analysis of current models, approaches and tools. Therefore, the research methodology to apply is the deductive approach.

As mentioned above, after the literature review, the deductive method assumes empirical approaches to validate hypothesis and assumptions. According to Fischer, Wentholt, Rowe, & Frewer (2013) *"a broad range of expert opinions, as well as transparency about choices made regarding whom to involve, and how the expertise is integrated into a judgement, are essential to be able to evaluate the relevance and possible biases in expert consultations"* Taking in account this statement and the outline of the research, the involvement of experts and the format of their participation was considered fundamental. Therefore, the definition of which methods would be more suitable to respond to this need, as well as the number of experts to involve was the next challenge. Yet in accordance with Fischer et al. (2014) they are five possible methods and for each, the author assume a minimum and a maximum number of experts required, as shown in Table 3.1.

Table 3.1 - Research methods applied to experts' involvement and its sample size – Adaptation of (Fischer et al., 2014)

Method	Number of experts to involve	
	Minimum	Maximum
Interview	3	279
On-off questionnaire	14	1200
Workshop	2	193
Delphi	12	4000

Additionally, one of the research concerns was the validation of SuCEES's implementation adaptability, as well as its usefulness and added value for companies (real business environment). With this purpose and considering that empirical analysis that examines a phenomenon within its real life context should be supported by cases studies approaches (Seuring 2005), and the fact that case studies can be applied to provide description, to test theory or to generate theory (Eisenhardt 1989), this approach was also included in the research methodology.

According to Yin, R. K., & Campbell, D. (2003), case studies can be Exploratory (if its intention is to validate propositions or questions of subsequent studies or to conclude about the usability of the desired research); Descriptive (if the objective is to present a detailed description of a phenomenon within a concrete context); or Explanatory (if the purpose is to analyze cause-and-effect relationships, based on data behavior and therefore understand how and why events occur).

Considering the definitions above and once the research assumes the importance of doing case studies, due to their capacity to validate a new and differentiator system based on current theories, as well as to their ability to conclude about the practicability of the research outcomes (theory

designed/ new knowledge generated), which means the validation of SuCEES's suitability to the real world, we conclude that the research case studies are Exploratory.

It is important to underline that two case studies were considered in this research, taking into account that according to Eisenhardt and Graebner (2007) multiple case studies usually produce more robust, generalizable and testable theory than single-case studies, regarding (Voss et al., 2002) multiple case studies are more appropriate when there are resources' constrains or limitations, therefore it may reduce research effort due to a lesser need to deeper study, however it may enlarge external validity, and protect observer bias. Another relevant factor is that both case studies must be conducted based on the same framework and method, enabling cross analysis and the identification of patterns (Pagell and Wu, 2009).

Thus, considering the statements above, Figure 3.1 illustrate the research methodology used as a reference.

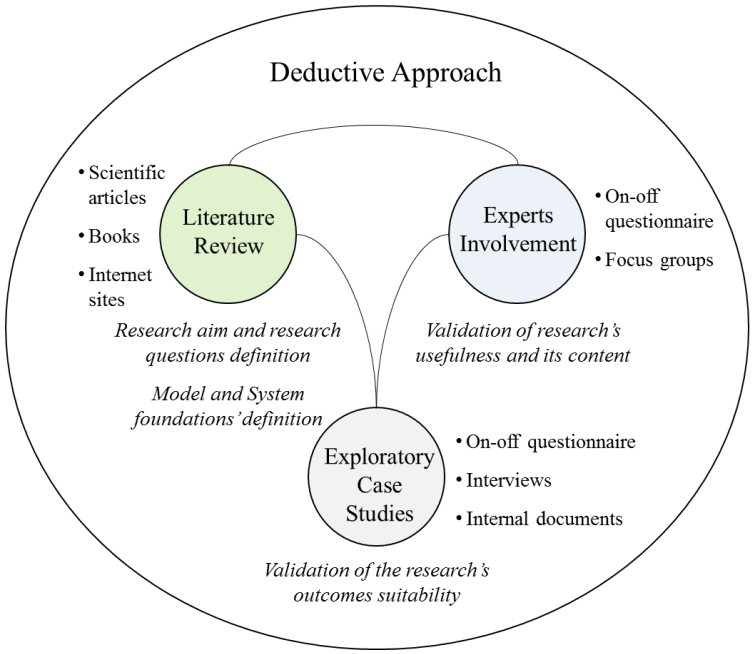


Figure 3.1 - Research methodology

3.2 Literature review

Regarding the selected research methodology, first step was literature review. Taking into account that it was intention of the researcher, considering his professional experience, to study ways of improving strategic planning processes, regarding new concepts an principles, as well as to try to develop approaches to increase the efficiency and added value of strategic tools and evaluation

models' usage, literature review was fundamental to identify current models, approaches and tools, differences between them, as well as to identify opportunities to fill gaps and reduce failure modes in this field of research. Thus, the state-of-art was based on a balanced literature review between themes and fundamental concepts, models and tools, allowing a transversal knowledge and a solid understanding of how complementarity and added-value could be achieved through the integration of these concepts and approaches with the purpose to contribute to companies' bankruptcy exposure reduction and competitiveness advantage increase. Reached this point, and considering the purpose of this research, its aim and objectives, as well as taking into account the research guidelines (see Chapter 1.3.2), Figure 3.2 and Table 3.2 illustrates how the literature review has provided inputs for the sustainable competitive model's conception and for the SuCEES's design.

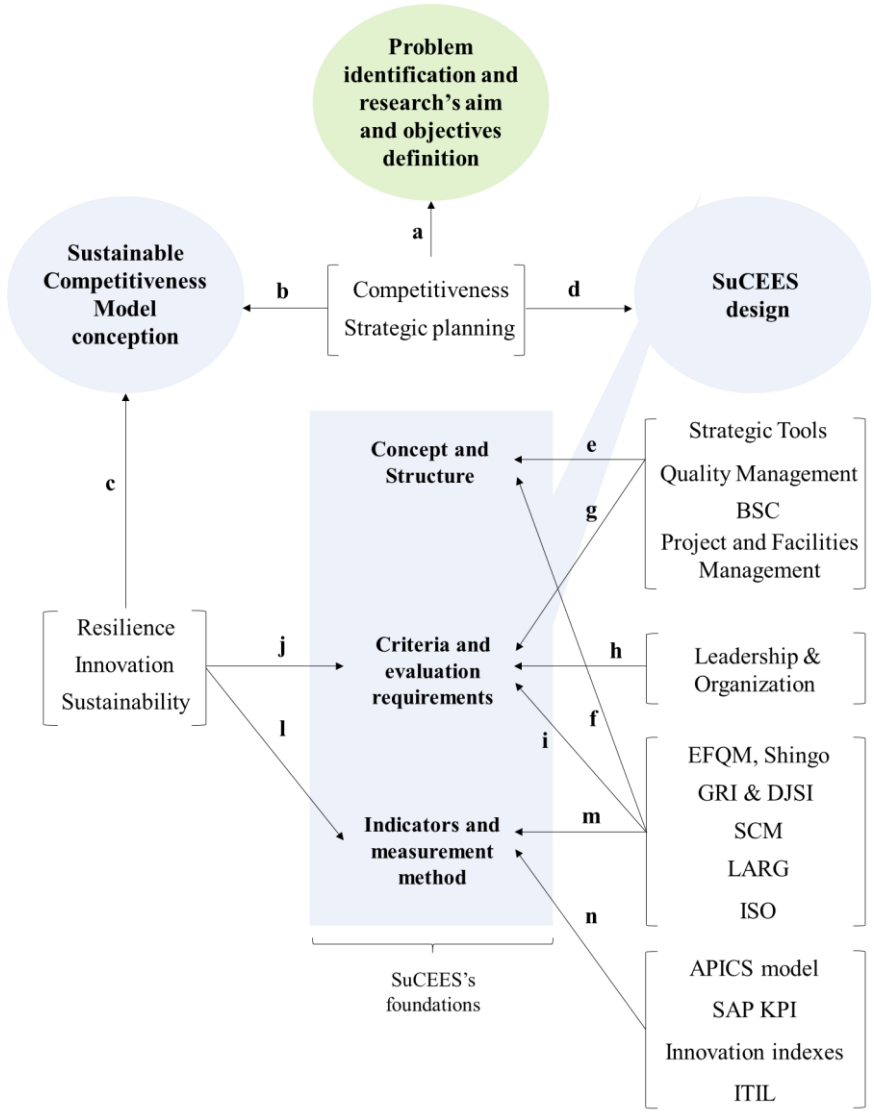


Figure 3.2 - Literature review's input for the research content (a)

Table 3.2 - Literature review's input for the research content (b)

Path	Theme features and opportunities	Inputs for the research
a	Lack of competitive advantage increases bankruptcy risk Strategic planning process is incipient among the majority of companies and there still failure modes (e.g. execution gap)	Clarification of the research aim, its scope, objectives and hypothesis Could a sustainable competitiveness model and a more integrated strategic planning system be helpful and an added value, contributing to reduce companies' risk of bankruptcy?
b	Competitiveness definition is not unanimous either universally understood or calculated Strategic planning success could benefit from the clarification of competitiveness concept	There is an opportunity to establish an alternative definition of competitiveness, which should be the foundation of an integrated strategic planning approach (system) The need for its measurement and conversion into a rank, was the drive for the development of Real Competitive Strength's expression
c	New concepts like resilience and innovation could be an added value for an alternative definition of competitiveness Sustainability is assumed on a time basis (*"the ability to be competitive today and in the future*")	The resilience triangle and the innovation S-curve could support an alternative definition for competitiveness, concerning the ability to manage resources to face disturbances and the capability to create market trends and to be ahead of competitors The Triple Bottom Line principle could assume the basis to measure results, therefore to establish indicators to calculate economic, social and environmental performance The above merged with path b were the ingredients for the definition of Sustainable Competitiveness Model and its Competitiveness Diamond
d	Competitive advantage and sustainable competitiveness, as well as strategic planning processes combine strengths and allow synergies	The idea of integrating competitiveness principle with strategic planning concept was the genesis of the opportunity to develop a system to support companies on their strategic planning process, reinforcing the integration of evaluation and execution activities in a systematic way (SuCEES), boosting competitive advantage and reducing exposure to bankruptcy
e	Overlaps between approaches, as well as unfilled scopes or focus limitations represent inspirations to design SuCEES	Strategic planning principles and its cyclical nature, mixed with BSC philosophy, allowed the design of SuCEES' concept (systematic evaluation and execution, in an integrated way). Quality management, in concrete Deming's PDCA cycle, was on the bases of 4 A's Cycle's creation. BCG matrix was the main reference to create the Competitiveness Positioning Matrix The need to measure performance (results or impacts) associated to the idea of TBL, established the Competitive Advantage, based on indicators' measurement Considering the existence of risks of losing competitive advantage, Porter's 5 forces were the foundations to define Competitiveness Risk SWOT analysis inspired the design of a more objective tool able to link potentialities and fragilities with actions needed (PFG frame) Sustainable Competitiveness Value Chain was based on Porter's value chain, where risks and results were added To fulfill the ability of SuCEES to deploy and implement actions, which conduct to the achievement of strategic goals and operational targets, BSC and its strategic mapping tool were a reference to design the Strategy Mapping tool (actions and targets), as well as the Strategy Deployment Matrix Project management guidelines allowed the incorporation of strategic actions' implementation control (actions execution and targets achievement monitoring charts)

Path	Theme features and opportunities	Inputs for the research
f	Solid evaluation frames to score compliance with requirements, based on practice evidences	The evaluation frames of PESTLE (path e), EFQM, Shingo, GRI and DJSI were the inspiration for the structure design of SuCEES's proficiency level matrix to evaluate Competitiveness Positioning, as well as for its scoring methods
g, i	Overlaps between models and perspectives, as well as unfilled scopes or focus limitations represents an opportunity to establish a common and representative pool of evaluation criteria	The seven (7) Competitiveness Drivers of the Model as well as the principle of its breakdown structure into elements and evaluation criteria, arose from PESTLE, BSC, EFQM, Shingo's criteria and evaluation dimensions. GRI and DJSI also gave important guidance on this matter The above models and principles, as well as SCM, LARG, ISO standards and facilities management approaches were a relevant contribute for the definition of the requirements of each proficiency level to score resilience and innovation for the 7 Competitiveness Drivers.
h	Regardless of its own models, Leadership concepts are mentioned in many approaches and included in several evaluation frameworks and standards. These overlaps conduct to confusion and inefficiencies. Regarding learning organization, more integration with other approaches could be an added value	Leadership principles gave guidance for the definition of the proficiency levels requirements to score personal behavior and organizational culture in terms of resilience and innovation. Learning organization was a fundamental concept to define the evaluation requirements related to organizational behavior and knowledge management
j	The complementarity between resilience and innovation dimensions could be understand as ways to manage resources to achieve results Sustainability could materialize those results on a TBL perspective	Principles like strategic and operational resilience, as well as open and disruptive innovation among others, were valuable references to define transversal evaluation requirements concerning resilience and innovation, respectively, along the 7 Competitiveness Drivers Based on a possible relation between this three concepts, the Real Competitive Strength's expression was design, where: Competitiveness Positioning is grounded on resilience and innovation requirements; and Competitive Advantage is generated by sustainability indicators, which are exposed to risk, which drives to competitive advantage loss
l	There is an endless list of indicators and scorecards, with different structures and ways of calculation. However, in real business context companies (mainly in SME's) still focus on financial and commercial indicators There is an opportunity to evaluate performance in terms of the real advantage of a company upon its direct competitor	A set of indicators was selected, considering their capability to express resilience, innovation and sustainability features. Diverse thematic indicators were included in the System to fulfill all 7 Competitiveness Drivers Competitive Advantage component was developed based on composed indicators, which allow the comparison between the performance value of the company for the simplified indicator, and the performance value of its direct competitor for the same simplified indicator (e.g. the competitive advantage indicator "Market share" is not interested on knowing what is the company's Market share, but about the relation between the company's Market share and the Market share of its direct competitor, because this relation will define if the company does have a Market share advantage upon its direct competitor or not)
m, n	The range of indicators included in models (EFQM, Shingo Prize, GRI and DJSI – comprehensive) and in approaches and standards (SCM, LARG, ISO, APICS SCC, SAP and ITIL – operational and thematic focused) revealed overlaps that, once again, need to be managed in an efficient way, in case of co-existence of different modes, approaches and tools in the same company	Results (impact) indicators where selected and indexes where design to fulfill strategic and operational concerns of each Competitiveness Driver Proper calculation methods were established regarding the inputs of these models, approaches and tools

3.3 Experts involvement and their contribution

Following the research methodology, they were involved experts to obtain inputs, feedback and validations about intermediate research outcomes as they were produced.

According to the research methodology's requirements, there were considered 18 experts taking into account that the main model of interaction between the researcher and them would be questionnaire, personal contacts whenever needed and a focus groups (workshops).

Once defined the size of number of experts to involved the next step was the definition of appropriate profiles to select most suitable experts to reach the objectives of their participation. Therefore, there were defined the following selection criteria:

- Overall business experience and vision – to assure a global understanding about companies' constraints, needs and expectations, competition factors, market and concepts trends;
- Years of professional experience – to obtain an across generational overview about practices and business models' usage, companies maturity about strategic planning processes and monitoring practices, failure modes and management awareness and commitment to these issues;
- Current role and professional career – to include perspectives from different economic sectors and business environments, as well as inputs regarding companies of reference and star-ups;
- Specific skills related to the research filed – to get specific insides about resilience, innovation and sustainability, as well as about key organizations factors like people, knowledge management, finance, marketing and commercial, manufacturing and logistics, and technology.

3.3.1 Experts presentation and their participation context

Considering the selection criteria defined, a list of potential experts was created and an invite letter addressed (see Appendix A1a). As a result of this process it was possible to count with the participation of eighteen (18) experts (Annex 3), which authorized the disclosure of their identity, and shared their opinion about the suitability and value added of the research's outcomes, by the signature of the respective declaration (protocol) – see Appendix A1i.

According to the information above the pool of experts have an average age of 51 years old (minimum of 38 and maximum of 66 years) and more than 485 accumulated years of experience (minimum of 15 and maximum of 41 years), covering all critical business dimensions and relevant components pre-defined at the research scope.

In fact, 56% of the Experts are older than 50 years and nearly haft of them have more than 30 years of professional experience (see Figure 3.3).

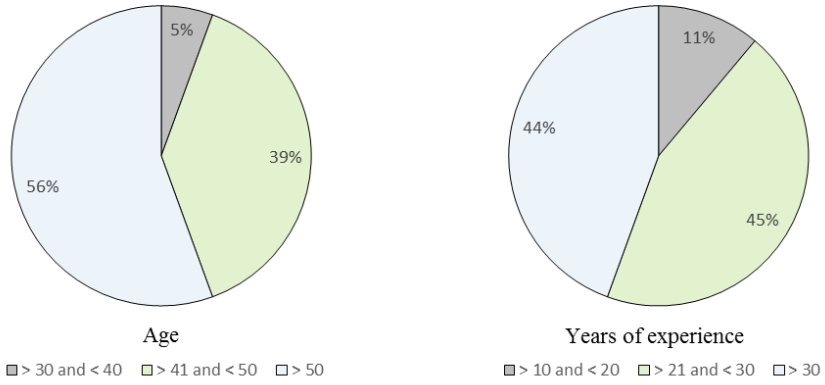


Figure 3.3 – Distribution of Expert's age and years of experience

In terms of the coverage of knowledge and specific skills of Experts, there has been a balance between issues, by ensuring at least about 1/3 of Experts with recognized property to express their opinion on each subject (with exception to Leadership and Finance), not invalidated sharing their experience in relation to the other matters (as shown in Table 3.3).

Table 3.3 - Expert's knowledge coverage

Business dimensions and relevant components	%
Strategy	44
Monitoring	33
Resilience	39
Innovation	33
Sustainability	28
Quality	28
Leadership and Organizations	22
Finance	17
Commercial	28
Manufacturing and Supply Chain	33
Services	39
Technology	28

3.3.2 Experts contribution and results

As mentioned before, the experts' involvement had two initial objectives, in concrete to obtain:

- Validation about the interest and value added of the research scope; and
- Inputs, feedback and validation about the model designed and about the system developed.

However, due to experts' conclusions and comments it was identified the need to consider a complementary field of study. The majority of experts suggest that SuCEES should have different levels of application to be suitable to any kind of companies' maturity. This recommendation conduct to the development of the Monitoring Readiness Evaluation approach, which was also followed by a smaller group of experts and had their validation through a focus group session.

3.3.2.1 Research aim and research questions interest and usefulness

With the objective to validate if the research filed was of interest and could be a real added value to companies and to competitiveness growth, as well as to achieve a more clarified vision about the gaps that this research could fulfill, it was design a questionnaire to collect experts' opinions and thoughts about the following concerns, regarding their perception about companies' understanding and maturity about strategic planning practices (see Appendix A1e):

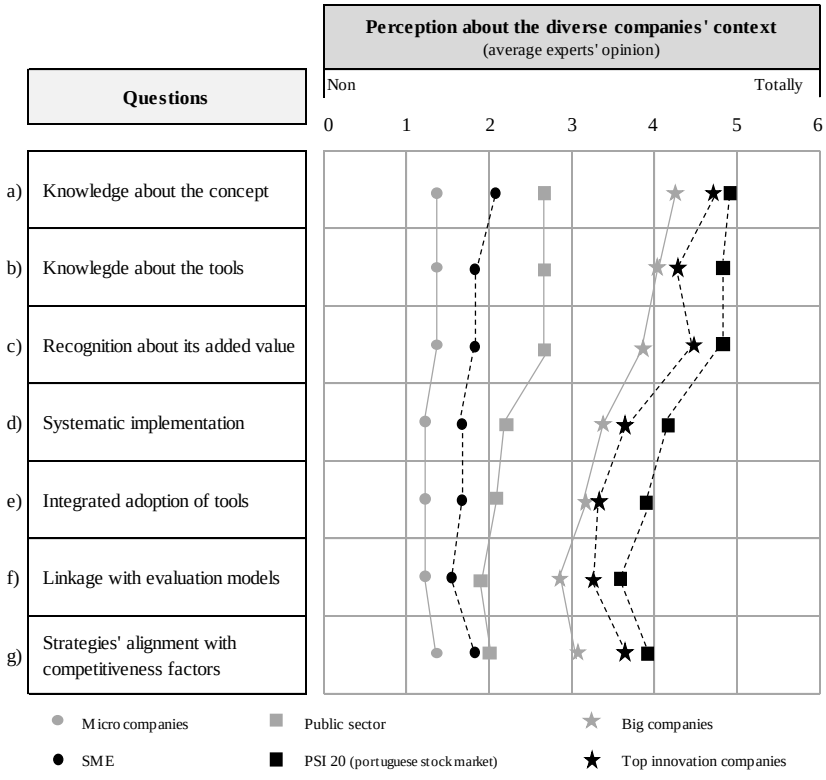
- How deep strategic planning concepts and its implementation is absorbed by companies?
- What are the causes and motivations that conduct to inconsistent practices of strategic planning?
- In what way is the conventional definition of enterprise competitiveness perceived?
- What are the factors that can impact on business and what is the perception of companies' managers?
- Is there an opportunity to establish an alternative definition for competitiveness, embedded in an integrated strategic planning system and why?

The questionnaire was developed with closed answers (some of them of multiple choice), based on nominal and ordinal scales. The answers were treated through frequency analysis and, in specific cases, considering the answer's average.

As an initial conclusion it was possible to observe a strong convergence of experts' opinions, as shown below, regarding the results for each questionnaire issue:

How deep strategic planning concepts and its implementation is absorbed by companies?

As shown in Figure 3.4 we conclude that, independently the company's type, there is a similar pattern regarding each question. It is also obvious that there is a huge opportunity to support companies to demystify concepts and tools, as well as to help them in their strategy implementation process, because even just half or less more than half of big companies (perception between 3 and 4) have relevant domain about this issues (see Appendix A6a).



Score legend: 1 – Very few or none; 2 – Few; 3 – Half; 4 – More than a half; 5 – Most; 6 – All

Figure 3.4 – Perception about strategic planning concepts and tools - regarding different company's types

What are the causes and motivations that conduct to inconsistent practices of strategic planning?

According to the results summarized in the following Table 3.4, we can assume that most part of companies don't conduct strategic planning practices consistently, due to lack of knowledge or

expertise, there still exist absence of commitment to results, usually those practices don't lead to action and there are limited definition of indicators and goals.

Table 3.4 - Experts' opinion about causes and motivations that conduct to inconsistent practices of strategic planning

Issues	Experts' Opinion
There is a lack of knowledge or a lack of expertise Managers do not master the concept and do not have enough expertise / qualification in strategic management	54% mostly 22% usually
It is a waste of time Managers know about the concept but face it as a waste of time or an unnecessary cost, once they always acted as of today and do not see any reason to change that	45% seldom 45% usually
It is complex The strategic planning concept and process is faced as useful, but perceived as a complex instrument that requires a lot of involvement from managers	72% rarely or seldom 28% mostly or always
Absence of commitment to results Managers master the concept but prefer not to assume the risk of strategic planning, fearing to assume a compromise and fail to achieve results	45% mostly or always 45%seldom or usually
Not a priority Managers are too focused on current management and leave strategic planning in second plan	50% usually 39% mostly or always
Does not lead to action Managers only focus their efforts on the diagnosis and the strategy definition, neglecting strategic execution/implementation	67% usually
It is a narrow skill Managers consider strategic planning is a Top management skill only (no interaction nor unfolding thorough the organizational structure)	39% usually 33% mostly
Partial/incipient application Managers assume that by applying the most well-known tools they are already performing strategic planning	39% usually 39% seldom
Limiting definition of indicators and goals Managers find it hard to enunciate objectives and to establish goals and/or consider only traditional (financial and commercial) indicators	45% always or mostly 27% usually
Feeble monitoring Managers delegate incipiently, they do not lead, do not monitor and do not conveniently manage feedbacks	44,5% seldom 44,5% usually

In what way is the conventional definition of enterprise competitiveness perceived?

Regarding this question, 78% of experts consider the coexistence of various definitions, introducing confusion and making benchmarking more difficult (a). 67% defend that conventional definition has incipient and/or ambiguous criteria, as well as is sustained by isolated competitiveness factors (b). Only 10% recognize that it is measurable and translatable in an internationally acknowledged index (c), and just 30% consider it pragmatic and integrated,

contributing to strategic planning (d). Finally, 83% assume that the conventional definition has potential to improve, towards new emerging concepts and principles (see Figure 3.5).

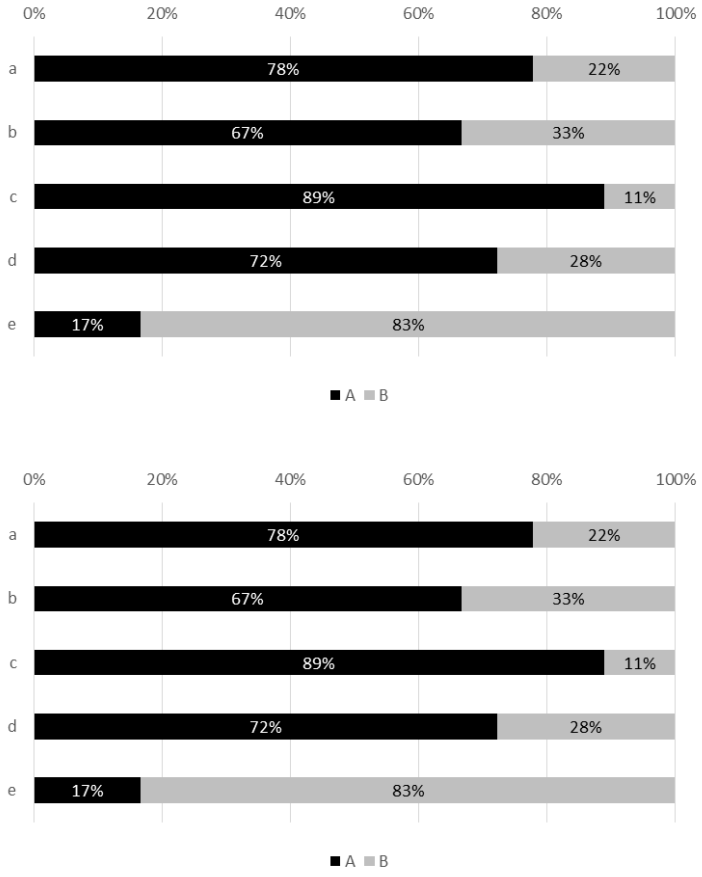


Figure 3.5 – Experts' opinion about conventional definition of Enterprise Competitiveness

What are the factors that can impact on business and what is the perception of companies' managers?

The analyses of experts' opinion about this issue (see Figure 3.6) allow to conclude that managers' perception about the importance that a clear understanding concerning competitiveness dimensions and concepts like resilience, innovation and sustainability has on companies' capacity to compete on a global market (scored between 2 and 3), is even lower than the real impact that each issue has on the business (scored between 3 and 4).

This reveals that in general, managers are not sufficiently aware about the real consequences of not considering this kind of principles as a daily management practice. It is also interesting to see that innovation is considered the dimension mostly perceived concerning its impact on competitiveness.

On other hand, there is a lack of knowledge about sustainability definition, as well as a reduced integrated vision about the influence that resources have on business results.

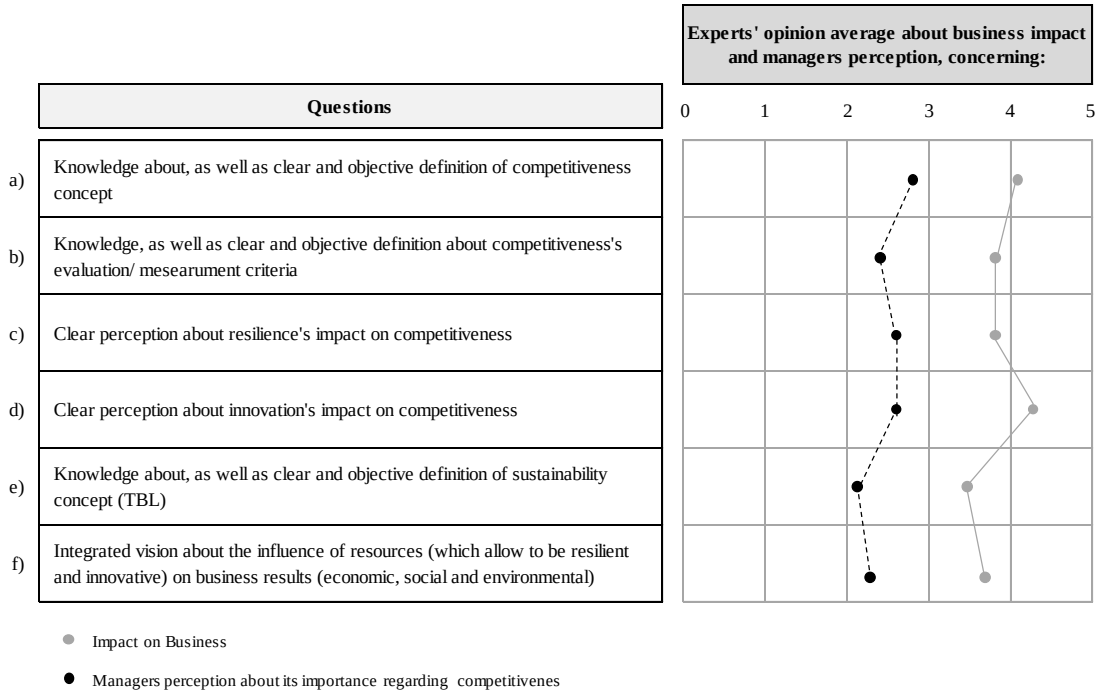
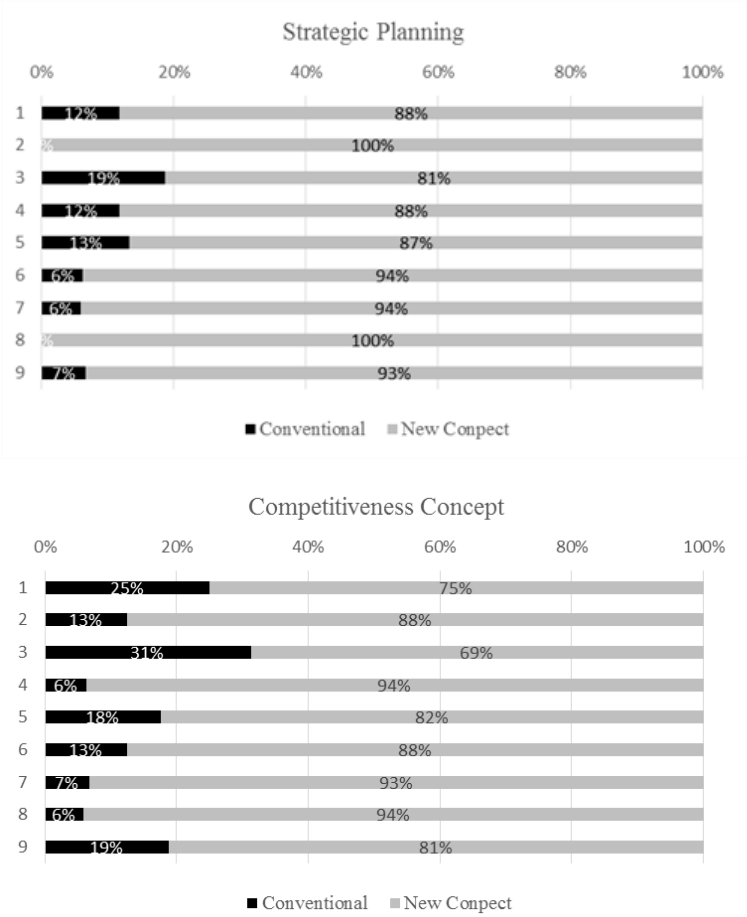


Figure 3.6 – Experts' opinion about factors that can impact on business and what is the perception of companies' managers

Is there an opportunity to establish an alternative definition for competitiveness, embedded in an integrated strategic planning system and why?

Taking into account Figure 3.7 we easily conclude that the establishment of an alternative definition for competitiveness linked to an integrated strategic planning system is considered a huge opportunity to support companies on their business development and growth, due to a large range of benefits.

In fact, only "*Reduction of risk and uncertainty*" (issue 3 for competitiveness concept) was recognized by more than 25% of the experts as an issue that the conventional definition covers properly. Regarding the rest of the issues there is an absolute convergence of opinions traduced in a clear perception about the benefits that a clearer and integrated concept could offer.



Legend: 1 - Better clarity when applying tools (which, when and what for); 2 - More accuracy assessing performance; 3 - Reduction of risk and uncertainty; 4 - Stronger strategically and operational focus; 5 - More accuracy defining priority actions; 6 - More receptivity to systematically adopt strategic planning practices; 7 - Rise in strategic planning process efficiency (involving diagnosis, strategic definition implementation, and monitoring); 8 - Capture of benefits springing from the application of news management principles and concepts; 9 - Rise in the accuracy of benchmarking initiatives

Figure 3.7 - Experts' opinion about the opportunity to create an alternative definition for competitiveness embedded in an integrated strategic planning system

3.3.2.2 SuCEES's requirements and evaluation criteria validation

As mentioned before, experts were also involving to validate SuCEES's evaluation criteria. With this purpose, a set of documents has been prepared, to explain the Sustainable Competitiveness Model principles, SuCEES fundamentals and tools, as well as specific questionnaires to collect their opinion (see Appendixes A1b, A1c, A1d, A1e, A1f, A1g and A1h).

Therefore, it was possible to validate, concerning to:

- Competitiveness Positioning – the suitability and comprehensiveness of the requirements of the most demanding proficiency level (Extremely high level) of each evaluation criteria, both for Resilience and Innovation dimensions, allowing the definition of the remaining proficiency levels; and

- Competitive Advantage – the appropriateness and extensiveness of the impact indicators of each Competitiveness Driver. In this particular aspect, it was intention to obtain experts' feedback if those indicators were able to measure the expectable outcomes from Competitiveness Positioning's requirements on a resilience and innovation point of view.

The questionnaire was developed based on an ordinal scale and once again it was applied a frequency analysis to treat the data. The observations of the final results reveal also a significant convergence of experts' opinions, as shown below.

Competitiveness Positioning

Resilience requirements suitability appreciation

Analyzing the results (see Appendix A7), we conclude that 93% of resilience evaluation criteria were considered by experts as having suitable (x) or entirely appropriate (1) requirements to score its proficiency levels, which means that 40 evaluation criteria in 43 had more than 94% of experts with this opinion. Nevertheless, the other 3 criteria (*Recruitment and Career*, *Handling and Storage*, as well as *Transformation, Assembling and Packaging*) had also a high convergence of opinion among experts, once 89% of experts also share the above belief, however we accept this fact as an opportunity to refine or improve the respective requirements (in a further research context because the score is high enough to be considered as suitable in this stage of the model's development).

Therefore, we assume that all 43 resilience evaluation criteria include requirements that are able to properly assess each criteria and are capable to score the corresponding proficiency level.

Innovation requirements suitability appreciation

Concerning innovation dimension, the conclusions are about the same than in resilience dimension. Through the analysis of the results presented in Appendix A8, we conclude that 87,5% of innovation evaluation criteria were considered by experts as having suitable (x) or entirely appropriate (1) requirements to score its proficiency levels, which means that 21 evaluation criteria in 24 had more than 94% of experts with this opinion. Nevertheless, the other 3 criteria (*Wisdom Deployment*, *Financing Ability*, as well as *ICT Services Innovation*), in spite of 89% of experts also agreed that they are suitable or entirely appropriate, we assume it as an opportunity

to refine or improve the respective requirements (in a further research context because the score is high enough to be considered as suitable in this stage of the model's development).

However, taking into account the convergence of opinions among experts we consider that all 24 innovation evaluation criteria include requirements that are able to properly assess each criteria and to score the corresponding proficiency level.

Competitive Advantage

With the purpose mentioned before, the analysis of the results presented in Appendix A9, demonstrate that 90,3% of the impact indicators contemplated by the Model (56 impact indicators in 62), were considered by experts as suitable (x) or entirely appropriate (1) to measure the fundamental principles related to each Competitiveness Driver's outcome in an advantage evaluation point of view (not only to know the company current performance, but to score the comparison between the company indicator value and its direct competitor indicator value). This means that more than 94% of experts have this opinion. Nevertheless, about the other 6 impact indicators, just 17% of experts considered 4 indicators dispensable (*Awards Index*, *Managerial Rate*, *Carbon Footprint per Employee*, and *ICT Expense as Percentage of Total Administrative Expense*), and only 22% of experts have the opinion that *Solidarity Index* and *Social Equity Index* are also dispensable.

It is interesting to notice that the 6 impact indicators more voted to be considered as dispensable are related to social and environmental themes, which can reveal that also the pool of experts selected to collaborate on this research also consider this issues as secondary priorities or that they assume that companies still not prepared to respond to this kind of concerns.

Aligned with our previous decisions, we assume all 62 impact indicators to be part of the Model, because none of them had a strong unanimous answer among experts to be considered as dispensable, as well as because the intention of this research is also to increase the awareness about social and environmental aspects, as foundations for companies' sustainable growth.

3.3.2.3 Monitoring Readiness Evaluation approach validation

The need for an extra involvement of experts was caused due to their comments and suggestions about the suitability of SuCEES, regarding that they assume that it is a value added system, nevertheless complex for the majority of companies.

Tus, the research considered a complementary approach (Monitoring Readiness Evaluation approach), which in the end was incorporated in the System (see Figure 5.3).

Taking this in account a smaller group of experts (5 elements randomly invited) participate in a focus group session (brainstorming method) to appreciate and comment the parameters of the Monitoring Readiness Evaluation approach (see Figure 5.4, Figure 5.5 and Table 5.1), mainly focus on the following aspects:

- Does it make sense to consider the below evaluation dimensions?
  - ✓ Organizational Awareness;
  - ✓ Environment Influence;
  - ✓ Monitoring Maturity.
- What should be the evaluation criteria for each dimension?
- Does it make sense to structure proficiency levels to unfold evaluation criteria for Monitoring Maturity dimension, due to its importance (see Table 5.1)?

The results of this session was considered very important, once this approach gives the opportunity to develop different demanding levels of SuCEES and therefore the possibility to apply the most suitable SuCEES level according to each company maturity (see Chapter 5.2.1).

3.4 Case studies introduction

Another very important moment of this research was testing the concepts inherent SuCEES in a real business context. In fact, according to the research methodology case studies were contemplated. Therefore, the first step was to define which companies could be suitable references to apply the system.

Thus, an also considering experts' feedback, the case study should be applied on companies where concepts like competitiveness and sustainability were well understood and where decision making was strongly based on reliable data. Therefore, we considered a range of companies with high levels of management skills and business practices.

After several contacts with potential companies that could be interested in participating on this research, we obtain two companies which fulfill the conditions required to take part of the case

study and expressed the intention to collaborate and contribute to the validation of the system, belonging to different economic sectors and cultures, namely:

- Electrolux Poland, and
- Visteon Portugal.

3.4.1 Companies description

In this chapter we briefly describe each company who were part of the case studies and present the present their Focal Point element with which we establish relationships for the system's application.

3.4.1.1 Electrolux Poland

Electrolux is a global leader in household appliances and appliances for professional use, selling more than 60 million products to customers in more than 150 markets every year. The company focuses on innovations and sustainable solutions that are thoughtfully designed, based on extensive consumer insight, to meet the real needs of consumers and professionals.

With products such as refrigerators, dishwashers, washing machines, cookers, vacuum cleaners, air conditioners and small domestic appliances, under esteemed brands including Electrolux, AEG, Zanussi, Frigidaire and Electrolux Grand Cuisine, the Group, in 2015, had about 58,000 employees, had sales of SEK 124 billion (more less than 14,3 billion USD).

The achievement of this results correspond to the following product mix of sales:

- 62% of kitchen products - cookers, hobs, ovens, hoods, microwave ovens, refrigerators, freezers and dishwashers;
- 16% of laundry products - washing machines and tumble-dryers are the core of the company product offering for washing and garment care for consumers and professional users;
- 7% of small appliances - vacuum cleaners, small domestic appliances and accessories are sold to consumers worldwide;

- 15% of adjacent product categories - rapidly growing areas of air-conditioning equipment, water heaters and heat pumps, as well as consumables, accessories and service.

Electrolux has been doing business since 1919 and currently the Electrolux share ELUXb is listed on Nasdaq OMX Stockholm.

Focused on being an innovative market leader and committed to sustainability, Electrolux is one of the major companies in its economic sector, with headquarters located in Stockholm, Sweden. However, the case study Focal Point is located in Electrolux Poland (Global Shared Service Centre), al. Powstańców Śląskich 26, 30-570 Kraków. To know more about Electrolux, visit: www.electroluxgroup.com

3.4.1.2 Visteon Portugal

Visteon Portuguesa – Automotive Systems, S.A. is a Portuguese company, which belongs to Visteon Corporation, a global technology leader, focused on automotive cockpit electronics. Traditionally, Visteon participated in three main divisions, namely: climate, electronics, and interior system.

Visteon designs, engineers and manufactures vehicle cockpit electronics products and connected car solutions that deliver a rich, connected experience for drivers and passengers. As one of the most recognized automotive suppliers in the world, Visteon is technology-driven, flexible and enjoys a diversified customer base and broad global footprint.

The cockpit electronics market is one of the fastest-growing segments of the automotive industry – expected to be 40 to 45% of the industry's total buy in the next decade. As one of the world's three largest cockpit electronics providers – and the only one focused exclusively on this segment – Visteon is well-positioned to capitalize on this growth.

Whit its Headquarters at Van Buren Township, Michigan, U.S, the President and CEO - Sachin Lawande with his team of 11,000 employees around the world, were capable to generate revenue of $3.25 billion in 2015. With 50 manufacturing, engineering and customer support facilities in 19 countries its major customers are Ford, Renault/Nissan, Mazda, BMW, GM, Honda, PSA, JLR, VW and Daimler.

Visteon Portugal is one of its European unit, placed in Parque Industrial Carrascas, 2951 – 503, Palmela – Portugal, which is a Manufacturing (M) and Customer Center (CC), regarding Electronics products. With 1076 employees, Visteon Portugal is responsible for 12% of Visteon Corporation sales (which correspond to 55% of Visteon Europe's sales). To know more about Visteon visit: www.visteon.com.

3.4.2 Case study fundamental elements

To develop the case studies it was needed to define a Focal Point contact for each of the companies and to share fundamental information about the research, namely concerning Sustainable Competitiveness Model and SuCEES components, approaches and tools.

Regarding the above the Focal Points were:

- Paulo Morganho – EMEA HR Services Director at Electrolux (Poland); and
- Paulo Iglésias – Plant Manager at Visteon Corporation (Portugal).

The documentation shared had the purpose to align knowledge about the research concepts and assumptions, to collect data and to obtain their final opinion about SuCEES, in terms of its suitability and added value (general documents - see Appendixes A2a, A2b, A2c, A2d; data collecting documents – see Appendixes A2e, A2f, A2g, A2h and A2i).

Thus, it was possible to interact with each Focal Point, collect data and mutually clarify some doubts that arose. Making use of data collecting sheets it was possible to obtain each companies':

- Competitiveness Positioning (globally and in terms of resilience and innovation);
- Competitive Advantage; and
- Competitiveness Risk.

The other tools of the system allow the visualization of companies' scores, the analysis of results and the systemization of conclusion and recommendations.

It is important to highlight that data collection sheets were based on the concepts of SuCEES's foundations and assume ordinal scales according to proficiency levels to score Competitiveness Positioning, nominal scales to score Competitive Advantage and ordinal scales to score Competitiveness Risk.

The final results were obtained through the calculation methods defined by the system (see Chapter 5.4).

3.5 Chapter Highlights

To clarify the aim, objectives and scope of the initial research focus, the development of some previous activities were needed. To achieve this purposes a deductive methodology was applied, supported by:

- Literature review to identify investigation fields and knowledge gaps, which could be explored to develop useful approaches and/or tools as a contribution to solve business contexts problems and to support companies' competitiveness increase and business growth;
- Experts opinion and vision about companies' weaknesses concerning strategic planning practices, about the opportunity and interest to create an alternative approach that could be useful to companies, as well as to validate evaluation criteria to measure and score companies' performances;
- Execution of two exploratory case studies to validate the suitability of the system developed, as well as to collect real feedback about SuCEES application benefits, difficulties, adjustments needed and recommendations.

According to literature review it was possible to identify that companies' bankruptcy and loss of competitiveness is a real problem that should be addressed and where new concepts like resilience, innovation and sustainability could perform a better role to reduce or avoid such situation.

In line with the above, also experts' opinion reinforces this need and assume that there is a huge opportunity to develop an alternative definition for competitiveness embedded in a systematic strategic planning process.

Afterwards, experts where again involved, following the research methodology steps, with the objective to validate the evaluation and scoring parameters included in the Sustainable Competiveness Model. As a conclusion, the convergence of experts' opinion was very high and therefore all parameters designed where incorporated in the final version of the Model.

After the conclusion of SuCEES, the case studies were conducted to test the system's applicability, as defined in the research methodology. The conclusions were very grateful, due to the favorable opinion of both Focal Points. In fact, both agree that it is a useful system, very comprehensive and a powerful instrument to support companies' in their strategic planning process, therefore a real contribution to competitiveness increase (see Chapter 6).

However, there is a unanimous opinion among experts and both Focal Points that the Model and SuCEES is complex and demanding for the majority of companies, due to managers' business maturity and their lack of skills and effort needed to apply the system.

Additionally, there are some opportunities to improve and adjust the Model and the System that can be considered as further research opportunities (see Chapter 7).

Underlines

The methodology used for this research was based on a deductive approach, which includes literature review, involvement of 18 experts and the development of two exploratory cases studies.

The state-of-art to support the thesis implied a transversal review of several thematics concerning: strategy, competitiveness, resilience, innovation, sustainability, leadership, supply chain, business models, monitoring, among others.

The involvement of experts had the purpose to obtain their opinion about the need, suitability and added-value of an alternative competitiveness definition embedded in an integrated strategic planning system; as well as to validate competitiveness positioning requirements used to score each evaluation criteria, and also to get consensus about the impact indicators that the model should held to score Competitive Advantage.

The experts' selection was based on their professional experience, competences and knowledge about the themes related to this investigation, considering the need to cover all relevant aspects of the research, as well as to assure data/ opinion reliability and representative results.

The cases studies were conducted in Electrolux Poland and in Visteon Portugal, companies which fulfil the requirements defined to be able to validate SuCEES's application (regarding only its evaluation framework).

The results' analysis of experts' questionnaires' answers, and the several interactions that were established with them, allow to conclude that there is a huge opportunity to improve this

themes, all evaluation requirements and impact indicators are suitable to apply as score methods, as well as that Sustainable Competitiveness Model and SuCEES are differentiators concepts and an added-value to support companies' competitiveness increase and business growth.

The case studies also revealed that the evaluation framework of SuCEES is a suitable instrument to apply on a real business context and a value added for companies (see concrete results in Chapter 6).

Nevertheless, the Model was considered complex and demanding, which is an opportunity to develop different levels of SuCEES (less demanding), to allow its implementation to a broader range of companies considering their monitoring maturity stage.

Due to the above, it was developed a monitoring readiness approach to help companies to identify their monitoring maturity stage allowing them to choose their adequate SuCEES level.

4 Sustainable Competitiveness Model

Considering the research context and the theoretical review, as well as the unanimous opinion of the experts involved in this research, we conclude that an alternative definition of competitiveness, clearer, measurable and based on new concepts and principles, could represent an effective value added to companies and managers, contributing to more reliable benchmarks and to significant improvements with direct effect on their real competitiveness.

Thus, one of the objective of this research is to establish this alternative definition called Sustainable Competitiveness Model, which according to Cavaco, Nuno M. and Cruz-Machado (2014), assume an alternative approach to support competitiveness evaluation processes (Cavaco, Nuno M. and Cruz-Machado, 2015).

4.1 Concepts and Definitions

In addition to the already mentioned, concepts like sustainable competitiveness and competitive advantage (see chapter 2.2), can be applied in a different or combined way, contributing to a better definition of competitiveness.

Instead of consider sustainability in terms of time, which is commonly assumed as the aptitude to be competitive today and in the future, this research develop an integrated concept based on the fact that time frame of competitiveness should be ensured through the combination of the capability to be resilient (recover performance in time) and the ability to be innovative (increase performance in time), which represent the way Companies use their resources to create sustainable results. So the model is based on the assumption that practices that companies use to be resilient and to be innovative (which are their resources - inputs) should have impact on their results (performance – output). Thus, taking into account that sustainability, according to the Triple Bottom Line principles, should address economic, social and environment issues (Graham Hubbard, 2009), then we can assume that companies' performance (results) should be measured through indicators able to evaluate this dimensions. This hypothesis is a contribution to an evolution of sustainable competitiveness definition, integrating several concepts and establishing a direct relation between a modern definition of competitiveness with an overall definition of sustainability.

Regarding the above Sustainable Competitiveness is based on two fundamentals:

- Competitiveness, which should be able to identify how the company manage its resources to be resilient and innovative;
- Sustainable, which should be capable to identify if the use of those resources are creating advantage regarding its competitors, measured through its performance based on economic, social and environmental indicators. As well taking into account the risk of losing this advantage.

Therefore, we can assume the following definition for Sustainable Competitiveness:

> Ability to manage resources to be continuously resilient and innovative to face risks and to generate constantly economic, social and environmental advantage.

In this definition, associated to results we identify the word "Advantage", which means that the definition itself incorporates measurement concerns. Thus, the Sustainable Competitiveness Model has its foundations on three components:

- Competitiveness Positioning – which measures company's resilience and innovation;
- Competitive Advantage – which measures company's economic, social and environmental results in comparison with its direct competitor;
- Competitiveness Risk – which measures company's risk of losing its competitive advantage.

Taking into account the above, a combination of these three components could be defined as the company's Real Competitive Strength.

The following chapters will detail each of one of these components, for a better understanding of the concepts and the model itself.

4.1.1 Competitiveness Based on Resilience and Innovation

Considering that sustainable competitiveness can be measured through two parameters, namely, performance and time, and resilience and innovation can be expressed through these two parameters, it is possible to establish a relation between them to support competitiveness definition. Regarding the "Resilience Triangle" (Carvalho, H., & Machado, V. C., 2012) and applying the same principle to the "Innovation S – Curve" J. Hinks, M. Alexander, G. Dunlop,

2007), competitiveness can be defined as the readiness to react to disturbances (resilience) and the willingness to leverage performance in a pro-active way (innovation) - Figure 4.1. Therefore, we can assume that competitiveness can be measured through the following expression, considering these two dimensions:

$$Competitiveness = (Resilience\ Capacity + Innovation\ Ability)$$

Hence, it is necessary to clarify what resilience and innovation really mean in the Sustainable Competitiveness Model.

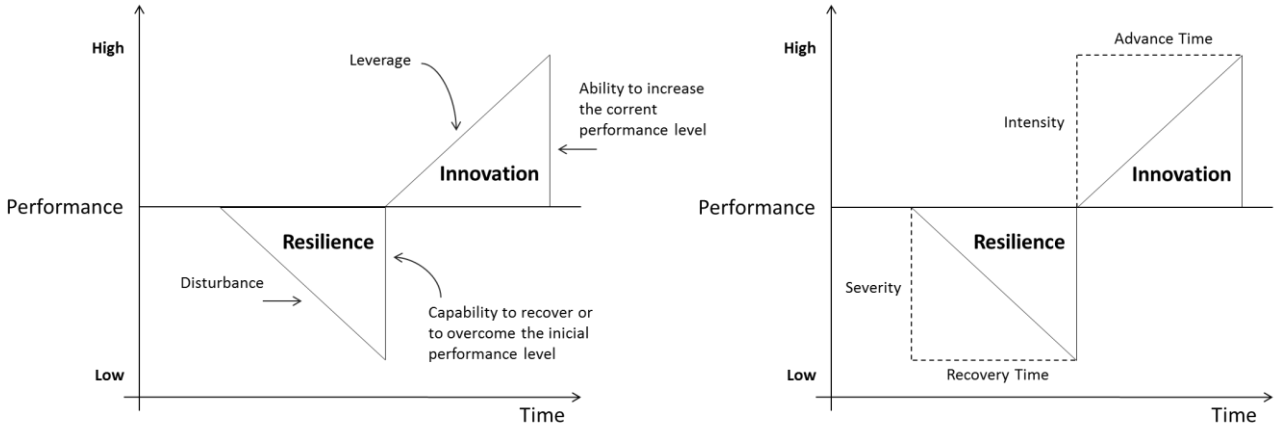


Figure 4.1 - Competitiveness definition based on resilience and innovation principles

Taking into account the Figure above, it is obvious that when a company faces a disturbance its performance trend to decrease, so resilience is the capability to recover or to overcome the initial performance level, so we can assume that severity correspond to the impact that the disturbance has on performance and the recovery time correspond to the time needed do restore normality. So resilience can be defined as the area of the triangle, obtained through the following expression:

$$Resilience = \frac{1}{2}\ (Severity \times Recovery\ Time)$$

On the other hand, and assuming the same principle, to increase performance companies should innovate, therefore we can consider that this performance increase can be defined by intensity (of innovation) and the advanced time which that innovation represents. Analogously, innovation can be defined as the area of the triangle, obtained through the following expression:

$$Innovation = \frac{1}{2}(Intensity\ x\ Advance\ Time)$$

Developing this principle deeper, it is possible to consider two triangles for each competitiveness dimensions (see Figure 4.2).

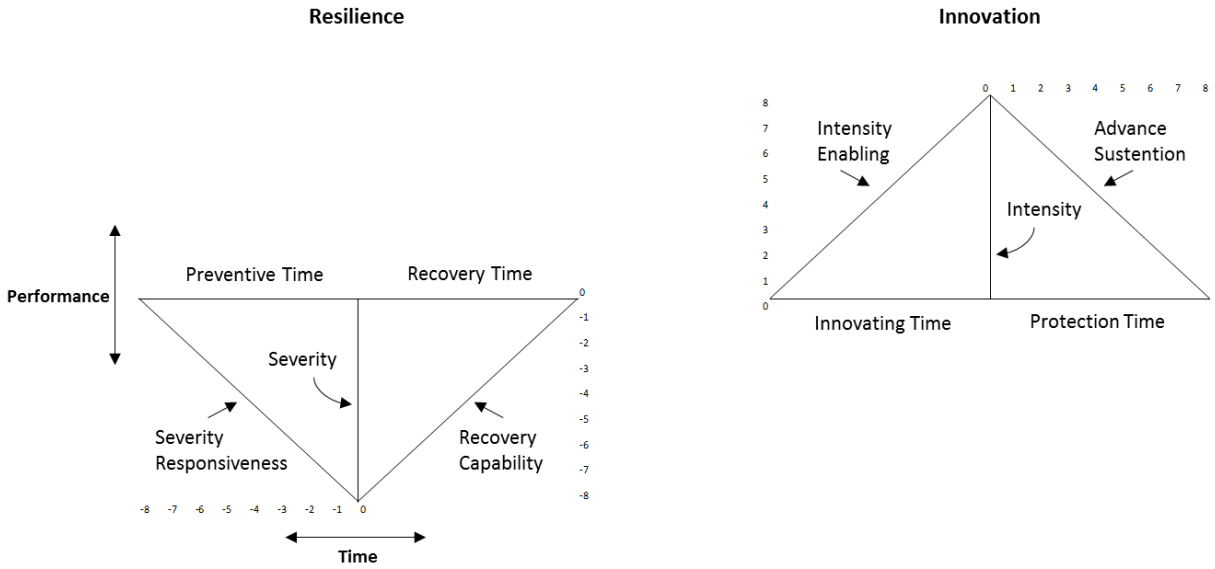


Figure 4.2 - Theoretical decomposition of resilience and innovation dimensions of the Sustainable Competitiveness Model

Regarding Resilience, we can assume that:

- Severity Responsiveness – is a parameter that measures the capacity to attenuate performance severity due to disturbances. The better this parameter the longer is the Preventive Time, which means that it takes longer to achieve a lower performance level stated.

- Recovery Capability - is a parameter that measures the capability to recover from the lower performance level achieved. Thus, the better this parameter the shorter is the Recovery Time, which means that it takes lesser to reestablish normality.

Concerning Innovation, we can assume that:

- Intensity Enabling – is a parameter that measures the ability to be intensively innovative, which means that a higher performance level stated is achieved faster. Thus, Innovating Time is shorter when this parameter has high values.

- Advance Sustention - is a parameter that measures the ability to maintain longer this innovation advantage. Thus, the better this parameter the longer is the Protection Time.

If we merge Resilience and Innovation triangles we obtain the Competitiveness Diamond (see Figure 4.3).

Figure 4.3 - Competitiveness Diamond

Taking into account the assumption above, high competitiveness (high Resilience Capacity and high Innovation Ability) depends on the maximization and minimization of the area of these four triangles.

To do so, we assign a theoretical behavior of the Competitiveness Diamond assuming a normalized frame based on a scale between 0 and 8 (which correspond to the evaluation scale used in the model – see chapter 5), and also:

- Define fixed values to the minimum severity level = - 8 (decrease of performance) and to the maximum intensity level = 8 (increase of performance);

- Consider that the measurement of Severity Responsiveness (score given in its evaluation), for this purpose, can be converted into a corresponding value of Preventive Time, and Recovery Capability (score given in its evaluation), can be converted into a corresponding value of Recovery Time; and

- Consider that the measurement of Intensity Enabling (score given in its evaluation), for this purpose, can be converted into a corresponding value of Innovating Time, and Advance Sustention (score given in its evaluation), can be converted into a corresponding value of Protection Time.

Taking into account this assumptions, extreme values of Resilience and Innovation evaluation are shown in Figure 4.4 and Figure 4.5.

4.1.1.1 Low Competitiveness Diamond

An extreme negative score of competitiveness positioning (based on Resilience Capacity - Severity Responsiveness and Recovery Capability evaluations (score equal to n); and on Innovation Ability (based on Intensity Enabling and Advance Sustention evaluations (score equal to n)), can be illustrated by competitiveness diamond shown in the following figure.

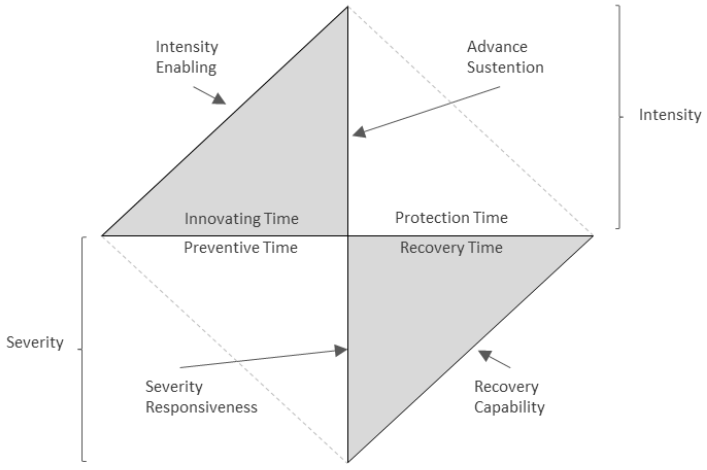


Figure 4.4 - Low Competitiveness Diamond

The configuration of this diamond is obtained through:

Resilience Capacity

- Low Severity Responsiveness due to low capacity to prevent disturbances ("Zero" Preventive Time);
- Low Recovery Capability due to low capacity to restore early conditions ("Boundless" Recovery Time).

Innovation Ability

- Low Intensity Enabling due to low ability to materialize innovation ("Boundless" Innovating Time);
- Low Advance Sustention due to low capacity to protect innovation ("Zero" Protection Time).

Where:

Table 4.1 - Converting expressions of evaluation scores into theoretical competitiveness diamond - Low Resilience

Competitiveness Results	Parameter	Score (value of n)	Timeline impact	Correspondent Diamond value	Conversion expression
Minimum Resilience Capacity	Severity Responsiveness	0	Preventive Time	0	-n
	Recovery Capability	0	Recovery Time	8	8-n
Minimum Innovation Ability	Intensity Enabling	0	Innovation Time	-8	n-8
	Advance Sustention	0	Protection Time	0	n

4.1.1.2 High Competitiveness Diamond

In the opposite, and considering the same principles above, an extreme positive score of competitiveness positioning can be illustrated by competitiveness diamond, shown in the following figure.

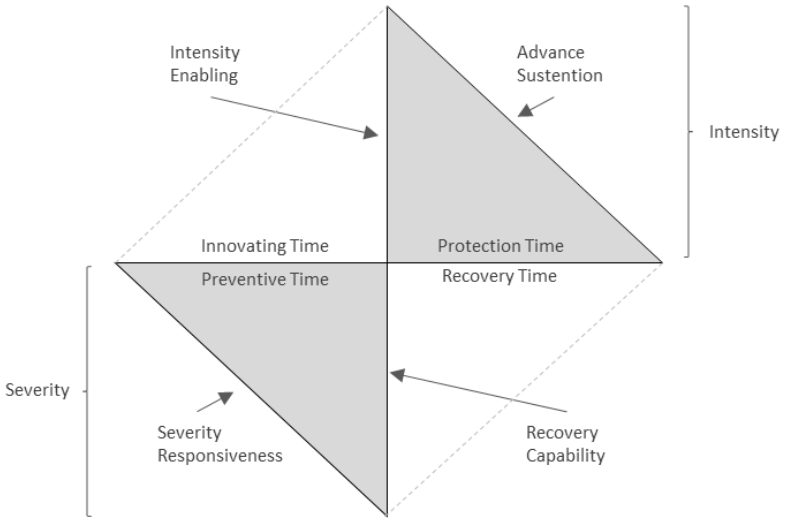


Figure 4.5 - High Competitiveness Diamond

The configuration of this diamond is obtained through:

Resilience Capacity

- High Severity Responsiveness due to high capacity to prevent disturbances ("Boundless" Preventive Time)
- High Recovery Capability due to high capacity to restore early conditions ("Zero" Recovery Time)

Innovation Ability

- High Intensity Enabling due to high ability to materialize innovation ("Zero" Innovating Time)
- High Advance Sustention due to high capacity to protect innovation ("Boundless" Protection Time)

Where:

Table 4.2 - - Converting expressions of evaluation scores into theoretical competitiveness diamond - High Resilience

Competitiveness Results	Parameter	Score (value of n)	Timeline impact	Correspondent Diamond value	Conversion expression
Maximum Resilience Capacity	Severity Responsiveness	8	Preventive Time	-8	-n
	Recovery Capability	8	Recovery Time	0	8-n
Maximum Innovation Ability	Intensity Enabling	8	Innovation Time	0	n-8
	Advance Sustention	8	Protection Time	8	n

4.1.1.3 Maximizing Competitiveness

Assuming this principles companies' intention should be maximizing Competitiveness (C max), that means:

Maximizing Resilience Capacity + Maximizing Innovation Ability

As said before, it can be expressed through the sum of the areas of Competitiveness Diamond, which maximization corresponds to the high competitiveness diamond. Considering Figure 4.6, we identify that maximization of competeveness diamond is obtained through the sum of R1 and I2.

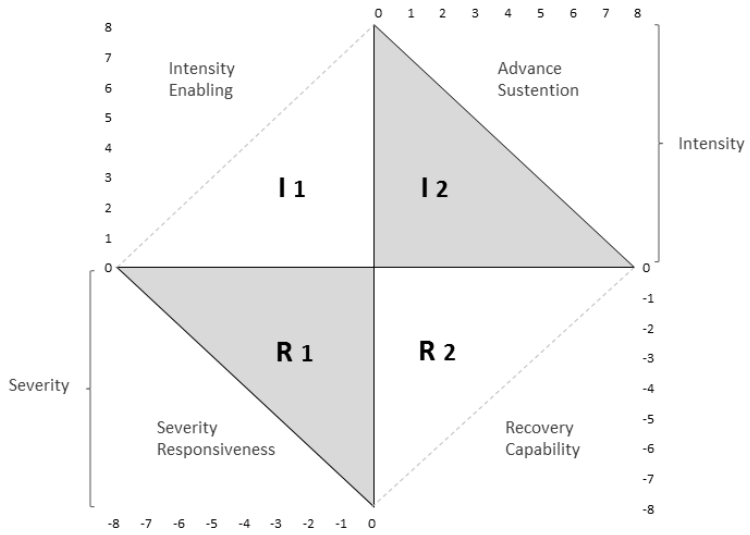


Figure 4.6 - Areas of the competitiveness diamond that maximize competitiveness

Therefore, we can calculate the corresponding areas as follows, taking into account that we want to:

- Maximize R1 and minimize R2
- Minimize I1 and maximize I2, so:

C max = R max + I max,

R max = R1 – R2; and R1 = (8x8)/2 = 32, and R2 = 0, then R max = 32

I max = I2 – I1; and I2 = (8x8)/2 = 32, and I1 = 0, then I max = 32

Thus,

C max = 32 + 32 = 64, and C min = - 64

As a conclusion, the competitiveness diamond can be used for benchmark comparing the diamond's configuration between companies, and the scale above obtained through the diamond area calculation can also be used for comparison between companies, as shown in Figure 5.26.

4.1.2 Competitiveness Positioning

As mentioned before, the competitive positioning of a company should be obtained through the measurement of resilience and innovation. The question is how can we to that? How to associate competitiveness with resilience and innovation in a measurement way?

To do so, Sustainable Competitiveness Model (SCM) is based on 7 (seven) Competitiveness Drivers that include key elements which any kind of companies incorporate. These Drivers were defined through the application of content analysis, taking into account the analysis of competitive factors and the most recognized current international models used to improve companies' performance, namely principles and criteria from EFQM, Shingo Prize, Balanced Score Card and PESTLE (see Chapter 2.1.2). Thus, Table 4.3 shows the relationship that can be established between the several models.

Table 4.3- Relation between the 7 Competitiveness Drivers of the Sustainable Competitiveness Model and the EFQM, Shingo and PESTLE models' evaluation criteria, and the Balanced Score Card perspectives

Criteria of EFQM model	Principles of Shingo Prize model	Competitiveness Drivers	Balanced Scorecard Perspectives	PESTLE
Leadership	Culture Enablers Leadership & Ethics Enterprise Culture Enterprise Thinking Consistent Lean Policy Deployment	**Corporate Behavior**	Learning and Growth	Political Legal
Strategy Customer Results Society Results	Quality Delivery Cost Competitive Impact	**Business Proposition**	Customer	Economic
Business Results	Business Results Financial Impact	**Financial Stability**	Financial	
People Partnerships & Resources People Results	People Deployment	**Organization Wellbeing**	Learning and Growth	Social
Processes, Products & Services Partnerships & Resources	Continuous Process Improvement Lean Ideas Value Stream & Support Processes	**Operational Leanness**	Internal Business Processes	Technical Environmental
		Technological Alignment		
		Facilities Suitability		

This relation allows companies to adopt this new approach taking advantage of any other model in use, independently of the model, or in an integrated way, once the 7 Drivers will incorporate the best of each principle and criteria of each of the other models.

Given the above, measuring Competiveness Positioning based on this new approach should consider resilience and innovation through this seven Competitiveness Drivers. Thus, it is needed to define what should be the understanding of resilience and innovation for each of these drivers. Considering this, Sustainable Competitiveness Model establish features to define what can be resilience (regarding failure modes) and innovation (regarding leverage factors) to each Driver (see Table 4.4).

Table 4.4 - Competitiveness Drivers and its relation to failure modes (Resilience) and to leverage factors (Innovation) - Examples

Competitiveness Drivers	Features	Key findings	Competitiveness Dimensions (Variables) - *Examples*	
			Resilience (Failure Mode)	Innovation (Leverage Factor)
Corporate Behavior	• Ethics and solidarity • Leadership • Knowledge management (market share, clients' satisfaction, complains, …) • Policies	• What are the main concerns of the board? • How do they act? • How do they deploy?	• Corruption and personal scandals • Management changes (nominations and exonerations) • Strategic failures	• Visioning practices • Open innovation initiatives • Establishing strategic partnerships
Business Proposition	• Customers' needs/ expectations • Product attractiveness • Service • Marketing (brand)	• What is the product/ service value added and its suitability to client expectations? • What is the market recognition?	• Sales decreasing • Crisis management (communication and brand) • Political instability of markets	• Research deployment • Product development
Financial Stability	• Return On Investment • Cash flow	• Is the business auto-sufficient?	• Alternative business to distribute risk • Back-up practices to cash flow slippages	• New solutions to increase Return On Investment
Organization Wellbeing	• Culture and Leadership • Competencies and entrepreneurship • Motivation and empowerment	• What is the internal environment, employee satisfaction and labor capabilities to the future?	• Change management routines • HR rotation and substitution plans • Social dynamics (e.g. strikes)	• Learning innovation • New social practices • New kind of acknowledge programs
Operational Leanness	• Logistics (planning, procurement, purchasing, storage, distribution) • Manufacturing/ service delivery • Maintenance	• How come are the operations efficient and effective?	• Planning constraints • Capacity Shortage * • Material Shortage * • Quality assurance	• Implementing edge improvement methodologies • Adopting new partnerships over the business value chain

Competitiveness Drivers	Features	Key findings	Competitiveness Dimensions (Variables) - *Examples*	
			Resilience (Failure Mode)	Innovation (Leverage Factor)
Technological Alignment	• Technological infra-structure • Communications • Technological applications	• How come technology satisfies the business needs?	• Help desk capability • Disaster recovery • Business continuity planning	• Establishing collaborative initiatives with High Tech companies • Introduction of edge solutions (tech pioneering)
Facilities Suitability	• Installations • Equipment • Ergonomics	• How come facilities allows the proper on-going operations?	• Catastrophes and disasters • Accidents and labor diseases	• Adapting newest facility solutions • Edging safer and efficient equipment

However, the table above is just a reference. To measure Competitiveness Positioning it is necessary to be more explicit to reduce measuring subjectivity. So, considering resilience and innovation variables (examples given above), for each Competitiveness Driver was defined Competitiveness Elements, as well as sources of disturbance (evaluation criteria for resilience) and sources of enhancement (evaluation criteria for innovation). The definitive failure modes (convertible into impacts of low resilience) and leverage factors (convertible into impacts of high innovation) were also defined as shown in Annex 1 and Annex 2.

As mentioned before these evaluation criteria were inspired in the models reviewed in chapter 2 and result from a complementarity of evaluation criteria used by them. Nevertheless, this alternative Model aims to be as much as possible an unambiguous measurement process. Therefore, the evaluation of company's Competitiveness Positioning is based on a scoring method for each criteria, based on:

- Proficiency Levels - to assess Severity Responsiveness (concerning Resilience dimension) and Intensity Enabling (regarding Innovation dimension); and
- Practice Consistency – to assess Recovery Capability (concerning Resilience dimension) and Advance Sustention (regarding Innovation dimension).

These Proficiency Levels correspond to requirements that companies should fulfill to minimize low resilience impacts and to maximize high innovation impacts. So, the model assumes a scoring scale between 0 and 8, with 5 proficiency levels with requirements defined and 4 intermediate levels (see detail of Proficiency Levels in Appendix A3 and A, as well as its scoring method in Chapter 5). It is important to highlight that the requirements of extremely high proficiency level

of each evaluation criteria result from literature review (see Chapter 2) and were validated by the experts involved in this research, and the other requirements of the remaining proficiency levels were defined through a decreasing demand approach. The selection of the company's proficiency level should be based on the practices used by the company that can be proved has valid evidences of compliance with the corresponding proficiency level assigned (see chapter 5). It is also relevant to underline that proficiency levels are based on requirements instead of practices, because the purpose is to analyze the effective results of the implementation of those practices and not just check about their existence. Some examples of practices that can be assumed as current references for Competitiveness Positioning evaluation are shown in Table 4.5.

Table 4.5 – Examples of current practices that can be used as references to score proficiency levels of Competitiveness Positioning, by Competitive Driver

Competitiveness Drivers	Current examples of practices that can be assumed as references for requirements fulfillment evaluation (Proficiency Level scoring)
Corporate Behavior	EFQM/ Baldrige, Shingo Prize, GRI, Dow Jones Sustainability Index; ISO Certifications; SWOT, PESTLE; Canvas; McKinsey 7S, Awards; …
Business Proposition	Benchmarking practices; Marketing Research; BCG Matrix,; Product Life Cycle Curve; Gartner's Magic Quadrants; Design Thinking; …
Financial Stability	Compliance and risk evaluation; External auditing; …
Organization Wellbeing	Learning and flexible Organizations; Leadership models; International Position Evaluation System; Culture and motivation models; Kirkpatrick model; …
Operational Leanness	LARG; 6 sigma; Kaizen; TPS; SCOR; Open Innovation, TRIZ; specific ISO's; …
Technological Alignment	ITIL; ICT Certifications; NOC; …
Facilities Suitability	International standard compliance; 5S (Sort, Straighten, Shine, Standardize and Sustain); Awards; …

On other hand this way we assure more flexibility to the model because best practices are in continuous improvement, making it independent from the new practices that can appear in the future.

Regarding Practice Consistency, the evaluation approach is based on the principle: the greater the practices' degree of maturity/ implementation and cutting edge the company prove as an evidence, higher its Recovery Capability and its Advance Sustention, so higher its score (as shown in Chapter 5.).

Considering the company's evaluation under these definitions, if we build a matrix capable of crossing Resiliency with Innovation it is possible to establish a Competitive Positioning based on the corresponding scores obtained, which allow the identification of companies' profile about

these two dimensions. In this way companies' competitiveness can be expressed visually in this matrix, allowing a clearer understanding if the company is abler to react to disturbances (Resilient) or more prepared to anticipate the future (Innovative).

Therefore, it can be defined four different company profiles corresponding to the four quadrants of the matrix, as illustrated in Figure 4.7.

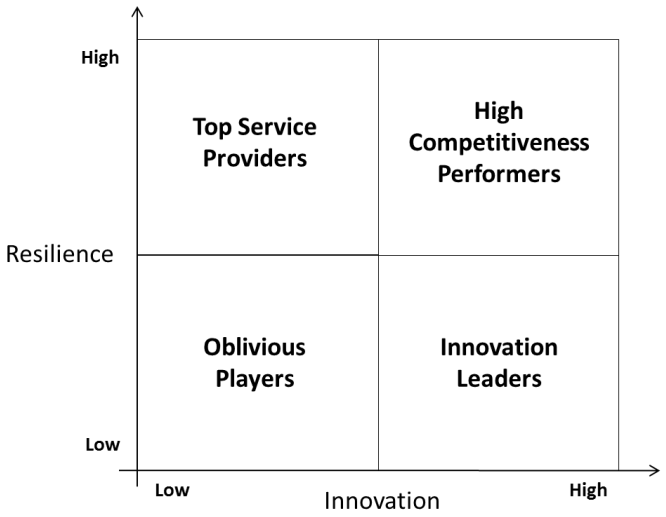


Figure 4.7 - Competitiveness Positioning Matrix (CPM)

Each of these profiles can be expressed by resilience and innovation features and by generic behavior towards key business attitudes, as shown in the following table.

Table 4.6 - Description of each Competitiveness Positioning profile – by Competitiveness Dimensions and by Business Attitude

		Competitive Positioning			
		Oblivious Players	Top Service Providers	Innovation Leaders	High Competitiveness Performers
Competitiveness Dimensions	Resilience	• Accommodation to the usual service levels • Low concern to respond quickly to disturbances	• Solid procedures and routines to react to disturbances	• Low practice of dealing with disturbances	• Strong and deployed empowerment to provide quick responds to disturbances
	Innovation	• No motivation to develop new solutions	• Low practice of developing new solutions	• Motivation to accomplish new solutions (what clients want)	• High motivation to create disruptive solutions (what clients don't know they want)

		Competitive Positioning			
		Oblivious Players	Top Service Providers	Innovation Leaders	High Competitiveness Performers
Business Attitude	Market Perception	• My product/ service is unique, the best and timeless • My clients will always be loyal	• My market share depends on the quality of my service	• My market share depends on the differentiation of my product	• I'm never satisfied with my market share • My competitors are not sleeping
	Knowledge Management	• No decision making based on real data (no risk assumption)	• Decision making based on client reaction (low risk assumption)	• Decision making based on market behavior (low risk assumption)	• Decision making based on trend analysis (high risk assumption)
	Business Focus	• Living from the success of the past (I'm already good)	• Responsiveness (I can always be better)	• Anticipation (I can always be better)	• Always visioning the future (I can always be different)

Assuming these profiles, it is also possible to do benchmark analysis between companies belonging to the same economic sector.

The comparative Competitiveness Positioning between companies can express advantages/ disadvantages only based on this evaluation component of the Sustainable Competitiveness Model (see Figure 4.8)

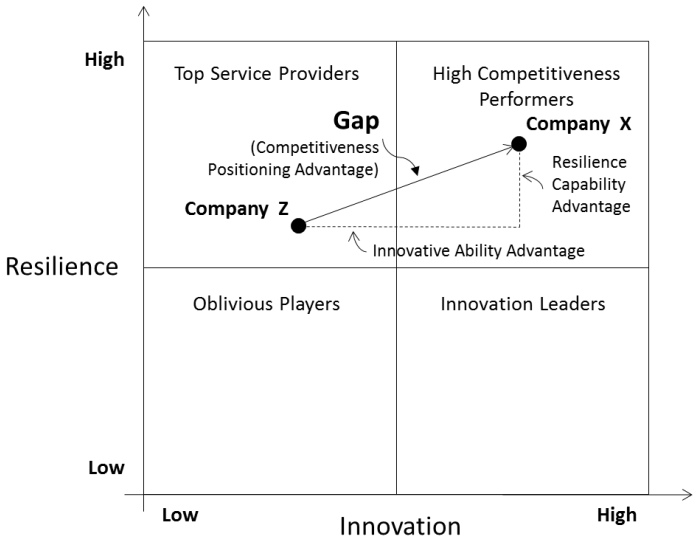


Figure 4.8 - Competitiveness Positioning benchmark (comparison between company's X and Y)

Taking into account what was already mentioned, competitive positioning advantage should be defined as the existing gap obtained from the comparison between the competitiveness positioning of a company and their competitors. Therefore, this gap allow a clear understanding of the dimensions, drivers and evaluation criteria that really contribute to have that advantage, so it is possible to identify if it is a resilience capability advantage or an innovative ability advantage.

It is relevant to emphasize that this advantage is only about resources and not linked to results. The next Chapter will define Competitive Advantage based on impact indicators.

4.1.3 Competitive Advantage

After this description of the Model, in fact a company can have a high competitiveness positioning, without causing competitive results (theoretically it should be a relationship between resources and results – this issue is a recommendation and could also be considered as an opportunity for further research – see Chapter 7.3.2). With this concern the SCM include a measurable component to evaluate the impact that the company is generating, in concrete Competitive Advantage (CA).

Thus, it is through the Competitive Advantage that the SCM is able to make the relationship with sustainability concept. This means companies generate positive impacts on Triple Bottom Line principle, which is being competitive through low costs and creating value (economically), generating wellbeing (socially) and without compromising the environment (environmentally), taking into account the satisfaction of all the stakeholders involved, namely obtaining:

- Shareholders welfares – creating value added;
- Clients and Society recognition – exceeding expectations;
- Suppliers and Partners reliability – promoting trust;
- Management and Employee empowerment – sponsoring motivation.

Considering the foundations of the Model, the link between Competitiveness Positioning and Competitive Advantage should be establish regarding the 7 Competitiveness Drivers, based on the definition of key indicators able to measure economic, social and environmental impacts and taking into account the Resilience and Innovation. Table 4.7 presents the impact evaluation objective for each Competitiveness Driver and the total number of impact indicators defined, as well as their relation in terms of sustainability and scope.

Table 4.7- Purpose of Competitive Advantage measurement, by each Competitiveness Driver and its relationship with Triple Bottom Line and the Competitiveness Dimensions (R – Resilience; I – Innovation)

#	Competitiveness Drivers	Impact evaluation objective	Sustainability dimensions			Scope		
			Economic	Social	Environmental	R	I	R/I
10	Corporate Behavior	Corporate commitment to society, transparency and ethics, as well as economic, social and environmental development	7	6	4	2	4	4
10	Business Proposition	Market presence, sales effectiveness and customers' satisfaction	10	4	4	4	3	3
10	Financial Stability	Liquidity and solvency health, as well as assets valorization and investments return	10	2	1	3	3	4
12	Organizational Wellbeing	Managerial balance, employee performance and satisfaction	3	11	2	5	2	5
11	Operational Leanness	Productivity, quality, logistics and service performance, as well as operational partners' compliance	10	1	2	2	2	7
5	Technological Alignment	Technological sophistication and internal ICT service performance	5	1	1	3	1	1
4	Facilities Suitability	Security and safety performance, as well as infrastructure optimization	3	2	1	1	1	2
62 indicators		**Totals**	**48**	**27**	**15**	**20**	**16**	**26**

So, the evaluation of Competitiveness Advantage is based on the measurement of 62 impact indicators (see Table 4.8 and Annex 4). These indicators were defined considering the evaluation objectives, the literature review (see Chapter 2.5) and their validation by the experts involved in this research (see Chapter 3.3.1). It is important to highlight that the indicators defined are a mix between indicators commonly used (mostly commercial and financial), and more complex ones (indexes specifically developed to respond to the Model's needs).

Table 4.8 - List of Impact (Advantage) Indicators, by Competitiveness Driver and its source of inspiration (Note - X represents the most expressive contribution to de definition of the correspondent indicator)

Driver	Impact Indicator	Based and inspired on measures and principles addressed in									
		BSC	GRI	Dow Jones Index	Innovation Scorecard	SCOR	LARG	ISO 22400-2:2014	ITIL	GAAP	Other
Corporate Behavior (10)	GDP contribution			X						X	X
	Employment contribution		X	X							X
	Cost of fines and compensations on gross revenue		X	X							X

Driver	Impact Indicator	Based and inspired on measures and principles addressed in									
		BSC	GRI	Dow Jones Index	Innovation Scorecard	SCOR	LARG	ISO 22400-2:2014	ITIL	GAAP	Other
	Awards index		X	X	X						X
	Solidarity index		X	X							X
	Environmental index		X	X			X				X
	Patents and trademark index				X						
	Average innovation cycle time				X						
	Number of scientific publications				X						
	Partnership and suppliers' satisfaction index	X	X	X	X	X	X				
Business Proposition (10)	Market value perception index				X						X
	Market share	X		X						X	
	Sales margin	X								X	
	Sales of new products (and services) on total of sales				X						
	Sales of green products (and services) on total of sales		X	X	X		X				
	Percentage of sales closed	X									
	Average revenue per client (ARPU)	X									X
	Customer retention rate	X									X
	Marketing expenses per customer on revenue									X	X
	Customer satisfaction index	X	X	X		X	X		X		
Financial Stability (10)	Gross revenue	X								X	
	EBITDA per employee	X					X			X	
	EBITDA profit margin (profitability)	X					X			X	

Driver	Impact Indicator	Based and inspired on measures and principles addressed in									
		BSC	GRI	Dow Jones Index	Innovation Scorecard	SCOR	LARG	ISO 22400-2:2014	ITIL	GAAP	Other
	ROA (Return on assets)									X	
	ROE (Return on quity)									X	
	RoPDE (Return on product development expense)				X					X	
	Debt-to-assets ratio									X	
	Quick assets ratio (acid-test ratio): Liquidity									X	
	Interest coverage ratio: Solvency									X	
	Cash to cash Cycle	X				X	X			X	X
Organizational Wellbeing (12)	High qualified employee rate		X	X	X	X	X				
	Managerial rate		X	X							X
	Social equity index (gender and ethnic diversity, as well as employment of disables)		X	X							X
	Salary average	X								X	
Organizational Wellbeing (12)	Personnel costs on total costs						X			X	
	Local residents on total workforce		X	X							
	Training costs per employee	X	X								X
	Absenteeism rate		X	X		X	X				
	Employee turnover rate		X	X							X
	Carbon footprint per employee		X	X			X				
	Employee performance evaluation index	X	X	X		X	X	X			X
	Employee satisfaction index	X	X	X		X	X	X			X

Driver	Impact Indicator	Based and inspired on measures and principles addressed in									
		BSC	GRI	Dow Jones Index	Innovation Scorecard	SCOR	LARG	ISO 22400-2:2014	ITIL	GAAP	Other
Operational Leanness (11)	Customer special orders responsiveness					X	X				
	OEE (Overall Equipment Effectiveness)					X	X	X			X
	Changeover time					X	X	X			
	On-time delivery	X				X	X	X			
	Customer lead time					X	X	X			
	Inventory turnover					X	X				
	% of recycled material used as raw material input				X		X				
	Non conformity rate	X				X	X	X			
	Production maintenance productivity						X	X			
	Downtime due to equipment failure						X	X			
	Suppliers performance index	X	X	X		X	X	X	X		
Technological Alignment (5)	ICT investment rate				X				X	X	
	ICT expense as percentage of total administrative expense				X				X	X	X
	Downtime due to capacity shortage or service unavailability						X		X		
	Downtime due to security breaches						X		X	X	
	Number of systems integrated with other company systems				X				X		X
Facilities Suitability (4)	Accidents and safety incidents	X	X	X							
	Ergonomic and health costs rate		X								X
	Facilities maintenance cost on total	X								X	X

Driver	Impact Indicator	Based and inspired on measures and principles addressed in									
		BSC	GRI	Dow Jones Index	Innovation Scorecard	SCOR	LARG	ISO 22400-2:2014	ITIL	GAAP	Other
	maintenance costs										
	Space productivity					X	X	X			X

Nevertheless, as a result form the experts' opinion (see Chapter 3.3.2) and the case studies' feedback (see Chapter 6), the companies' capacity to obtain reliable values for these indicators strongly depends on their monitoring readiness, which means that it makes sense to define a set of more simple indicators to be considered in the SCM for less demanding approaches (suitable to companies with lower monitoring maturity).

Another relevant consideration is that these 62 indicators were defined to measure competitiveness advantage, so they must be comparable with the company's competitors, because they will be converted into an advantage scale based on the relative difference between the company's indicator value and its direct competitor value (see Chapter 5.4.2) – its real advantage for each indicator.

Despite the above, each indicator should also be analyzed by its absolute value for target achievement evaluation and trend analysis. Additionally, we highlight the fact that for a few indicators its value will be very small considering the proportions of its calculation expressions (eg. GDP contribution, Employment contribution). For the examples given, for comparable effects we could only consider GDP or the number of employee, but we would loss the contribution effect, which, nonetheless are very small values, could be amplified through a multiplier coefficient to obtain a better perception about the company's contribution.

It is also important to underline that the existence of these indicators does not enable the use of other indicators (more commonly used or more operational focused – see Appendix A5). Actuality they should be used complementarily (this issue is another recommendation and an interesting opportunity for further research – see Chapter 7.3).

The evaluation of Competitive Advantage allows the identification of where to put more effort to achieve direct competitor performance or to gain more advantage. However, companies also loss performance because of external causes and under this subject the model consider the risk of losing advantage that can be evaluated through the Competitiveness Risk.

4.1.4 Competitiveness Risk

In any business there are always external effects that can justify non-achievement of goals and targets, as well as the nonsuccess of strategies' implementation. Therefore, it is extremely important that companies are aware of their business environment, and able to understand the potential risks that may influence their business. Thus, SCM include another component on its definition, which is the Competitiveness Risk. This component should be understanding as the risk of losing Competitiveness Advantage, caused by external circumstances, because internal resources (Competitiveness Positioning) already may influence Competitiveness Advantage.

Assuming the following expression that define risk:

Risk = (Probability of occurrence of an event) x (impact caused by that event)

It is necessary to establish what kind of events could occur and may have impact on companies Competitive Advantage.

To do so it was considered the two most commonly used strategic planning tools regarding this subject, namely Michal Porter's Competitive 5 Forces and PESTLE (see Chapter 2.1.2). Analyzing the two approaches, SCM could be based in anyone of them. However, Porter's 5 Forces was considered more suitable because PESTLE include variables that already were embraced in the requirements that characterize the proficiency levels of Competitiveness Positioning.

Once this decision taken, the challenge was to adapt the Porter's 5 Forces to match into Sustainable Competitiveness Model principles. The following Table 4.9 shows the guidelines used to define the 40 Competitiveness Risk evaluation criteria (see the list of risk evaluation criteria on Annex 4) and some refurbishments about its sub-forces (Lee et al., 2012) – see Chapter 2.1.2.

Table 4.9 - Competitiveness Risk guidelines for the definition of its evaluation criteria

Porter's 5 Forces	Guidelines to assure risk evaluation criteria alignment with SCM principles	Number of criteria defined
Rivalry among existing companies	Measurement of variables about the current conditions of existing competitors and its capacity to influence the company advantage	8
Threat of new entrants	Measurement of variables regarding barriers or facilitators factors then amplify or reduce the probability of new players in the market and its impact on the company advantage	10
Threat of substitute products	Measurement of variables that may have effect on company´s advantage because of the complexity or simplicity of entrance of similar products	6

Porter's 5 Forces	Guidelines to assure risk evaluation criteria alignment with SCM principles	Number of criteria defined
Bargaining Power of Suppliers	Measurement of variables that may have impact on the company, as a result of high vulnerability to suppliers	8
Bargaining Power of Buyers	Measurement of variables regarding the company high exposure to buyers positioning, which may impact on its advantage	8
	Total of risk evaluation criteria	**40**

Through the Competitiveness Risk evaluation, companies are able to identify in which criteria they are more exposed to the market and the impact it may have in their Competitive Advantage. This evaluation should also provide valuable information about initiatives that a company should adopt in terms of resilience and innovation to:

- Prevent or reduce negative effects (loss of advantage) due to a high probability of a negative event occurrence; and
- Benefit from favorable market circumstances, boosting even more its advantage or improve its current performance.

Based on this principle, it is possible to design a Competitiveness Exposure Matrix (see Figure 4.9), which allow a better understanding about the soundness degree of the company's advantage.

This Matrix results from the combination between the company's current performance (Competitive Advantage) and its Competitiveness Risk, which allow a positioning in one of four quadrants, taking in account the measurement results (as average scores for each of these components of the SCM).

The company should compare its Competitiveness Positioning with its exposure positioning (the corresponding quadrant of its profile), to link resilience and innovation initiatives needed to address their risks of losing advantage.

It is important to highlight that this matrix represents the real company's advantage because it uses the Competitiveness Advantage scores measured through the relation between its impact indicators and its direct competitor.

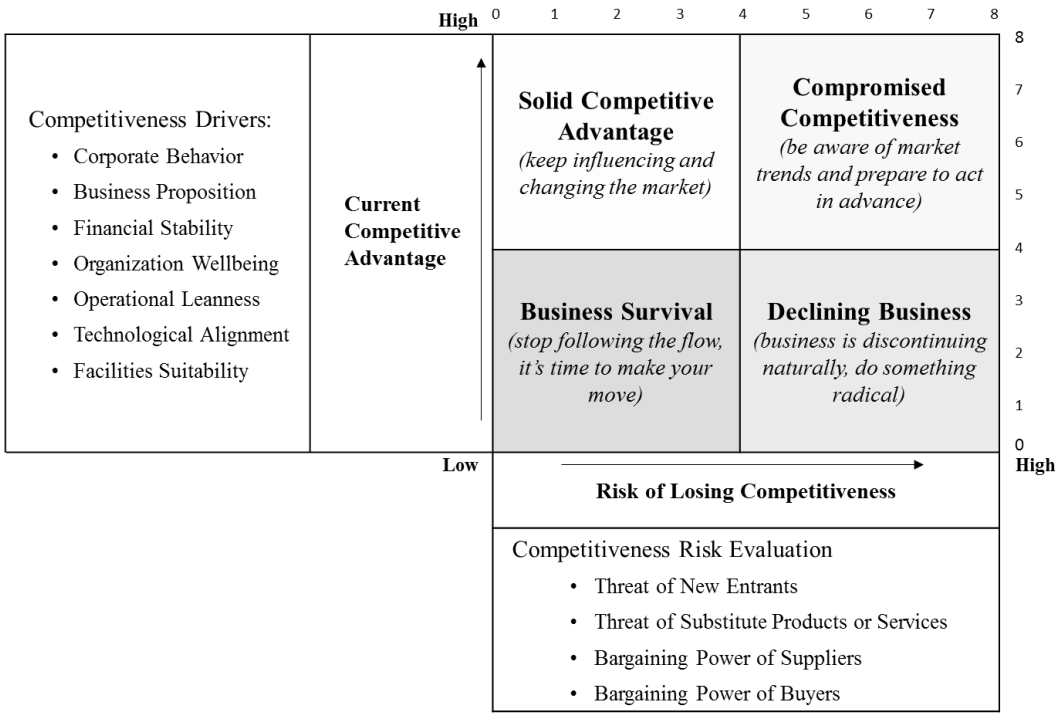


Figure 4.9 - Competitiveness Exposure Matrix

4.1.5 Real Competitive Strength

Considering the above, another concept can be developing which is Real Competitive Strength (RCS). This concept establishes a relationship between the fundamental components of the Sustainable Competitiveness Model (Competitiveness Positioning - CP, Competitive Advantage – CA and Competitiveness Risk - CR) and can be assumed as a perception of the real sustainable competitiveness of a company.

The relationship established to obtain the company's Real Competitiveness Strength is assumed as the sum of the company´s resources utilization (CP) and its results (CA) corrected by the company's risk of losing this advantage (CR) – see expression (1) in Chapter 5.2.2.

Another alternative way to define RCS could be based on the concept of productivity, which means that an expression assuming outputs (results – CA) divided by inputs (resources – CP) could be develop. This issue is assumed as a recommendations and could be considered as an opportunity for further research (see Chapter 7.3.2).

4.2 Model Application Contexts

Competitive models can be applied on several contexts. Entities like OECD (Organization for Economic Co-operation and Development), The World Economic Forum, The World Bank among others, focus competitiveness more on a country and regional perspective, the models analyzed in the present research such as EFQM, Shingo Prize, BSC, etc, are suitable to governments and companies, and some of these are able to reach a personnel application, as well as Leadership models.

Considering the definition of the Sustainable Competitiveness Model, its application focus is clearly on companies. However, it has a significant potential to be adapted to governmental entities, taking into account their real context, mission and constraints.

On another hand, SCM has also a very interesting potential to be adapted on a people perspective. In fact, it is considered a fascinating filed for further research (see Chapter 7.4), because the most recent approaches are based on leadership models and on personnel competences and individual performance evaluation, but questions like: How much resilient and innovative is this employee? What are the impacts of his skills in the company's competitiveness growth? What is the risk of losing this talent and the implications to the company? Are not explored in a specific approach?

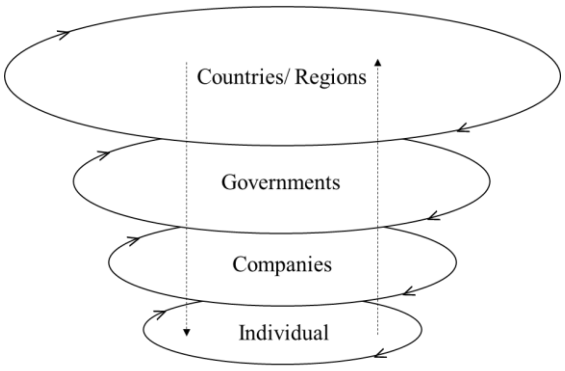


Figure 4.10 - Competitiveness models application contexts

Even so, and as mentioned before, the full application of the model makes sense just taking into account companies from the same economic sector. Otherwise, we obtain comparisons that are not comparable inducing to false conclusions and therefore to unsuitable strategies. Regarding this point of view another opportunity for further research is to incorporate in the SCM sectorial impact indicators to evaluate Competitiveness Advantage, and so developing specific Sustainable Competitiveness Models by economic sector (see Chapter 7.4).

4.3 Chapter Highlights

The Sustainable Competitiveness Model (SCM) establishes an alternative way to measure company's competitiveness and share guidance to increase competitiveness positioning and obtain sustainable advantage, considering market environment risks. The model is based on an alternative definition of competitiveness that integrates resilience and innovation dimensions, as well as economic, social and environmental issues (based on the triple bottom line principle).

Considering that through literature review (see Chapter 2) and regarding the majority of experts' opinion (see Chapter 3) that it doesn't exist a clear definition of competitiveness, and that exist an opportunity to develop an alternative competitiveness definition based on new concepts, SCM can be assumed as a solution to these challenge.

Nevertheless, it is also assumed that SCM is a demanding definition that requires a certain level of monitoring maturity by companies (so there is an opportunity to design less demanding requirements and evaluation criteria). Anyway, the Model should be used as an evangelization process to less mature companies to gradually introduce these new concepts and concerns into their management practices and strategic planning approaches, and to be able to continuously implement improvements and systematically increasing their competences and boost their sustainable competitiveness.

Underlines

Sustainable Competitiveness Model (SCM) is an alternative definition for competitiveness base on new concepts and principles, namely resilience, innovation and triple bottom line.

The Model define 7 Competitiveness Drivers which are composed by 14 elements.

It includes three fundamental components that evaluate resources (Competitiveness Positioning - CP), results (Competitive Advantage - CA) and the risk of losing this advantage (Competitiveness Risk - CR).

It is possible to establish a relationship between these components and obtain a perception about the Real Competitive Strength of a company.

Each component of the Model is supported by evaluation criteria (requirements in case of CP, impact indicators in case of CA and an adaptation of Porter's 5 forces in case of CR).

Competitiveness Positioning is based on 43 Resilience and 24 Innovation evaluation criteria, for which were defined (0 to 8) Proficiency Levels, corresponding to different degrees of demanding requirements.

Competitive Advantage is measured through 62 impact (advantage) indicators.

Competitiveness Risk assume 40 evaluation criteria.

Each component is measurable and can be represented graphically for a better understanding of its results (scores), analysis of causes and identification of improvement opportunities.

They are 4 Competitiveness Positioning Profiles (*Oblivious Players¸ Top Service Providers¸ Innovation Leaders and High Competitiveness Performers*).

They are Competitive Advantage Profiles (*Solid Competitive Advantage, Compromised Competitiveness, Business Survival and Declining Business*).

Companies should adopt SCM for strategic and operational purposes, as well as to use as a benchmark tool, however only for comparisons in the same economic sector.

It is relevant to remind that experts' opinion about SCM was very grateful and inspiring once most of all assume that it is a differentiator Model.

Sustainable Competitiveness Model has several fields for further research, namely the development of specific derivations for different economic sectors (including its suitability to governmental entities) and also the potential to be adapted to a people perspective.

O SuCEES pode tornar-se numa metodologia muito valiosa e prática na formulação e implementação de princípios de gestão estratégica nas organizações empresariais.

Assenta numa metodologia abrangente e de fácil enquadramento ao contexto competitivo de cada organização/sector, o que permite abrir um leque de oportunidades à sua implementação e validação conceptual.

Incorpora fundamentalmente um conjunto de indicadores chave de desempenho que permite traduzir uma visão estratégica num processo de gestão mais alinhado e mais deliberado por parte de uma organização, limitando os factores de incerteza e de risco associados a ambientes competitivos e em mudança constante.

O SuCEES tem assim potencialidades para poder equilibrar a disciplina requerida a uma gestão por objectivos estratégicos, com a flexibilidade para antevisão e tomada de decisões oportunas indispensáveis em contextos empresariais dinâmicos.

Assinatura: 

5 Sustainable Competitiveness Evaluation and Execution System - SuCEES

SuCEES (Sustainable Competitiveness Evaluation and Execution System) was designed with the objective to be an integrated framework to support companies in their strategic planning process, taking into account the major reasons of its failure and non-application of this practice on a systematic and structured way. Thus, SuCEES is a framework that integrates evaluation and execution activities in a single approach, giving a continuity along all the strategic planning activities and allow the application of traditional and new tools in a structured and sequential way (see Figure 7.2).

In order to give more emphasis on the major component cause of strategic planning processes' failure, which is its execution, SuCEES assume as an alternative definition. Thus, instead of Strategic Planning Process, it should be used Strategy Deployment Process. This chapter will present the System – SuCEES, based on its frameworks and tools.

5.1 The Strategy Development and Deployment Process

The Strategy Development and Deployment Process (SDDP) involve strategic diagnosis (evaluation), strategic definition, strategic execution and strategic monitoring (execution).

Based on the Sustainable Competitiveness Model (see chapter 4), SuCEES promotes a continuous awareness and knowledge about the company's competitiveness and allows taking actions concerning evidences that are exposed. The approach fulfills strategic concerns and operational issues. It replies to management responsibilities in identifying competitiveness advantage and risks, and in defining the suitable strategies to maintain or increase company's competitiveness positioning. Additionally, it deploys the strategy into operational actions that will be measured in terms of execution, which means impact gained (economic, social and environmental targets). Achieving this integrated implementation of the system, it assures an overall of the cause-effect between operational initiatives implemented and sustainable competitiveness goals and targets defined. To do so, we need to consider that management have a continuously concern about their competitiveness, which may be expressed as illustrated in Figure 5.1.

5.1.1 Competitiveness Management Cycle

To succeed companies, need to establish their strategic objectives taking into account their current competitiveness positioning and the opportunities and threats of the market, as well as the capacity to execute the action needed to achieve their strategic goals. Therefore, as a concern of the companies' management, they should adopt a continuous reflection as shown in the following figure.

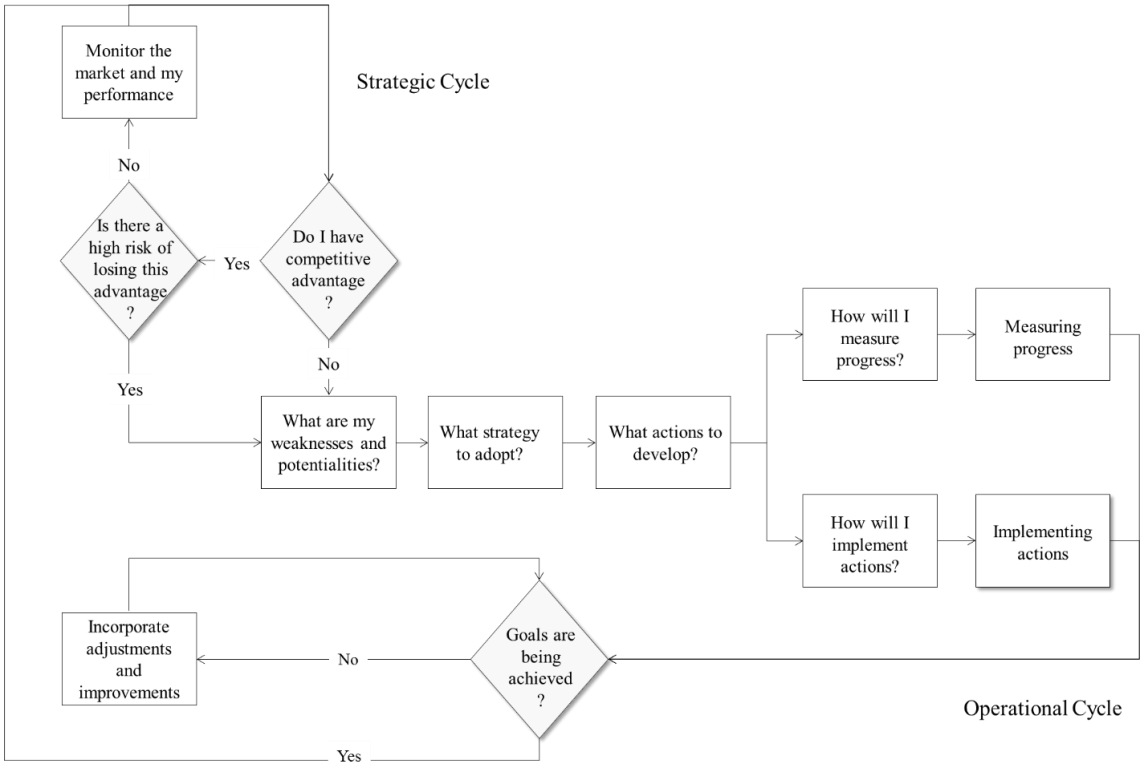


Figure 5.1 - Competitiveness Management Cycle

Considering the continuous need to have answers to each question of the Competitiveness Management Cycle, it is possible to design an approach that can be used as a reference to guide companies on their Strategy Deployment Process. This guidance should be clear in terms of what to achieve, when and how. With this purpose SuCEES supports its approach on 4 steps, named as "The 4 A's Approach".

5.1.2 The 4 A's Cycle

The 4 A's Cycle, inspired on Deming's PDCA cycle (Deming, 1986), cover all Strategy Development and Deployment Process activities, focusing on evaluation and execution interventions, as shown in Figure 5.2

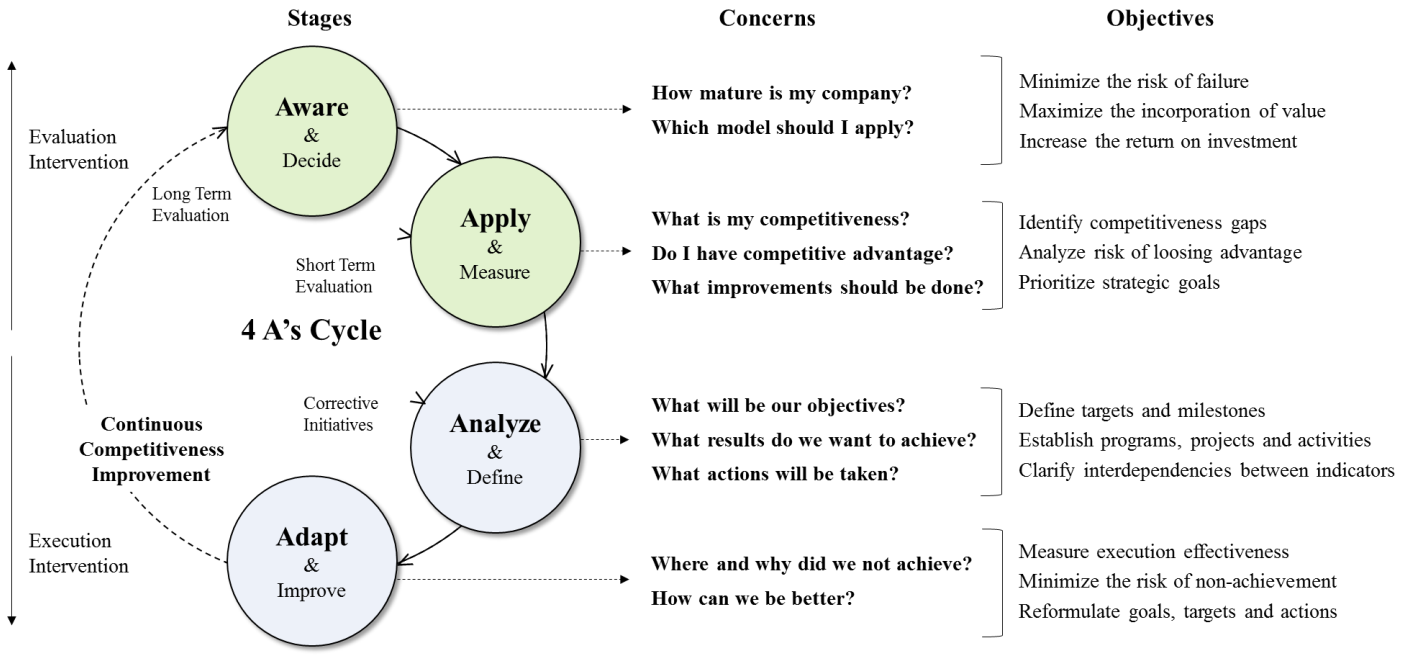


Figure 5.2 - 4 A's Cycle (Sustainable Competitiveness Framework of SuCEES)

The first stage (Aware & decide) has been introduced in the approach as a result of the conclusions obtained from the experts' feedback, as well as from the conclusions of the case studies (see chapters 3 and 6). In fact, this step is required to identify which level of complexity of SuCEES should be applied taking into account the company's maturity, considering its level of strategic planning and monitoring practices. Therefore, we assure that the application of the System is suitable to each company and so, we satisfy the experts observations that SuCEES could be too much sophisticated for the majority of the companies. Nevertheless, establishing lower levels of complexity of SuCEES we allow companies to apply the system, contributing to their improvement and to a gradual progress of their ability to implement Strategy Deployment Processes.

The second stage (Apply & measure) of this approach has the objective to identify the company's sustainable competitiveness positioning. Through the application of several tools it is possible to calculate the company's Real Competitiveness Strength.

Analyze & define, is the third stage of the 4 A's Approach, and its purpose is to define which strategic goals and targets should be assumed as the company's strategic priority to respond to its vulnerabilities and to leverage its potentialities. Additionally, it supports the deployment of this goals and targets into actions that correspond to the foundations needed to accomplish that goals and targets. Through this step SuCEES aims to reduce the impact of one of the major reasons of strategic planning failure – strategic execution gap. The last stage of the approach is focusing on the execution monitoring. Like step three, this stage is also a fundamental activity to reduce the execution gap. A continuous and rigorous follow-up of the execution of the actions defined, as well as the capacity to react to deviations and the ability to prevent constrains are key to increase the probability of goals and targets achievement.

The 4 A's Approach, as shown should be applied as a continuous process. Therefore companies should implement continuous corrective and preventive initiatives to adjust deviations and redefine targets as needed, and introduce continuous competitiveness improvements applying short term evaluations (based on competitiveness positioning achieved) and long term evaluation (considering a new cycle of evaluation of its Strategy Development and Deployment Process and monitoring practice maturity – to identify if it is suitable to apply a more demanding level of SuCEES, allowing a gradual progress of the companies' Strategy Development and Deployment Process.

Considering that SuCEES approach (4 A's cycle) is structured in two distinguished, but integrated, interventions – evaluation and execution, it is relevant to describe the purpose, tools and methods used to support each of these components.

5.2 Evaluation Framework

As mentioned before, to define what kind of strategic objectives or priority goals a company should adopt, the first step is knowing how the company is now, otherwise the company could define wrong strategic guidelines and establish very ambitious goals or very low targets. To do so it is absolutely fundamental to apply the evaluation framework of SuCEES. Basically, as assumed in the 4 A's Approach, it is supposed to find out about the company's:

- Monitoring Readiness – to identify which level of SuCEES is more suitable taking into account the company's monitoring and strategic planning practices maturity; and
- Real Competitive Strength – to know its competitiveness positioning, competitive advantage and its competitiveness risk.

5.2.1 Monitoring Readiness Evaluation

As a first step of SuCEES approach, it is important to identify the company's motivations to apply monitoring practices, in terms of its purpose, external obligations or business needs, to obtain a clear understanding of what kind of monitoring (indicators) they already domain and what they do with them. Therefore, we can infer also about its strategic planning practice (once there exist dependency between both). Additionally, it is also important to understand their technological sophistication level, because it gives a perception about the monitoring process efficiency and data accuracy (and also, the perception about the company's willingness to invest in its monitoring process and therefore conclude about the importance/ priority of this theme to the company). Thus, Monitoring Readiness Evaluation embeds three dimensions of evaluation, as shown in *Figure 5.3*.

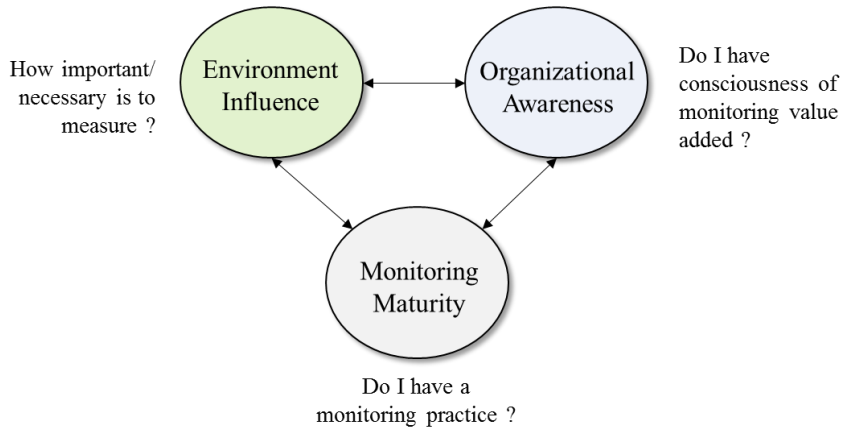
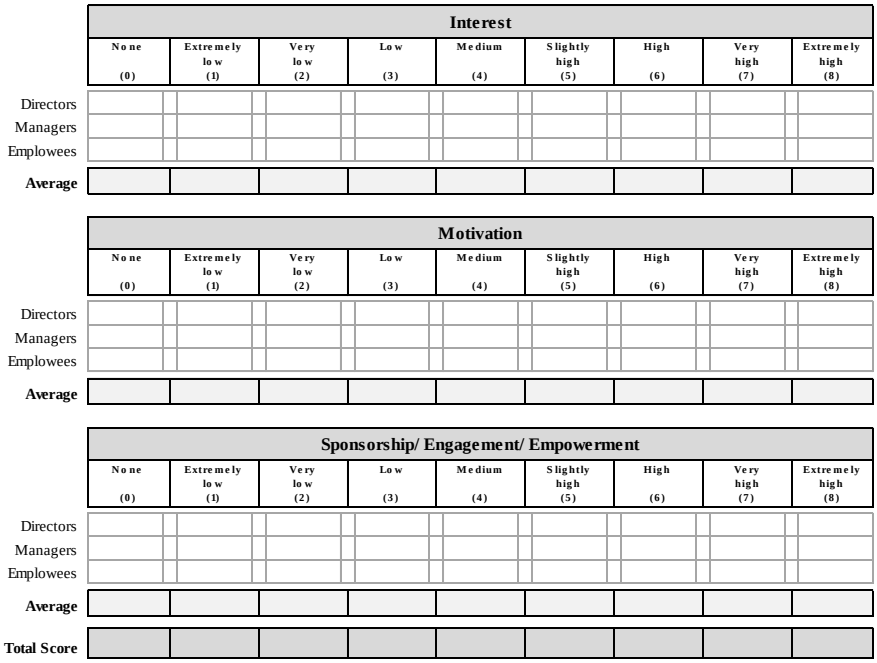


Figure 5.3 - Monitoring Readiness Evaluation Dimensions

5.2.1.1 Organizational Awareness and Environment Influence Evaluation

Considering the above, Organizational Awareness should be evaluated to understand if the company's human resources consider that monitoring the company's performance introduce benefits and also to analyze their potential to adopt this kind of practices. Therefore, SuCEES offers a succinct survey to obtain the opinion of the three basic enterprise roles (jobs classification, as defined by IPE - International Position Evaluation System from Mercer[37]), by scoring their own interest, motivation and sponsorship/ engagement/ empowerment concerning monitoring processes. The following figure illustrates the score sheet used to evaluate this dimension, that basically involves the score between 0 = none and 8 = extremely high, being possible to score inter intermediate values.

[37] https://www.imercer.com/products/2010/ipe.aspx



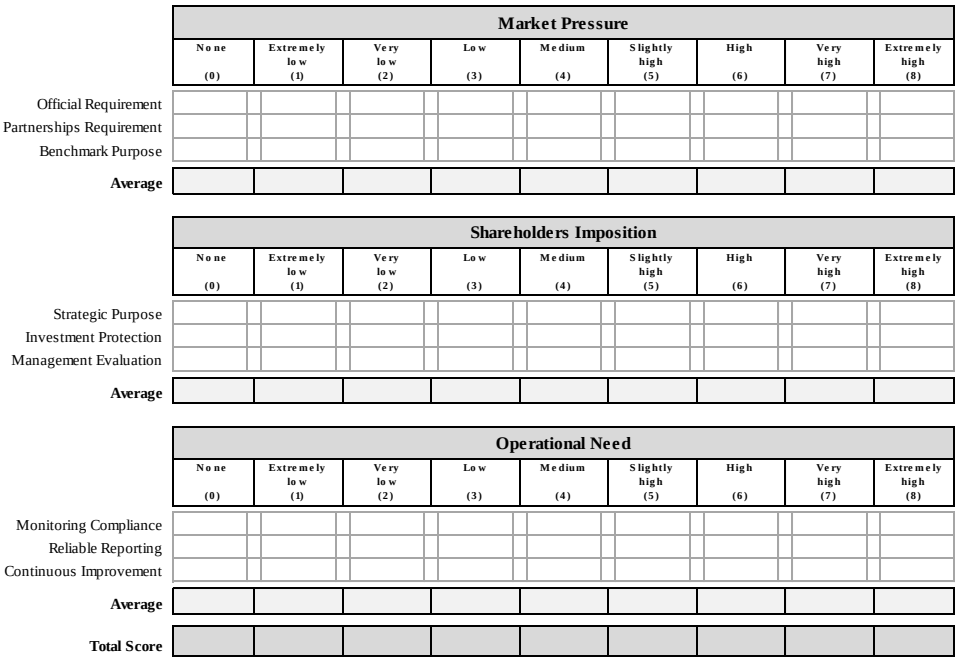
	Interest								
	None (0)	Extremely low (1)	Very low (2)	Low (3)	Medium (4)	Slightly high (5)	High (6)	Very high (7)	Extremely high (8)
Directors									
Managers									
Emplowees									
Average									

	Motivation								
	None (0)	Extremely low (1)	Very low (2)	Low (3)	Medium (4)	Slightly high (5)	High (6)	Very high (7)	Extremely high (8)
Directors									
Managers									
Emplowees									
Average									

	Sponsorship/ Engagement/ Empowerment								
	None (0)	Extremely low (1)	Very low (2)	Low (3)	Medium (4)	Slightly high (5)	High (6)	Very high (7)	Extremely high (8)
Directors									
Managers									
Emplowees									
Average									
Total Score									

Figure 5.4 - Organizational Awareness Evaluation Sheet

Concerning the evaluation of Environment Influence dimension, the purpose is to understand if the monitoring practices used in the company are a natural behavior or are applied by obligations (therefore regarded as worthless and source of stress). The scoring approach is very similar to the Organizational Awareness evaluation sheet, however considering different criteria for three potential sources of pressure, namely, market pressure, shareholders' imposition and operational need, as shown in Figure 5.5.



	Market Pressure								
	None (0)	Extremely low (1)	Very low (2)	Low (3)	Medium (4)	Slightly high (5)	High (6)	Very high (7)	Extremely high (8)
Official Requirement									
Partnerships Requirement									
Benchmark Purpose									
Average									

	Shareholders Imposition								
	None (0)	Extremely low (1)	Very low (2)	Low (3)	Medium (4)	Slightly high (5)	High (6)	Very high (7)	Extremely high (8)
Strategic Purpose									
Investment Protection									
Management Evaluation									
Average									

	Operational Need								
	None (0)	Extremely low (1)	Very low (2)	Low (3)	Medium (4)	Slightly high (5)	High (6)	Very high (7)	Extremely high (8)
Monitoring Compliance									
Reliable Reporting									
Continuous Improvement									
Average									
Total Score									

Figure 5.5 - Environment Influence Evaluation Sheet

5.2.1.2 Monitoring Maturity Evaluation

The last dimension to evaluate the company's monitoring readiness is Monitoring Maturity. Given the foregoing, the evaluation of the maturity of a company's monitoring routine should be able to measure three fundamental aspects:

- level of monitoring practice;
- level of technological sophistication; and
- value appropriation status.

In this sense, the model includes a matrix to measure this three aspects, as shown in Figure 5.6. This assessment is based on a 0-8 rating scale and allow organizations to quantitatively visualize their level of monitoring maturity. Specifically, the higher the score, more solid is the knowledge management about monitoring concepts and tools, and greater the investment in the technology to support it. The diagonal line (Balance Line) is a virtuous line that represents the ability to appropriate value, reveals the existing balance between these two dimensions and any coincident mate with the same reveals that the ability to generate value is maximized taking into account the level of technological investment and the existing knowledge on monitoring.

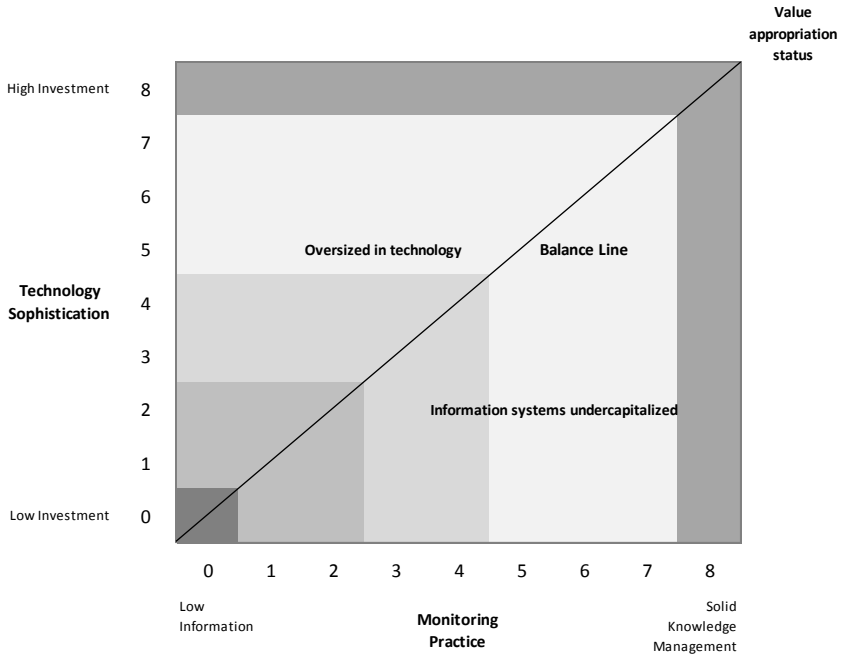


Figure 5.6 - Monitoring Maturity Matrix

Thus we conclude that, for evaluations:

i) below the Balance Line, the organization lies undercapitalized of technology to support their practice of monitoring, not enhancing their knowledge caused by technological limitations;

ii) above the Balance Line, the organization is oversized in technology and is not able to get the benefit from it, because of lack of knowledge to use it.

It is noted that the greater the distance of the positioning obtained against the Balance Line, the greater the cost / benefit of the monitoring system implemented in the organization, and less the value appropriation by the company. Using this matrix, it is possible to obtain comparative analysis of several kinds. Can be used in the context of a domestic company, allowing the measurement progress and evolution of their maturity level, through a temporal comparison (from prior periods), but can also be used in benchmarking initiatives, via comparative representation of average levels of maturity from different economic sectors, public versus private entities, among others. As mentioned earlier, the application of this matrix aims to identify the levels of "Technological Sophistication" and "Monitoring Practice," on a scale of 0 to 8, of an organization. To obtain these quantitative scores, the tool is based on the evaluation of four (4) criteria, specifically:

- Leadership & Organizational Alignment – ability to identify the level of involvement of hierarchical levels of the organization in the practice of monitoring, evaluating the depth of deployment of strategic goals and objectives and their indexing to individual employees' goals;
- Measurement Approach - ability to demonstrate the complexity of the indicators used and the level of comparability exercised with recognized international metrics;
- Technological Support - ability to reveal the level of robustness and suitability of existing technological solutions used as a support to the monitoring practice; and
- Data Scope & Reliability - ability to enhance the coverage of the data used in monitoring as well as the level of automation of collection and treatment.

The final positioning of factor "Monitoring Practice" results from the arithmetic average of the scores given to the dimensions that combine the practice and which are inherent to a more effective monitoring, in particular, "Leadership & Organizational Alignment" and "Measurement Approach". Similarly, the positioning of factor "Technological Sophistication" results from the arithmetic average of the scores given to the dimensions that embodies the tools necessary for more efficient monitoring, in concrete, "Technological Support" and "Data Scope & Reliability." In order to minimize the subjectivity of the evaluation and increase the capacity and accuracy in carrying out benchmarking initiatives, this tool is based on proficiency levels defined for each rates of the scale 0-8 for each dimension in appreciation. The proficiency levels are detailed in

the following Table 5.1, and allow the conversion of a qualitative assessment into a quantitative score. It is important to underline that the higher proficiency level of each criteria were validated through a focus group session involving a restricted group of experts that participate on the overall model validation.

Table 5.1 - Monitoring Maturity Proficiency Levels

Proficiency Level	Leadership and Organizational Alignment	Data Scope and Reliability	Measurement Approach	Technological Support
0	Without definition of objectives, goals and targets	Sources of data not identified	Existence of incipient and dispersed information	Without applications support
1	Definition of global objectives or to some functional areas	Incipient data collected sporadically	Existence of unstructured information and not converted into indicators	Use of basic applications (e.g.: Microsoft Office or similar)
2	Definition of corporate objectives as well as goals to functional areas, with sporadic indexation to projects	Some data (from some functional areas) collected periodically	Existence of some basic indicators (e.g.: for financial area)	Use of recognized financial and sectorial applications
3	Some linkage of strategic objectives and goals to first and second organizational levels, with sporadic indexation to projects	Comprehensive data (from all functional areas) collected periodically	Existence of basic financial, market, operational and HR indicators	Use of financial or operational applications (e.g.: ERP solutions) with some basic dashboards
4	Deployment of some strategic objectives and some goals through several organizational levels of some functional areas, with incipient indexation to projects	Comprehensive and reliable data, collected in a standardized and systematic way	Existence of solid indicators for all functional areas and a routine of measurement	Use of dashboards based on data given by financial and operational applications
5	Deployment of some strategic objectives and some goals through several organizational levels of some functional areas, with solid indexation to projects	Solid, comprehensive and reliable data with some automation of collection and processing	Solid practice of measuring indicators from all functional areas and definition of some goals	Use of Business Intelligence solutions without any integration
6	Deployment of some strategic objectives and some goals through several organizational levels of all functional areas, with solid indexation to projects and linkage to individual performance indicators	Full automation of all data collection and data processing (internal data)	Consistent review of results achievement and decision making based on timely and reliable analyses of goals deviations (consolidated measurement practice of goals for indicators of all functional areas)	Some integration of Business Intelligence solutions with financial and operational applications (e.g.: ERP solutions)
7	Full deployment of strategic objectives and goals through all organizational levels and functional areas, with solid indexation to projects and sophisticated HR performance evaluation based on individual goals linked to strategic and operational results	Consolidated automation of all data collection and data processing (internal data) and continuous external data collection (third part entities reports and benchmark)	Definition of strategic goals and operational targets based on trends and benchmarks (comparison between internal information and third part entities information)	Full integration of Business Intelligence solutions with financial and operational applications (e.g.: ERP solutions)
8	Consolidated strategic deployment based on continuous improvement and recognized as a reference to other entities	Solid practice of data sharing with third part entities for benchmark and active contribution for the development of new indicators and international/ sectorial indexes	Adoption of best-in-class monitoring models and use of international indicators for benchmark (e.g.: Dow Jones Sustainability Index, GRI indicators, sectorial indexes, ...)	Continuous up-grade to best-in-class solutions, advanced integration of technology and contributions to the development of solutions (e.g.: Gartner Matrix solutions and head of best practices)

It is relevant to mention that, during the evaluation process, in order to increase the accuracy of the selection of the proficiency level and thus proceed to a more reliable measurement against the existing reality, intermediate values should be used to a better description and consistency with the current situation of the organization. Accordingly, should be added 0.5 values to the proficiency level considered, if this level is below the current organizational status, or subtracted 0.5 values at that level, if it favors the real situation.

5.2.1.3 Monitoring Readiness Results and Conclusions

Applying the tools above the company is able to build an integrated vision about its monitoring readiness and therefore conclude about which level of SuCEES is more appropriate taking into account its reality. This integrated readiness view can be illustrated through the Readiness Snapshot Graphic that combines the scores obtained for each of the three dimensions of evaluation (see Figure 5.7).

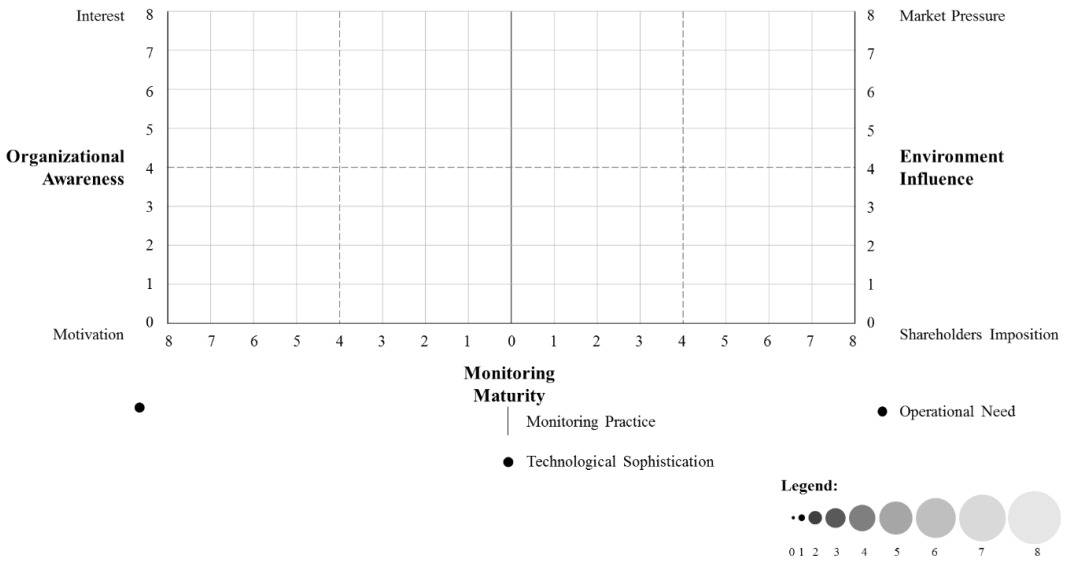


Figure 5.7 - Readiness Snapshot Graphic

Through the analysis of the readiness snapshot graphic, companies can choose about the most suitable SuCEES level to apply considering their monitoring readiness. Taking into account the experts recommendations there were defined 6 levels of complexity. Two, regarding less demands and based on a light application of the model concepts, classified as a Commitment to Sustainable Competitiveness (C1 and C2); two levels regarding more demanding requirements but even so based on a basic approach of the system, namely B1 and B2; and two more, that can be considered

as the most sophisticated levels of SuCEES, therefore advanced levels, concretely A1 and A2 (see Table 5.2).

Table 5.2 - SuCEES Application Levels

SuCEES Level	Evaluation			Execution	
	Competitiveness Positioning	Competitive Advantage	Competitiveness Risk	Targets and Actions Definition	Execution Follow-up
Commitment I (C1)	Based only on some criteria of 2 Competitiveness Drivers (Business Proposition and Financial Stability)	Based on simple commercial and financial indicators, excluding competitors performance	Non applicable	Definition of general strategic guidelines and simple commercial and financial targets	Based on a simple dashboard to follow the progress and achievement of the targets defined
Commitment II (C2)	Based only on some criteria of 4 Competitiveness Drivers (the 2 of level C1), plus Organizational Wellbeing and Operational Leaness)	Based on simple financial, commercial, organizational and operational indicators, excluding competitors performance	Based only on the analysis of some criteria of bargaining power of buyers and suppliers	Definition of strategic goals and basic actions to achieve simple commercial, financial, organizational and operational targets	Based on a simple dashboard to follow the progress and achievement of the targets defined
Basic I (B1)	Based on some criteria of all Competitiveness Drivers	Based on simple indicators for all Competitiveness Drivers, excluding competitors performance	Based on the analysis of the 2 forces of level C2, plus some criteria of Threat of new entrants and of substitute products	Definition of strategic goals and key actions to achieve simple targets regarding all Competitiveness Drivers	Based on a complete dashboard to follow the execution progress of actions and the achievement of the targets defined
Basic II (B2)	Based on all criteria of all Competitiveness Drivers	Based on simple indicators for all Competitiveness Drivers, including competitors performance	Based on the analysis of some criteria of all the 5 forces	Definition of measurable strategic goals and all actions needed to achieve all targets of all Competitiveness Drivers	Based on complete control sheets to follow the execution progress of actions and dashboards to follow the achievement of targets
Advanced I (A1)	Based on all criteria of all Competitiveness Drivers	Based on all indicators for all Competitiveness Drivers, including competitors performance	Based on the analysis of all criteria of all the 5 forces	Definition of measurable strategic goals and all actions needed to achieve all targets of all Competitiveness Drivers	Based on complete control sheets to follow the execution progress of actions and dashboards to follow the achievement of targets, plus cause-effect analysis
Advanced II (A2)	Based on all criteria of all Competitiveness Drivers + Employee Competitiveness Drivers	Based on all indicators for all Competitiveness Drivers, including competitors performance + Employee Sustainable Indicators	Based on the analysis of all criteria of all the 5 forces + Employee Risk Analysis	Definition of measurable strategic goals and all actions needed to achieve all targets of all Competitiveness Drivers + Employee's Sustainable Competitiveness improvement targets and actions	Based on complete control sheets to follow the execution progress of actions and dashboards to follow the achievement of targets, plus cause-effect analysis + Empoyee progress follow-up control sheets and dashboards for individual targets

It important to highlight that the specific content of each of one of this levels were not developed in the present dissertation and are assumed as an opportunity for further research (see chapter 7). In fact, to be a usable system considering each of its application levels, there must be a clearly definition and selection of the resilience and innovation criteria, the simple indicators to consider and the selection of the criteria to measure risk. Additionally, the tools to support execution intervention should also be adapting to the demands of each level, taking into account what is defined in the evaluation intervention. Finally, level Advanced II (A2) includes the employee Sustainable Competitiveness (SC) model, which is assumed as a significant added value to the model (to be further research), considering that it is a complement between the company's (SC) and its employees (SC), to analyze the cause-effect that employee SC has on the company's SC and its increase.

5.2.2 Real Competitive Strength Evaluation

After identifying the suitable SuCEES level to apply, companies will initiate the concrete application of the system.

Following the Sustainable Competitiveness Model presented in chapter 4, as well as the 4 A's Cycle, to start we need to evaluate the company's Real Competitive Strength (RCS). Thus, sustainable competitiveness evaluation should be a continuous measurement process, as shown in Figure 5.8 (which can be an extract of Figure 5.1 – Competitiveness Management Cycle).

So to obtain the Real Competitiveness Strength (RCS) of the Company's it is necessary to identify its Competitiveness Positioning (CP) – based on the evaluation of its resilience and innovation drivers; its Competitive Advantage (CA) – based on the comparison of its impact (advantage) indicators (performance results) to its direct competitor (economic, social and environmental indicators); and its Competitiveness Risk (CR), regarding the probability and impact of losing this advantage – based on its exposure to market conditions, according to the 5 forces of Michael Porter. Therefore, Real Competitive Strength (RCS) can be calculated assuming the following expression, allowing the creation of a rank that can be used for benchmark:

$$\text{RCS} = \frac{CP + (CA\ x\ (1 - CR))}{2} \text{ x } 100, \quad (1)$$

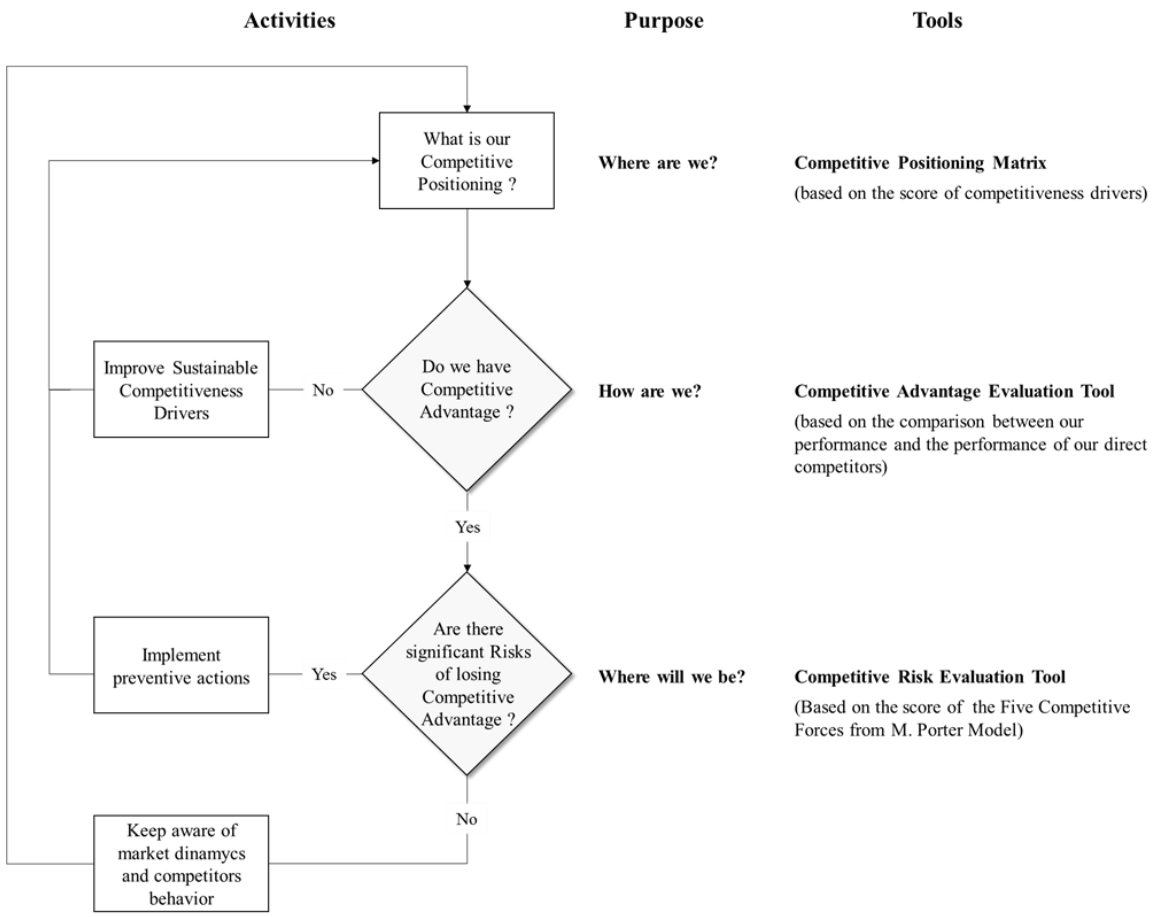


Figure 5.8 - Real Competitiveness Strength cycle

5.2.2.1 Competitiveness Positioning Evaluation

According to chapter 4, Competitiveness Positioning regards to the evaluation of the company's level of maturity, of being able to be resilient and innovative, which means the identification of the corresponding compliance with several requirements, concerning several criteria of each 7 Competitiveness Drivers. With this purpose, SuCEES, based on the feedback and validation of the experts involved (see chapter 3), define for each Competitiveness Driver a set of evaluation criteria (sources of disturbance – in case of Resilience dimension; and sources of enhancement – in case of Innovation dimension), as well as 9 proficiency levels for each criteria (5 specific and 4 intermediate) allowing a precise evaluation (through a correct scoring) taking into account the practices used by the company that can be proved has valid evidences of compliance with the corresponding proficiency level assigned. However, it is not enough to consider just the proficiency levels, according to the model definition there are two components to consider in either dimensions. Thus, SuCEES assume Proficiency Levels to evaluate Severity Responsiveness (concerning Resilience dimension) and Intensity Enabling (regarding Innovation dimension). To evaluate Recovery Capability (concerning Resilience dimension) and Advance

Sustention (regarding Innovation dimension), the system applies 9 levels (5 specific and 4 intermediate) that are able to evaluate the Practice Consistency of the corresponding methods, principles approaches and tools that the company had presented as evidences to score its proficiency level. These 4 levels of Practice Consistency are:

- Not suitable/ inexistence;
- Unknown practice/ internal solution;
- Common practice/ legal obligation;
- Best in class/ reference to others; and
- Cutting edge/ driving continuous R&D.

Taking into account the above, see Annex1 to find the Resilience Extremely High proficiency level for each Competitiveness Drivers (to see all Proficiency Levels for Resilience Dimension, see Appendix A3).

Annex 2 presents the Innovation Extremely High proficiency level for each Competitiveness Drivers (to see all Proficiency Levels for Innovation Dimension, see Appendix A4).

It is important to highlight that the option of define proficiency levels based on requirements instead of practices, has the purpose to appreciate the effective results of the implementation of those practices and not just check about their existence. Additionally, this assumption is a way that gives more flexibility to the System because best practices are in continuous improvement, which allows the permanent suitability of SuCEES, making it independent from the new practices that can appear in the future. Anyway, this fact cannot be considered an argument to excuse SuCEES's further reviews. The market dynamics and competition environment changes so quickly that SuCEES, needs to be able to keep up with this changes.

5.2.2.2 Competitive Advantage Evaluation

Another fundamental evaluation is the company's Competitive Advantage. To assure the alignment with the 7 Competitiveness Drivers, SuCEES defined impact (advantage) indicators for each of these drivers that are suitable to analyze the company's performance based on the Triple Bottom Line principle, which assume that companies to be sustainable should create impact on economic, social and environmental issues. As defined in chapter 4, as presented below, the system includes 62 indicators that satisfy not only sustainability principles but also are related with resilience and innovation performance.

As mentioned in chapter 2.5.2, theoretical review shows that there is a large range of possible indicators, either simple or composed. Additionally, knowing that a worldwide practice to establish suitable indicators is the KISS principle (Keep It Simple and Smart), the challenge was to identify the most suitable indicators to satisfy two demands:

- The ability to evaluate performance that could measure outcomes of the requirements of the proficiency levels from Competitiveness Positioning; and
- The capacity to compare the company's performance with its direct competitor, because the final aim of this evaluation is not just the value of the company´s indicator, but the identification of its advantage to its direct competitor.

Therefore, there were selected a set of indicators, some of them basic and simple indicators, others that where developed and considered as indexes, based on literature review. Those indicators were also subject of appreciation by the experts and as a conclusion; we can generally assume that they are appropriate (as mentioned in chapter 3.3.2). So, the Annex 4 presents each indicator for each Competitiveness Drivers, its calculation expression and its relationship with sustainability, resilience and innovation dimensions.

The fact that SuCEES only considers these indicators, companies should not assume that other indicators are not needed. These indicators have a specific purpose, and other indicators (simpler and traditionally adopted) should be considered as a complement to the system to analyze more detailed activities (see Appendix A5 – List of complementary indicators).

5.2.2.3 Competitiveness Risk Evaluation

Finally, to determine the Real Competitiveness Strength, it is just needed the evaluation of the company's Competitiveness Risk. As mentioned in chapter 4, this issue should be understood as the risk of losing competitive advantage due to the probability of market environment changes and its impact on the company's results (impact indicators) – that obviously are influenced by its capacity to be resilient and innovative.

Therefore, we take as reference the definition of risk, which is measured according to the following expression:

Risk = (Probability of occurrence of an event) X (the Impact that this event causes), (1)

So, SuCEES, supports its Competitiveness Risk evaluation on this principle, assuming that it should be measured criteria to define market conditions, and for each of one of this criteria the evaluation should be done in terms of its probability of occurrence and the corresponding impact that these changes/ conditions has on the Company.

Considering that the model, to evaluate Competitiveness Risk, is based on Michael Porter's 5 Forces, SuCEES adapt the author's model in terms of the criteria to consider for each forces (see Table 5.3), where the criteria are composed in a way that if the answer is totally true, then it is an unfavorable condition to the company. Assuming that those conditions are evaluated in terms of a current situation, it is not accurate to assume a probability (this issue is assumed as an opportunity to further research – see chapter 7), instead it is supposed to understand what is the severity's level of each market condition (criteria) – considering a scale between totally false to totally true - and the company's exposure level to that condition (its impact) – considering a scale between low and high (see chapter 5.4).

Table 5.3 - Competitiveness Risk Criteria

Business context risk factors	
Porter's 5 Forces	**Evaluation criterion**
Rivalry among existing companies (high score = high rivalry intensity)	There is a large number of competitors in the industry
	There is a low differentiation among industry companies, regarding products and services
	The industry has high capacity to satisfy demand
	Industry growth rate is low
	Fixed cost vs variable costs are high
	Buyers' switching costs are low (low brand loyalty)
	Industry strategic stakes are high
	Exit barriers (factors preventive companies from leaving) are high

Threat of new entrants (high score = favorable conditions for new entrants)	Industry growth rate is low
	Government policies and regulations are favorable to new entrants
	Industry has low economies of scale
	Product and service differentiation is low
	Buyers' switching costs are low (low brand loyalty)
	Initial capital requirement is low
	Incumbents' defense of market share is low
	Other cost advantages are low (intellectual property)
	Access to distribution channels is easy
	Access to industry local raw materials is easy
Threat of subsitute products (high score = favorable conditions for substitute products)	Number of substitute products is high
	Relative quality of susbtitute products is high
	Relative price of substitute products is low
	Buyers' switching costs are low (low brand loyalty)
	Access to substitute products is easy
	Other ways to provide the same value is high (technology innovation)
Bargaining Power of Suppliers (high score = suppliers with high power)	Importance of suppliers is high (inputs relevancy to industry's products/ services quality)
	Number of suppliers is low (availability of substitute inputs)
	Supplier uniqueness is high (substitute inputs differentiation)
	Dependence on suppliers is high (few suppliers represent large % of company's total purchases)
	Suppliers profit margins are high
	Industry knowledge about suppliers costs structure is low
	Switching costs to another supplier are high
	Suppliers threat of forward integration is high
Bargaining Power of Buyers (high score = buyers with high power)	Importance of products/ services to buyers is low (inputs relevancy to buyers product/ service quality)
	Number of buyers relative to sellers is low
	Product/ service differentiation between sellers is low
	Dependence on buyers is high (few buyers represent large % of company's sales)
	Buyers profit margins are high
	Buyers knowledge about industry costs structure is high
	Buyers switching costs to another supplier are low
	Buyers threat of backward integration is high

5.2.3 Sustainable Competitiveness Value Chain

Inspired on Michael Porter's value chain, the Sustainable Competitiveness Value Chain (see Figure 5.9), includes risk factors and sustainability concerns (covering all perspectives of SuCEES). It gives an overall view about the results obtained and allows a structured analysis of the company (where Added Value Functions correspond to Competitiveness Positioning and also can be presented in both dimensions: Resilience and Innovation; Value Creation correspond to Competitive Advantage; and Risk correspond to Competitiveness Risk, expressed by: 1-Risk).

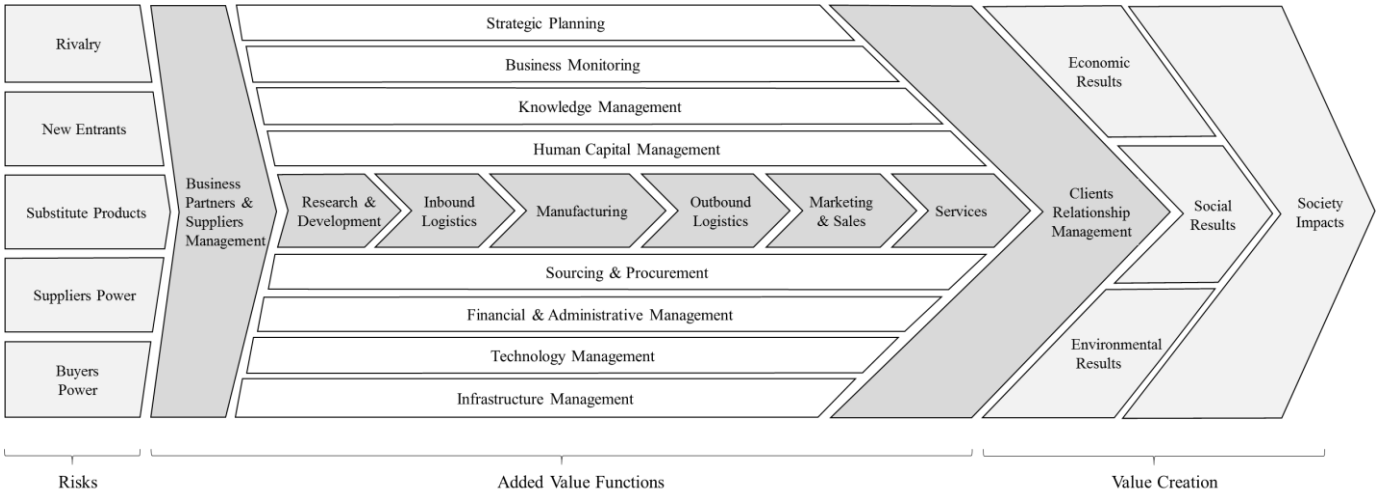


Figure 5.9 - Sustainable Competitiveness Value Chain

This value chain allows the highlight of critical areas and processes, assigning the global (or average) results in each component and/ or through a color scale. To do so, value creation is calculated according to a selection of impact indicators related to economic, social, environmental and society issues (see Appendix from A11h to A11k), risk elements are directly assignable, and for added value functions it is needed to establish a relationship between them and the Competitiveness Drivers, as shown in the following table (see details at A11g).

Table 5.4 - Correspondence between Added Value Functions of the Sustainable Competitiveness Value Chain and the 7 Competitiveness Drivers – see Appendix A11g

Competitiveness Drivers	Sustainable Competitiveness value Chain
Corporate Behavior	Strategic Planning Business Monitoring Knowledge Management Business Partners Management
Business Proposition	Marketing & Sales Clients Relationship Management
Financial Stability	Financial and Administrative Management

Competitiveness Drivers	Sustainable Competitiveness value Chain
Organizational Wellbeing	Human Capital Management
Operational Leanness	Research & Development Inbound Logistics Manufacturing Outbound Logistics Services Sourcing & Procurement Suppliers Management
Technological Alignment	Technology Management
Facilities Suitability	Infrastructure Management

It is a useful tool to support the identification and the systematization of priorities, objectives and actions.

5.3 Execution Framework

As mentioned SuCEES is an integrated approach that aims to reduce the gap between evaluation and execution activities inherent to the traditional strategic planning process. Till now we just addressed the evaluation intervention of 4 A's Cycle (Aware and Apply), therefore this chapter will focus on the execution component of the system (Analyze and Adapt). Regarding the analysis of the results obtained through the diagnosis stage (evaluation intervention), companies should use this knowledge to define their strategy, goals and actions (practices needed to achieve the goals), as well as to define the way they will following the execution of that actions and the achievement of the targets defined.

5.3.1 Sustainable Competitiveness Analysis and Strategic Goals Definition

To do so, SuCEES offers another fundamental tool, to analyze results and to define strategic goals, namely:

- PFG Frame – inspired on SWOT analysis, this approach is more focused and gathers in the same frame potentialities, fragilities and the goals that are needed to face the situation.

Complementary, inspired on SWOT analysis, we are able to use the PFG frame (Potentialities, Fragilities and Goals) that conduct to an integrated vision about strengths and opportunities

(aggregated as positive factors, therefore considered as potentialities), weaknesses and threats (aggregated as negative factors, so considered as fragilities), and what to do about it, which corresponds to the goals that the company should address (see Figure 5.10).

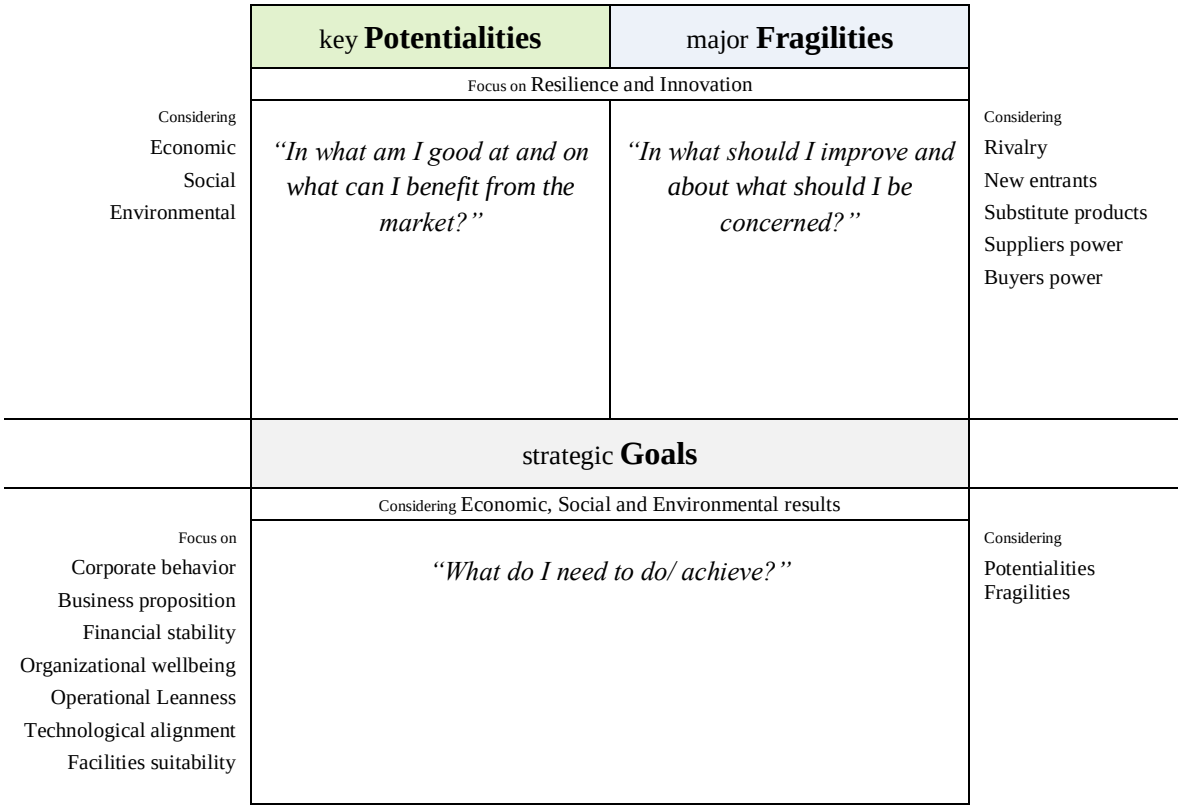


Figure 5.10 - PFG Frame (Potentialities, Fragilities and Goals Frame)

5.3.2 Strategy Transposition into Targets and Actions

After this point, companies know what to achieve but they didn't yet define "how to do it", which means that companies should now define what kind of actions are needed to achieve that goals, and how can that goals be measured (translated into targets).

Inspired in BSC (Balanced Score Card) principles, which allow a clear alignment between strategy and objectives to achieve, SuCEES offers two tools (one for actions and another for targets definition) that integrate in a structured way the 7 Competitiveness Drives (substitution of the 4 perspectives of BSC) with the 3 Triple Bottom Line definition (economic, social and environmental concerns). So it is possible to define actions and targets that cross resources and impacts.

So, Sustainable Competitiveness Strategy Mapping (SCSM – Targets) – see Figure 5.11, supports the definition of targets that translate strategic goals into measurable parameters (taking as

reference Competitive Advantage results), and SCSM – Actions (see Figure 5.12) supports the definition of the actions needed to achieve the strategic goals defined, taking as reference Competitiveness Positioning and Competitiveness Risk, as well the "how to do" to achieve the targets established.

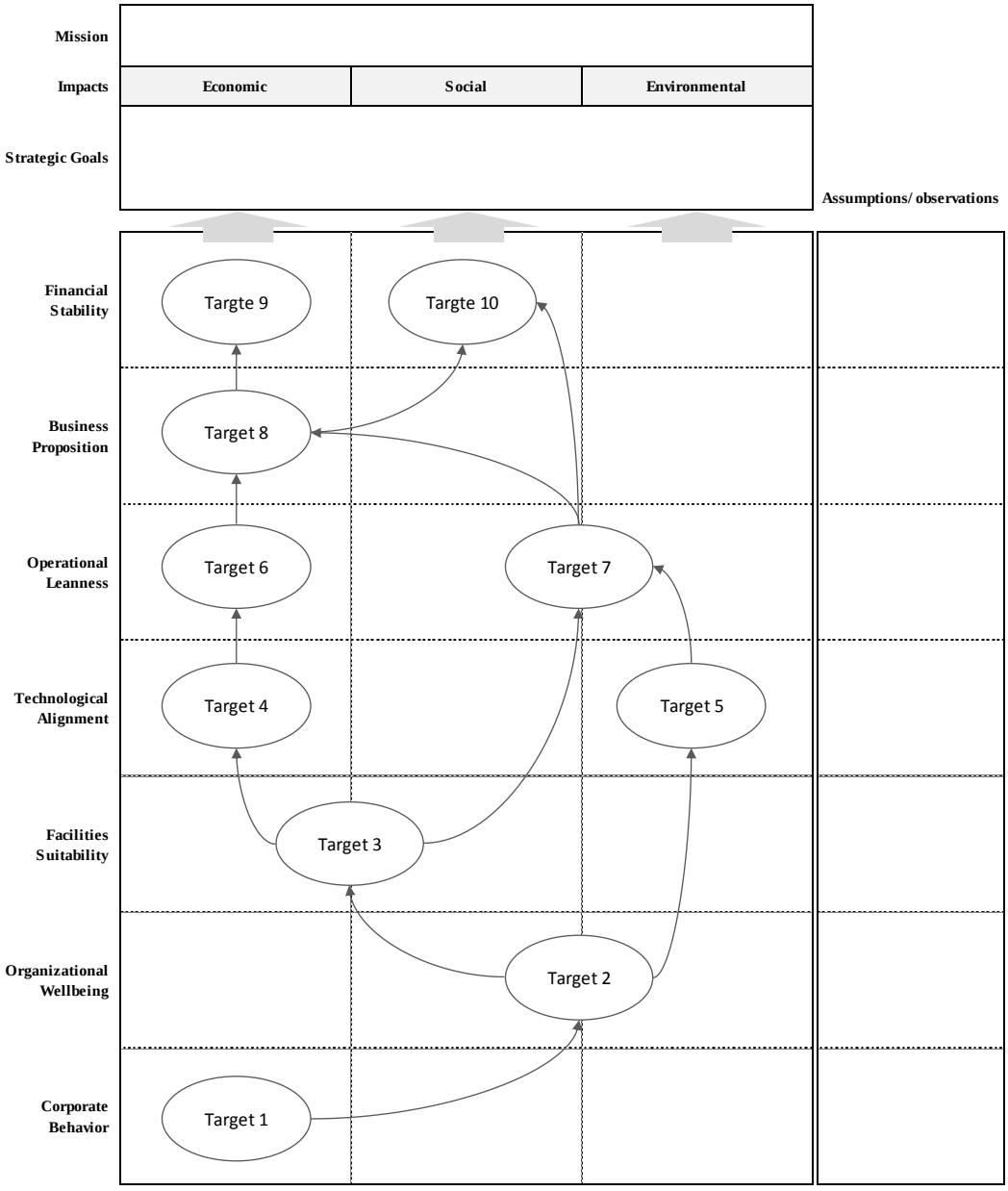


Figure 5.11 - SCSM - Sustainable Competitiveness Strategy Mapping (Targets)

It is important to underline that, as well as in BSC, also SCSM allow the establishment of relationships between targets, which makes possible a cause-effect analysis and reaction towards deviation situations or their prevention. Obviously this feature is also applied in the Strategy Mapping for actions. The establishment of these relationships is possible because the Strategy

Mapping includes a rearrange of the 7 Competitiveness Drivers, considering a down-up influence of the drivers, as also assumed in BSC principle.

Another relevant aspect is that, depending on the number of the strategic goals defined, it may be necessary to create Strategy Maps (SCSM) for each strategic goal, to simplify and increase focus.

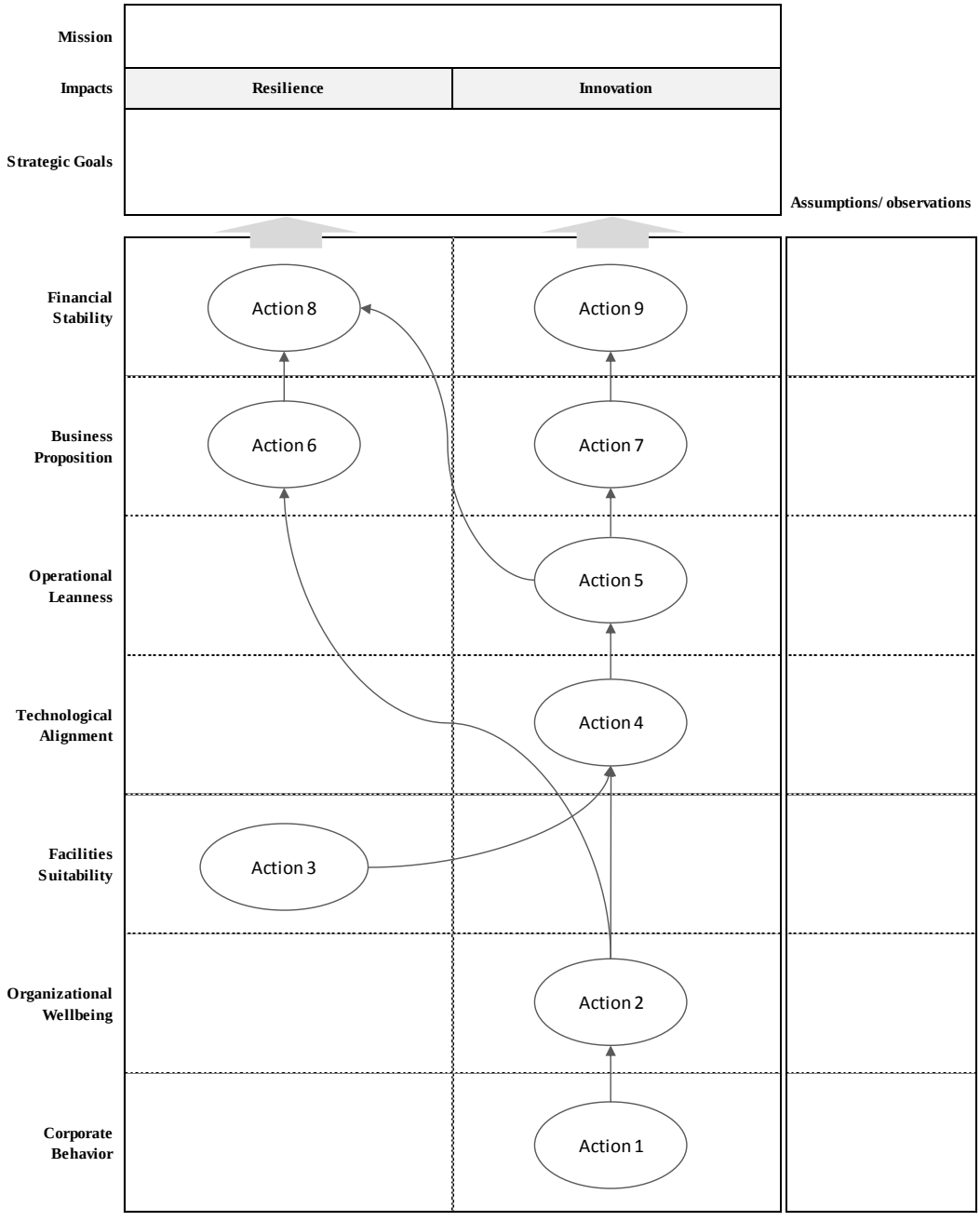


Figure 5.12 - SCSM - Sustainable Competitiveness Strategy Mapping (Actions)

As a note we would like to underline that complementary tools can be used, for example the Business Model Canvas that gives another perspective of the company's business. However, those complementary tools, concerning SuCEES, are considered as practices that contribute to

Competitiveness Positioning measurement, once they allow to score the Proficiency Level (see Appendixes A3 e A4.

5.3.3 Deployment trough the Organization

Considering the sources of strategic planning failure, mentioned before, it is critical to assure that all the organization areas and level of the company understand the strategic goals, and its translation into de Strategy Maps. This understanding is crucial to guarantee that everyone knows what is the company's intention, bus this is not sufficient because they don't know how should/ must they contribute to that achievement (what is their role and what is expected from them – organizational areas, levels and about the employee himself). It is important to remember that in this stage the company must also define what the boundaries of employees' decision making are. With this concern SuCEES, include an organizational deployment approach to convert the Corporate SCSM (targets and actions) into Organizational SCSM. To do so, for each strategic goal defined (if many) the Corporate SCSM should suffer a rotation, transforming itself into a matrix (see Figure 5.13), where corporate targets will appear in column and each Organizational areas (of the same level) should represent each line. In this way it is possible to each Organizational area, taking into account its own mission, role, functions and responsibilities, to define what should be their own targets to contribute to the corporate target. The sum of all of these matrixes (of each of one Organizational area) should be compiled into that Organizational area SCSM.

Strategic Goal								
	Corporate Behavior	Organizational Wellbeing	Facilities Suitability	Technological Alignment	Operational Leanness	Business Proposition	Financial Stability	**Competitveness Drivers**
Organizational Areas								**Corporate Targtes or Actions** (pedending on the matrix)
A								
B								
...								
Z								

Figure 5.13 - Strategy Deployment Matrix

Replicating this approach to the SCSM for actions, each Organizational area will be defining their actions needed to contribute to the corporate actions. This process should be applied to all

organizational levels till its translation into individual (employee) targets and actions also, as well as integrated with merit and incentive programs. Another very critical activity inherent to the deployment stage is the definition of responsibilities and obligations between transversal organizational areas (eg. Internal SLA), assuring reliable interaction between functions. Thus, we accomplish a total strategic alignment in the organization and a global commitment and motivation focused to increase the company´s sustainable competitiveness.

5.3.4 Execution control

To be sure that strategic goals are achieved, the simple definition of actions and targets and their organizational deployment are not enough. As mentioned by several researchers, strategic execution fails precisely on the capacity to make it happen. Thus, beside of other success factors like leadership or sponsorship, the use of tools for monitoring actions execution and the progress of targets achievement, are essential. With this concern SuCEES include two more tools to cover this critical issue of the Strategy Deployment Process, based on PMI (Project Management Institute) principles (see Figure 5.14 and Figure 5.15).

#	Action	Related to (Strategic Goal)	Owner	Key dates		Resources	Key Success Factors (Risks)	Milestones		Progress Status	Causes of deviation	Adjustments
				Start	End			Interim results	Time frame			Corrective/ preventive/ improvement

Figure 5.14 - Actions Execution Monitoring Chart

The monitoring of actions execution, to be effective, must assure alignment with goals, include responsibilities and deadlines, as well as interim milestones (control moments and interim results expected with the execution of the corresponding action) – to allow timely adjustments in case of deviations - and the identification of risk and resources. Regarding responsibilities, the above Chart can be divided according to the RACI concept (R = Responsible – those who execute; A = Accountable – those who approve; C = Consulted – those who give opinions; I = Informed – those who are kept up – to – date).

#	Indicators	Target	Related to (Strategic Goal)	Owner	Data Sources	Measurement Periodicity	Needed Conditions	Milestones		Deviation	Potential Causes	Adjustments
								Interim targets	Time frame			Corrective/ preventive/ improvement

Figure 5.15 - Targets Achievement Monitoring Chart

Concerning the monitoring of targets achievement, it is more less the same. Nevertheless, it is needed to define data sources and measurement periodicity.

Based on this control companies are able to anticipate deviations and proceed in conformity taking in account causes of deviations and constraints, as well as to go along on the 4 A's Cycle of SuCEES. It is also important to highlight that another factor that must be controlled is the budget of each action, which implies a detailed breakdown structure and a careful estimate of costs for each action defined. The chart of Figure 5.14, can include that information in a specific column.

5.4 Tools and Measurement Methods

As mentioned Strategy Development and Deployment Process based on sustainable competitiveness model, involve evaluation and execution activities that should be developed as a continuous process, considering the measurement of resilience and innovation drivers to obtain the current competitiveness positioning, the comparison of impact indicators with the direct competitors to identify the company's advantage, the risk analysis of losing that advantage, as well as the analyses of these results, definition of strategic goals, actions and targets, and its following in terms of implementation and achievements.

To support the above activities SuCEES offers a set of tools that should be applied in each of 4 A's cycle. Additionally, to those tools other ones will be considered to support the measurement of each evaluation component. Figure 5.16 illustrates the approach and correspondent tools for each stage.

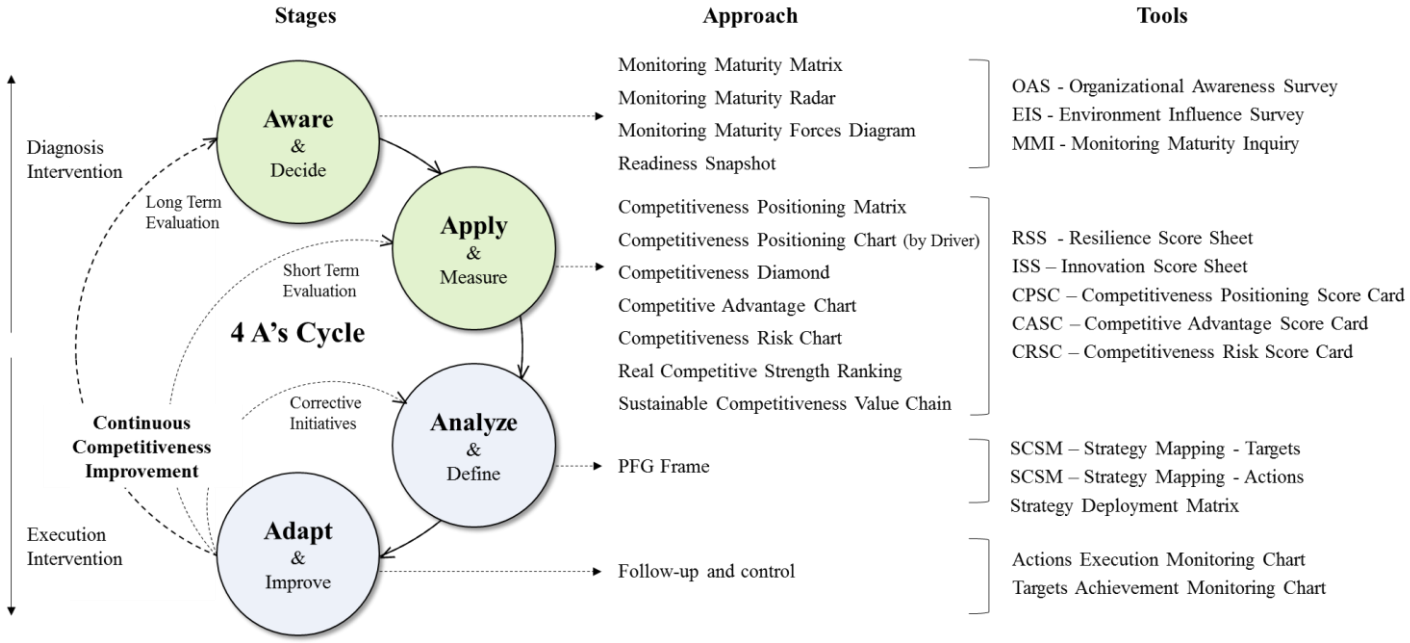


Figure 5.16 4 A's Cycle - Approaches and tools

The application of SuCEES framework implies the use of these approaches and tools, and for that it is needed to know how. The following chapters will explain the measurement methods and the calculations needed to do so.

But before that, it is relevant to remember that the Sustainable Competiveness Model is based on a 0 to 8 scale, once it is characterized by the use of a descriptive value per level. Additionally, by assuming this scale, we increase the level of detail of the measurement process and minimize "central tendency" effect, since under level 4 we are facing negative evaluations and only values above level 4 are considered positive performances.

5.4.1 Monitoring Readiness Measurement

In order to illustrate the application of these evaluation tools, we take up fictitious data as an example of proficiency's levels scores for each dimensions, regarding four (4) companies from the same economic sector (X; Y; Z and W), as shown in Figure 5.17.

Company	n (L)	n (M)	n (T)	n (D)	n (MP)	n (TS)
X	1	2	4	4	1,5	4
Y	3	4	4	4	3,5	4
Z	2	2	3	6	2	4,5
W	2	3	4	5	2,5	4,5
Average	**2**	**2,75**	**3,75**	**4,75**	**2,375**	**4,25**

Legend:

n (L) – proficiency level score for dimension "*Leadership & Organizational Alignment*"
n (M) – proficiency level score for dimension "*Measurement Approach*"
n (T) – proficiency level score for dimension "*Technological Support*"
n (D) – proficiency level score for dimension "*Data Scope & Reliability*"
n (MP) – positioning of factor "*Monitoring Practice*"
n (TS) – positioning of factor "*Technology Sophistication*"

Figure 5.17 - Dummy example of an evaluation table - monitoring maturity evaluation of four companies

Using the following expressions, we can achieve the positioning of the companies as well as the cluster positioning (average of the positioning of the economic sector), allowing comparative analysis and the set of focused improvement actions:

Expression for calculating the positioning of factor "Monitoring Practice" of an organization:

$$n(MP) = \frac{n(L)+n(M)}{2};$$

Expression for calculating the positioning of factor "Technology Sophistication" of an organization:

$$n(TS) = \frac{n(T)+n(D)}{2};$$

Expression for calculating the positioning of factor "Monitoring Practice" of a cluster:

$$n(MP) = \frac{\sum_{i=1}^{n}\left(\frac{n(L)i+n(M)i}{2}\right)}{n},$$ wherein n is the total number of entities considered in the cluster;

Expression for calculating the positioning of factor "Technology Sophistication" of a cluster:

$$n(TS) = \frac{\sum_{i=1}^{n}\left(\frac{n(T)i+n(D)i}{2}\right)}{n},$$ wherein n is the total number of entities considered in the cluster.

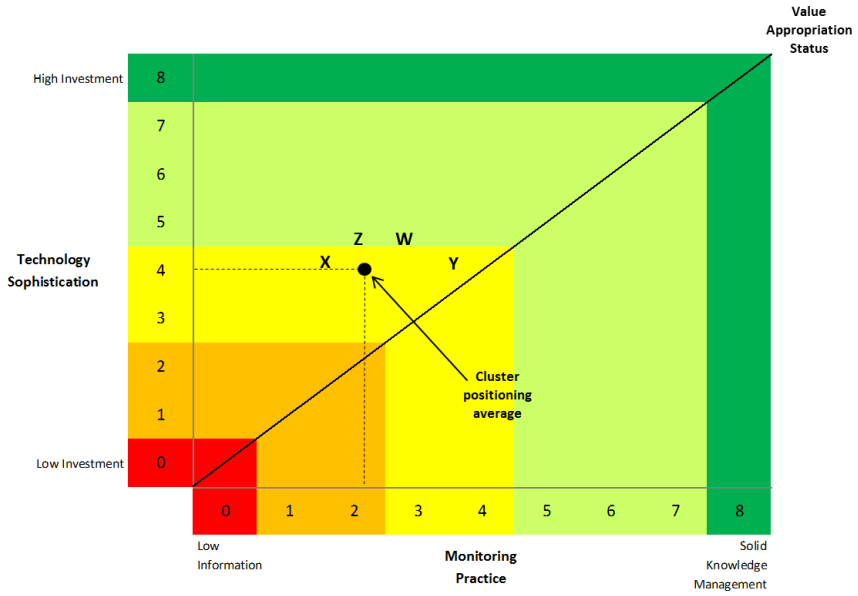


Figure 5.18 - Monitoring Maturity Matrix - Dummy positioning of four companies and average position of the economic sector (cluster)

Given the above, by recognizing the current state of the organization in each of the dimensions, it is possible to place the organization on a 4 axis evaluation radar of monitoring maturity and therefore visualize the distribution of evaluations disaggregated by each dimension. Thus, the following Figure 5.19 shows the example of the positioning of the company Y, as well as it compares positions with other companies and with the average for the sector in which it operates.

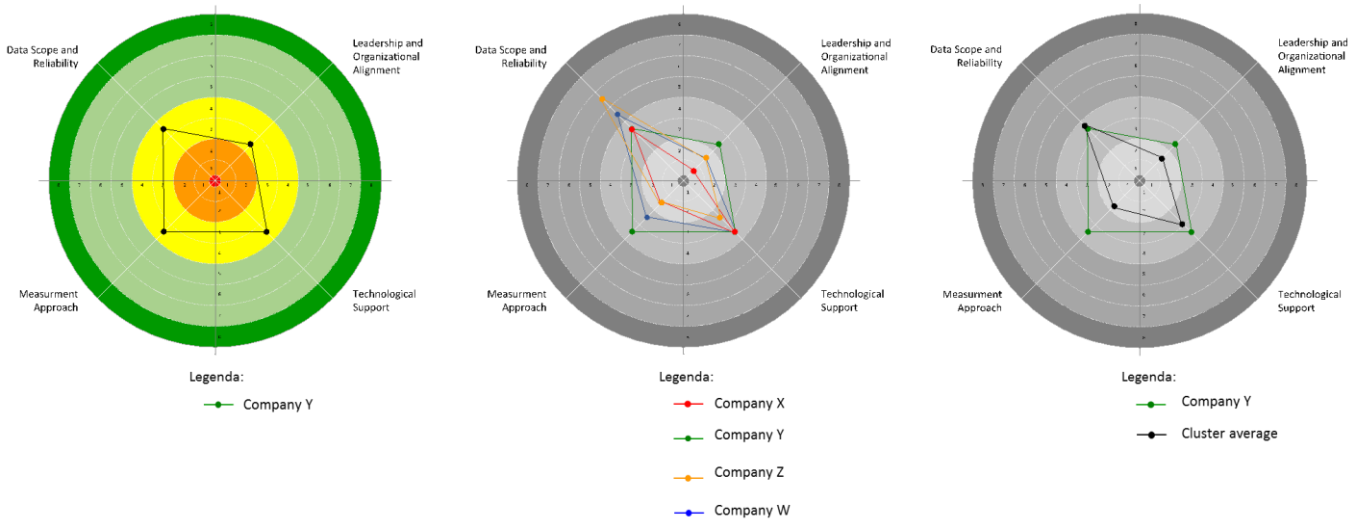


Figure 5.19 - Monitoring Maturity Radar - illustrative

The use of this tool Radar through the visualization of each dimensions' positioning, enables the analysis of forces between the dimensions with direct complementarity. So it is possible to

identify inconsistencies that must be corrected immediately, or to conclude about the existence of non-balanced efforts. For illustrative purposes, Figure 5.20 shows the forces existing in the dummy company Z.

It is emphasized that the balance of power between dimensions is determined by subtracting the respective scores (proficiency levels) assigned to each dimension.

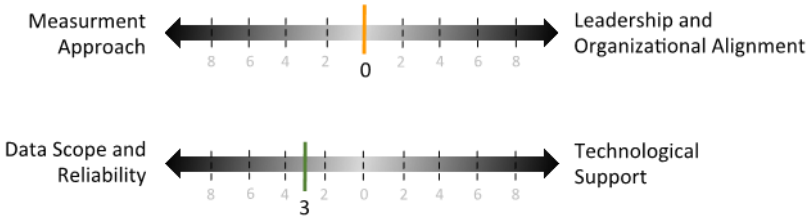


Figure 5.20 - Monitoring Maturity Forces Diagram – Illustrative for Company Z

Applying the Forces Diagram, it is possible to conclude that there is a good balance of factor "Monitoring Practice", since the forces of its dimensions cancel each other (which means that each dimension was evaluated with the same level of proficiency). However, the score of factor "Technology Sophistication" reveals a significant imbalance, with no supporting technology to meet the levels of maturity of the existing data.

In order to succeed in establishing quantified evaluation positioning between organizations and between clusters, it is necessary to combine not only the level of each factor but also the relationship between them (which means the monitoring maturity position) and its distance to the Balance Line (because it correspond to the maximum value appropriation). Therefore, it is assumed that the best positioning corresponds to the maximization of the length of the Balance Line and the minimization of the distance between the Balance Line and the monitoring maturity position, as shown in Figure 5.21.

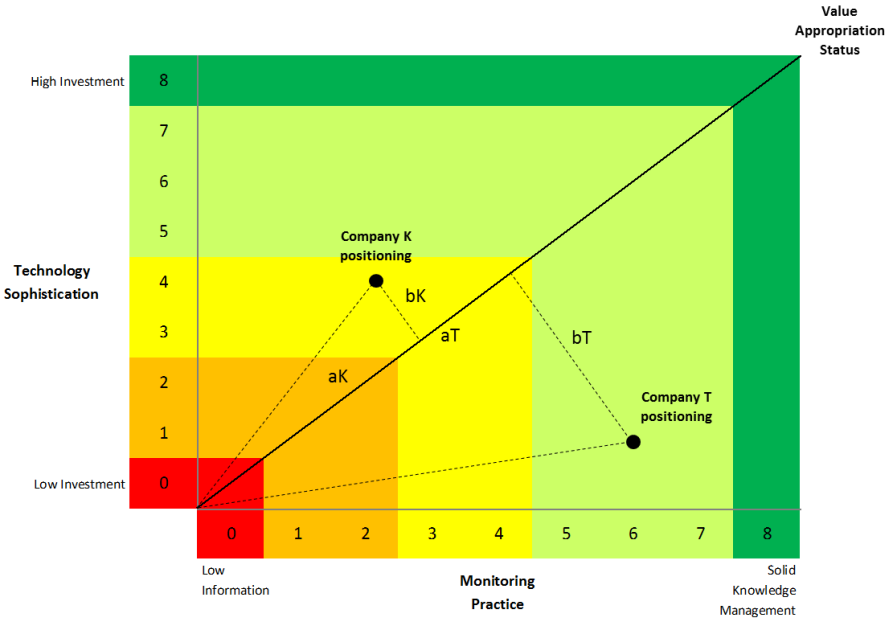


Figure 5.21 - Illustrative Positioning of two companies for evidence of the importance of the relation between the positioning and the distance to the Balance Line

According to figure above it is readily perceived that it is relevant to understand which company K or T has in fact the best positioning.

Following the above, the matrix also allows a proper interpretation of the relative position between organizations (or comparing prior periods). In this context, as the evaluation is based on the length of the Balance Line versus its distance to the monitoring maturity position, the ranks of company K and T should be obtained by the calculation of their final score through a specific expression, that taking into account the major aim of the present dissertation, was considered as an opportunity for further research.

5.4.2 Evaluation Measurement

To explain the use of the next approaches and tools of SuCEES framework we structured this chapter for each evaluation components in the following sections:

- Scoring methodology; and
- Calculations and analysis.

5.4.2.1 Competitiveness Positioning scoring and analysis

Scoring methodology

The evaluation of Competitiveness Positioning is based on the assessment of Companies' capability to use their resources to be resilient and innovative. Therefore, this evaluation is based on the score of each criteria defined for the seven Competitiveness Drivers, regarding the proficiency levels (applied to Severity Responsiveness and to Intensity Enabler) and the types of practices' consistency (applied to Recovery Capability and to Advance Sustention). To do so we use the Score Sheet (RSS – Resilience Score Sheet and ISS – Innovation Score Sheet) for each Competitiveness Driver (see Figure 5.22).

Competitiveness elements	**Criteria** (Sources)	**Proficiency Level Score**	**Practices' Consistency**					**Practices' Consistency Score**	**Dimension Score**
			Assign just one option *(x)*						
			Not suitable/ inexistent	**Unknown practice/ internal solution**	**Common practice/ legal obligation**	**Best in Class/ reference to others**	**Cutting edge/ driving continuous R&D**		
Culture and leadership	Innovative Organization								
	…								
	…								
…	…								
Facilities management	..								
	Facilities and security innovation								

Figure 5.22- Competitiveness Positioning Score Sheet - illustrative (for each dimension: RSS - Resilience and ISS - Innovation

Proficiency Level scoring

Taking this Score Sheet as a reference, scoring proficiency levels means that according to the Company's practices and resources we should attribute a score between 0 – no evidence; and 8 – extremely high evidence. This score should correspond to the level of compliance that the Company is able to prove (real practice) through clear and reliable evidences, as well as complete fulfillment of all requirements of that level (see Appendix A3 and A4 – Proficiency Levels). In case of incomplete fulfillment of a level the score should take the intermediate value.

Practice Consistency scoring

To score the consistency of practices that the Company use to respond to each criteria of evaluation, we assume a scale between 0 and 8, where: 0 = *not suitable/ inexistent*; 2 = *unknown practice/ internal solution*, 4 = *common practice/ legal obligation*, 6 = *best in class/ reference to others* and 8 = *cutting edge/ driving continuous R&D*. In case of overlap or progressive situations the score should take the intermediate value.

Calculations and analysis

As mentioned before Competitiveness Positioning can be expressed through three different means, in concrete:

- Competitiveness Rank;
- Competitiveness Matrix; and
- Competitiveness Diamond.

Calculating the Competitiveness Rank

Considering that Competitiveness is defined as Resilience plus Innovation, it is natural that to calculate the final score (Rank) of a Company's Competitiveness, we need to compute the total Resilience Score and the total Innovation Score. Once finished the scoring procedure for the proficiency level and for the practice consistency for each criteria, we are able to calculate the score of each competitiveness dimension. To do so we use the following expressions:

$$\textit{Resilience Score} = \sum_{j=1}^{m} \frac{SR\ average\ j + RC\ average\ j}{2}\ ;(1)$$

$$\textit{Innovation Score} = \sum_{j=1}^{m} \frac{IE\ average + AS\ average}{2}\ ;(2)$$ where:

SR average = Score average of Severity Responsiveness;

RC average = Score average of Recovery Capability;

IE average = Score average of Intensity Enabler;

AS average = Score average of Advance Sustention.

j = Competitiveness Driver; and

m = total number of Competitiveness Drivers;

Therefore, the Competitiveness Positioning Rank is given by the following expression:

Competitiveness Positioning Rank = Resilience Score + Innovation Score (3)

The Rank (final score) can be expressed by Competitiveness Driver through the Competitiveness Positioning Score Card (CPSC), as shown in Figure 5.23.

Competitiveness Drivers	Resilience Score	Innovation Score	Competitiveness Positioning
Corporate Behavior	8	8	16
Business Proposition	8	8	16
Financial Stability	8	8	16
Organizational Wellbeing	8	8	16
Operational Leanness	8	8	16
Technological Alignment	8	8	16
Facilities Suitability	8	8	16
	56	56	112

Figure 5.23 - Competitiveness Positioning Score Card (CPSC), illustrating maximum score

Considering that they are seven Competitiveness Drivers and the maximum score is 8 values, each dimensions can reach 56 points. That means that the maximum Rank for Competitiveness Positioning is 112 points.

Note that it is possible to represent the Competitiveness Positioning by Driver and by Competitiveness Element for more detailed analyses to identify where the business strategy should focus and what kind of improvements should be considered.

In terms of graphical presentation, Competitiveness Positioning can be illustrated as shown in Figure 5.24.

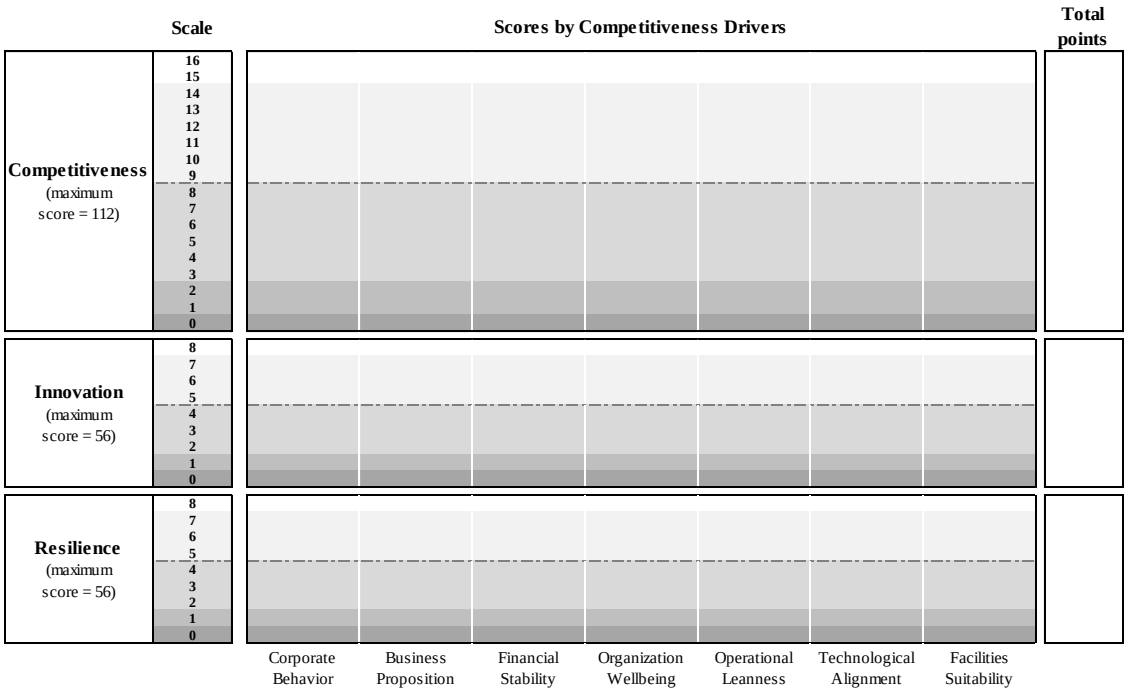


Figure 5.24 - Competitiveness Positioning Chart (CPC) - by Competitiveness Driver

It is important to highlight that for the company's Real Competitive Strength calculation is needed to convert the Competitiveness Rank into a 0 – 1 scale, which can be obtained by the following expression:

$$Competitiveness\ Positioning\ (CP) = \frac{Value\ of\ the\ Competitiveness\ Rank}{112}\ (4);$$

Designing the Competitiveness Matrix

Another way to analyze the Company's Competitiveness Positioning is through the Competitiveness Positioning Matrix (CPM). As mentioned in chapter 5, it is of interest to understand which of the four competitive positioning stages defines the Company. With these purpose and taking the corresponding Resilience and Innovation Scores - calculated by the expression (1) and (2) – we draw the matrix as follows (see Figure 5.25).

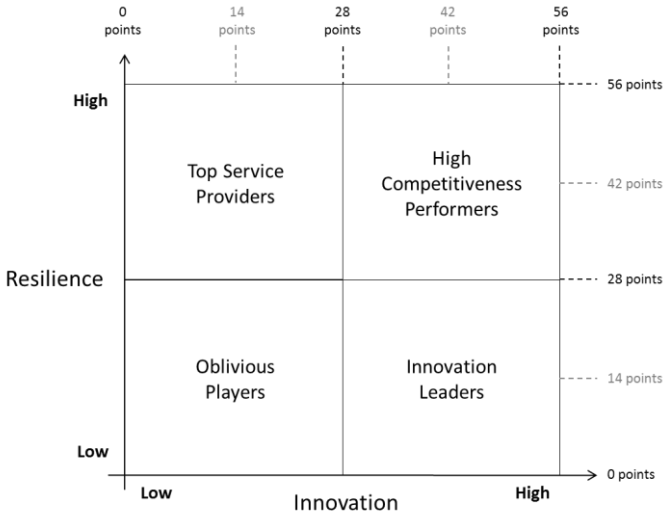


Figure 5.25 - Competitiveness Positioning Matrix (CPM)

Calculating and designing the Competitiveness Diamond

To illustrate the Competitiveness Diamond, it is needed to calculate each component of each competitiveness dimensions, namely:

- Severity Responsiveness and Recovery Capability, regarding Resilience dimension; and
- Intensity Enabler and Advance Sustention, concerning Innovation dimension.

Taking into account the principles defined to design a Competitiveness Diamond, it is supposed to normalize the calculation into a scale between 0 and 8. Thus, we can obtain the needed values through the following expressions:

$$\textit{Severity Responsiveness (SR)} = \frac{\left(\sum_{j=1}^{m} SR\ j\right)}{m} \textit{;(5)}$$

$$\textit{Recovery Capability (RC)} = \frac{\left(\sum_{j=1}^{m} RC\ j\right)}{m} \textit{;(6)}$$

$$\textit{Intensity Enabler (IE)} = \frac{\left(\sum_{j=1}^{m} IE\ j\right)}{m} \textit{;(7)}$$

$$\textit{Advance Sustention (AS)} = \frac{\left(\sum_{j=1}^{m} AS\ j\right)}{m} \textit{; (8)}$$ where:

j = *Competitiveness Driver,* and

m = *total number of Competitiveness Drivers.*

To obtain these values we need to calculate the value of each of these components for each Competitiveness Driver, which is the average value of the scores of the evaluation criteria that compose the Driver.

After this calculation, to represent the Competitiveness Diamond it is only necessary to replace n by the respective values:

Severity Responsiveness Score (- n) – theoretical correspondence to preventive time;

Recovery Capability Score (8 – n) - theoretical correspondence to recovery time;

Intensity Enabling Score (n - 8) - theoretical correspondence to innovating time; and

Advance Sustention Score (n) - theoretical correspondence to protection time.

Example given in Figure 5.26 illustrate a Medium Competitiveness Positioning expressed by a score = 4 at all parameters.

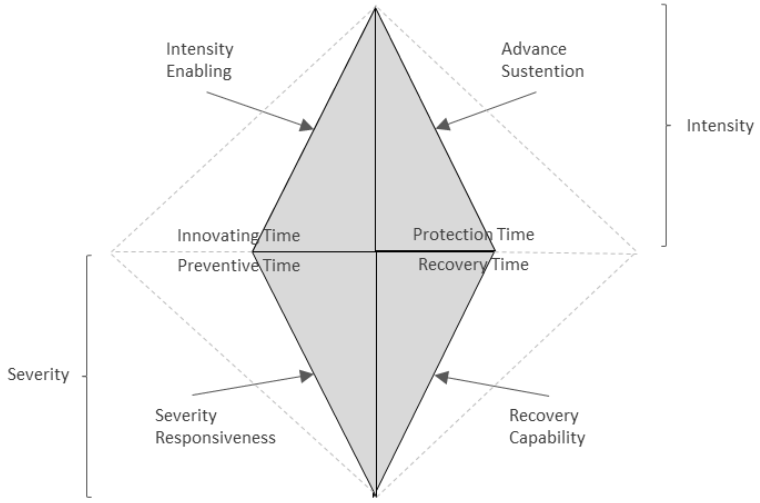


Figure 5.26 - Competitiveness Diamond – Example of a medium score

Note that we can also design Competiveness Diamonds for each Competitiveness Driver, allowing more detailed analyses. To do so, we consider the values of each Driver (j).

We can also use diamond's illustrations to compare competitiveness positioning's between competitors and identify weaknesses and positive aspects by overlap results of different companies in a same Diamond diagram. In other hand it is also possible to compare companies in terms of a linear positioning (see Figure 5.27), taking into account the optimization of the

diamond's area. As mentioned in Chapter 4, maximum Competitiveness Positioning expressed as the diamond's area correspond to a value = 64, and minimum Competitiveness Positioning value = - 64.

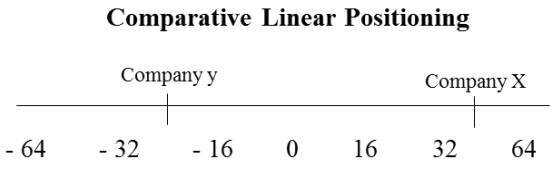


Figure 5.27 - Comparative Linear Competitiveness Positioning- illustrative for dummy company's X and Y

5.4.2.2 Competitive Advantage scoring and analysis

Scoring methodology

As mentioned in Chapter 5, SuCEES is able to assess the Company's performance by evaluating impact indicators suitable to measure its Competitive Advantage over major/ direct competitors. As shown, each Competitiveness Driver has several indicators, depending on their nature, the Company's aim is to maximize (M) or minimize (m) the value of each indicator.

To score Competitiveness Advantage it is necessary to compute the current value for each indicator for the Company and for its major/ direct competitor. After that we attribute a score between 0 = *no current advantage* and 1 = *high current advantage*, considering the result obtained by the calculation of the *Advantage Coefficient*. This coefficient establishes the relation between the Company's performance and its major/ direct competitor.

Note that if we don't know exactly the competitor's indicator value, we should assume a value of our perception. Considering this and the fact that for some indicators it can be difficult to be precise about competitors' real performance, the model includes an uncertainty factor to correct inaccuracies and adjust lack of reliable data. Therefore, *Uncertainty Factor* should be scored between 0 = *unknown* and 1 *accurate*. The scoring should be held by the use of the Competitive Advantage Score Card (CASC), as shown in Figure 5.28.

Competitiveness Drivers	Impact Indicators	Aim	Performance Current Value	Direct Competitor Current Value	Advantage Coefficient (0 to 1)	Current Advantage (present performance) None 0	0,2	0,4	0,6	0,8	Low / High 1	Uncertainty Factor (data reliability) Unknown 0	0,2	0,4	0,6	0,8	Accurate 1	Competitive Advantage Score By Indicator	By Driver
Corporate Behavior	GDP contribution	M	600	300	0,7	≤ 0,5	< 0,55	< 0,65	< 0,75	< 0,9	≤ 1						1	0,60	
	…	M				≤ 0,5	< 0,55	< 0,65	< 0,75	< 0,9	≤ 1								**0,2**
	Partnership and suppliers satisfaction index	M	50	75	0,4	≤ 0,5	< 0,55	< 0,65	< 0,75	< 0,9	≤ 1						1	0,00	
…	…	M				≤ 0,5	< 0,55	< 0,65	< 0,75	< 0,9	≤ 1								
Facilities Suitability	Accidents and safety incidents	m	9	60	0,13	≥ 0,5	> 0,45	> 0,35	> 0,25	> 0,1	≥ 0						1	0,80	
	…	M				≤ 0,5	< 0,55	< 0,65	< 0,75	< 0,9	≤ 1								
																		Global Advantage Score	

Figure 5.28- Competitive Advantage Score Card (CASC) – Scoring illustration, assuming that data is reliable

Calculations and analysis

After calculating the value of each Company's *Impact Indicator* and at the same way for its major/ direct competitor, we need to obtain the *Advantage Coefficient* value (which is normalized in a scale between 0 and 1). To do so we can use the following expression:

$$Advantage\ Coefficient = \frac{Perfomance\ Current\ Value}{Perfomance\ Current\ Value + Direct\ Competitor\ Current\ Value} \quad (9);$$

Through the result of each *Advantage Coefficient* we score the company's *Current Advantage*, taking as a reference the parameters of Table 5.5. Note that if this coefficient is 0,5 it means that there are no competitive advantage.

Table 5.5 - Current Advantage scoring parameters

Indicators which aim is to be maximized	Score equal to:	Indicators which aim is to be minimized
if Advantage Coefficient		if Advantage Coefficient
≤ 0,5	0	≥ 0,5
> 0,5 and < 0,55	0,2	> 0,45 and < 0,5
> 0,55 and < 0,65	0,4	> 0,35 and < 0,45
> 0,65 and < 0,75	0,6	> 0,25 and < 0,35
> 0,75 and < 0,9	0,8	> 0,1 and < 0,25
> 0,9 and ≤ 0,1	1	≥ 0 and < 0,1

As mentioned, due to potential lack of reliable data about competitors' performance, *Uncertainty Factor* should be considered. Thus, a score = 0 means that we don't know our competitor's performance and a score = 1 means that the data is accurate. To help the score between these boundaries we can take as a reference the parameters of Table 5.6.

Table 5.6 - Uncertainty Factor scoring parameters

Uncertainty Factor	
Score equal to:	If competitor's data is:
0	Not available or totally incorrect
0,2	The Company's perception
0,4	The market perception
0,6	The competitor assumption
0,8	The official competitor information and recognized by the market
1	Certified by third part official entities

It is important to underline that if the company doesn't know its performance regarding a specific indicator, these aspects should be reflected as a score = 0 in the *Uncertainty Factor*, to be able to consider this effect on the calculation of the global value of Competitive Advantage.

Now, to complete the calculation of Competitive Advantage, we obtain the values for each Impact Indicator by the use of the following expression:

$$Competitive\ Advantage_{\ i} = Current\ Advantage_{\ i}\ x\ Uncertainty\ Factor_{\ i}\ ;\ (10)$$ where:

i = Impact Indicator

It is possible to obtain a Competitive Advantage score for each Competitiveness Driver by the use of the following expression (note that this result is not the average, because if there is an Impact Indicator without a score the Company should be penalized).

$$\text{Competitive Advantage}_{\ m} = \frac{\left(\sum_{i=1}^{n} Competitive\ Advantage\ i\right)}{n};\ (11)$$ where:

i = Impact Indicator;

n = total number of Impact Indicators included in Competitiveness Driver $_m$ (to considerte total number of indicators of the Driver even if there any without a score);

m = Competitiveness Driver.

And at the end the global Competitive Advantage score is the average of the values obtained for the Competitiveness Drivers, as the expression:

$$\text{Competitive Advantage (global)} = \frac{\left(\sum_{j=1}^{m} Competitive\ Advantage\ j\right)}{m}\ ;\ (12)$$ where:

j = Competitive Advantage score of Competitiveness Driver j;

m = total number of Competitiveness Drivers.

5.4.2.3 Competitiveness Risk scoring and analysis

Scoring methodology

To evaluate the Company's Competitiveness Risk, we assume the 5 Forces of Porter as criteria do asses the exposure to market. Therefore, and taking in account that risk is translated as the probability of occurrence of an event multiplied by the severity/ impact of that occurrence to the Company, to compute the Competitiveness Risk we assume as occurrence the current market environment and as severity the Company's vulnerability (impact) to this conditions (as mentioned in Chapter 5).

Thus, calculation of Competitiveness Risk is based on scoring each Porter's criteria regarding each of the 5 Forces in:

- A scale between 0 = *Totally false* and 8 = *Totally true*, considering the market environment regarding to Company's major markets (assuming Pareto's Law as a reference, which means the 20% of markets that represent 80% of your presence) and major products/ services (20% of goods/ services that represent 80% of your sales or purchases); and
- A scale between 0 = *Low impact* to the Company and 1 = *High impact* to the Company.

It is important to note that we face favorable market environments if the Current Conditions' scores are low, which means (a score correspondent to totally false). Thus, to score Competitiveness Risk we can use the Competitiveness Risk Score Card (CRSC) - see Figure 5.29 - Competitiveness Risk Score Card (CRSC).

Business context risk factors		Current Conditions					Impact on the company due to current conditions						Risk	
Porter's 5 Forces	Evaluation criteria	Totally false	Some false	Medium	Quite True	Totally True	Low					High	Parcial	By Force
		0	2	4	6	8	0	0,2	0,4	0,6	0,8	1		
Rivalry among existing companies (high score = high rivalry intensity)	There is a large number of competitors in the industry													
	…													
…	…													
Bargaining Power of Buyers (high score = buyers with high power)	…													
	High threath of Buyers' backward integration													
													Total Risk Score	

Figure 5.29 - Competitiveness Risk Score Card (CRSC)

Calculations and analysis

After scoring each criteria risk we can calculate the risk of each Force through the following expression, taking in account the normalization of the results by dividing by 8 each criteria score to achieve final scores between 0 and 1, to be able to calculate the Real Competitiveness Strength:

$$Competitiveness\ Risk\ of\ Force_{\ m} = \frac{\frac{\left(\sum_{i=1}^{n}(CCi\ x\ Ii)\right)}{8}}{n}$$ *;(13)* where:

CC_i = *Current Conditions of criteria i;*

I_i = *Impact of criteria i;*

i = Criteria of force m;

n = total number of criteria of force m; and

m = total number of forces.

Finally, the total Competitiveness Risk Score corresponds to the Average of scores of each Force. As we can see, it is possible to analyze risk in global perspective but also in a desegregated manner allowing more detailed research and to be aware of potential issues that should be addressed.

A way to expose these results is Competitiveness Risk Chart (CRC), which illustrate the relationship between the market conditions and the Company's vulnerability to these conditions (see Figure 5.30).

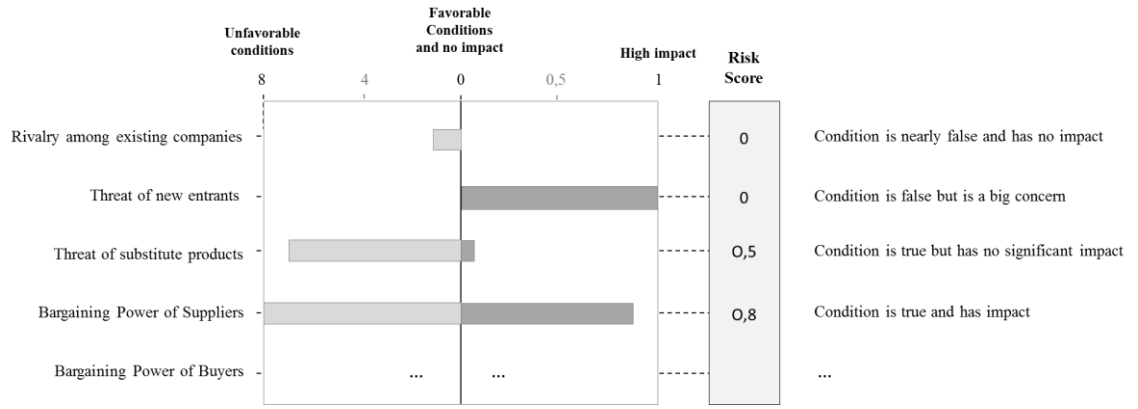


Figure 5.30 - Competitiveness Risk Chart (CRC)

5.4.2.4 Real Competitive Strength Scoring and Analysis

In the end we are able to calculate an aggregated score that can represent a global rank of the company's Real Competitive Strength (RCS), regarding its Competitiveness Positioning (CP), Competitive Advantage (CA) and Competitiveness Risk (CR) scores. To do so we apply the following ranking expression:

$$\textit{Real Competitiveness Strength (RCS)} = \frac{CP + (CA\ x\ (1-CR))}{2}\ x\ 100 \quad ;(14)$$

taking into account:

CP, CA and CR are expressed by values between 0 and 1.

This score can be assumed as a final rank which can be used as a global value to benchmark within the company's sector. So if CP = 1, CA = 1 and CR = 0, then RCS = 100, which is the maximum score possible and correspond to the highest sustainable competitiveness performance.

5.5 Required Conditions and Success Factors of SuCEES implementation

Similar to any other implementation process, also SuCEES must be considered as a changing situation. Added to this fact its implementation is even more sensitive because it is related with

strategy – which in mostly companies it still a very management restricted issue – and with monitoring – which still is surrounded by the "ghost" of employee control associated to labor "penalties" instead of recognition of merit and opportunities for employees' growth and development.

Therefore, the major activity that is required is an appropriate Change Management Program, which should include:

- High level sponsorship and empowerment;
- Communication plan, giving relevance to:
    - ✓ Objectives of SuCEES implementation,
    - ✓ Why it is important for the company and for the employees (what are the benefits for all)?
    - ✓ What is the System (general components)?
    - ✓ What is expected to achieve? and
    - ✓ What will be the role of direct personnel involved and what is expected from all (with high relevance to the definition of the boundaries of employees' decision making)?
- Definition of the implementation team and the governance model (reporting hierarchy and reports – templates and periodicity, as well as feedback and motivation dynamics);
- Definition of the implementation plan, with deadlines, responsibilities, interim milestones, budget, resources needed, risks and contingency plan;
- Definition of an incentive program, indexed to achievement of results;
- Design of a training course (for several levels of knowledge needed – implementation team, direct personnel involved – Organizational areas managers, and for general employees);
- Formal presentation of the evaluation results and mobilization of all relevant personnel to de definition of goals, targets and actions;
- Formal presentation of the progress of actions execution and targets achievement, involving relevant personnel for problem solving and to define improvements; and

- Finally, a global appreciation of how was SuCEES implementation, systematize lessons learned and start another cycle.

5.6 Benefits and Differentiation Aspects

According with was mentioned along the document, SuCEES being an integrated system to support Strategy Deployment Processes, it covers all stages of conventional strategic planning tasks, focusing on evaluation and execution activities in an aligned and cyclic approach. Based on several existing evaluation models and strategic tools, it extracts the best of each and incorporate new business concepts in a combined way, build on an alternative definition of competitiveness (Sustainable Competitiveness Model) – see Table 5.7.

Table 5.7 - Differentiation Aspects - Qualitative comparison between SuCEES (Sustainable Competitiveness Evaluation and Execution System) and other international core models and approaches of reference

Core references	Major Focus	Major Scope	Major Objective	Major domain
SuCEES	Strategic and operational	Resilience, innovation and sustainability	Evaluation and execution (with potential to be an award)	System (model, tool, index and cyclic)
BSC	Operational based on strategy	Business factors (Financial, clients, processes and learning)	Execution	Tool
EFQM	Operational with strategy impact	Total Quality Management	Evaluation (and award)	Model
Shingo Prize	Operational with strategy impact	Total Quality Management	Evaluation (and award)	Model
LARG	Operational with management impact	Value Chain	Optimization	Tool
SCOR	Operational with management impact	Supply Chain Management	Optimization	Tool
GRI/ DJSI	Operational with strategy impact	Sustainability	Evaluation (and award)	Index
Innovation Score Card	Operational with strategy impact	Innovation	Execution	Index
ITIL	Operational	Technology	Certification	Standard
ISO	Operational with management impact	Overall	Certification	Standard

Considering the table above we conclude that SuCEES features are wide ranging in terms of focus, scope, objectives and domain, and mainly include characteristics of all core references considered.

Taking into account that each reference itself is a valuable instrument to companies' improvement, development and growth, having a system that is able to integrate in a logical manner several of this references makes it more complete, structured, efficient and effective. Additionally, regarding the experts' opinion (see Chapter 3) and the feedback of the case studies (see Chapter 6), it is unanimous that both consider SuCEES as applicable, an added value and with relevant benefits.

So, it is possible to underline the following benefits of SuCEES:

- greater clarity in the application of tools (what, when, how and why);
- greater accuracy in the evaluation of performance;
- Reduced risk and uncertainty;
- Greater strategic and operational focus;
- Greater precision in the definition of priority actions;
- Increased willingness to adopt strategic planning practices systematically;
- Increased efficiency of the strategic planning process (diagnosis, definition, implementation and monitoring);
- Capture of benefits due to the application of new management principles and concepts;
- Increased accuracy of benchmarking initiatives.

5.7 Chapter Highlights

As mentioned before, SuCEES aims to be a helpful framework to continuously apply strategic planning processes in a structured way, allowing the use of several tools that are conveniently aligned with its purpose and integrated in an overall approach. Nevertheless, companies can apply SuCEES as an integrated framework, or use its tools as they need (obviously the final results will not add all the potential value of this system).

It is important to highlight that SuCEES may be complex to be applied. We are aware that to be a real added value, companies must have already a certain level of maturity in monitoring and

strategic planning processes to catch its benefits. Therefore, we underline the importance of the selection of the most suitable SuCEES level, which implies a correct application of the Monitoring Readiness stage. Another relevant aspect is that this Readiness evaluation is itself also an important tool for benchmarking.

Underlines

SuCEES is an integrated system that aims to respond to minimize the failure factors of traditional Strategic Planning Processes.

This system is based on the principles of the Sustainable Competitiveness Model.

As a system it assumes a continuously approach, based on a framework that include 4 stages of development (4 A's Cycle), which promote an integrated implementation of evaluation and execution activities.

For each of 4 A's Cycle the system offers several tools to support the measurement and analysis of results, as well as the definition and control of actions and targets.

Each tool and approaches include specific sets of evaluation criteria which were developed based on literature review and validated by the experts involved in the present dissertation.

Its successful implementation implies the correct application of the calculation methods and also an appropriate Change Management Program.

Finally, it is important to underline that the experts' opinion about SuCEES was very motivating and encouraging once all assume that it is an applicable system and an added value.

6 Case Studies – Practical Application of SuCEES

This research aims to be an added value to companies and a real contribute to the improvement of sustainable competitiveness. With this objective and considering that it was developed an alternative definition for competitiveness and a framework to support companies' in their strategy deployment processes, it was considered fundamental to apply SuCEES in a real context to obtain feedback about its suitability and benefits in a business point of view.

6.1 Scope and constraints of the Case Studies

Attending to the sophistication of SuCEES, one of the requirements to identify suitable companies to experiment the application of the system was their maturity concerning strategic planning processes and the knowledge about the Sustainable Competitiveness Model's foundation concepts.

As mention in Chapter 3.4, the research includes two case studies, which consists in applying SuCEES in Electrolux Poland and in Visteon Portugal.

It is very important to highlight that the scope of both case studies was the application of the evaluation framework of SuCEES (however, it was possible to create each companies' Sustainable Competitiveness Value Chain, using the results obtained, and validate its usefulness).

Anyway SuCEES was integrally presented and explained to both companies (Focal Points of each company) with two purposes:

- The correct understanding of the system's concepts, 4 A's Cycle and its approaches and tools, to assure an appropriate application of the evaluation framework and a reliable feedback to take proper conclusions and findings; and
- To obtain an overall appreciation of the differentiation factors, benefits and added value of the system.

They are three reasons why both case studies were focused on the evaluation framework of the system, in concrete:

- The full application of SuCEES would imply a very demanding involvement of the companies, taking into account the cycle time needed to follow-up and control actions' execution and targets' achievement;
- In one case the set of strategic goals, establishment of targets and the definition of actions was considered confidential information; and
- In the other case the period, which the case study occur, was not compatible with the company's strategy definition cycle.

Despite these limitations, concentrating the case studies based on the evaluation framework of SuCEES allowed a more focused validation of this component of the system and enables the validation of the execution framework as an opportunity for further research.

Additionally, it is also relevant to underline that there were four aspects that were constraints and a limitation concerning this case studies, in concrete:

- Location and proximity of the company – it was established a more interactive relation with Visteon Portugal, than with Electrolux Poland, which difficult the validation and clarification of doubts. Despite this aspects, both were always available and very collaborative;
- Organizational structure of the companies – both companies are multinational companies that have headquarters or shared services in one country and their manufacturing units spread all over the world. Therefore, it was not possible to collect some data, because it is centralized information;
- Confidential and restricted information – both companies where pleased to reveal their identity, but in the end some data could not be disclosed;
- Scope of the system's implementation – SuCEES incorporates the concern about how to apply the system (eg. Recommending the application of Pareto's rule: please consider the 20% of your market that represents 80% of your income; please consider the 20% of your products that represent 80% of your sales, ect). Even so, we conclude that not always these boundaries are easy to define. This issue should also be an opportunity for further research, because depending on the scope of SuCEES application (on an aggregate way – all markets and all products, or focusing only on the major markets and products) benchmarks are accurate or can induce to wrong analysis.

Nevertheless, the pointed facts above were a grateful input to understand and consider other issues that have impact on SuCEES suitability do real business context.

6.2 Results achieved

The application of the evaluation framework of SuCEES, implied data collection to obtain Competitiveness Positioning, Competitive Advantage and Competitiveness Risk scores. Therefore, it was shared with each Focal Point the several evaluation tools (score sheets) and guidelines, as well as established continuous contacts to clarify issues and explain doubts (see Appendix A2). After several interactions it was possible to obtain the scores (see Appendix B6 and B7), which allow:

- identification of score sheets' fulfillment and final calculations;
- presentation of the system's charts and its analysis, as well as;
- take major conclusions and get an overview of SuCEES appreciation.

Thus, we present below the results achieved for each company, based on the calculations presented in Appendix A11 and A12.

6.2.1 Electrolux results and considerations

To achieve the purpose and objectives of this case study, we applied the SuCEES's evaluation framework at Electrolux. This research step was very important because it allow the validation of the system's tools through a real experiment of its application (see data collected on Appendix B6). The following sub-chapters present the results of each evaluation component.

6.2.1.1 Competitiveness Positioning results

After applying the Competitiveness Positioning Score Sheets, and through the use of the system's evaluation framework tools (see Appendix A11a and A11b), we conclude that Electrolux is a *High Competitiveness Performer*.

The company has a high positioning score (6,1; 6,2) corresponding to a very good balance between Resilience Capacity and Innovation Ability. Considering the maximum score that a company can reach (112), their still opportunities for improvements, once Electrolux total score is 86,19 (see Figure 6.1).

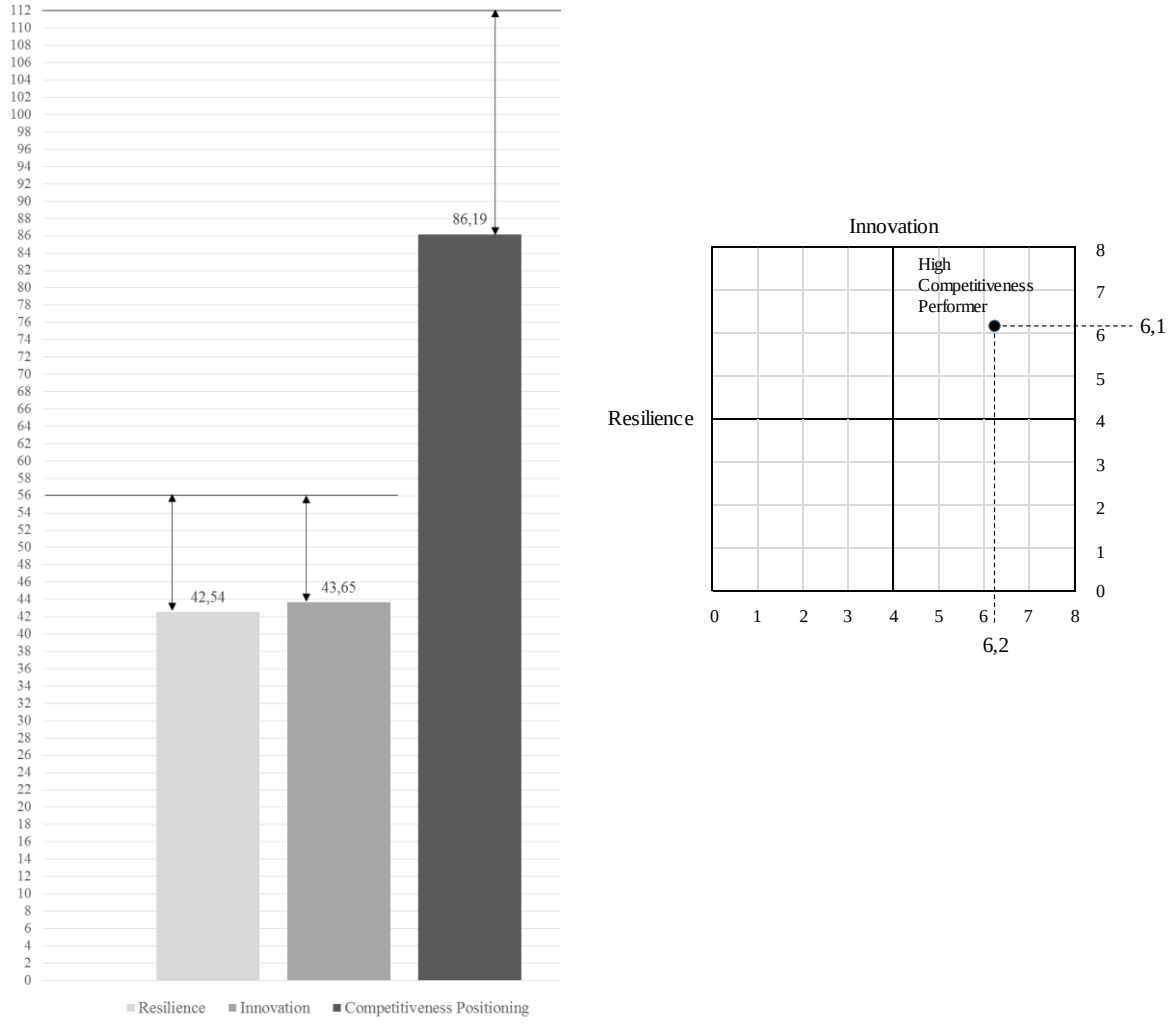


Figure 6.1 - Electrolux Competitiveness Positioning Matrix and global score

Considering each Competitiveness Drivers' scores for the two competitiveness dimensions, Electrolux can improve its Resilience through the adoption of practices to enable a better Financial Stability and Technological Alignment. Concerning Innovation, the improvement effort can be done, once again, on Financial Stability driver, and even more relevant, on Organizational Wellbeing. In a global point of view, the focus on Resilience improvement should have more impact on the final Competitiveness Positioning score (see Figure 6.2).

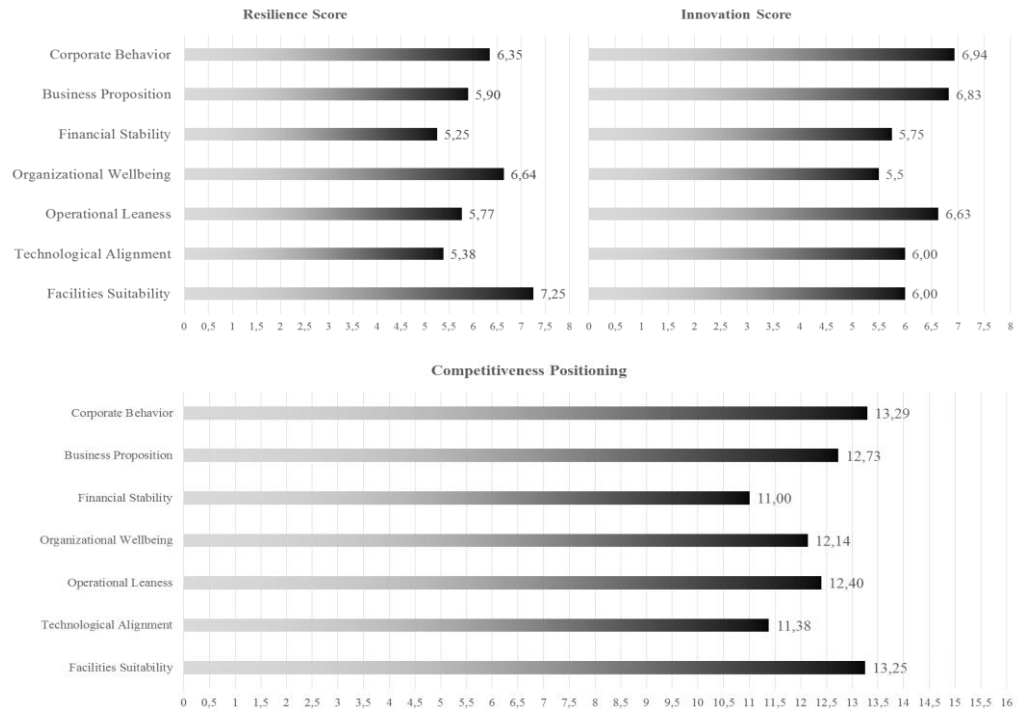


Figure 6.2 - Electrolux Competitiveness Positioning Chart (by driver)

Regarding the results exposed through the Competitiveness Diamond (see Figure 6.3), Electrolux has nearly a very high Severity Responsiveness (a long preventive time regarding disturbances) and a very high Intensity Enabler (a short innovation time). Additionally, in spite the good score at Advance Sustention, there still opportunities to improve this parameter, as well as to implement practices able to reduce even more de recovery time.

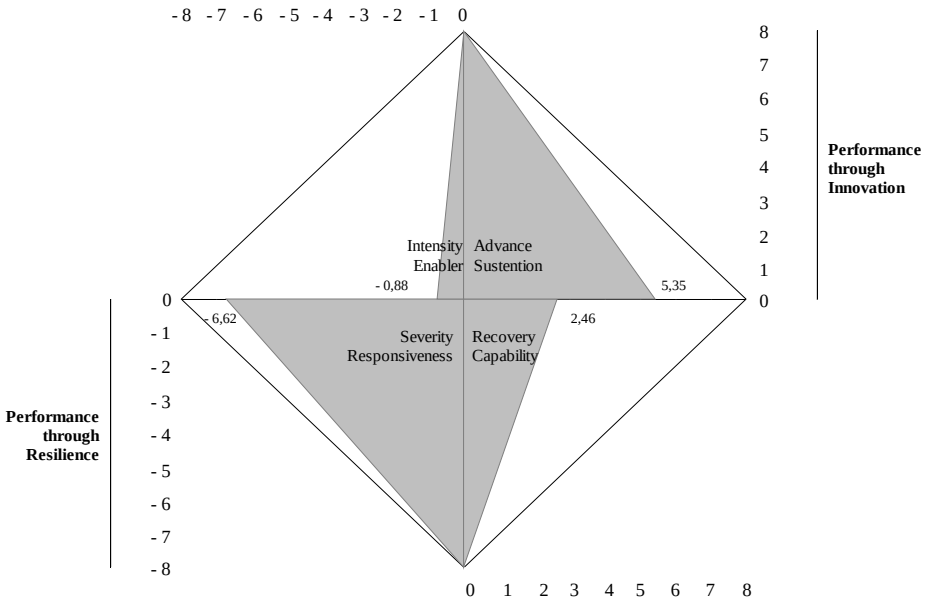


Figure 6.3 – Electrolux Competitiveness Diamond

Taking into account the above, Electrolux's final evaluation score for Competitiveness Positioning (in a 0 to 1 scale) is 0,77 (which is already a very high score), as shown in the following table.

	Resilience			Inovation			Competitiveness Positioning		
Drivers	**By Driver**	**Average**	**0 to 1 scale**	**By Driver**	**Average**	**0 to 1 scale**	**By Driver**	**Average**	**0 to 1 scale**
Corporate Behavior	6,35			6,94			13,29		
Business Proposition	5,90			6,83			12,73		
Financial Stability	5,25			5,75			11,00		
Organizational Wellbeing	6,64	6,08	0,76	5,5	6,24	0,78	12,14	12,31	**0,77**
Operational Leaness	5,77			6,63			12,40		
Technological Alignment	5,38			6,00			11,38		
Facilities Suitability	7,25			6,00			13,25		
Totals	**42,54**			**43,65**			**86,19**		
	Resilience			Innovation			Competitiveness Positioning		

Table 6.1 - Final Electrolux Competitiveness Positioning Score

6.2.1.2 Competitive Advantage results

Considering Electrolux Competitive Advantage, we must conclude that the results obtained are not entirely reliable. We assume this limitation due to the application scope of the case study, which covered the global activity of Electrolux worldwide.

In fact, only 50% of the model impact indicators (31 in 62) where scored, because of the following reasons:

- the information was considered confidential;
- the indicator was not used at all and it was not appropriate to compile all the data needed;
- the data was just not available or not available in an aggregated way.

Additionally, another source of inaccuracy was the difficulty to obtain reliable data of the direct competitor for each impact indicator considered. Nevertheless, Electrolux was able to score 25 indicators (from the 31 scored) with its direct competitor value. However, only 6 of them (24%) are 100% of accuracy (uncertainty factor score = 1). It is interesting to notice that these indicators are related to financial stability competitiveness driver, which indicates that companies still more focused on financial performance benchmark, also because these values are easier to obtain and

more reliable, once official sources dedicate more effort concerning this kind of information). Nevertheless, the rest of the indicators scored with direct competitor values based on Electrolux's perception (about 76%) were corrected through the uncertainty factor (as provided in the model's evaluation sheet).

In spite of the above, Electrolux Competitive Advantage evaluation, was severely penalized due to the model's score calculation method (the average value, always considers all 62 indicators assuming that the company should have measured all of them, once all indicators are important to support the Sustainable Competitiveness Model).

To counteract the above and only for illustrative purposes, it was assumed that for indicators scored by Electrolux without direct competitor's values, the advantage coefficient was equal to 1 (which means that we scored Electrolux with the maximum score – high advantage in comparison with its direct competitor), and corrected this effect by assuming an uncertainty factor equal to 0,4. (see Appendix A11c, A11d and A11e).

Therefore, as shown in Figure 6.4 – Electrolux Competitive Advantage Chart, we conclude that Electrolux's current competitive advantage is very low, in fact a global score just equal to 0,159 (in a 0 to 1 scale). In a deeper analysis we observe that the company just have competitive advantage in 7 indicators, and only 4 of them represent a significant advantage (three with 100% of accuracy, namely EBITA per employee, ROA and Deb-to-assets; and % of Recycled Material used as Raw Material Input however with some related uncertainty). It is important to highlight that concerning to Corporate Behavior driver there is no advantage at all and the best score obtained is in Technological Alignment.

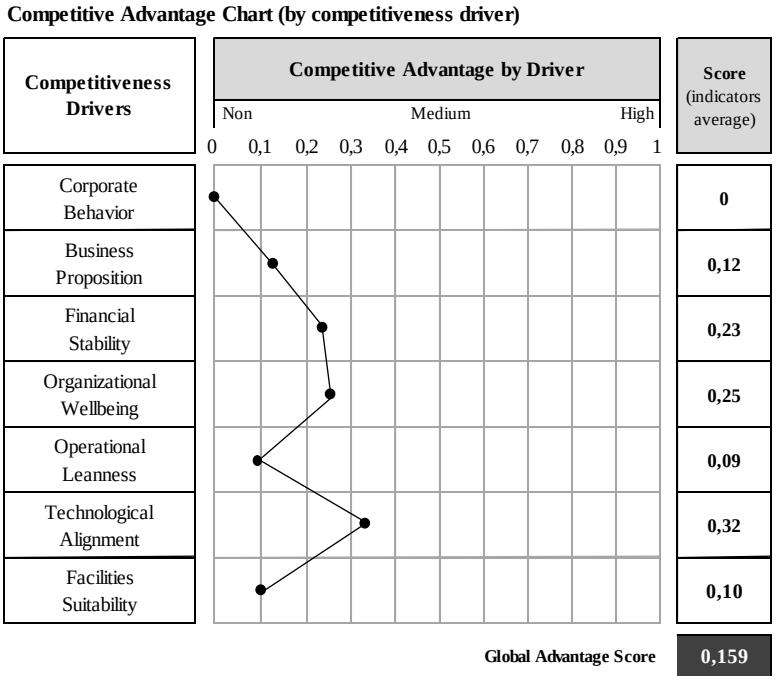


Figure 6.4 – Electrolux Competitive Advantage Chart

6.2.1.3 Competitiveness Risk results

Concerning Electrolux's exposure to market context, the results show that the company has a medium risk. Through the scores presented in Figure 6.5 we conclude that, in spite of the high rivalry among the existing companies, customer's power and the threat of substitute products represent the major risks. This can be explained by the economic sector's specific nature in which Electrolux operates. Other interesting conclusions are the difficulty for a new player to enter into this sector and the solid supply chain, which can be explained by the sector's maturity.

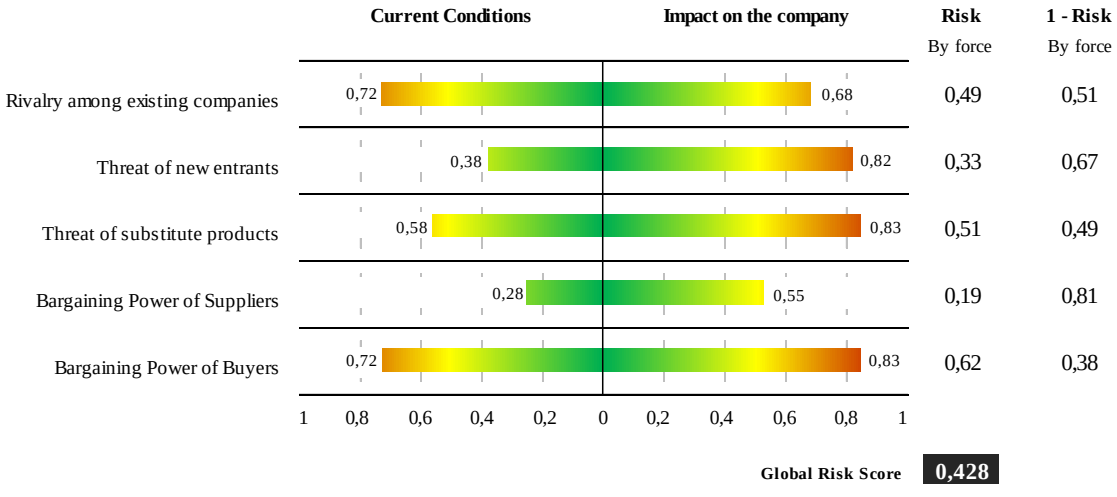


Figure 6.5 - Electrolux Competitiveness Risk Chart

The results shown in the figure above reveal that Electrolux Competitiveness Risk is 0,428 (in a 0 to 1 scale), which correspond to the average score of this evaluation component – see calculation details in Appendix A11f.

6.2.1.4 Real Competitive Strength

With the calculation of the SuCEESS's three evaluation components scores we finally are able to find out Electrolux ranking, and therefore obtain its Real Competitive Strength (RCS). Taking into account the scores of

Table 6.4 and the following expression to calculate RCS:

$$\textit{Real Competitiveness Strength (RCS)} = \frac{CP + (CA\ x\ (1 - CR))}{2}\ x\ 100$$

Table 6.2 - Electrolux Real Competitiveness Strength score

Evaluation components	Scores
Competitiveness Positioning (CP)	0,770
Competitive Advantage (CA)	0,159
Competitiveness Risk (CR)	0,428
Real Competitive Strength (RCS)	**43,05%**

We conclude that the Real Competitiveness Strength of Electrolux is 43%, which is a low value. However, we assume that this rank is strongly influenced by the Competitiveness Advantage score, due to its unreliable data.

6.2.1.5 Sustainable Competitiveness Value Chain

According to 4 A's Cycle (see Figure 5.16), after the company's Real Competitiveness Strength calculation, it is time to apply another approach, namely the Sustainable Competitiveness Value Chain.

In fact, according to the relationship established between the different elements of this value chain and the Sustainable Competitiveness Model's components, as well as the respective scores calculated in terms of this relation (see Appendix A11g to A11l), we obtain the Electrolux's Sustainable Value Chain, as shown in Figure 6.6.

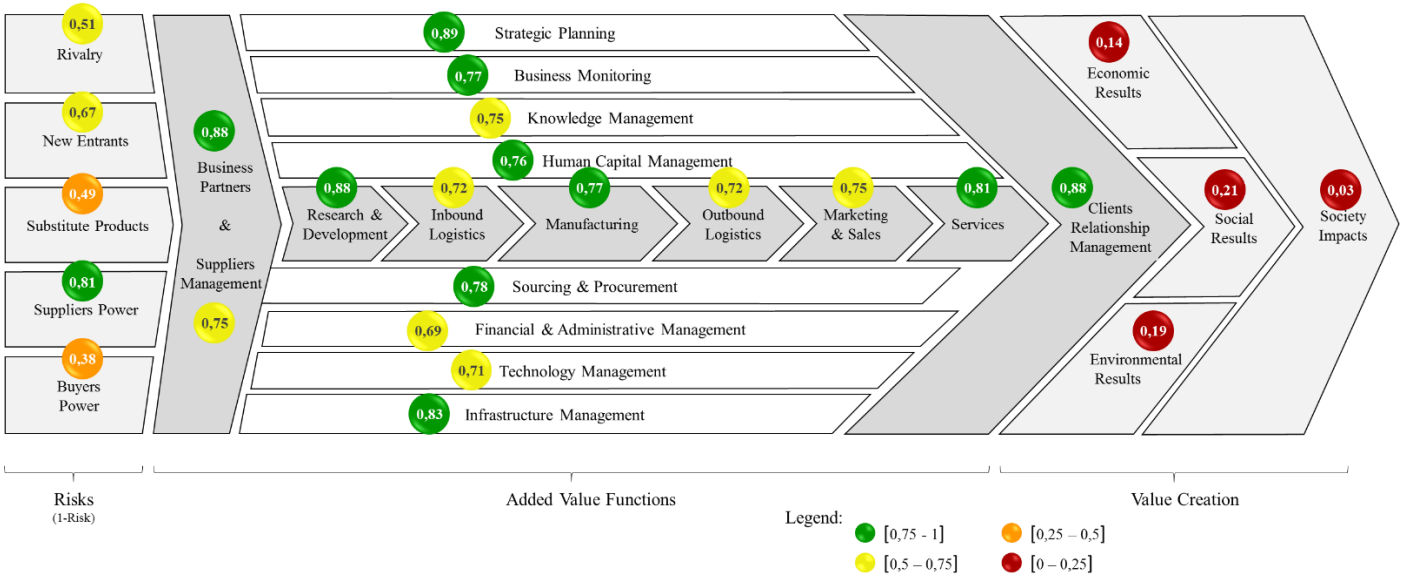


Figure 6.6 - Electrolux Sustainable Competitiveness Value Chain

The analysis of the value chain above reveals that the main stream of the core business of the company has good resilience and innovation scores, though some improvement opportunities concerning suppliers' management, inbound and outbound logistics, as well as marketing and sales should be taken into account. Therefore, it is possible to conclude that its focus is on the establishment of business partners, research and development, manufacturing and on service delivery and client relationship. These conclusions make sense due to the nature of this specific sector, where a consistently practice of product innovation is needed (where the time-to-market is a crucial factor), where de business margins are low and where the differentiation is made by the quality of the service provided and the way you promote strong relationships with your clients.

Regarding management functions and support activities we pointed out knowledge management, financial and administrative management, as well as technology alignment has issues to address. About risks and value creation subjects, improvements to be held were already mentioned, but through this value chain they get highlighted.

6.2.1.6 General considerations

The results achieved by the application of the SuCEES evaluation framework at Electrolux, revealed that, in spite of its Real Competitive Strength (RCS) ranked with 43% - which is a medium value that do not correspond to its real value, because of the Competitive Advantage score obtained – the company is considered sustainable competitive with high standards of practices and performance.

According to Appendix A11a we observe that, concerning Resilience, the Severity Responsiveness parameter score (equal to 6,62) is a little bit higher than Recovery Time (equal to 5,54). In fact, regarding Severity Responsiveness, about 54% of its evaluation criteria where scored with 7 (very high) or 8 (extremely high), fifteen criteria and eight respectively. Nevertheless, Internal ICT Customer Satisfaction criteria was the lowest score (4 = medium; once the company argue that its practice "*is not on a high level but has been progressively increasing over the years. IT has been modernizing it platforms and equipment. Electrolux is now moving into SAP HANA that gives faster seep and less downtime*) and other five were scored with 5 (slightly high), namely: Governance Principles, Accountability, Profitability and Production and Service Planning. About Recovery Capability, Electrolux scored 53,5% of the evaluation criteria with 6, 7 or 8, considering their practices as Best in Class/ Reference for other or as Cutting Edge/ Driving Continuous R&D (where Responsibility Management and Environmental Management where scored with 8). However, 25% of the evaluation criteria were scored with 4 (considered as Common practices/ legal obligations).

In terms of Innovation (see Appendix A11b), we conclude that 88% of Intensity Enabler's evaluation criteria were considered very high or extremely high (score = 7 or 8) and the rest of them high (score = 6), in concrete: Wisdom Deployment, Talent Search and Retention and Facilities Security Innovation. Concerning Advance Sustention, 62,5% of the evaluation criteria were assumed as being supported by practices considered Best in Class/ Reference for Others or nearly as Cutting Edge/ Driving Continuous R&D (therefore with a score = 6 or 7). Nevertheless, the above scores, it is important to underline that Entrepreneurship was scored with 3, which means that this issue is based on practices that are recognized between Unknown Practices/ Internal Solutions and Common Practices/ Legal Obligations (in fact, its platform *"iJam is sponsored by the Innovation Triangle - Marketing, R&D and Design - and will funnel ideas from employees into the Innovation Activation pipeline at Electrolux. It is designed to harness the creativity and innovation of Electrolux employees*", still in progress).

As mentioned before Competitive Advantage was the component that leads Electrolux to a lower global evaluation. If we analyze more in detail, we observe that none of the seven Competitiveness Drivers had totally fulfilled its impact indicators. The best that was achieved was 80% of Technological Alignment's indicators, 70% of Financial Stability's indicators and 66,7% of Organizational Wellbeing's indicators. Corporate Behavior was the lowest driver with just 20% of its indicators fulfilled and had no advantage at all in comparison with their direct competitor. The above explains the Electrolux's lowest performance in Corporate Behavior (score = 0) and its best performance in Technological Alignment (nevertheless with a very low score = 0,32, under a medium evaluation).

Regarding to Competitiveness Risk, Electrolux considered five risk criteria as totally true (score = 8). In concrete, they assume that there is a low Differentiation Among Industry Companies, regarding products and services; the Access to Substitute Products is easy; Other Ways to Provide the Same Value is High (technology innovation); the Number of Buyers Relative to Sellers is low and Buyers Switching Costs to Another Supplier are low. However, only the last three have a very high impact on the company's business (score =1).

On the other hand, Electrolux consider that Initial Capital Required to enter into this business is high; Buyers' Brand Loyalty is high; Supplier Uniqueness is low (there is reduced differentiation) and Suppliers Threat of Forward Integration is low (due to the score = 0). As a conclusion, regarding to the nature of its market environment Electrolux has a medium competitiveness risk.

Concerning the application of the Sustainable Competitiveness Value Chain it was an opportunity to test its suitability and if a more visualized way to present all influencing factors in an integrated view would be an added value. In fact, it was considered a tool able to recognize where efforts should be focus on.

6.2.2 Visteon results and considerations

The application of SuCEES's evaluation framework on Visteon was a positive experience (see data collected on Appendix B7), which allow the validation of the system's tools and generated interesting findings.

6.2.2.1 Competitiveness Positioning results

After applying the Competitiveness Positioning Score Sheets, and through the use of the system's evaluation framework tools (see Appendix A12a and A12b), we conclude that Visteon Portugal can be considered a *High Competitiveness Performer*.

The company has a good score for this positioning (5,7; 5,4), as well as a good balance between Resilience Capacity and Innovation Ability. Considering the maximum score that a company can reach (112), their still opportunities for improvements, once Visteon's total score is 77,67 (see Figure 6.7).

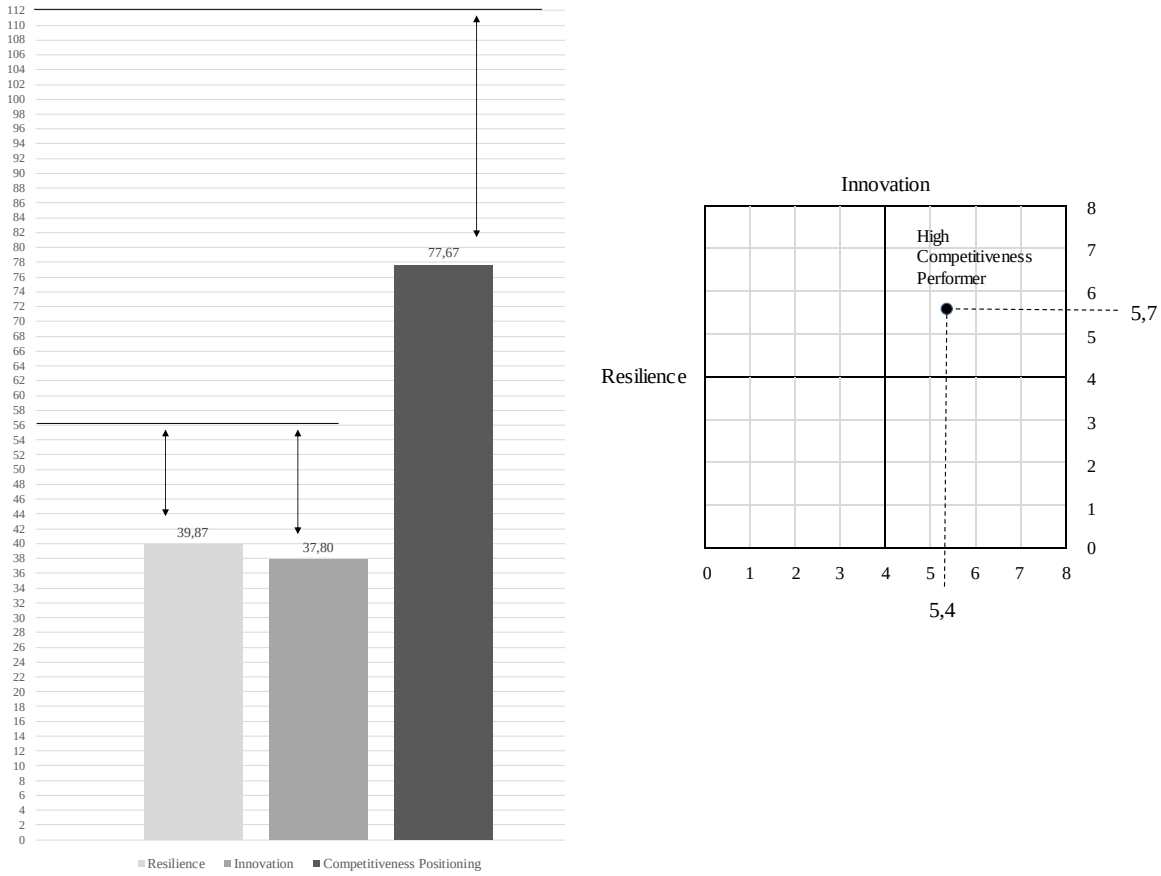


Figure 6.7 - Visteon Competitiveness Positioning Matrix and global score

If we analyze the two competitiveness dimensions considering each Competitiveness Drivers' scores, we identify that concerning Resilience there is space to adopt practices to enable a better Technological Alignment. About Innovation, besides the driver Technological Alignment once again, also Financial Stability is a driver where improvements can be made. Nevertheless, at a global point of view, Business Proposition is another driver that should be focus of attention (see Figure 6.8).

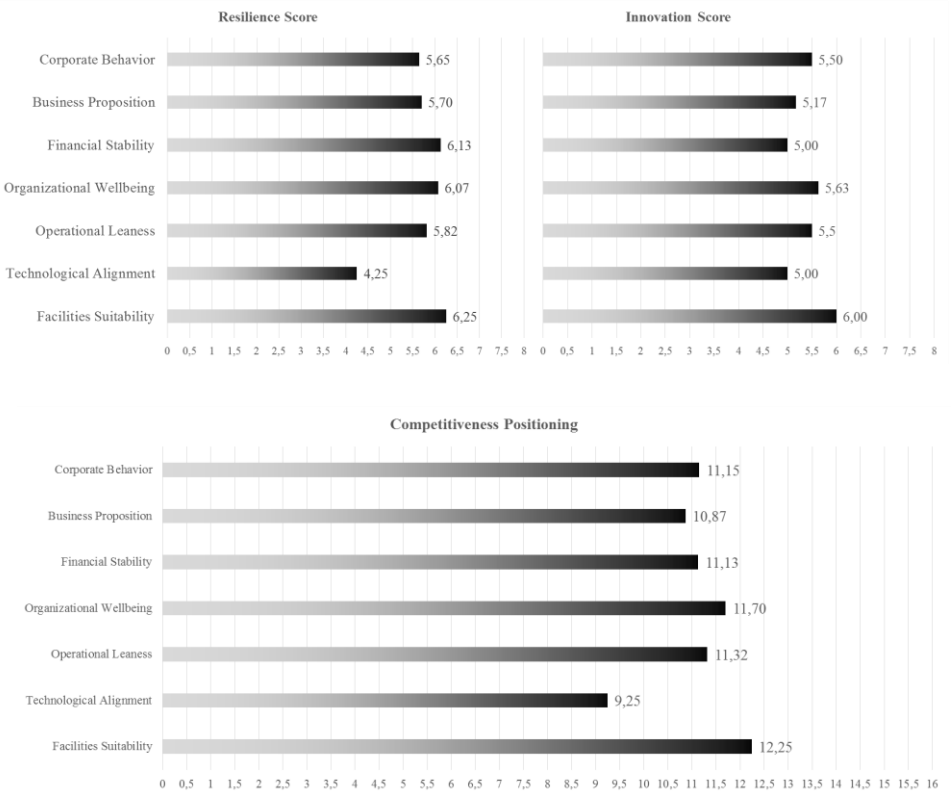


Figure 6.8 - Visteon Competitiveness Positioning Chart (by driver)

In a deeper analysis, taking into account the results exposed through the Competitiveness Diamond (see Figure 6.9), Visteon has a high Severity Responsiveness (a long preventive time regarding disturbances) and also a high Intensity Enabler (a short innovation time). However, the company should increase its innovation protection time through the improvement of Advance Sustention parameter, as well as increase its recovery capability.

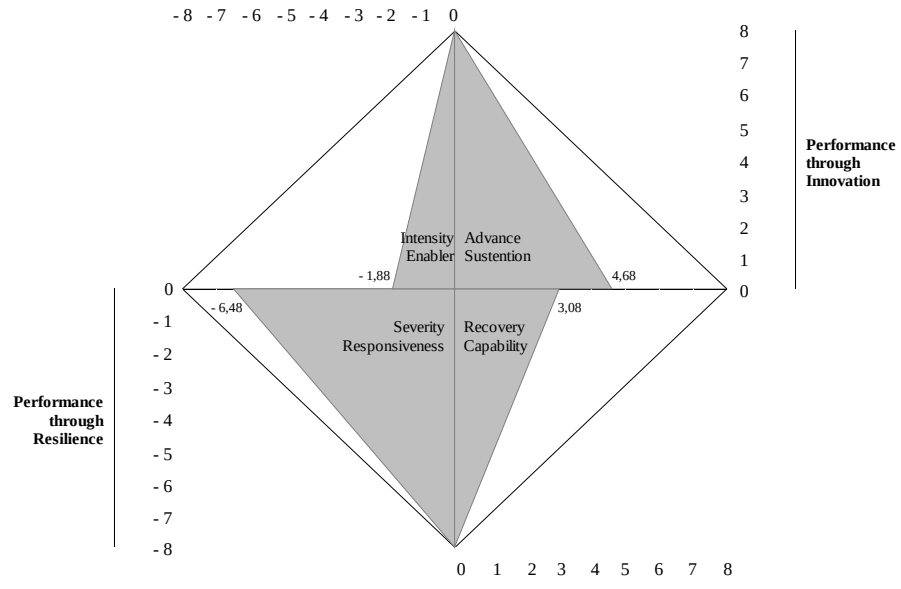


Figure 6.9 – Visteon Competitiveness Diamond

Has a result of this evaluation component the final score of Visteon (in a 0 to 1 scale) is 0,693, as shown in the following table.

Table 6.3 - Final Visteon Competitiveness Positioning Score

	Resilience			Inovation			Competitiveness Positioning		
Drivers	**By Driver**	**Average**	**0 to 1 scale**	**By Driver**	**Average**	**0 to 1 scale**	**By Driver**	**Average**	**0 to 1 scale**
Corporate Behavior	5,65			5,50			11,15		
Business Proposition	5,70			5,17			10,87		
Financial Stability	6,13			5,00			11,13		
Organizational Wellbeing	6,07	5,69	0,71	5,63	5,4	0,675	11,70	11,09	**0,693**
Operational Leaness	5,82			5,5			11,32		
Technological Alignment	4,25			5,00			9,25		
Facilities Suitability	6,25			6,00			12,25		
Totals	**39,87**			**37,80**			**77,67**		
	Resilience			Innovation			Competitiveness Positioning		

6.2.2.2 Competitive Advantage results

Similarly, to what happened in the assessment of Electrolux's competitive advantage, also in Visteon were significant limitations in the scoring of this evaluation component. In fact, we cannot assume Visteon's Competitiveness Advantage results entirely reliable, due to the following major reasons (cause being a manufacturing unit of Visteon Corporation):

- About 20% of the system's impact indicators (12 in 62) were considered Not Available (NA), either assumed as confidential or not measured at all by the company; and
- It was not possible to obtain the direct competitor's values for each impact indicator considered.

According to the above, Visteon's Competitive Advantage evaluation, on one hand suffered a significant penalty caused by the average score calculation (because the evaluation method to obtain the average value, always considers all 62 indicators assuming that the company should have measured all of them, once all indicators are important to support the Sustainable Competitiveness Model, as already mentioned before in Electrolux's case study). On the other hand, with the purpose of not over penalizing this evaluation component, as well as to counteract the other effect mentioned before, not knowing the direct competitor's indicators values implied the assumption of an advantage coefficient equal to 1 (which means that we scored Visteon with the maximum score). However, we adopt a correction factor of 0,4, considering the fact of

uncertainty. These assumptions were important to consider, otherwise Visteon's final score of Competitive Advantage would be equal to zero, since when considering that, the company has no better performance than its direct competitor at any indicator, therefore the advantage coefficient would be equal to zero (see Appendix A12c, A12d and A12e). So, as shown in Figure 6.10, we conclude that the company current advantage is very low, where only Corporate Behavior should be highlighted due to its even lower performance and Financial Stability as well as Facilities Suitability for having the higher score (0,4), which means that at Visteon all impact indicators of these two competitiveness drivers are available.

Taking into account the exposed performance, as a result of the current indicators' values and the assumed assumptions, Visteon's global advantage score is 0,319 (in a 0 to 1 scale). It is possible to conclude that Visteon's evaluation benefit in comparison with Electrolux's due to the adopted assumption, because regarding indicators where Electrolux scored its direct competitor had always lesser performance then Visteon.

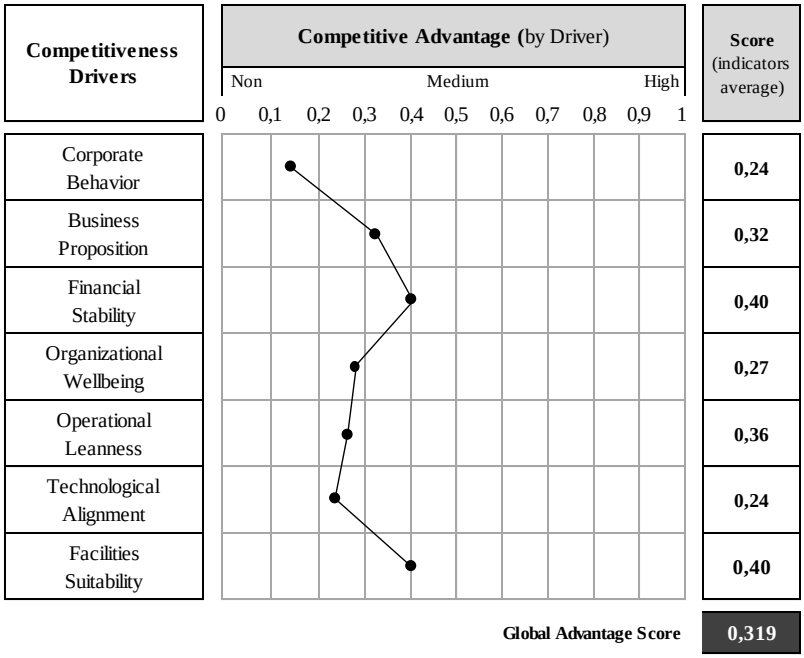


Figure 6.10 – Visteon Competitive Advantage Chart

6.2.2.3 Competitiveness Risk results

Visteon presents a very low risk concerning its exposure to market context. This can be related to the fact that the company has, in some way, a kind of protection belonging to a wide world corporation, which is its direct client.

According to Figure 6.11 we conclude that the Threat of Substitute Products represents the higher risk and the entrant of new players is in fact difficult.

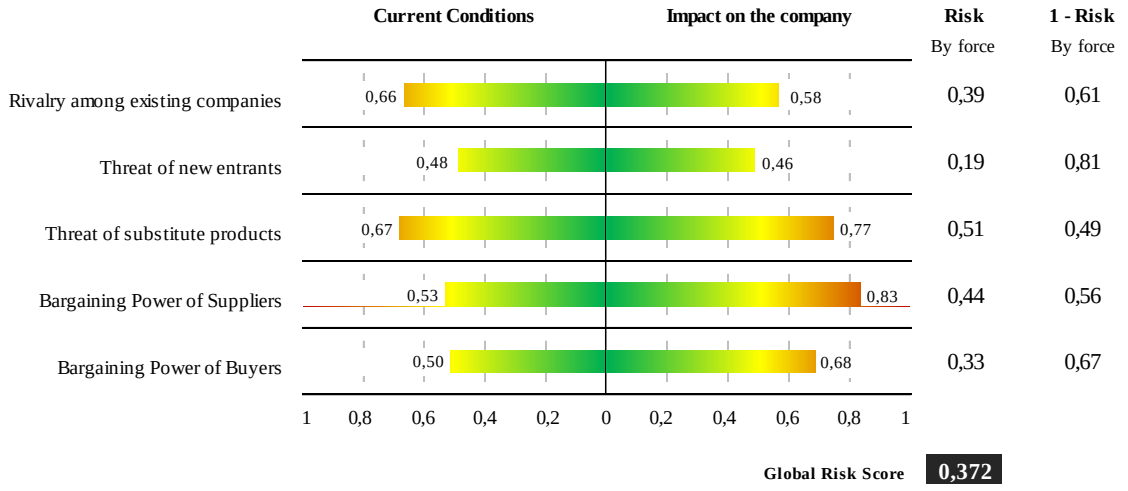


Figure 6.11 - Visteon Competitiveness Risk Chart

Considering the score average of this evaluation component, Visteon's Competitiveness Risk is 0,372 (in a 0 to 1 scale) – see calculation details in Appendix A12f.

6.2.2.4 Real Competitive Strength

With all the three evaluation components scores calculated we finally are able to find out what is the Visteon's ranking, regarding its Real Competitive Strength (RCS). Taking into account the scores of

Table 6.4 and the following expression to calculate RCS:

$$\textit{Real Competitiveness Strength (RCS)} = \frac{CP + (CA\ x\ (1 - CR))}{2}\ x\ 100$$

Table 6.4 - Visteon Real Competitiveness Strength score

Evaluation components	Scores
Competitiveness Positioning (CP)	0,693
Competitive Advantage (CA)	0,329
Competitiveness Risk (CR)	0,372
Real Competitive Strength (RCS)	**44,98%**

We conclude that the Real Competitiveness Strength of Visteon is 45%, which is a low value. However, we assume that this rank is strongly influenced by the Competitiveness Advantage score, due to its unreliable data.

6.2.2.5 Sustainable Competitiveness Value Chain

According to 4 A's Cycle, after the company's Real Competitiveness Strength calculation, it is time to apply another tool, namely the Sustainable Competitiveness Value Chain (see Figure 5.16).

In fact, according to the relationship established between the different elements of this value chain and the Sustainable Competitiveness Model's components, as well as the respective scores calculated in terms of this relation (see Appendix A12g to A12l), we obtain the Visteon's Sustainable Value Chain, as shown in Figure 6.12.

The analysis of the value chain above reveals that the main stream of the core business of the company has good resilience and innovation scores, though some improvement opportunities concerning supplier's management, research & development and services.

This scores can be justified by Visteon's mission (focused on production), once it is a manufacturing unit of Visteon Corporation. Nevertheless, being also a Customer Center its services should have a better score.

Regarding management functions and support activities we pointed out knowledge management, sourcing & procurement and technology alignment has issues to address.

About risks and value creation subjects, improvements to be held were already mentioned, but through this value chain they get highlighted.

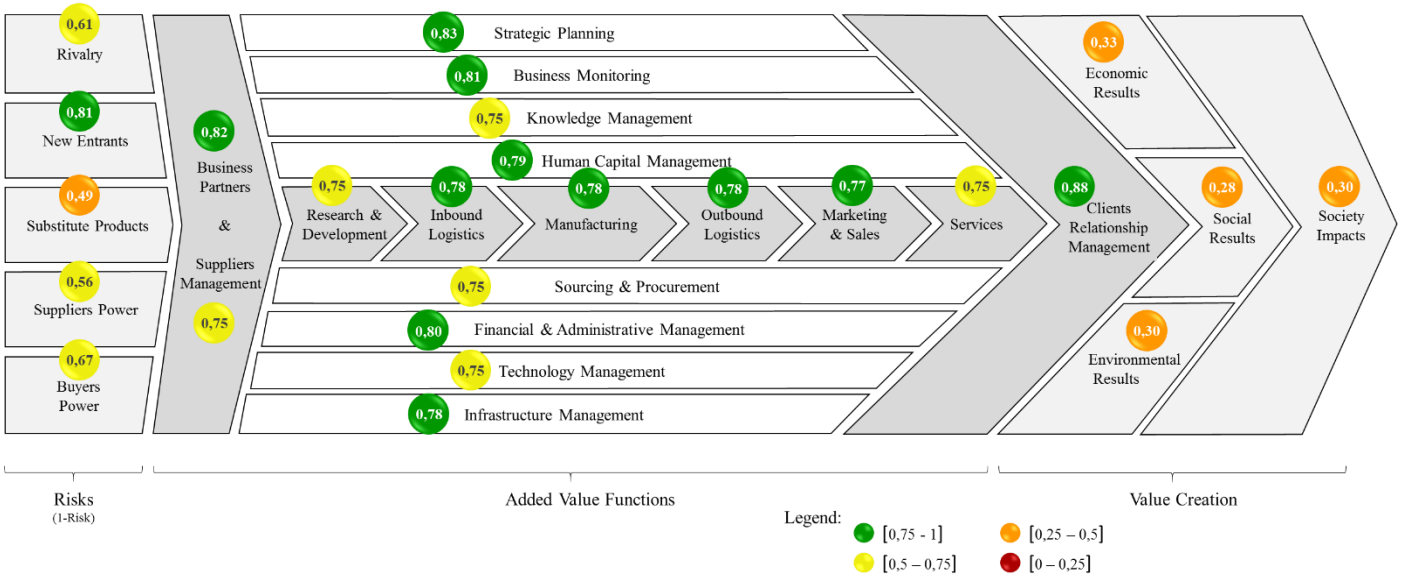


Figure 6.12 - Visteon Sustainable Competitiveness Value Chain

About risks and value creation subjects, improvements to be held were already mentioned, but through this value chain they get highlighted.

6.2.2.6 General considerations

The results achieved by the application of the SuCEES evaluation framework in Visteon, revealed that, in spite of its Real Competitive Strength (RCS) ranked with 45% - which is a medium value it does not correspond to its real value, because of the Competitive Advantage score obtained – the company is considered sustainable competitive with high standards of practices and performance.

Regarding Resilience (see Appendix A12a) we observe that Visteon's lower score concerning Severity Responsiveness parameter was 6 - equal to High - (about 53,5% of the evaluation criteria had this score, so the rest of them were assumed as very or extremely high). Considering Recovery Capability, the company has a very significant number of evaluation criteria with practices considered Common Practice/ Legal Obligation (score = 4), which can be explained due to automotive industry's demands. It is also relevant to observe that Technological Alignment was the competitiveness driver with the poorest score, particularly in ICT Services, where Help Desk/ Service Provision and Business Continuity was scored with 2 (because there is *"no help desk service available"* in Portugal, it is provided by the Corporation) and Internal ICT Customers Satisfaction assumed as Inexistent (score = 0).

Innovation dimension had a similar evaluation than resilience (see Appendix A12b), however we conclude that 83,3% of Intensity Enabler's evaluation criteria were considered high (score = 6) and the rest of them very high (16,7%). Regarding Advance Sustention parameter, the lowest score was 0,4 (in fact two thirds of the evaluation criteria were assumed Common Practice/ Legal Obligation and just 16,7% considered Best in Class/ Reference to Others).

As mentioned before Competitive Advantage was the component that lead Visteon to a lower global evaluation. If we analyze more in detail, we observe that only Financial Stability and Facilities Suitability have 100% of their indicators fulfilled, and Operational Leanness had 91%. On the other hand, 40% of the impact indicators of Corporate Behavior and of Technology Alignment were considered Not Available.

It is interesting to observe that Visteon considered only one risk criteria as totally true (score = 8), assuming that in terms of Rivalry Among Existing Companies there are a Large Number of Competitors in the Industry. However, according to Visteon's opinion it doesn't cause a serious impact to the company (score = 0,6). On the other hand, Visteon assume that in spite of the high impact on the company that Access to Industry Local Raw Material has (score = 1), it doesn't represent a threat to new entrants in the market (risk score = 0), because in Visteon's opinion getting industry raw material locally is totally false (current situation score = 0). Still regarding risk evaluation, just another one criteria is worthy of reference, namely regarding Bargaining Power of Suppliers. Despite the high impact of Suppliers Profit Margins on Visteon's business (score = 1), the current situation is medium (score = 4), therefore the real risk is also medium (risk score = 0,5). As a general conclusion we can assume that Visteon has a low competitiveness risk.

As mentioned in Electrolux case study, also in this case Visteon's Sustainable Competitiveness Value Chain was considered a tool that gives an integrated vision about the way the company is managing its resources, creating value and exposed to external risks.

6.3 Chapter Highlights

The case studies were very useful not only to validate the suitability of the SuCESS's evaluation framework, but also to identify constraints and limitations, as well as to obtain feedback from a real business context about two different economic sectors' companies with high positioning in worldwide markets. These applications allow the definition of adjustments, improvements and the identification of further research opportunities. It also promotes the understanding in what way it could be applied in different companies' environments and scopes (eg. multinational

companies that have headquarters or shared services in one country and their manufacturing units spread all over the world – in an aggregated way? In comparison between manufacturing units? and so on).

It is important to highlight that both companies are entirely responsible for the scores given. They justify their evaluation based on the practices used at Electrolux and Visteon, which constitute the corresponding evidences that satisfy the requirements of the linked proficiency level. Several contacts were established with both Focal Points to clarify some statements, arguments and practices used (see Appendix B6 and B7), with the purpose to increase the scoring reliability. It allows to conclude that this kind of auto-evaluation can introduce some subjectivity to the evaluation process, if not applied seriously).

Therefore, concerning the evaluation of Competitiveness Positioning, the creation of a data-base of business and management practices linked to specific proficiency levels (one for resilience and other for innovation), properly adopted to specific economic sectors, and would be a way to minimize this potential source of subjectivity. Additionally, the definition of standardized evaluation procedures used by external qualified (and eventually certified) evaluators (owners of a certain profile – " a kind of auditor skills", with specific training in Sustainable Competitiveness Model as well as in SuCEES), could also be a way to assure more sense of criticism, impartiality and standardization, increasing the reliability of results.

Regarding Competitive Advantage evaluation component, we conclude that it can be considered the most difficult to apply. Two reasons can be pointed out as possible justifications for this conclusion, namely:

- Some of the model's indicators are difficult to obtain, because they are composed indicators not commonly used and without structured and reliable data available; and
- It is difficult to obtain competitors reliable data, especially regarding non-financial or non-commercial indicators (because only these have some data published as a legal obligation). Getting information about the rest of the indicators implies investigation and research through other channels (enterprise strategic intelligence).

Yet on this evaluation component, we also conclude that the assumptions made (due to lack of all the necessary data and for illustrative purposes to assure the overall applicability of the Competitive Advantage assessment), have great impact on the final results of the score. In fact, we observed that Electrolux scored fewer indicators than Visteon, however showed values of its direct competitor for some indicators. Therefore, presenting a more accurate evaluation, Electrolux was hurt because the evaluation had in consideration the real current advantage

circumstances and applied the uncertainty factor assumed by the company, based on its perception, for each of the direct competitor value (in many cases with a score lower that 0,4). This situation gives a higher performance to Visteon because for all indicators scored it was assumed that the company had totally advantage (score = 1) and applied an uncertainty factor equal to 0,4. This leads us to conclude that the application of this evaluation component requires high accuracy and to assume that when there are no data about the direct competitor the score of those indicators must be zero (which means that it is assumed that the company has no competitive advantage regarding its direct competitor). It is expected that the effect of this act will stimulate companies to research and get more knowledge about their competitors' performance.

About Competitiveness Risk, the case studies show that once again the scope of the model's application and the economic sector in which the company acts, have direct and relevant impact on results and therefore on conclusions. It is also interesting to underline that taking into account the definition of risk, for further research it might make sense to consider (in the risk calculation expression), the probability of current conditions' change.

Despite the differences between the two case studies, both companies had a similar Real Competitive Strength rank (Electrolux = 43% and Visteon = 45 %) which means that there is a compensation between the three evaluation components, reinforcing the importance to clearly define the scope of SuCEES implementation and to design specific models for each economic sector (because they are not comparable due to the amount of specific variables). This aspect is even more important when to attend benchmarking purposes. This conclusion is an opportunity to improve the system, therefore considered an issue for further research (see Chapter 7.4).

Additionally, although the Sustainable Competitiveness Value Chain's application was outside the scope of the case studies (because it is one of the execution framework's tools), through the results obtained in the evaluation process, it was possible to design the respective companies' chains. The application of this tool was a step ahead on the 4 A's Cycle that allow testing its suitability and promote a more visualized way to present all influencing factors in an integrated view, conforming its value added and its usefulness to support better (more focused and robust) and quicker (on-time) decisions.

In summary, after the above findings and conclusions we are able to assume that the Sustainable Competitiveness Model and SuCEES are added value approaches that contribute to companies' competitiveness increase and are a helpful way to support management to do so. However, they are demanding and require a strong commitment of the board, as well as a significant effort and engagement between and among the management team.

Nevertheless, the positive and grateful conclusions, it is very important to consider the Focal Points' feedback and recommendations, which gave a clear understanding about the need to adapt the system to less mature companies, meaning the introduction of less demanding requirements and less complex indicators, as well as the need to design dedicated systems' for specific economic sectors (as transposed in the following testimonials).

Electrolux

> Is a strong and comprehensive business evaluation model to be applied in complex environment, where a deep analysis of the enterprise value chain needs to be employed. The split between the two key perspectives (innovation and resilience) gives a different and innovative approach from the traditional value chain evaluation and gap analysis methodologies. This enables a simplified way, and still relevant and meaningful, to understand the results, while ensuring the right detail level on the different criteria maturity levels that can result in clear action points. Moreover, the fact that the full result can be translated into a simple visual representation give a strong impact when communicating to executive teams.
>
> One suggestion would be to have a shorter version of the model, focused on the fewer criteria, risks, indicators, that could be used on a high-level analysis.

Visteon

> **The Sucess process is a easy and helpful process for companies .**
>
> **It is a good process but still needs validation with more companies in different industries.**
>
> **Not sure it it could be applicable for small companies.**

Underlines

SuCEES was validated through two case studies.

The scope of the case studies was the evaluation framework of SuCEES.

The case studies were done in two companies from different economic sectors and cultures that fulfil the system application's requirements (Electrolux Poland and Visteon Portugal).

While data collection to evaluate CP, CA and CR some information was not shared because it was considered confidential or not available (the evaluation process scored this cases with zero – assuming that the indicator does not exist – is comparable to the situation where a company does not use the item, therefore the system assume that as a "punishment")

It was possible to confirm that the current version of SuCEES is not suitable to compare companies from different economic sectors, and that companies' culture can also be a relevant factor that influences the correct implementation of the system.

The results achieved prove that SuCEES's tools can be successfully applied and that are opportunities for adjustments and improvements, namely to adapt less demanding requirements and less complex indicators to be suitable to companies with lower business maturity.

The analysis of the results by the use of the system's charts and other approaches proved to be helpful to management teams to take conclusions and define better decisions, being a strong support to increase companies' competitiveness.

An important conclusion is that SuCEES to be a fully added value and a reliable instrument for benchmarking, needs to be applied with total honesty, appropriate indexation between evidences (practices used) and proficiency levels, and accurate data and precise information about indicators and direct competitor's performance, which implies unconditional commitment of the Board and high responsibility and transversal engagement of top management.

7 Final Conclusions and Recommendations

The purpose of this chapter is to introduce the main conclusions of this research considering the initial objectives and hypothesis defined. It shares several recommendations according to the findings, which result from experts' opinion and the two case studies developed.

Finally, it also presents a few opportunities for further research and studies that can be conducted in an academic and a business point of view.

7.1 Thesis Overview

As an overview of this research it is relevant to share that not always things happened the way we expect or wanted.

Identifying the research aim and scope; establishing the hypothesis; defining and redefining assumptions; merging models, approaches and concepts as well as designing tools and templates; involving experts, conducting cases studies and obtaining data to validate outcomes and summarize conclusions, was challenging.

Nevertheless, it is also grateful when the final outcome is considered useful, suitable, differentiator and an added value for the real business environment and also for academic purposes.

The research revealed to be more complex and related with so many themes than previously ever thought. Even so it was possible to focus on the problem and provide a model and a system, which are a real contribution to support companies on their competitiveness increase journey.

The research methodology adopted was an appropriate reference for the dissertation development. Nevertheless, some little adjustments were needed, however without relevant impact on the research workflow.

The following Figure 7.1 illustrates the research methodology used, considering the stakeholders involved, the several activities required, the methods applied and the results obtained by each activity. It is of interest to highlight that the below figure is already an up-date from its initial version, once that in the research's early moments there were no idea that it would be needed a

Monitoring Readiness Evaluation Approach, which was identified later on by the research's experts.

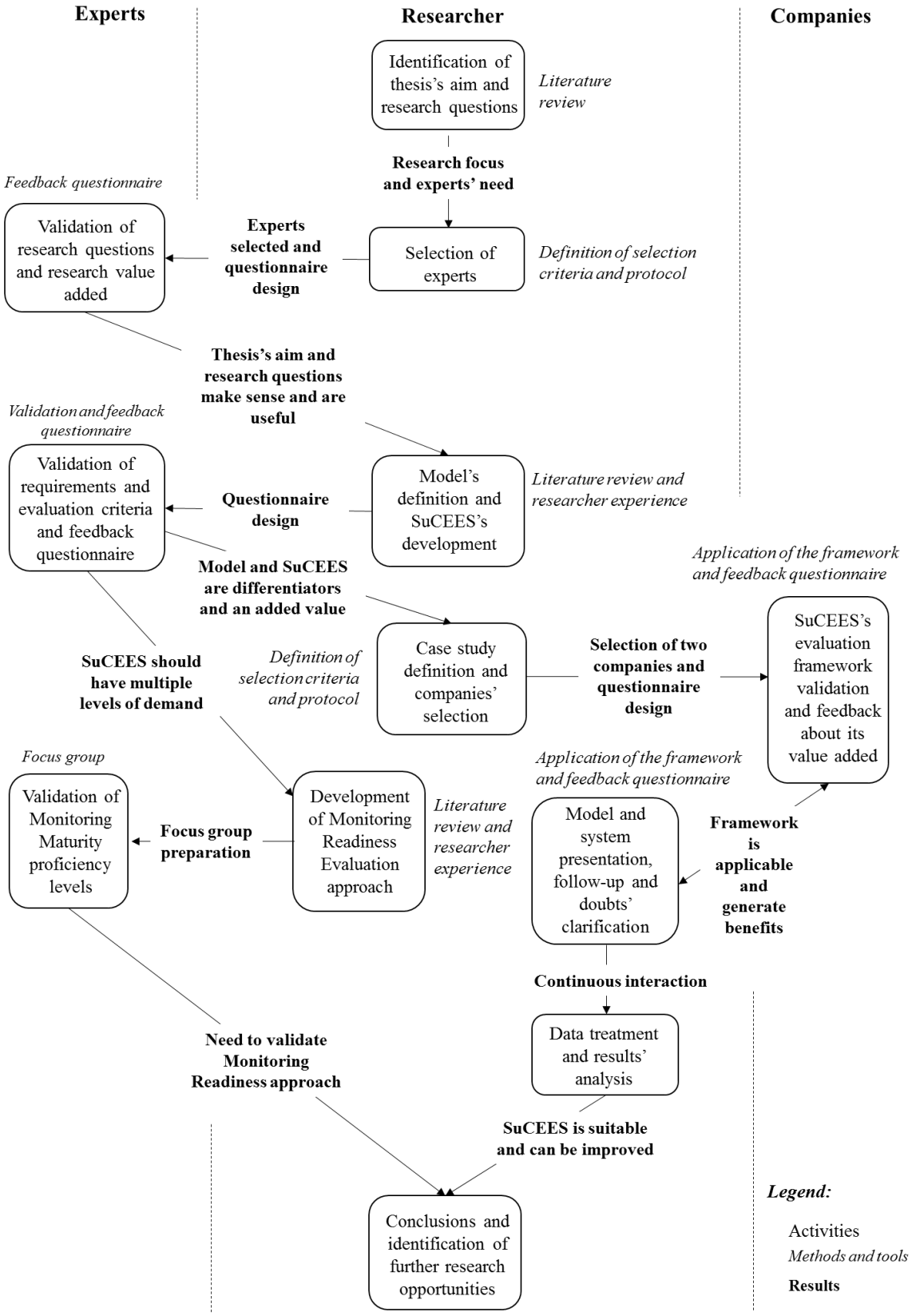


Figure 7.1 - Research overview

The development of the above activities allows the design of SuCEES (Sustainable Competitiveness Evaluation and Execution System), which includes the evaluation of companies' sustainable competitiveness, based on an alternative concept, and integrates the strategy execution by the application of tools able to transpose strategic objectives into operational actions, as well as capable to control actions implementation.

Thus, SuCEES is a system grounded on the 4 A's Cycle and based on the Sustainable Competitiveness Model. Its evaluation framework implies the assessment of companies' competitiveness positioning (by scoring their resilience capabilities and innovation ability - considering proficiency levels of requirements for seven competitiveness drivers), their competitive advantage (by scoring the comparison between the company's own performance and their direct competitor – based on indicators regarding economic, social and environmental results), and their risk of losing that advantage (taking into account Porter's 5 forces).

The result of this evaluation can be translated into a rank (Real Competitiveness Strength) and detailed analysis using four key tools, allow the identification of improvement areas and support the definition of strategic guidelines.

The execution framework starts with the application of the PGF frame, which supports the definition of strategic goals to overcome the fragilities and to fortify the potentialities identified, allowing their transposition into targets and into the actions needed to targets achievement (by the use of strategy maps).

The next stage demands the deployment of these strategy maps into the company's different organizational levels and the control of actions' implementation (in terms of quality, time and costs) and targets' achievement (by the use of execution monitoring charts). Once SuCEES is a system based on a cyclic approach, all this procedure should be replicated on a suitable timeframe to assure continuous knowledge about internal conditions and external dynamics, to establish appropriate initiatives to maintain competitive advantage and to lead competitors (see Figure 7.2).

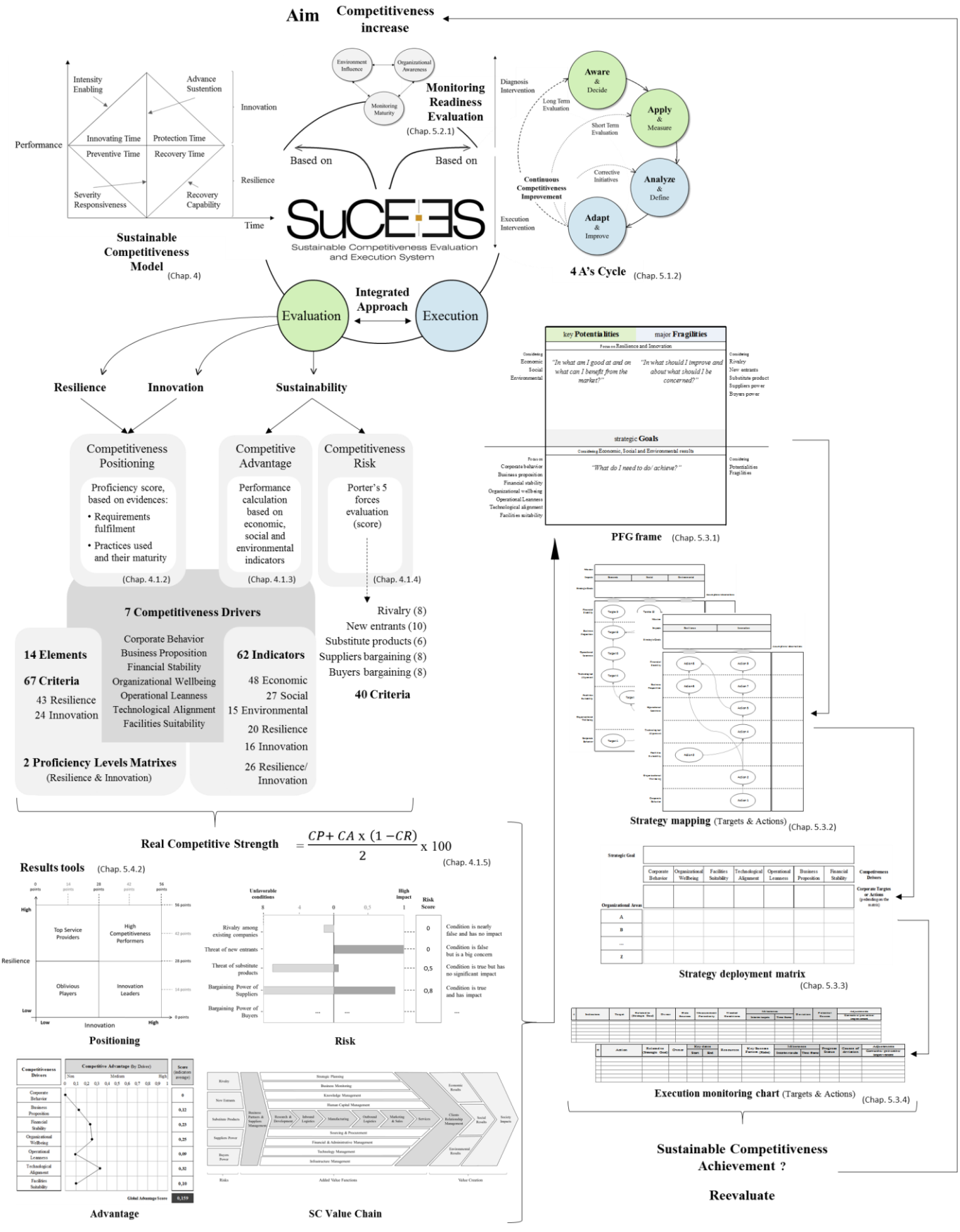


Figure 7.2 - SuCEES global overview

7.2 Conclusions, main results and achievements

Considering the research aim and objectives, hereby we present the main outcomes and results achieved within this dissertation, mentioning if and in what way the research questions defined were accomplished.

First of all it is considered that both research objectives were reached, taking into account that it was possible to create an alternative definition for competitiveness based on new concepts and principles, in concrete the "Sustainable Competitiveness Model", based on resilience, innovation and on the triple bottom line principle of sustainability; as well as to develop an integrated system to support companies' on their strategic planning practices, namely, "SuCEES – Sustainable Competitiveness Evaluation and Execution System", which allow a structured and cyclical approach based on a sequentially application of specific tools (purposely developed for this system) on a logical way. Additionally, this research developed complementary approaches and principles for further theoretical discussion and study, such as:

- Cavaco Wheel – a contribution to a possible evolution of the traditional Vollmann Triangle;
- Strategy Development and Deployment Process (SDDP) – as an alternative definition for strategic planning process (which infers an interpretation of the concept, more related to planning than to execution), being more suitable to SuCEES foundations and to promote awareness to overpass strategic planning failure modes;
- Monitoring Readiness Approach – which was developed due the need to evaluate companies' monitoring maturity to identify the proper SuCEES's application level that suits to their readiness;
- Potentialities, Fragilities and Goals frame (PFG) – as an alternative frame of SWOT analysis; and
- Sustainable Competitiveness Value Chain – as a evolution of Porter's value chain.

Regarding to the research questions, it was possible to obtain favorable answers to nearly all of the questions. Table 7.1 - Research Questions Answer (achievement evidence), presents the evidences that allow concluding about the final achievements.

Table 7.1 - Research Questions Answer (achievement evidence)

#	Research questions	Evidences of achievement
Q1	Is it possible to design an alternative definition of sustainable competitiveness, able to incorporate the concepts of resilience, innovation and sustainability in a logical and integrated manner?	Q1.1 - As shown in Chapter 4.1 resilience (capability to overcome disturbances) and innovation (ability to increase performance) can be assumed as resources that have impact on results, and constitute foundations for competitiveness definition. The merge of resilience triangle (based on severity responsiveness and on recovery capability) with the innovation triangle (based on intensity enabling and on advance sustention) allow the design of the Competitiveness Diamond, which gives a perception of company's competitiveness positioning. Q1.2 - Additionally, sustainability was transposed in the model as a result (performance) dimension. Therefore, it is assumed as the economic, social and environmental impacts caused due to resources' management. This was possible assuming that time dimension is inherent to resilience and to innovation. Joining the above concepts, it was possible to establish a relation between these three concepts and define the "Sustainable Competitiveness Model" Q1.3 - The model is an added value because it allows companies to identify if they are more resilient or innovative (see Figure 4.7 - Competitiveness Positioning Matrix) and if they are generating competitive advantage and what are the major risks of losing it. Both experts and the case study companies agree upon the model's benefit.
#	**Research questions**	**Evidences of achievement**
Q2	Is it possible to create a model that allows objective assessment of companies' competitiveness positioning, advantage and risks?	Q2.1 - The model is based on seven competitiveness drivers (as a result of the analysis of several current evaluation models and tools) which cover all internal fundamental aspects that can influence companies' sustainable competitiveness, and also consider external factors (based on the Porter's 5 forces) to evaluate the companies' exposure to market circumstances (their risk of losing advantage). Based on requirements structured in 8 proficiency levels to score each competitiveness driver in terms of its resilience and its innovation point of view, it is possible to evaluate companies' Competitiveness Positioning (CP). Considering a pool of indicators aligned with the competitiveness drivers, enabling data collection about economic, social and environmental performance, the model allows the evaluation of companies' Competitive Advantage (CA). Q2.2 - Despite the design of the score sheet that permit the scoring of these impact indicators in a comparison way, establishing its calculation through the relation between the company's value and its direct competitor value (generating a perspective of the real existing advantage), both case studies revealed constraints to obtain their direct competitor values. Therefore, it was not possible to completely validate this aspect of the model. It should be an issue to be considered in further research. Nevertheless, levels of SuCEES's implementation without this demanding were design. Q2.3 - As mentioned above the model include evaluation criteria to score companies' risk of losing competitive advantage. Scoring these criteria companies obtain their Competitiveness Risk (CR) score. Both case studies revealed the

		importance of risk evaluation as a way to measure companies' exposure to external issues and their exposure to market dynamics. Q2.4 - Despite the calculation expression of RCS, which involves CP (resources) and CA (results) as well as CR (a sort of adjustment coefficient), establishing a connection between resources and results, it should not be considered as an expression able to establish a relation between these variables, regarding a productivity point of view. Therefore, there is an opportunity for further research on this field and it is assumed that this secondary hypothesis was not totally achieved. Q2.5 - Although all the individual analysis that the model and the system provide, and can be used for benchmark purposes (eg. resilience and innovation scores based on requirements fulfillment and practices used), it is also possible to do comparisons between companies, through the Real Competitive Strength (RCS). This score should be understood as a ranking value. However, benchmarks just are reliable between companies of the same sector and nature, due to its specificity.
#	**Research questions**	**Evidences of achievement**
Q3	Is it possible to build a strategic planning system able to cover the traditional failure modes, combining these alternative concepts of the model and being suitable to the real business context?	Q3.1 - SuCEES is a single, structured, consistent and cyclical system that integrates two fundamental frameworks to support strategy definition and its successful implementation (evaluation and execution). Based on its approach (4 A's Cycle) companies' are able to diagnose their positioning and performance; define their strategic goals, targets and actions; deploy, execute and follow the progress of actions and the achievement of targets, being able to introduce preventive and corrective initiatives in useful time, in case of deviations. Q3.2 - The evaluation framework of SuCEES is totally based on the Sustainable Competitiveness Model (inspired on evaluation models like EFQM, Shingo Prize, GRI, DJSI, as well as in operational approaches like LARG, SCOR, …), and the system as a whole was inspired by other tools such as Porter's value chain and 5 forces, SWOT analysis, PESTLE, BSC, among others). Q3.3 – The case studies conclude that the model and the system can be applied to distinguished contexts (government/ public vs. private sectors; specific economic sectors, including on a personnel perspective – issue for further research), however SuCEES need to be modeled to be suitable to specific particularities. Additionally, for benchmark it is crucial to highlight that it make sense just between companies from the same economic sector, as mentioned before. Q3.4 – Once the scope of the research was delimited to the validation of the SuCEES's evaluation framework (due to the strategic process timeframe of the case study companies', as well as because of confidantial aspects), it was not possible to validate the execution framework. However, the results prove that the system is suitable and useful for companies in a real business context. Nevertheless, the case studies revealed (and some experts involved in the research have the same opinion) that the system is complex and demanding for the majority of companies. Therefore, to satisfy the secondary questions concerning if the system would be a contribution/ encouragement to increase the adoption of strategic planning practices by organizations, we conclude that SuCEES should be unfolded into several application levels with less demanding requirements. Considering this conclusion 6 levels were already defined and provided guidance for their development.

		Q3.5 – It was possible to conclude through the case studies and by the Focal Point's opinion that the success of SuCEES's implementation depends on several factors, which can be overcome through change management, and project management practices, as the system already includes. Q3.6 - Finally, Experts involved in the research and both Focal Points of the case studies share de opinion that SuCEES is a differentiator system; it adds value and generates benefits to companies. It improves the quality of strategy definition and increases focus on action; by clarifying where and how to intervene, identifying needs for resilence and innovation requeriments fulfillment, as well as to adequate targets of indicators; and providing structured and more tangible knowledge about risks enabling. Therefore, SuCEES contributes to rise competitiveness and to reduce bankruptcy exposure.

7.3 Impacts and recommendations

Regarding the conclusions and comments already mentioned, the outcomes of this research are considered a value added for companies, due to its positive business impact and because it allows theoretical developments that can be more explored in further research.

7.3.1 Business impacts and theoretical implications

In fact, according to the experts' global appreciation (see Appendix A1 – results treatment; and B5 – Experts' answers), 94% considered the Sustainable Competitiveness Model an added value or a differentiator concept, and regarding SuCEES 89% considered it applicable to a real business context and the same percentage also agree that the system is a value added to companies' competitiveness increase.

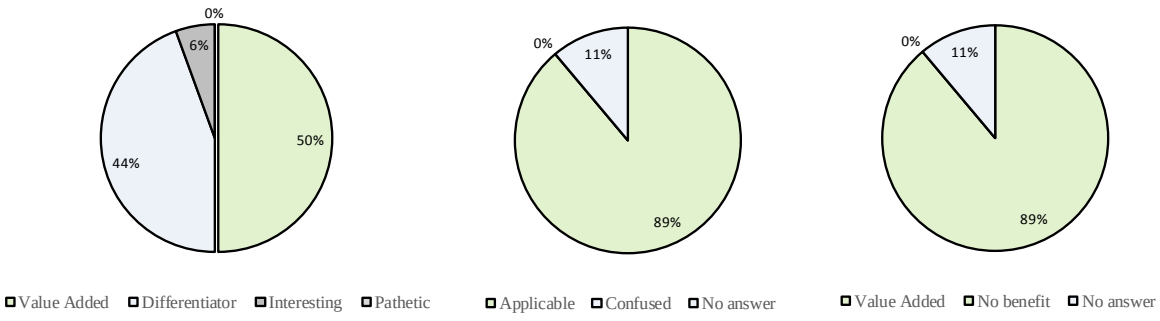


Figure 7.3 - Experts' appreciation about Sustainable Competitiveness Model and SuCEES

Taking into account the case studies and the respective Focal Points' opinion (see A11 and A12 – case studies results treatment; and B6 and B7 – case studies scores), it is also unanimous that SuCEES is suitable, an added value for companies and an approach that contributes to reduce the exposure to bankruptcy, as shown in the following table.

Table 7.2 – Companies' case study Focal Points opinion about SuCEESS

Issues	Electrolux	Visteon
Global appreciation about SuCEES		
Its differentiation regarding other existent models and tools	Relevant	Relevant
Its scope considering the factors that influence competitiveness	Very complete	Comprehensive
Its deepness / detail in terms of measurement	Very complete	Comprehensive
Its suitability to real business context	Applicable with some adjustments	Applicable with some adjustments
Its implementation effort	Very demanding	Demanding
Its added value	Very high	High
Its value added is a result of	· Allow a better evaluation through a more objective measurement · Allow a global view of the company and higher focus where to improve · Allow a better understand of which, when and how to use management tools	· Allow a better evaluation through a more objective measurement · Allow a better integration between evaluation and execution (reduce execution gap)
SuCEES's contribution		
Reduce companies' vulnerability to bankruptcy	High	High -
Support companies to avoid losing and/ or increase their competitiveness	High	High -
Increase companies' awareness about sustainability impacts and its benefits for stakeholders	Very High	High -
Implementation success factors and opportunities for improvement		
SuCEES's implementation success factors are:	· Strong commitment from the Executive Team to dedicate time and resources to make a proper and deep analysis · ICT systems that can provide complex and reliable indicators · Strong intelligence about the competitors	· Easy · Clear · Fast
SuCEES could be improved in terms of:	· Fewer indicators / easier to calculate · Merge of some Evaluations Criteria to ensure mutually exclusiveness	· Adapt the various questionnaires to the different industries and companies

So, we conclude that both the model and the system, are a contribution to increase the awareness about factors that can lead to bankruptcy and to give anticipated information to act preventively, as well as a strong support for companies to guide them on their strategy development and deployment process, causing an impact on their business, through the increase of their sustainable competitiveness. Enabling managers to analyze the company's practices that allow to be more resilient and more innovative; to compare economic, social and environmental indicators with its direct competitor; as well as to be aware of external factors that can affect its market advantage. There are no doubts that it is a consistent and powerful approach to identify where to anticipate and improve, along with what to do and how to do it. Additionally, transposing goals into targets and actions, followed by the control/ monitoring of achievements and executions, companies, their managers and their employees will be more aligned, more responsible and more motivated. The overall result will be more successful companies, increase of social responsibility and environmental commitment, as well as the rise of stakeholders' satisfaction and of society recognition.

Nevertheless, according to the research findings and outcomes' validation, much more research can be done in different domains. Considering that the model and the system themselves are a theoretical contribution to scientific knowledge production, there are other fields to explore, and still opportunities for adjustments and improvements, as well as a long path to cross to make them universally recognized.

7.3.2 Major Recommendations

Despite the benefits mentioned and the recognized added value of the application of SuCEES as a support to Strategy Deployment Processes, it is considered a complex system for the majority of companies, once it demands high levels of monitoring maturity. Therefore, the major recommendation is to simplify the system through the development of several less demanding levels of SuCEES to be suitable to different kinds of companies' development stages (as mentioned in Chapter 5.2.1).

Considering that the scope of both case studies was the application and validation of the evaluation framework of SuCEES, due to the reasons already mentioned, it is recommneded to to apply and validate its execution framework in the near future.

The success of SuCEES's application depends on the accuracy of its implementation. Thus, the attribution of a Proficiency Level for Competitiveness Positioning evaluation, must be well scored, which means that the practices that are assigned as evidences to score a proficiency level,

demands the capacity to prove its existence and the fact that these practice indeed has impact on the requirements of the respective evaluation criteria. Additionally, do evaluate precisely the Competitive Advantage, it is required a correct understanding of the impact indicators (what they mean and how they are calculated) and also to assure data reliability. At last it is extremely important to have a good perception about what is going on in the market where companies act, only having this continuously behavior companies are able to evaluate in a more accurate way their Competitiveness Risk. Regarding this concerns it is important to create the "SuCEES Manual and its Implementation Guidelines" as well as define several levels of training courses to share this knowledge and concepts, and to start a movement of its real adoption.

Once SuCEES is a system, another recommendation is the development of a technological application to support the implementation of all components of the system, allowing electronic scoring and automatic calculation and visualization of results (dashboards and alerts, able to be accessed by any technological device), as well the ability to introduce strategic goals, execution actions and targets and their follow-up and corrective and preventive adjustments. Additionally, to obtain procedural efficiency and data accuracy, it would also fundamental to develop web services to assure SuCEES's technological integration with legacy systems, like ERP's, dashboards, etc, to leverage automatically data collection (fundamentally regarding performance and operational indicators).

Other recommendations can be pointed out regarding improvements that could be added to the model, such as:

- Review the requirements of some evaluation criteria from Proficiency Levels, regarding the feedback obtained by the case studies mentioning the perception of some overlaps.
- Development of a specific tool to assure more reliable interaction between organizational functions (transversal areas) supporting the deployment process regarding the accordance of responsibilities and obligations (internal Service Level Agreements – SLA) on a horizontal perspective;
- Development of specific systems (SuCEES) as references for each economic sector, considering specific realities, practices and indicators, as well as taking into account in what way it could be applied in different companies' contexts and scopes (eg. multinational companies that have headquarters or shared services in one country and their manufacturing units spread all over the world – in an aggregated way? In a comparison way between manufacturing units? Considering jus major markets and products? …).

- Development of adopted systems (SuCEES) as references to different market cultures (Latin, Anglo-Saxon, Nordic and Asiatic).

- Establishment of a linkage between impact indicators (indicators that compose Competitive Advantage measurement) and other indicators (more commonly used or more operational focused), and to analyze coexistence of cause-effect relationships.

- Definition of a weight method to calibrate the evaluation framework (since Competitiveness Drivers and each of their evaluation criteria, impact indicators and Risk criteria).

- Definition of different implementation approaches (independently of SuCEES application level), which could be used as corrective weights for the application of the system, which could be based on:

    - ✓ If the evaluation is executed by company's internal personnel;
    - ✓ If these personnel have specific training about Sustainable Competitiveness Model and about SuCEES;
    - ✓ If the evaluations are executed just by one managerial level or in an 360º perspective; or
    - ✓ If the evaluation is executed or audited by external qualified professionals.

  On this perspective, it can be applied an uncertainty factor to include a weighting element to correct eventual assessment influences due to different degrees of experience from who is responsible for the evaluation process (who is scoring). This may be useful considering that the model is based on a large range of issues, demands specific knowledge about a lot of themes and that best practices regarding each Competitiveness Driver are continuously changing and innovating. By taking into account this corrective factor it is possible to reduce inconsistences and make the model fairer and comparable, allowing even more reliable benchmarks. An example could be the attribution of a score = 1 when the evaluation is done by external and impartial professionals certified to apply the SuCEES model or considered international experts in a specific Competitiveness Driver, and a score = 0,2 when the evaluation is conducted internally by employees of the Company (Figure 7.4).

Competitiveness Drivers	Resilience Score	Innovation Score	Competitiveness Score	Uncertainty Factor (Unknown … Accurate) 0,2	0,4	0,6	0,8	1	Competitiveness Positioning
Corporate Behavior			0						0
Business Proposition			0						0
Financial Stability			0						0
Organizational Wellbeing			0						0
Operational Leanness			0						0
Technological Alignment			0						0
Facilities Suitability			0						0
Global Competitiveness Score	0	0	**0**					**Global Competitiveness Positioning**	**0,00**

Figure 7.4 - Competitiveness Positioning Score Card (CPSC) – including uncertainty factor

- Development of a baseline version of SuCEES that could be used by Financial Entities and Investment Agents, to standardize and enlarge companies' evaluation criteria, as well as to support decision making regarding funding requests.

- Development of SuCEES on a people perspective. In fact, it is considered a fascinating filed for further research, because the most recent approaches are based on leadership models and on personnel competences and individual performance evaluation, but questions like: "How much resilient and innovative is this employee? What are the impacts of his skills in the company's competitiveness growth? What is the risk of losing this talent and the implications to the company? Are not explored in a specific approach?

- Another recommendation is related with the assumption assumed for the definition of Competitiveness Risk. Actually it is based on the fact that the probability of occurrence of an event associated to each evaluation criteria is equal to 1, because once it is the current situation, it is assumed as 100% true (it is like it already happened). Therefore, it would be interesting to include this variable in a future perspective, which means the inclusion of the probability of current situations' changes. Doing so it is possible to introduce a more accurate application of the risk definition, once we apply the probability of current conditions get worse, as well as its impacts on the company. This approach can be applied using the following score card.

Business context risk factors		Current Conditions					Impact on the company due to current conditions						Vision about future condition (new value)	Probability of current conditions' increase						Impact on the company due the new (future) conditions						Risk	
Porter's 5 Forces	Evaluation criterion	Totally false	Some false	Medium	Quite True	Totally True	Low					High		Low					High	Low					High	Parcial	By Force
		0	2	4	6	8	0	0,2	0,4	0,6	0,8	1	classify from 1 to 8	0	0,2	0,4	0,6	0,8	1	0	0,2	0,4	0,6	0,8	1		
Rivalry among existing companies (high score = high rivalry intensity)	There is a large number of competitors in the industry																										
	…																										
…	…																										
Bargaining Power of Buyers (high score = buyers with high power)	…																										
	High threath of Buyers' backward integration																										
																									Total Risk Score		

Figure 7.5 - Competitiveness Risk Score Card (CRSC) – including probability of future changes

- In this line of improvements, the model could also include trend analysis in the Competitive Advantage Score Card. With this development companies would be able to consider in their evaluation process dynamics of performance growth. In concrete the model could score in a scale between 0 and 1(Recent Trend) the correspondent value of growth rate for each Impact Indicator calculated through CARG (Compound Annual Growth Rate), as shown in Figure 7.6.

Competitiveness Drivers	Impact Indicators	Aim	Performance Values			Direct Competitor Current Value	Advantage Coefficient (0 to 1)	Current Advantage (present performance)						CAGR (Compound Annual Growth Rate)	Recent Trend (growth average rate - last 3 years)						Uncertainty Factor (data reliability)						Competitive Advantage Score	
			Current Year	Last Year	Second Last			None		Low			High		Decreasing					Growing	Unknown					Accurate	By Indicator	By Driver
								0	0,2	0,4	0,6	0,8	1		0	0,1	0,3	0,6	0,8	1	0	0,2	0,4	0,6	0,8	1		
Corporate Behavior	GDP contribution	M													< - 10	< 0	< 20	< 60	<150	>150						1		
	…	M													< - 10	< 0	< 20	< 60	<150	>150								
	Partnership and suppliers satisfaction index	M													< - 10	< 0	< 20	< 60	<150	>150						1		
…	…	M													< - 10	< 0	< 20	< 60	<150	>150								
Facilities Suitability	Accidents and safety incidents	m													< - 10	< 0	< 20	< 60	<150	>150						1		
	…	M													< - 10	< 0	< 20	< 60	<150	>150								
																										Global Advantage Score		

Figure 7.6 - Competitive Advantage Score Card (CASC) – including trend analysis

7.4 Further Research Opportunities

Being a framework based on an alternative definition of Competitiveness (Sustainable Competitiveness Model) introducing recent concepts and principles, as well as having the ability to integrate strategic evaluation activities with strategic and operational execution actions, supporting its progress assessment on the achievement of targets, SuCEES is a system with a lot of further research opportunities, namely on an academic point of view and on a business value perspective.

7.4.1.1 Academic perspective

In an academic point of view, the major opportunities for further research are:

- Real Competitive Strength (RCS) is considered a final score of Sustainable Competitiveness. Therefore, the design of an alternative metric to express RCS based on productivity concepts is assumed as an opportunity for further research. Additionally, the set of a metric to express the mini-sum concept behind the calculation of Competitiveness Diamond's areas is also a field of research.

- A very interesting further research should be the identification of correlations between practices adopted by companies (approaches or tools – like LARGE, 6 sigma; TRIZ, …) and their impact on Sustainable Competitiveness Model, which means, as an example, answer to the following question: "In which way approaches like LARG, 6 sigma, Open Innovation, TRIZ, Leadership, …, generate impact on Sustainable Competitiveness (resilience, innovation, and sustainability)". Regarding this filed of research it could be interesting to consider the application of DEA methodology.

- Another further research field should be the identification correlations between risk factors (Competitiveness Risks) and resilience and innovation practices.

7.4.1.2 Business value

Considering the benefits that the implementation of SuCEES is able to offer to companies, it is possible to identify the following major opportunities for further research (regarding that somehow some are related to few academic research opportunities):

- Understanding in what way monitoring maturity has impact on companies' global competitiveness.

- Development of a best practices database (sources of evidences) to use as reference to support the scoring of Competitiveness Positioning evaluation process, for each evaluation criteria of all Competitive Drivers, and thus maximize the standardization of the evaluation process.

- As a result of SuCEES's implementation the application of cluster analysis to identify positioning and behaviors between different economic sectors, to establish cause-effect relation and to define best practices.

- Pelo seu carácter integrador quer em termos de drivers quer em termos de envolvimento de toda a organização tem um grande potencial para ser uma ferramenta de extrema utilidade nas organizações, em que a sustentabilidade não é apenas um objectivo, mas sim um valor intrínseco ao negócio;
- Está muito bem sistematizado, e tendo em conta o facto de ter alguma complexidade, prevê desde logo o compromisso na sua aplicação de acordo com a dimensão da empresa;
- Tem um grande potencial de sucesso na sua implementação, não obstante ser necessário, na minha opinião, ter em conta os seguintes factores críticos de sucesso:
    - Apoio de sistemas de informação adequados ao nível de estruturação necessária do programa e à necessária automatização de recolha de informação;
    - Integração dos modelos de monitorização e análise nos modelos actuais existentes nas empresas, como por exemplo no modelo de avaliação de desempenho, modelo de avaliação do mercado, prémios e outros, em que o KPIs, alinhados com o SuCEES, servirão desde logo para a necessária aferição do mesmo;
- Garantidos os factores críticos de sucesso elencados, o SuCEES será uma mais-valia para a gestão, traduzindo-se numa ferramenta fiável de gestão estratégica, pelo seu carácter integrador a todos os níveis de gestão na organização, garantindo assim a sustentabilidade requerida, e não necessitando de um esforço adicional por parte da organização para a sua implementação.

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ANNEXES

ANNEX 1 - Resilience Proficiency Matrix (Extremely High level)

ANNEX 2 - Innovation Proficiency Matrix (Extremely High level)

ANNEX 3 - Experts involved and their participation motivation

ANNEX 4 – Impact (advantage) indicators' definition and scope

ANNEX 1 - Resilience Proficiency Matrix (Extremely High level)

Corporate Behavior		
Culture and leadership		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Organizational culture	Lack of organizational cohesion Misalignment with vision and corporate objectives and goals Lack of professional pride	Solid understanding and internalization of Company's mission, values and culture at all Organization's areas and levels; High capacity to foresee/ anticipate problems/ occurrences; Dissemination of an unequivocal and proactive response readiness to adversity, at all Organization's areas and levels; High capacity to manage stress in a positive manner at all Organization's areas and levels; High capacity for incidents / occurrences resolution; Consolidated capacity to embed lessons-learned at all Organization's areas and levels.
Leadership leverage	Decrease of responsibility Talent waste Loss of opportunity to create value	Energizing and optimistic leaders at all Organization's areas and levels; Strongly oriented to the prevention/ anticipation of disturbances and to resolution of incidents/ occurrences; Highly consistent between convictions and their real attitude (inspiring resilience); Solid and systematic mechanisms of active/ effective communication and for delegation and feedback; Highly committed to results and to employee coaching at all Organization's areas and levels (development of new leaders); High organizational sensitivity and high capacity to manage conflicts and expectations; Highly recognized for their merit, by all Organization's areas and levels.
Ethics and solidarity	Corruption and personal scandals Image/ brand denigration Fines and business devaluation	Scrupulous and systematic compliance with all legal requirements (regarding the scope of business) and compliance with the applicable international standards; Consolidated preventive mechanisms of corruption and conflicts of interest in positions/ roles with decision-making power; High capacity to identify fraud and corruption, high ability to regularize this kind of situations, and to manage scandals; Total confidentiality and protection of the information regarded as confidential and unconditional cooperation with Official Entities in cases of suspected fraud; Solid and continuing participation in social responsibility initiatives with high impact and with international visibility; High recruitment standards to management roles (board and middle management) in terms of character, integrity and reputation; Strong commitment to Organization's values and culture, as well as strong respect for all Stakeholders.
Management and knowledge		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Strategy and policies	Non-achievement of business objectives Business failure Fines due to infractions	Solid and systematic mechanisms to analyze business context (legislation, taxes, competition dynamics, ...); High recognition of the business vulnerabilities and capacity to anticipate and solve problems; Strong capacity to define implementable strategies and measures that promote diversity/ redundancy, visibility, flexibility, responsiveness/ velocity and collaboration, as well as to incorporate the commitments made with shareholders and strategic partners.

Quality assurance	Less ability to preventively act on the value chain Increase of non-compliance, dissatisfaction and brand vulnerability Increase of quality and non-quality costs	Solid and systematic quality management mechanisms at all Organization's areas and levels; Solid and systematic evaluation mechanisms for the business overall performance (analysis of the defined strategic and operational goals/ targets, at all Organization's areas and levels); Solid and systematic mechanisms for continuous improvement, based on the analysis of deviations, non-compliances, failures/complaints and identified improvement opportunities at all Organization's areas and levels; Consolidated quality audit mechanisms grounded in official bodies; High capacity to promote accuracy and quality to all Stakeholders.
Environment management	Pollution, contamination and occupational diseases Lower recognition by the market Fines due to infractions and to non-compliance with legal requirements	Strong orientation and ability to anticipate environmental impacts (at all Organization's areas and levels); Consolidated environmental audit mechanisms grounded in official bodies; Solid and systematic control mechanisms of noise, liquid effluents, gaseous emissions, solid wastes parameters, as well as non-compliance/ deviations management; High capacity to promote environmental awareness to all Stakeholders.
Governance principles	Management rotativity and governance instability Lack of strategy deployment Decrease of performance and results	Solid and systematic mechanisms to transpose strategic orientations into strategic objectives and operational goals at all Organization's areas and levels, translated into indicators and targets (goals and targets Organizational deployment); Solid and systematic mechanisms for employee rotation and mobility (by positions and/or business units) - mobility/ rotation plans; Solid and consistent succession/ replacement plans at all Organization's areas and key levels; Solid and systematic portfolio and project management procedures; Deployment of results oriented management meetings, at all Organization's areas and levels; Consistent mechanisms for risk and crises management.
Change management	Unsuccessful implementation of changes No return on project investments Organizational frustration and demotivation	Facing Organizational changes as a continuous response to the market and as an opportunity to improve; High commitment to change at all Organization's areas and levels, with high involvement of employees in strategic aligned implementation plans and targets definition; Solid and clear communication plans for each stakeholder with transversal organization involvement (considering motivation/ objectives of change, results/ targets to achieve and continuous feedback of change progress); Clear definition of expected results and about individual benefits; Several sponsorship levels and high performance teams; High implementation capacity at all Organizations areas and levels, with contingency plans; Proper merit recognition, visibility and celebration.
Knowledge management	Decrease of decision-making quality Inability to anticipate disturbances and to quickly recover performance levels Loss of opportunity for improvements	Intense and systematic collection of market information and trends; Existence of reliable information on impacts, results, performance and satisfaction, available to all stakeholders on a timely basis; Solid and systematic mechanisms to analyze and correlate information to act in anticipation of disorders/ disturbances and to react as soon as possible to incidents/ occurrences; Everyone knows the required data to perform their tasks, where to find it and what to do with it; Everyone provides relevant data and contributions to the creation of knowledge and is aware of its importance; All decisions at all Organization's areas and levels are solid and taken systematically based on the generated knowledge; The Organization improvements are the result of consistent and recurrent self-learning, at all Organizations' areas and levels, resulting from the analysis of generated knowledge.
Shareholders and strategic partners satisfaction	Misperception about our performance Disinvestment (in case of dissatisfaction) Partnership opportunity losses	Shareholders and strategic partners joint definition of clear targets and commitments at all Organization's areas and levels; Solid mechanisms based on objective and measurable criteria for systematic evaluation of compliance with goals and of shareholders'/ strategic partners' satisfaction; Continuous monitoring of the shareholders'/ strategic partners perception of all Organization's areas and levels' performance; Strong capacity to manage and receive complaints/ dissatisfactions and convert them into positive aspects, exceeding expectations (surprise effect).

Business Proposition		
Customer relationship		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Customer needs and expectations	Unsuitable value proposition Sales and market share decrease Loss of brand awareness	Consolidated client segmentation and reliable knowledge about the value that each client represents to the Organization; Strong knowledge of the clients' current and future needs, as well as their next challenges; Solid and systematic research about the value chain needs and expectations (vision/ understanding about the customers' clients needs and expectations); Solid mechanisms for systematic follow-up of market trends.
Customer and society satisfaction	Misperception about our performance Complaints, loss of reputation and brand vulnerability Client recovery costs	Solid mechanisms based on objectives and measurable criteria of systematic evaluation of clients and society satisfaction (confronting satisfaction with the importance of each criteria); Continuous monitoring of the clients/ society perception about Organization's performance; High flexibility to meet special requests and respond to clients unclear wishes; Strong capacity to receive and manage complaints/ dissatisfactions and convert them into positive aspects, exceeding expectations.
Commercial focus		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Prospects management	Inappropriate qualification of prospects False sales expectations and increased uncertainty about demand Costs increase/ inefficiencies due to inadequate sales force dimensioning	High capacity to generate strong and lasting relationships with new markets, new customers and new segments of clients; Solid and systematic auscultation approach to potential clients; Consistent mechanisms for clients qualification and validation of potential business; High ability in balancing commercial efforts and clients conversion.
Salesforce empowerment	Lack of client or results orientation Unsuccessful negotiations Non achievement of commercial objectives	Solid domain of Organization's products/ services features (product life-cycle, differentiators, sales pitch, ...); Solid mechanisms of systematic approach to customers and continuous client relationship, monitoring and follow-up; High listening skills and high ability to convert clients' needs in sales pitch and opportunities to create proximity with them; Strong results orientation (clear definition of ambitious sales targets) and high persuasiveness; Solid balance and consistency between sales objectives and sales pitch and Organization's responsiveness/ capacity to fulfill commitments agreed with customers.
Contractualisation and commitment	Costs and penalties due to inability to meet commitments Contract breach Loss of clients and negative reputation	High negotiation skills (definition of negotiation strategies), high ability to create bargaining advantage and to create win-win situations for the Organization. as well as high ability to finalize a deal/ contractualize; Solid and systematic mechanisms to assure and preserve the capacity to comply with all the agreed terms (either the product specifications or service levels); Solid and systematic mechanisms for contractual shield (persuasiveness at negotiation sessions, and for all contracts) able to address potential failures/ defaults by the customer.

Financial Stability		
Assets management		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Accountability	Progressive unviability of the company's strategy implementation Non achievement of objectives and targets Increase of administrative rework, as well as of inefficiency costs Lack of reliable data and decrease of decision making quality Risk of fraud and non-compliance to legal obligations and taxes Growing distrust of customers, partners and society	Systematic and solid mechanisms for budgeting and activity based costing aligned with the Company's strategy, concerning all organizational areas, based on accurate data and realistic assumptions; Solid continuous procedures of budget review and high capacity to rapidly adapt to new contexts; High consistency and accuracy of financial procedures (billing, accounting, treasury, ...); Solid and systematic mechanisms for financial reporting based on sophisticated indicators, in aggregated terms and its breakdown structure concerning each organizational area and by portfolio of businesses - reporting effectiveness.
Equity structure	Strategic disagreements and lack of clear objectives and targets definition Increase of corporate and managerial conflicts Increased market exposure General demotivation	Solid mechanisms and high capacity to generate consensus among shareholders and to ensure the stability of capital structure; Solid mechanisms to promote employee ownership through stock options schemes; High capacity to withstand to hostile takeovers.
Profitability	Increase of a negligent attitude, fostering waste (non saving attitude) Increase of operational costs and gross margin reduction Decrease of dividends distribution capacity	Solid and systematic mechanisms for expenditure analysis, regarding all Organization's areas and all cost items; Solid and systematic implementation of operational and administrative cost reduction solutions; High capacity to adjust current investments due to context and assumptions' changes and to address new challenges; High capacity to manage and reduce risk exposure of financial investments
Financial solidity		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Solvency and liquidity robustness	Inability to pay suppliers, taxes and employees Technical and financial bankruptcy	High capacity to cover all liabilities; High capacity to accommodate unfavorable exchange variances and commodity price changes; High capacity to negotiate receivables with all clients (ability to reduce receivable time and to agree on favorable conditions); High capacity to negotiate payment terms with all suppliers (ability to extend payment time and to agree on favorable conditions); Solid and systematic mechanisms to prevent bad debts and non-performing loans; High capacity to collect debts and loans.

Organization Wellbeing		
Human resources management		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Recruitment and career	Unsuitable match between employee skills and organizational needs Dissonance of expectations about career evolution Employee frustration and demotivation	Systematic and consistent mechanisms to identification of human resources needs highly aligned with the Organization's strategy (in terms of sizing, skills and culture); Strong involvement of the applicant area in the description of the role and candidate profile, competencies required and selection criteria; Accuracy in the consistency between the candidate's profile required and the role demands/ needs/ requirements; Timely recruitment planning and rigorous and systematic selection process (creation of a candidates database); Solid and wide welcoming process; Solid and transparent career and replacement plan (for all Organization's areas, levels and roles), disseminated to the different Organization areas and levels, and subject to systematic review.
Responsibility management	Stress, anxiety and lack of discernment Loss of performance and increase of inefficiencies Loss of employee's loyalty and trust	Organic structure, functions and authority chain/ report unequivocally and precisely defined, permanently updated and clearly understood by all employees; High ability to consistent delegation of responsibilities, decision-making autonomy transfer and solid knowledge about each specific competences, authority and obligations (at all Organization's areas and levels); Openness to communication, healthy opinion sharing environment, as well as problems and difficulties sharing; High job flexibility; Strong team spirit and shared commitment in problem-solving and incidents/ occurrences resolution.
Employee satisfaction	Misperception about our performance Demotivation and lack of empowerment Organizational culture corrosion Absenteeism	High Organizational sensitivity to anticipate and perceive dissatisfaction, tension and discomfort/ conflict situations; Solid and systematic assessments of employee satisfaction and Organizational climate, based on objectives and measurable criteria (at all Organization's areas and levels); Strong capacity to manage complaints/ dissatisfactions and convert them into positive aspects, exceeding expectations; High capacity to combine the interests of the Organization and employees' ambitions/ motivations.
Employee development and safety		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Skills development	Waste of time and low return on training investment Inability to achieve operational objectives Loss of employees due to their non-professional valorization	Solid and systematic competences/skills development plans (short/ medium and long term) based on future needs required by the implementation of new corporate strategies and in coherence with weaknesses/ opportunities for improvement identified in employees' performance evaluation, in operational audits/ evidences, and arising from Organizational climate surveys; High capacity to communicate the objectives and expected impacts of competences/ skills development plans' implementation, as well as high ability to mobilize/ motivate its execution; Strong ability to adapt the programming and contents of the competences/ skills development plans (contextualization with Organizational reality) regarding business priorities and employees' expectations, profile and needs; High capacity to select partners (training experts), to continuously evaluate their performance and the progress of training plans' execution, as well as to anticipate problems and act in a timely manner in face of constraints; Strong focus on continuous assessment of training courses' performance (taking into account its objectives), participants' satisfaction, as well as of the real incorporation of value/ impact generated/ knowledge sharing at all Organization's areas and levels as a result of the training execution (return on training investment).

Health and safety	Work accidents and occupational diseases Loss of productivity and downtime increase Fines due to infractions	Massified and consolidated healthy working environment; Solid labor insurance system (for all employees) and occupational health care and safety at all Organization's areas and levels; Solid and systematic mechanisms for identification of health and safety risks for employee and society; Systematic and consistent medical screenings/ checks of wide specialties, as well as drug use tests at all Organization's areas and levels; Solid and systematic introduction of ergonomic solutions and safety elements/ equipments in workstations and for the employees; Periodic and solid emergency and work accidents simulations.
Respect and Recognition		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Incentives and merit management	Counter-information and vicious cycle of negative energy Injustice and internal unbalances relationships Loss of productivity and unavailability to forthcoming extra efforts	Solid and systematic mechanisms for evaluating employees' performance, conducted in a participatory manner (360º) and applied in order to promote employees improvement and to reward merit through transparent and fair manners; Evaluation based on unequivocal criteria and on the fulfillment of objectives/ results achievement, prior and mutually defined and agreed; High coherence between challenge's requirements (difficulty on goals achievement) and the nature of incentives (reward value), as well as between the objectives defined and employee's ambition/ motivation; Solid and systematic mechanisms of communication/ dissemination of Organization's recognition/ acknowledgment about employees achievements/ awards (at all Organization's areas and levels, and partners); High capacity to manage employee's expectations and to reconvert skills for other functions/ roles.
Social rights	Fines due to infractions Strikes and labor disputes Loss of reputation and brand vulnerability	Solid and continuous defense of human and worker rights (across the value chain, including strategic partners); Total elimination of racial, political, religious, sexual or age discrimination; High capacity to congregate and have different opinions/ beliefs side by side; High capacity to anticipate sexual harassments risks and zero tolerance to incidents of sexual harassment; High capacity to deal with claims without reprisal (from employees and other stakeholders); Strong promotion of balance between professional and personal life, and provision of family benefits.
Operational Leanness		
Supply chain management		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Demand forcasting and inventory management	Material shortage Cost increase of storage and order processing Increase of obsolete materials	Strong technological integration with customers' material planning systems and with market trends analysis solutions (all customers); Strong technological integration with suppliers' production/ delivery systems (all suppliers); Strong technological integrated with transport/ tracking systems; Solid and systematic mechanisms of inventory management and continuous review of strategic buffers' levels of raw materials, WIP and FGI. Strong focus on product obsolescence prevention.

Sourcing and Procurement	Loss of opportunity to access to alternative suppliers Supply rupture Increase of purchasing costs	High capacity to standardize materials' specifications/ requirements and to perform aggregated purchases; High capacity to identify new/ alternative suppliers; High capacity to execute trading strategies (increase of bargaining power and dominion/ advantage in negotiation processes) and to formalize favorable agreements based on clear and measurable service levels, subject to penalties in specific cases of non-compliance; Strong relationships with strategic suppliers based on trust, joint cooperation and willingness to risk-sharing; Solid order processing mechanisms; Consistent and high response capacity of suppliers to special requests/ unplanned orders (urgent requests); High flexibility to recur to/ use alternative/ suppliers, as well as to contract expeditiously.
Transport, distribution and delivery	Decrease of on-time deliveries Production and service replanning Increase of supply chain complaints, costs and fines Trust decrease among the supply chain	High capacity to deliver products/ materials/ alternative components (for the entire range of goods); High flexibility to choose alternative routes or transport modes; Strong capacity to use different distribution channels (for the entire range of goods also ensuring services); High capacity to reduce supply and transit lead times.
Handling and storage	Increase of handling and picking costs and operational inefficiencies Increase of damaged materials and labor accidents Lead time increase	Consistent and efficient (sophisticated) mechanisms for receiving/ picking, handling and storage of raw materials, work-in-progress components and final products (goods); High flexibility to maximize or expand installed capacity of storage; Strong capacity to maximize product rotation; Strong focus on damage prevention.
Information management	Decrease of planning accuracy Decrease of supply chain flexibility Traceability loss of products and services	High understanding about the supply chain and its information flow, as well as strong alignment and integration of its information systems (in terms of accuracy, timeliness, adequacy and credibility of information exchanged); Solid and continuous information sharing mechanisms and full access to information throughout the supply chain; Consolidated standardization of information among all players of the supply chain; Solid mechanisms for identification (coding and labeling) of goods/ materials/ processes/ equipments/ workers, as well as capacity to carry out its traceability from origin to final destination; High and quick capacity for product/ goods recovery/ recall with customers and on the market.
Suppliers and operational partners performance and satisfaction	Unaccountability and misperception about performances Deresponsibilization and breaches of trust Increase of supplier switching costs (partners and suppliers changing)	Solid and systematic mechanisms for evaluating the performance of suppliers based on objective and measurable criteria (defined jointly) and in consistency with the contracts agreed; High flexibility to anticipate and manage conflicts and reach understanding platforms with the suppliers; High capacity to impose penalties or exercise counterparts in case of non-compliance by suppliers; Continuous monitoring of suppliers'/ operational partners' perception about the Organization's performance; Strong capacity to receive complaints/ dissatisfactions from suppliers/ operational partners and convert them into positive aspects, exceeding expectations.
Development, manufacturing and Service delivery		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Production and service planning	Low occupation or lack of capacity Non-fulfillments, waste and costs due to schedule errors or uncertainties Labor shortage or labor force over capacity	High flexibility to use maximum production/ service capacity and production capacity scalability (for all goods and services); High flexibility/ adaptability to change production's/ service's and delivery's schedules (for all goods and services); High flexibility to assign workforce according to peaks or lack of work.

Transformation, assembling and packaging	Loss of production flexibility and product shortage Increase of lead time Increase of production costs	High capacity to appeal to alternative production paths (processes and sites - for all goods); High capacity to reduce production times and to reduce setup or changeover times (for all goods); High flexibility to reallocate resources (equipment and workers/ flexible workforce); High flexibility for postponement (for all goods); High capacity to respond to urgent requests or special requests (for all goods and all segments of clients).
Quality Control	Increase of non-conformities, rework and waste Increase of customer complaints Increase of non-quality costs	High capacity to continuously meet customers' quality specifications; Solid and systematics mechanisms to increase processes' capabilities and to reduce variances of product specifications (focus on zero-defects); Solid and systematic statistical quality control mechanisms to prevent non-conformities (for all processes - manufacturing and services); High capacity to manage, reuse and recycle of non-conformities; High capacity to continuously improve quality control mechanisms and to reduce quality and non-quality costs; Existence of sophisticated quality control equipements and software applications.
Service provision	Loss of service flexibility Non-compliance regarding Service Level Agreements Failure to post-sale commitments and bad reputation	High capacity to appeal to alternative service paths (processes and sites - for all services); High capacity to reduce service times (for all services); High flexibility to reallocate resources (equipment and workers/ flexible workforce); High capacity to respond to urgent requests or special requests (for all services and all segments of clients); Consolidated customer service mechanisms with high attendance skills and relationship ability (for all services and all segments of clients); Solid mechanisms to comply with sale and post-sale commitments.
Equipment maintenance and calibration	Increase of lead time, non-compliance and waste Increase of maintenance costs Work accidents	Consolidated and systematic maintenance mechanisms of all production equipment, accessories, peripherals, and support components; Strong guidance on prevention and decision-making based on TCO (Total Cost of Ownership) at all Organization's areas and levels; Solid and systematic mechanisms for calibration of inspection, measurement and testing equipment; Strong relationship with equipment manufacturers and high flexibility to act in case of malfunction (repair, renewal or swift/ replacement of equipment) at all Organization's areas and levels; Solid mechanisms for inventory management of spare/ maintenance parts (for all maintenance components).
Technological Alignment		
ICT solutions		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Suitability and usage of ICT applications	Low return on ICT investments Loss of productivity and increase of errors and employee frustration Increase of ICT maintenance costs	Clear and deep understanding about the ICT impacts due to the Organization's strategy (in terms of information systems/ software applications); Solid knowledge and control over the implicit ICT needs (information systems/ software applications) to achieve the Organization's strategic goals and high capacity to define and implement solutions (ICT strategic planning); Strong focus on the adoption of solutions with high return on investment and decisions based on TCO (Total Cost of Ownership); Consistent and systematic adoption/ implementation of leading edge software applications to support all business aspects/ areas (transaction processing systems, knowledge management systems, office automation systems, management information systems, decision support systems and executive support systems); High capacity to maximize the use and potential of software applications; Solid mechanisms for updating the existing information systems.

Suitability of ICT infrastructure and equipments	Loss of ICT availability and capacity Loss of information security Non-compliance with legal requirements Increase of maintenance costs and employee dissatisfaction	Clear and deep understanding about the ICT impacts due to the Organization's strategy (in terms of ICT equipment and infrastructure); High capacity to design and implement compatible ICT solution (technological equipment and technological infrastructure) to satisfy the requerments needed to achieve the Organization's strategic goals; Strong focus on the adoption of solutions with high return on investment and decisions based on TCO (Total Cost of Ownership); Sophisticated technological equipment and technological infrastructure to support all business aspects/ areas (in terms of safety and capacity - confidentiality, integrity, availability, authenticity, non-repudiation and compliance); Strong ability to maximize the potential (capacity utilization) of installed equipment and technological infrastructure; Systematic mechanisms for renewal/ update of the existing technological infrastructure and equipment.
ICT Services		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Help desk/ service provision and business continuity	Loss of service flexibility, internal client focus and problem solving orientation Decrease of productivity, of results achievement and employee motivation Loss of disaster recovery capacity	Strong client orientation (internal), high attendance skills and relationship capacity; Solid and sophisticated mechanisms of registration, examination and forwarding of occurrences/ incidents and high capacity to rapidly implement reliable resolutions (covering all ICT aspects at all levels of the Organization); Consolidated mechanisms of ICT performance continuous supervision and detection of vulnerabilities; High capacity to analyze trends and to act in anticipation and avoid technological breakdowns; Consolidated mechanisms to ensure business continuity in case of technological breakdown (business continuity and disaster recovery plans).
Internal ICT customers satisfaction	Misperception about our performance Complaints and loss of reputation	Solid mechanisms based on objective and measurable criteria of systematic evaluation of the Organizational satisfaction (internal clients, middle management and board of directors) about the provided ICT services; Continuous monitoring of the organizational perception about ICT performance, taking into account the fulfilment of Service Level Agreements - SLA (information systems, equipment and infrastructure); High flexibility to meet special requests and respond to unclear demands of the Organization; Strong capacity to manage complaints/ dissatisfactions and convert them into positive aspects, exceeding expectations.
Facilities Suitability		
Facilities management		
Sources of disturbance	Impacts of low resilience (Failure Modes)	Extremely high Proficiency Level (Severity Responsiveness)
Facilities and installations cleaning and maintenance	Dirtiness, infestations and contamination Accidents, diseases and material damage or nonconforming products Operational constraints Increase of maintenance and transport/ handling costs Brand vulnerability	Solid and systematic optimization mechanisms of facilities and equipment location and layout design; High flexibility to readjust/ relocate/ move/(dis)mount installations or equipment at all Organization's areas and levels; Consolidated and systematic mechanisms for facilities and non-productive equipment maintenance - preventive, predictive and corrective (buildings and technical structures/systems); Strong focus on prevention and decision-making based on TCO (Total Cost of Ownership) - concerning facilities issues; Solid and systematic cleanup/disinfestation mechanisms of facilities and equipment; Solid and systematic mechanisms of identification/ removal/ elimination of risk factors (physical, chemical and microbiological); Consolidated security and safety surveys and audit initiatives in close collaboration with entities of reference and/or official bodies; Solid routines for verifying the validity and usability conditions of protection and safety equipment.

Security and surveillance	Unauthorized entries Vandalism and robberies Organizational instability due to danger perception	Solid access control and authentication mechanisms at all Organization's areas and levels; Consolidated procedures of facilities' monitoring and high capacity to act in situations of security breach; High capacity to preserve critical business assets; High flexibility to cope and give continuity to the business in case of high impact calamities or natural disasters; Consistent and continuously reviewed emergency and evacuation guides; Solid and periodic relationship and articulation with official entities for security plans update, knowledge/ practices recycling and ensure prompt joint response, in case of incidents and accidents.

ANNEX 2 - Innovation Proficiency Matrix (Extremely High level)

Corporate Behavior		
Culture and leadership		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Innovative Organization	Increase of Organizational alignment with innovation Share of innovation commitment Creation of an ownership environment (employees feel like part of the team)	Solid sharing of the company's vision with stakeholders and its consistent deployment at all levels of the Organization; Strong stimulus to the realization of innovation and entrepreneurship at all areas and levels of the Organization; Strong stimulus to curiosity, tolerance to error and active guidance for experiment practices at all levels of the organization; Organization is perceived as a leader in its capacity to increase and develop knowledge partners' networks and wisdom creation at international level.
Innovative Leadership	Auto-creativity deployment Talent maximization Increase of opportunity to generate differentiation	All leaders highly committed to innovation, with healthy ambition and high orientation to creativity, to team formation based on diversity, and to conversion of ideas into business (in the value chain); Promoters of systematic initiatives for generating ideas, improvisation and self-entrepreneurship at all levels of the Organization; Highly recognized (360 °) as inspirational leaders, generating new solutions/concepts/products/services, knowledge sharing and for their ability to reward goals' achievements.
Society commitment	Trustworthiness increase Increased recognition by the adoption of differentiated social initiatives	Strong capacity to develop innovative initiatives of social responsibility with high relevancy and high international recognition; The Organization plays a structural role in boosting regional and national economy (with high impact on the development of the environment and of the business area in which it operates, in terms of GDP, job creation, emergence of satellite businesses and promotion of research, development and innovation, as well as skills development); The Organization contributes greatly to the reduction of pollution levels in the region and the country and promotes solid and systematic green initiatives with the business community and society in general; Solid and systematic protection mechanisms of intellectual property and generated innovation (registration of patents and trademarks internationally).
Management and knowledge		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Strategic Vision	Anticipation in the face of competition Business perpetuity Leverage of strategic partnerships	Vision strongly embodied in innovation; Solid domain of constraints / internal potential and on the context and market trends (competitors, customers and strategic / organizational / operational / technological wisdom); High capacity in projecting the future and to manage resources needed to achieve new realities; Strong orientation to the execution and establishment of strategic innovation partnerships (universities, centers of innovation / research / technological, scientific laboratories, ...), and of value creation networks (business value network / cross business chains - intra and inter sectorial for the promotion of innovation); Consolidated capacity to deploy innovation strategy at all levels of the Organization and turn it into radical added value and capital gains (focus on disruptive innovation).

Quality and Environment commitment	Continuous innovation improvement Reduction of environmental impacts Increased recognition and visibility among stakeholders	Solid and systematic performance evaluation mechanisms for innovation (analysis of the achievement of the strategic and operational targets set at all Organizational levels - tangible results with financial, market, operational impact and at society level); Strong orientation to systematic reduction of waste at all levels of the Organization (high capacity to reuse and recycle); Strong orientation to systematic reduction of energy consumption at all areas and levels of the Organization; Consolidated introduction of continuous mechanisms for excellence at global level in the Organization; Solid and systematic mechanisms to introduce green solutions; Solid and systematic engagement mechanisms with stakeholders and ID&T partners to create green solutions (green innovation).
Governance and empowerment	Creation of idea-generating environments Increased accountability for innovation and self-motivation Increased probability of successful innovation	High alignment between innovation objectives and strategic purposes (favoring the identities and motivations of employees); Solid, systematic and focused multidisciplinary interaction (inwards and outwards the Organization), covering the full innovation cycle; Strong commitment and natural involvement of all Organization's areas and levels to innovation; Consolidated processes for generation, identification, selection and evaluation of ideas and its continuous improvement; Rigorous and continuous methods of project monitoring, measuring results (also post-project) and feedback/ communication; Systematic and adequate incentives to recognize value added from innovation.
Wisdom deployment	Information exploitation improvement and increased capacity to implement competitive advantage generating strategies Increased idea sharing dynamics and the capacity to create innovation Maximizing the use of available / generated knowledge	Intense and systematic analysis of market information and trends; Constant research of existing cutting-edge knowledge and monitoring of relevant research that can be applied to the business; Strong involvement in the continuous production of knowledge (scientifical/ technical and best practices/ trends) with prestigious international recognition; Extended dissemination of wisdom within all Organizations' areas and levels, partner's network and market/ society; Systematic creation of convertible knowledge into business and wisdom (intra and extra sector); Solid appetence to reduce learning curves and to maximize the reuse of knowledge within the network of innovation partners.
Shareholders and strategic partners engagement	Greater assurance of continued investments Enlargement and increased confidence and motivation of the research partner's network Research cost sharing and increased exchange of know-how	Solid and systematic recognition by the shareholders and the entire network of innovation partners of the capacity to create innovation; Systematic exploration of new concepts and correlation of solutions, with competitors and among clients; Continuous identification of potential partnerships and cooperation's (national and international) able to leverage the business and/ or generate innovation; Strong capacity to mobilize strategic innovation partners and get commitment to innovation, risk and investment's costs sharing; High capacity to perpetuate involvement in scientific bodies/ research centers of international prestige and to integrate and boost innovation networks.
Business Proposition		
Customer relationship		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Trends and needs creation	Creation of market appetence for new products / services Reduced risk of inadequate value proposals Increased market share and competitive leadership (time to market achievement)	Solid and systematic competitors' evaluation, innovation and technology's market trend analysis and its application to the business context and to customers' expectation (systematic participation in fairs, technical committees, sectoral associations); High capacity to identify new opportunities and niche markets with specific needs and appetite for new products/ services; Systematic involvement of all relevant players of the value chain with clearly defined objectives about ideas generation and problem solving (new concepts research with competitors and with customers); Constant involvement of customers during the cycle of innovation and in experimentation initiatives; Strong and systematic monitoring of customers' perception about the value-added generated by innovation; Strong involvement of the media/ opinion makers even during the innovation process.

Customer and society recognition	Increased recognition as an entity that generates innovation Increased brand and product loyalty	Solid mechanisms based on objective and measurable criteria for systematic evaluation of customers and society recognition of the innovation provided by the Organization (innovation brand awareness); Continuous monitoring of the perception of clients, market and competitors about the Organization's capacity to create and disseminate/ share innovation; High capacity to convert clients' and society perceptions into tangible impacts at all levels of the Organization; Strong capacity to manage complaints and convert them into innovation, exceeding expectations.
Commercial focus		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Marketing and salesforce engagement	Increased confidence and relationship with customers Increased sales Reduced marketing and sales efforts due to the differentiation of products / services	Continuous deep knowledge of customers' profile and trends (systematic analysis of behavior and preferences); Solid customer segmentation by profile, by new preferences and by client return value; High capacity to stimulate curiosity and appetite for new products/ services (in all customer segments), and to convert desires into immediate needs; High ability to define and create differentiation factors in products and services (creation of distinguish/ innovative features and high capacity to transpose them into sales pitch); Solid and recurring customer engagement mechanisms in promoting innovation initiatives/ in dissemination of new products/ services; Strong capacity for a clear and continuous communication about new products/ services and about its differentiating factors; Solid and systematic implementation of innovative sales approaches/ exposure to customers, to the market and to society; Continuous adoption of new channels of publicity and communication with clients and markets; Solid and systematic mechanisms to introduce innovation in contracting processes.
Financial Stability		
Assets management		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Investments management	Continuous patrimony valorization Financial and business risk dispersion Return on investments maximization	Solid mechanisms of systematic enhancement of all existing Company's patrimony (continuous valorization of all assets); High capacity to diversify investments and reduce the risk of market exposure; Solid and systematic mechanisms for assessing the financial return of all new investments (either improvement or innovation investments), taking into account the calculation of its NPV (Net Present Value), break-even and its TCO (Total Cost of Ownership); High capacity to evaluate investments risks and to make reliable financial projections based on consistent and realistic assumptions; Solid and systematic mechanisms to identify alternative and new financial solutions and high capacity to generate return through financial applications (income earned from financial applications).
Financial solidity		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Financing ability	Increased ability to invest and to grow Increased bargaining power	High capacity of self-financing; High ability to access to diverse funding sources and credit access; Strong ability to negotiate interest rates and favorable conditions; Solid and systematic mechanisms to identify new models/ forms of financing; Solid and systematic mechanisms for renegotiating loans and high capacity to reduce financial costs.

Organization Wellbeing		
Human resources management		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Talent research and retention	Increased ability to attract and retain talent Talent allocation improvement according to innovation needs Increased capacity to offer exciting challenges	Rigorous and solid knowledge about the mix of skills required to meet the priorities of innovation; Strong relationships and ongoing commitment with talent suppliers (talent search entities - universities, technology and research centers, headhunters); Active and ongoing promotion and disclosure of career opportunities/ jobs, of ongoing and planed research projects, of innovation culture and innovation dynamics practiced in the Organization, of technical and scientific publications/ events/ innovations undertaken, and of the network of partnerships in which the Organization takes part.
Entrepreneurship	Creation of intellectual assets Transforming ideas into business Increased personal satisfaction and self-esteem	Continuous creation of relaxed environments and dynamics of spontaneous and planned creativity, to stimulate the creation of radical challenges and disruptive innovation and of ideas exchange/ experiences and experiments sharing; Strong commitment to multidisciplinary interaction among various cultures and different experiences at all levels of the Organization; High encouragement of experimentation at all Organization's areas and levels and support to business incubation (inwards and outwards the Organization); Strong orientation to grant employees opportunities for achievement and exploitation of their own ideas/ business (providing there is no conflict of interest); High clarity and strong joint commitment (at all Organization's areas and levels) on objectives and innovation results to be achieved; Consolidated and systematic mechanisms for assessing the satisfaction of employees involved in innovation practices, based on objective and measurable criteria.
Employee development and safety		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Talent preservation and valorization	Incorporation of trends and best innovation practices Reduced innovation cycle time Increased self-learning and enthusiasm for innovation	High critical mass of expertise in research/ development/ innovation at all Organization's areas and levels; Strong knowledge about the areas of expertise of each talent of the Organization, their motivations and preferences, their development potential and their place/ role within the planned innovation issues; Continuous research and consolidated relationship with the best/ leading-edge training institutions in innovation (international); High capacity to mobilize their employees for top training initiatives in innovation and creating specific programs to tackle specific challenges; Consolidated dissemination mechanisms of knowledge assimilated in training initiatives in innovation at all Organization's areas and levels; Solid and systematic evaluation mechanisms of the return of innovation training courses investments (financial and non-financial); High capacity to manage expectations and to reorient skills (at all Organization's areas and levels).
Respect and Recognition		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Corporate commitment to employees	Continuous employee engagement to innovation Increased complicity and reinforcement of team spirit Consolidation of relationships between employees and top management	Solid and systematic mechanisms to assess employees' involvement in innovation, according to consolidated performance criteria and based on commonly agreed innovation objectives; Solid definition of criteria to distinguish effort and dedication to innovation, based on principles of equity and justice, without any social discrimination and with recognition based on results (overall, team and individual); Strong capacity to give high visibility to the Organization's talents in various contexts and internationally; High organizational sensitivity to perceive and anticipate frustrations and discouragement before negative experiences of innovation, and strong capacity to reverse these situations (at all Organization's areas and levels); Continuous involvement of top management in the co-creation of relationships between the Organization and the employees' families to stimulate contexts of innovation and to recognize their contribution to innovation.

Operational Leanness		
Supply chain management		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Strategic Sourcing and procurement	Stimulus to the creation of more innovative raw materials Gains by economies of scale and by reducing processing costs Research cost-sharing	Solid and systematic mechanisms of strategic sourcing, based on an active and constant research of new/ alternative suppliers and solutions (sourcing, e-sourcing and e-tendering); High capacity to promote/ encourage the creation of innovative/ improved/ alternative raw materials/ methods/ services, jointly with suppliers; Strong commitment with suppliers to share risks and innovation investments; Solid and systematic mechanisms of e-procurement for major suppliers.
Operational logistic innovation	Incorporation of transport, handling and storage innovative solutions Increase of information integration and lead time reduction Decrease of logistic costs	Consolidated and systematic mechanisms to define and implement innovative strategies in the supply chain; High capacity to introduce innovation in transport modes and in handling and picking activities; High capacity to introduce innovation in storage solutions; High capacity to introduce innovation in operational information sharing systems and in information management mechanisms (along the supply chain).
Development, manufacturing and Service delivery		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
New product/ service research, design and deployment	Provision of innovative products and services Placing of competitive prices Increased awareness	High capacity to transpose ideas into product/ services (innovation effectiveness and high capacity to get benefit from time-to-market); Consolidated means and mechanisms for experimentation and conceptualization of pilot projects, prototyping, ...; Consistent mechanisms to rapidly scale prototyping for production/ services.
Methods, time and tools innovation	Increased process efficiency and reduced operating costs Lead-time and time-to-market reduction Increase of zero-defects	High capacity to introduce innovation in processes and in resources at all Organization's areas and levels; Solid and systematic introduction of innovative mechanisms in working practices/ methods, in production sequences and activities, material flow and in service provision, as well as in all inter-departmental relations; Solid and systematic mechanisms for introducing innovation in production equipment and support tools; Systematic introduction of innovation to maintenance methods and calibration of production and measurement equipment and support resources; High capacity to introduce innovation in innovation processes - to reduce innovation costs and time (along the innovation funnel).
Technological Alignment		
ICT solutions		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
ICT development engagement	Active participation in research and development in ICT Incorporating innovative competences in ICT Reinforcement of the positioning in the partners' network	Solid and systematic mechanisms for identification of cutting-edge/ new/ alternative technological solutions (equipment, infrastructure and software application) applicable to all Organization's areas and levels; High capacity to view the future and to develop/ implement/ adopt ICT solutions to address business challenges; High capacity to joint ICT innovation with ICT developers/ manufactures of reference; High capacity to convert ICT innovations developed internally into marketable solutions; Continuous and strong involvement with international reference ICT entities of reference, with practical effects in creating innovation in ICT.

ICT Services		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
ICT services innovation	Increased capacity to generate innovation in ICT services Encouraging innovation and entrepreneurship by way of example	Strong orientation for internal ICTs services innovation (considering cutting-edge solutions of ICT providers); Strong orientation for innovation of ICT internal relationships with internal customers of ICT services; Solid and systematic mechanisms of involvement of internal ICT customers in creativity and generation of internal ICT services innovation initiatives; High capacity to convert ICT's internal service innovation ideas into effective practices.
Facilities Suitability		
Facilities management		
Sources of enhancement	Impacts of high innovation (Leverage Factor)	Extremely high Proficiency Level (Intensity Enabler)
Facilities and security innovation	Increased recognition as a sophisticated and innovative Organization Improvement of ergonomic issues Introduction of environmental and safety solutions	High capacity to generate innovation on the Organization's security and safety resources, procedures, equipments and systems; Consistent and systematic mechanisms to introduce innovative solutions for maintenance of facilities and support equipment; Strong orientation to introduce innovative solutions that reduce environmental impacts.

ANNEX 3 - Experts involved and their participation motivation

#	Name	Years		Key professional aspects	Involvement motivation
		Age	Experience		
1	António Angelo	66	41	Long career as auditor in several standards in Lloyd's Register, as well as coordinator and senior auditor in different sectors and countries	High operational knowledge (industry and services companies), expertise in quality and sustainability, international standards and focus on results, measurement and continuous improvement
2	Carlos Valente	46	> 20	General Manager of Pioneer Portugal, with high industrial experience	Overall business overview and effective industrial expertise, international relationships within the value and supply chain, knowledge about resilience and business models and management and operational tools, as well as about sustainability
3	Carlos Zorrinho	57	> 30	Member of the European Parliament, Politician and University Professor, was also the responsible for the implementation of the Portuguese Technological Program	Global overview of competitiveness, correlation between policy's (political point of view), academics and research, as well as technological impacts on real economy
4	Francisco Gil	41	> 17	Board Member and CCO of SATA (Azores Airlines), currently is the Chairman at Turismo dos Açores - Convention and Visitors Bureau	Expertise about global commercial challenges, negotiation, market needs and trends, as well as customer expectations and services provisioning
5	Helder Guerreiro	47	24	General Manager of Libbey Europe, with high industrial experience	Overall business overview and effective industrial expertise, international relationships within the value and supply chain, knowledge about resilience and business models and management and operational tools, as well as about sustainability
6	Isabel Andrade	50	27	Entrepreneur, currently owner of Bright Concept, with expressive experience on top management coaching and leadership	Knowledge about top managers' weaknesses, and lack of leadership skills, as well as people rights, motivation factors and human behavior
7	Jaime Quesado	49	> 25	President of ESPAP (Shared Services of Portuguese Public Administration), previously was Responsible for the Nacional Knowledge Society Operational Program, as well as Member of the Board of Clusters and Companies	Transversal overview of companies' challenges and maturity, with high knowledge about public and private business environments, expert in innovation, competitiveness and information society
8	João Gonçalves	49	20	Associate Professor (FFUL/ULisboa), and Group Leader/Principal Investigator at iMed-The Research Institute for Medicines	Expertise about continuous challenges of a cutting edge innovation company and about entrepreneurship. Responsible for development and commercialization of innovative medicines. Implemented drug discovery systems which resulted in two start-up companies in the pharmaceutical field.
9	João Gil Rodrigues	48	> 25	Senior Patient & Strategic Health Initiatives Manager at AbbVie Pharmaceutical (ex-Abbott), previously was Business Development Manager at the same company	Expert in marketing and business development, with high knowledge about competitiveness and product differentiation through innovation. Overview about international business management practices

10	Joaquim Ramalho	54	> 35	Consultant at Deloitte Consultants	High experience in several industries and service companies in diverse fields of management consultancy. Expertise in knowledge management, information research and data analysis
11	Jorge Gabriel	54	> 30	Member of the Board of FLAD (Luso-American Development Foundation)	High international experience about companies' global challenges, as well as a broad view concerning competitiveness and market environment. High expertise in innovation and cutting edge solutions
12	José Eduardo de Figueiredo Soares	64	> 40	EDP Group's Ethics Ombudsman. Previously, he held technical and management positions in the domains of centralized Procurement and Suppliers' management, corporate Quality, professional Education and Training, and Sustainability, among others, mostly in the Energy Sector. He is Honorary Member and past-President of the Board of the Portuguese Association for Quality, and was member of the Global Reporting Initiative (GRI) "Supply Chain Disclosure Working Group".	Global business view, with an impressive experience in several themes. Expert in Ethics, quality and procurement. High knowledge about sustainability and in GRI model.
13	Nuno Ferrão	50	> 27	Was Board Member of SAMS (Banking Health Care Services), currently is the Social Responsibility Director in BCP (Portuguese Commercial Bank)	Overall knowledge about management challenges on a service provider company, strategic planning and management tools. Expertise in social rights, ethics and organizational wellbeing
14	Nuno Santos	38	> 15	Currently is the Managing Director of GFI Portugal, previously was Board Member Turismo de Portugal being responsible for technology and training areas	Solid overview about technological consultancy and cutting edge technologies and ICT solutions. High experience as top manager with high skills in international reporting and business strategy definition and deployment
15	Pedro Gonçalves	54	> 29	Logistic Director at Galp Energia, SA	Expert in supply chain management. High knowledge about resilience practices, suppliers' partnerships and information sharing. Global vision about business's impacts due to operational (supply chain) performance
16	Pedro Rocha e Silva	45	> 20	Was Partner at Heidrick & Struggles, currently is Partner at Neves de Almeida Consultancy	Large experience about human capital value and talent search (head hunting). Overall vision about top management skills and about companies' needs concerning professional competences
17	Rosário Barroco	53	> 30	Finance Director at World2Meet Portugal, was Finance Direct of TUI Portugal, as well as Senior Auditor at Deloitte & Touche Portugal	High expertise in finance and international reporting. Knowledge about crucial indicators and about financial resilience and innovation practices
18	Vitor Calhau	55	> 30	Chief Operating Officer of Standard Bank of Angola, previously Country Manager of Leadership Business Consulting Angola	Overall vision about constraints and maturity of companies of developing countries. Solid experience in strategic and operational alignment and in change management, as well as in project management. High skills in management consultancy and in business development within different cultures

ANNEX 4 – Impact (advantage) indicators' definition and scope

Corporate Behavior (10)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
GDP contribution	Relevancy to national economy (average of n markets)	$\sum^{n}{}_{i}$ GVA$_i$/ National GDP$_i$ (1)	X			R/I
Employment contribution	Relevancy to national employment (average of n placements)	$\sum^{n}{}_{i}$ Nº of employees/ national employment rate$_i$ (2)		X		R
Cost of fines and compensations on gross revenue	Ethical consistency and legal compliance (fines due to environmental incidents, taxes & labor, infraction, scandals, …)	(Cost of fines and compensations/ Gross revenue) x 100	X	X	X	R
Awards index	Commitment to improvements and general society issues	0,2 x nº of recognized awards + 0,8 x nº of recognized indexes + average of indexes score (3)	X	X	X	R/I
Solidarity index	Engagement and empowerment to social issues	(Charity costs and donations/ total expenses) x total employee hours assigned to voluntary activities		X		R/I
Environmental index	Commitment to global warming and climate change reduction	(Total of gas emission x total of water consumption x total of energy consumption x total solid waste produced)/ GVA			X	I
Patents and trademark index	Innovation effectiveness	0,8 x nº of patents approved + 0,2 x nº of trademarks registered	X			I
Average innovation cycle time	Innovation efficiency	$\sum^{n}{}_{i}$ time since idea till launch of the new product or service$_i$/ nº of new products or services launched	X			I
Number of scientific publications	Relevancy to innovative and scientific knowledge (innovation recognition)	Nº of scientific articles published in recognized scientific journals (ex.: ISI)	X	X		I
Partnership and suppliers' satisfaction index	Network capacity and its recognition among partners and suppliers	$\sum^{n}{}_{i}$ (0,5 x bilateral business commitment + 0,5 x operational empowerment)/ n (4)	X	X	X	R/I

(1) GDP: Gross Domestic Product of each market

GVA: Gross Value Added (based on the revenues from the correspondent market)

GVA = Gross revenue - Cost of non-durable inputs purchased from other producers

(2) Placements: countries where the company has physical facilities

(3) NOTE: As recognized prizes (awards = prizes without scoring; and indexes = prizes with scoring) it should be understood those who have international visibility (ex.: EFQM, GRI, DJS Index, Innovation score, Great Place to Work, Leadership award)

(4) NOTE 1: Apply this index as an average of your strategic partners and core suppliers (20% of suppliers that represents 80% of purchases) to evaluate their satisfaction about the company's performance
NOTE 2: n = number of strategic partners + number of core suppliers
NOTE 3: Classify each criterion in a scale between (0 = very low satisfaction, and 10 = very high satisfaction)
Bilateral business commitment (out our effort and willingness to) = 0,4 x (share information) + 0,6 x (joint investment)
Operational empowerment = 0,4 x (joint problem solving) + 0,3 x (demand planning accuracy) + 0,3 x (flexibility = ability to attend to partners and suppliers' constraints)

Business Proposition (10)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
Market value perception index	Brand awareness and product and service value recognition	0,2 x price + 0,2 x product + 0,2 x process + 0,15 x people + 0,15 x promotion + 0,05 x place + 0,05 x physical environment (1)	X	X	X	R/I
Market share	Market presence and sales effectiveness	(Sales/ market sales) x100	X			R/I
Sales margin	Sales efficiency	((Revenue – Cost of Sales)/ Revenue) x 100	X			R
Sales of new products (and services) on total of sales	Capacity to convert innovation into business	(Sales of new products and new services/ total of sales) x 100	X	X	X	I
Sales of green products (and services) on total of sales	Ability to convert environmental commitment into business and introduce green solutions into the value chain	(Sales of green products and green services/ total of sales) x 100	X		X	I
Percentage of sales closed	Sales force efficiency (successfully sales)	(Nº of sales closed/ nº of total sales proposals) x 100	X			R
Average revenue per client (ARPU)	Capacity to generate profit in terms of customers	Total Revenue/ total nº of clients	X			R
Customer retention rate	Ability to generate customers' loyalty	((Nº customers at end of the year – nº of new customers acquired during the year)/ nº of customers at start of the year) x 100	X	X		R
Marketing expenses per customer on revenue	Effectiveness of marketing investments	Revenue/ (marketing expenses/ total number of customers)	X			I
Customer satisfaction index	Customers recognition and their performance evaluation	$\sum^{n}{}_{i}$ (0,2 x relationship + 0,3 x service reliability + 0,5 x product compliance)/ n (2)	X	X	X	R/I

(1) NOTE 1: This index reflects the company opinion about the market perception about its value proposition (concerning the average of its core products or services = 20% of products or services corresponding to 80% of revenue), based on the 7 P's of marketing mix.
NOTE 2: If the company is only a service provider, product and process should be merged in one with the weight of 0,3 and price criterion should have a weight of 0,3
NOTE 3: Classify each criterion in a scale between (0 = very low positioning, and 10 = very high positioning)
Price = on a perspective of value for money
Product = taking into account its quality, durability, reliability, usefulness, convenience and warranties
Process = concerning packaging and delivery
People = in terms of customer service
Promotion = on a communication perspective, advertising and special offers or discount policies
Place = in terms of commercial channels
Physical environment = considering customer interfaces suitability and comfort

(2) NOTE 1: Apply this index as an average of your core customers (20% of customers that represents 80% of sales or are considered as strategic customers), to evaluate customers' opinion about our performance
NOTE 2: n = number of core customers
NOTE 3: Classify each criterion in a scale between (0 = very low performance, and 10 = very high performance)
Relationship = 0,5 x (empowerment recognition = about our effort and willingness to share information, investment and risk) + 0,3 x (ability to solve problems) + 0,2 (availability to reduce costs)
Service reliability = 0,8 x (special orders responsiveness) + 0,2 x (invoicing accuracy)
Product compliance = 0,5 x (on-quality delivery) + 0,5 x (on-time delivery)

Financial Stability (10)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
Gross revenue	Capacity to receive money in exchange for its goods and services	Total revenue	X			R/I
EBITDA per employee	Productivity in terms of employee	EBITDA/ Nº of employees (1)	X	X		R/I
EBITDA profit margin (profitability)	Ability to generate profit, through higher prices based on quality advantage, perception or branding; or through lower product costs due to production efficiency or economies of scale	(EBITDA/ Gross revenue) x 100	X			I
ROA (Return on assets)	Efficiency to generate earnings (net income) using its assets	EBIT/ Total assets (2)	X			R
ROE (Return on equity)	Efficiency to generate earnings (net income) using stockholder's equity	EBIT/ Total stockholder's equity	X			I
RoPDE (Return on product development expense)	Innovation effectiveness (ability to generate earnings by new products or services)	(Gross Margin – PDE)/ PDE x 100 (3)	X	X	X	I
Debt-to-assets ratio	Leverage ratio or debt dependency (proportion of assets financed by debt)	(Long-term debt + Short-term debt)/ Total assets	X			R/I
Quick assets ratio (acid-test ratio): Liquidity	Ability to meet short-term obligations	(Current assets – Inventories) / Current liabilities	X			R
Interest coverage ratio: Solvency	Ability to meet the interest expense on its debt with its operating income	EBIT/ Interest expense	X			R
Cash to cash Cycle	Length of time from cash out to cash in, i.e.: the amount of cash needed to fund ongoing operations	Average Inventory/ (COGS/ days) + Average receivables/ (Sales/ days) – Average Payables/ (COGS/ days) (4)	X			R/I

(1) EBITDA = Revenue - Expenses (excluding tax, interest, depreciation and amortization)

(2) EBIT = Operational income = Revenue - Operating expenses = Net Income + Interest + Taxes

(3) Gross Margin (Gross profit) = Revenue – COGS
PDE (Product development expense) = Total innovation costs
NOTE: In case of service innovation, PDE should include this costs

(4) COGS (Cost of Goods Sold) = Direct costs

Organizational Wellbeing (12)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
High qualified employee rate	Commitment to excel, continuous improvement, research and innovation	(Nº of employees with doctoral or master degree/ total nº of employees) x 100		X		I
Managerial rate	Organizational leverage level and its balance between managerial and operational function	(Nº of managers/ total of employees) x 100 (1)		X		R/I
Social equity index (gender and ethnic diversity, as well as employment of disables)	Commitment to social equity and its preconceptions about competencies and skills	0,5 x % female management + 0,2 x % female workforce + 0,2 x % ethnic employment + 0,1 x % of disable employment (2)		X		R
Salary average	Ability to attract and retain high qualified workers and to be recognized as an employer of reference	Total salary/ total number of employee	X	X		R/I
Personnel costs on total costs	Relevancy of personnel costs and its balance in cost structure	(Total personnel cost/ total costs) x 100	X	X		R/I
Local residents on total workforce	Relevancy to local employment and its concern about staff mobility	(Nº of employees with residence within 30 km/ total nº of employees) x 100		X		R
Training costs per employee	Commitment to continuous training and development of employees' skills to promote improvements and innovation	Total training cost/ total nº of employees		X		R/I
Absenteeism rate	Empowerment to employee motivation and culture reinforcement	(Total of non-worked hours/ (Total nº of employee x total hours of planned work)) x 100		X		R
Employee turnover rate	Vulnerability to employee churn	(Nº of separated employee/ Average of employee) x 100		X		R
Carbon footprint per employee	Capacity to reduce carbon emission	Total carbon emission/ total nº of employees			X	I
Employee performance evaluation index	Ability to achieve goals and to solve gaps	0,5 x management performance average + 0,35 x productive staff performance average + 0,15 x supporting staff performance average (3)		X		R/I
Employee satisfaction index	Commitment to employees' expectations	0,5 x management satisfaction average + 0,35 x productive staff satisfaction average + 0,15 x supporting staff satisfaction average (4)	X	X	X	R

(1) NOTE: As managers should be considered the board, 1th, 2th and 3th level of directors

(2) % female management = (Nº of female managers)/ total nº of managers) x 100

NOTE: As top management should be just considered the Board and 1th level of directors
% female workforce = (Nº female employees)/ total nº of employees) x 100

% ethnic employment = (Nº of ethnic employees)/ total nº of employees) x 100

% of disable employment = (Nº of disable employees)/ total nº of employees) x 100

(3) Management performance average = $\sum^{n}{}_{i}$ (0,4 x goals achievement + 0,3 x leadership + 0,3 x sustainability commitment)/ n, where n = nº of managers

Productive staff performance average = $\sum^{n}{}_{i}$ (0,4 x work accuracy + 0,3 x empowerment + 0,3 x sustainability commitment)/ n; where n = nº of productive staff

Supporting staff performance average = $\sum^{n}{}_{i}$ (0,4 x work accuracy + 0,3 x empowerment + 0,3 x sustainability commitment)/ n; where n = nº of supporting staff

NOTE 1: Classify each criterion in a scale between (0 = very low performance, and 10 = very high performance)
NOTE 2: Leadership = 0,5 x ability to motivate and mobilize + 0,3 x ability to manage conflicts + 0,2 x capacity to create new leaders

NOTE 3: Sustainability commitment = 0,5 x innovation contribution + 0,5 x green commitment

NOTE 4: Empowerment = 0,5 x team spirit + 0,5 x availability

(4) Satisfaction average = $\sum^{n}{}_{i}$ (0,4 x company's recognition + 0,3 x new challenges and professional growth + 0,15 x opportunity to learn + 0,15 x values and culture)/ n, where n = nº of managers, n = nº of productive staff or n = nº of supporting staff

NOTE 1: Classify each criterion in a scale between (0 = very low performance, and 10 = very high performance)

Operational Leanness (11)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (Metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
Customer special orders responsiveness	Client orientation and capacity to respond to special and urgent requests	(On-time delivery of special orders/ Total nº of special orders) x 100	X			R
OEE (Overall Equipment Effectiveness)	Operational productivity	Availability x Performance x Quality (1)	X			I
Changeover time	Operational flexibility	Average time to switch manufacturing from making one product to making a different product	X			R/I
On-time delivery	Ability to comply to customer agreements (commitments compliance)	(Nº of orders totally completed and on-time/ total of orders) x100	X			R/I
Customer lead time	Overall responsiveness	Average time (in days) from customer's order placement to customer's delivery	X			R/I
Inventory turnover	Inventory management effectiveness	COGS/ Average inventory (2)	X			R
% of recycled material used as raw material input	Commitment to green supply chain	(Nº of recycled units of raw material/ total units of raw material used) x 100			X	I
Non conformity rate	Operational reliability	(Nº of defect units/ total units produced) x 100	X			R/I
Production maintenance productivity	Equipment maintenance efficiency	Gross Revenue/ production equipment maintenance cost	X			R/I
Downtime due to equipment failure	Maintenance effectiveness	(Hours of downtime due to equipment failure/ total operating capacity time) x 100)	X			R/I
Suppliers performance index	Ability to improve its downstream value chain	$\sum^{n}{}_{i}$ (0,2 x relationship + 0,3 x service reliability + 0,5 x product compliance)/ n (3)	X	X	X	R/I

(1) Availability = (Operating time/ planned production time) x 100

Performance = ((Total units produced/ (operating time/ ideal run rate)) x 100; where ideal run rate = theoretical production rate

Quality = (Units produced in compliance/ Total units produced) x 100

(2) COGS (Cost of Goods Sold) = Direct costs

(3) NOTE 1: Apply this index as an average of your core suppliers (20% of suppliers that represents 80% of raw materials value or are considered as strategic suppliers) to evaluate their performance
NOTE 2: n = number of core suppliers

NOTE 3: Classify each criterion in a scale between (0 = very low performance, and 10 = very high performance)

Relationship = 0,5 x (partnership empowerment = willingness to share information, investment and risk) + 0,3 x (ability to solve problems) + 0,2 (availability to reduce costs)

Service reliability = 0,8 x (special orders responsiveness) + 0,2 x (invoicing accuracy)

Product compliance = 0,5 x (on-quality delivery) + 0,5 x (on-time delivery)

Technological Alignment (5)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (Metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
ICT investment rate	Commitment to ICT up-grading and overall performance increase	(ICT investment amount/ (total investment amount – direct innovation investment)) x 100	X			I
ICT expense as percentage of total administrative expense	ICT management efficiency	(ICT expenses/ total administrative expense) x 100	X			R
Downtime due to capacity shortage or service unavailability	ICT management effectiveness and its ability to fulfill needs	(Hours of downtime due to shortage or non-capacity/ total capacity time) x 100	X			R
Downtime due to security breaches	ICT management effectiveness (in terms of security)	(Hours of downtime due to insecurity/ total capacity time) x 100	X			R
Number of systems integrated with other company systems	Ability to integrate ICT systems in its value chain	(% ICT suppliers' integration + % ICT customers' integration)/ 2 (1)	X	X	X	R/I

(1) % ICT suppliers integration = ($\sum^{n}{}_{i}$ Nº of systems integrated with supplier/ total nº of deployable systems)/ n; where n = number of strategic suppliers

% ICT customers integration = ($\sum^{n}{}_{i}$ Nº of systems integrated with customers/ total nº of deployable systems)/ n; where n = number of strategic customers

Facilities Suitability (4)

Impact Indicator	Evaluation Purpose (what is the company's …)	Calculation (Metrics)	Sustainability dimensions			R/I
			Economic	Social	Environmental	
Accidents and safety incidents	Safety effectiveness	(Nº of accidents + nº of safety incidents)/ 100.000 hours worked		X		R/I
Ergonomic and health costs rate	Commitment to employee health and capability to avoid occupational diseases	((compensation for injury, mutilation or deformity + absenteeism costs due to diseases)/ total personnel costs) x100	X	X		R/I
Facilities maintenance cost on total maintenance costs	Facilities maintenance efficiency	(Facilities maintenance cost/ total maintenance costs) x 100	X			R
Space productivity	Facilities efficiency	Gross revenue/ facility's square foot	X		X	I

APPENDIXES (Digital format)

PART A - System's templates and calculations regarding experts' and case studies' inputs

PART B - Experts' and case studies' data collection