



PROCESS MODEL FOR THE DIGITAL TRANSFORMATION OF SMEs



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A DIGITALISATION PROJECT OUTPUT

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“At least 40% of all businesses will die in the next 10 years...if they don’t figure out how to change their entire company to accommodate new technologies”

John Chambers
Executive Chairman, Cisco Systems

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Executive Summary

This document is a product of the “Digitalisation project”, a two-year project (2017-2019), which is funded as part of a "Strategic Partnership" within the EU “Erasmus+” programme. Its aim is to develop a tool that facilitates the processes of digital transformation in small and medium-sized enterprises across Europe.

We focused our efforts exclusively on supporting the needs and requirements of business services SMEs, helping them to adopt the main tools and advantages from an effective process of digital transformation. The use of the term ‘SMEs’ throughout the rest of this document refers to this market sector.

The main objective of this intellectual output is to develop a process model for the digital transformation of SMEs. A process model is an organisational tool that divides a process into different process units in order to simplify the solution of complex problems. It is a tool that supports the development and implementation of a change strategy, which in turn helps users to visualise the entire process of change.

Describing and guiding a transformation with a step by step approach helps with managing it. Because a process model is a tool for effective change, its development must be based on previously analysed theories of organisational change and change management. Moreover, in order to achieve successful results, it is recommended to take into account what is known about project management, risk management and knowledge management. In other words, firms should think about the **DT** process as a project, which has its own risks and knowledge implications.

On the basis of this theoretical foundation a practical online learning tool was developed, which you can use here free of charge: <https://digital-transformation-tool.eu>.

Introduction

According to the MIT Centre for Digital Business¹ – the world’s largest research centre focused on the digital economy - digital transformation is the third stage after the two major phases: (1) the birth of digital skills and (2) the use of digital tools in already existing processes. In this sense, digital transformation has more to do with the abandonment of previous work and business models than with the simple insertion of younger employees and artificial intelligence systems.

Digital transformation (hereafter also **DT**) is therefore a process of change which should be embraced by any type of firm regardless of its size or already accessible capabilities. Europe is characterised by a large number of small and medium-sized enterprises that often fail to seize new market opportunities because of a lack of required skills or resources. Nevertheless, SMEs, just like any other firm, need to be ready to enact this process of change in order to make their business processes more effective and efficient. SMEs need an innovative **self-learning tool**² that can be used directly from the workplace or on the move as it is available online. This– can help them to prepare the strategic setting of the **DT** process within the company and to initiate its implementation in operational processes. For that purpose, the present work will be structured in the following three parts:

PART 1: Introduction to the issue and to the tools that could be useful in a process of digital transformation. This is made up of three chapters.

Chapter 1 will introduce the relevance of digital transformation in today’s competitive environment both from a practical and academic point of view. It will then clearly explain what the target group of the project is, namely SMEs in the business services sector, and it will include a brief summary of the preliminary state analysis survey conducted across Europe.

Chapter 2 will illustrate specific initiatives undertaken by the European Commission in order to foster digital transformation.

Finally, **Chapter 3** will present the key theoretical background for organisational change, change management, knowledge management, project management and risk management since they are all considered essential for a **DT** process to be successful. The introductory section

¹ Founded in 1999, the MIT Centre for Digital Business is a strategic partnership between the MIT faculty and corporate sponsors. The MIT Sloan School of Management is one of the top management universities in the USA.

² Digitalisation online learning tool: <https://digital-transformation-tool.eu>

will then end by providing the reader with information about process models. In fact, developing a process model for the digital transformation of SMEs is the main goal of this work.

PART 2: Developing a **DT** Process for SMEs. This contains the more practical part of this output and it is made of three chapters.

Chapter 4 introduces the relevance of a current state analysis and suggests different steps aimed at understanding the current internal and external environment in which the process of change should take shape. It then outlines some of the main technologies and innovations currently available on the market.

Chapter 5 highlights the importance of revising the whole business model once the firm has a clear understanding of innovations, technologies and possible gains that could result from a correctly implemented **DT** process. The business model canvas is the main tool described in each of its aspects. Firms that do not have a clear business model in mind should take time to reflect on each point and rethink what must be changed for their **DT** process.

Lastly, **Chapter 6** discusses the main implications of a process of digital transformation. Firms should always be ready to change quickly and this has immediate consequences on organisational culture, employees' training and financial, strategic and operational activities.

PART 3: The digital transformation process model. This contains a graphic representation of the digital transformation process model, as well as some concluding remarks.

PART 1

INTRODUCTION TO THE ISSUE AND TO THE TOOLS THAT COULD BE USEFUL IN A PROCESS OF DIGITAL TRANSFORMATION

Chapter 1 – Digitalisation: Theory and Relevance in Today's Competitive Environment

Chapter 2 – European Policies on Digitalisation

Chapter 3 – Digitalisation and Organisational Change

Chapter 1 – Digitalisation: Theory and Relevance in Today's Competitive Environment

1.1 Relevance of the Issue

So far, the twenty-first century has been characterised by impressive dynamism and continuous change. Countries have seen their political, social, cultural and economic environment becoming more and more integrated with the rest of the world, losing boundaries and sometimes identities. This merger process, simply known as globalisation³, has completely changed the way in which businesses can approach the competitive landscape. Switching from local to global marketing and engaging in increasingly composite strategies is now on the agenda of almost every type of company, from multinationals and highly innovative born-global firms right through to traditional small and medium-sized enterprises.

It is because of this that companies who want to develop a sustainable, competitive advantage in an environment that is so crowded and complex have to do their best to attract and retain consumers, satisfying their existing needs, anticipating their new desires and creating new ones. Although this brief description of marketing efforts might seem to be nothing new for experts in the field, it has not yet been specified that the macro-change of the global environment has led to an equivalent change at the micro-level. In other words, the logical outcome of this increased flow of information, aided by ICT (Information and Communication Technology) and social networks, is that costumers are changing and becoming increasingly demanding. They expect higher quality, lower prices and a higher degree of control over corporate activities. As a natural result of the interaction with a more informed and conscious audience, companies need to work hard to build long-term relationship with the potential buyers of their goods and service. This can only be done by winning their trust.

In light of what has just been said, it is extremely easy to understand how businesses today are continuously changing in order to keep up with the times and not to lose their market share.

³ As defined by Martin Albrow and Elizabeth King in their book “Globalisation, knowledge and society” (1990), London, Sage: Globalisation “*is the process of international integration arising from the interchange of world views, products, ideas and other aspects of culture*”. Focusing on the economic aspect of globalisation, Alon and Jaffe in their “Global Marketing: Contemporary Theory, Practice, and Cases” (2013), McGraw-Hill Education write that it is “*the trend toward a single integrated and interdependent world*” and that it “*is driven by technology and made possible largely by information technology*”.

Innovations⁴, whether radical or incremental, are constantly being introduced to the market and have the result that **business rules are constantly changing**. This has a foundational implication for the market environment: changes in the competitive landscape basically provide an opportunity for SMEs to innovate and grow and to revolutionise their business models.

Globalisation, ICT developments and new technological products and services are just some of the drivers behind the new trend that is leading the global market: **digital transformation**. This is defined as a process of profound change of business and organisational activities, processes, competencies and models to fully leverage the changes and opportunities of a range of digital technologies and their accelerating impact across society in a strategic and prioritised way, with present and future change in mind.

There exists a need to seize the range of opportunities that new technologies could offer to every type of firm.

1.2 Brief Analysis of the Business Sector Competitive Environment

The issue is particularly relevant if we look at the European business services sector where 94% of companies are small enterprises with less than 10 employees.

The business services sector includes companies that range from offering technical services, i.e. architecture, IT and engineering, to other professional services, i.e. legal services, facility management, employment services⁵. They account for a significant proportion of the European economy, contributing to 11% of the EU GDP.⁶ Moreover, it is expected that by 2025, 30% of all EU employment will be within the business services sector (Cedefop, 2016).

In light of this, business services are particularly relevant when it comes to boosting European competitiveness and the “servitisation”⁷ of the economy. The European economy needs to foster

⁴ We define innovation as the *act of introducing a new device, method, or material for application in commercial or practical objectives*. Technological innovations are generally subdivided into radical innovations – meaning that they are totally different and disruptive with respect to existing products/processes - or incremental innovation – meaning that they just make some adjustments to existing products/processes (Shilling 2013).

⁵ Business services refer to: legal services; accounting, auditing and fiscal services; marketing and economic research, polling and statistics; business and management consultancy and related services; office-support services; recruitment services; printing and related services; business and business-related services in general.

⁶ European Commission, Growth – The European Single Market: Business Services

https://ec.europa.eu/growth/single-market/services/business-services_en

⁷ The term “servitisation” describes the strategy of creating value by adding services to products or even replacing a product with a service. It is the opposite of productisation of a service, which basically represents the evolution and standardisation of products. <http://productserviceinnovation.com/home/2010/09/10/what-is-servitisation/>

the growth potential of these small and medium-sized enterprises, helping them to face challenges, removing obstacles and stimulating competitiveness.

Accelerating the **DT** process is one of these important objectives, since it could enable the industry to increase their market share in the global market and foster growth.

1.3 Digitalisation – Conceptional Classification

Digital transformation is characterised by a fusion of advanced technologies⁸ and the integration of physical and digital systems, the predominance of innovative business models and new processes, and the creation of smart products and services.⁹ It is a process that is made up of at least two steps: (1) the *digitisation*¹⁰ of existing documentation and activities; (2) the automation of business processes. When considering this switch from paper-based documents and processes to *digital*, we could imagine that it is just a matter of productive processes, which will in turn remove manual labour where it is not efficient and effective anymore. The process of digital transformation, however, requires an even deeper change at the core of the organisation.

In his book “The Digital Transformation Playbook”, the faculty director of Columbia Business School’s executive education programme, David L. Rogers, states that “*digital transformation is not about technology, it is about strategy and new ways of thinking*”¹¹. The author defines five key strategic domains that must be completely restructured in order to maintain a strong competitive position in the digital world: **(1) Customers; (2) Competition; (3) Data; (4) Innovation; (5) Value.**

The following *table 1.1* briefly summarises what has already changed in each of these domains due to the shift from the analogue to the digital age.

⁸ With the term “new technologies” we are referring to the Internet of Things, big data, advanced manufacturing, robotics, 3D printing, blockchain technology, artificial intelligence, etc. Our learning modules on new technologies are available here: <https://digital-transformation-tool.eu/training/course/view.php?id=12&lang=en>

⁹ European Commission about growth, industrial policy and digital transformation available at https://ec.europa.eu/growth/industry/policy/digital-transformation_en

¹⁰ Digitisation is the automation of existing paper-based processes, moving them from an analogue to a digital format

¹¹ Rogers D. L. (2016) “The Digital Transformation Playbook – Rethink your business for the digital age”, Columbia Business School Publishing, New York, p. X

	FROM...	TO....
CUSTOMERS	<ul style="list-style-type: none"> ✦ Customers as mass market ✦ Communications are broadcast to customers ✦ Firm is the key influencer ✦ Marketing to persuade purchase ✦ One-way value flows ✦ Economies of (firm) scale 	<ul style="list-style-type: none"> ✦ Customers as dynamic networks ✦ Two-ways communications ✦ Customers are the key influencer ✦ Marketing to inspire purchase, loyalty, advocacy ✦ Reciprocal value flows ✦ Economies of (customer) value
COMPETITION	<ul style="list-style-type: none"> ✦ Competition within defined industries ✦ Clear distinctions between partners and rivals ✦ Competition is a zero-sum game ✦ Key assets are held inside the firm ✦ Products with unique features and benefits ✦ A few dominant competitors per category 	<ul style="list-style-type: none"> ✦ Competition across fluid industries ✦ Blurred distinctions between partners and rivals ✦ Competitors cooperate in key areas ✦ key assets reside in outside networks ✦ Platforms with partners who exchange value ✦ Winner-takes-all due to network effects
DATA	<ul style="list-style-type: none"> ✦ Data is expensive to generate in firm ✦ Challenge of data is storing and managing it ✦ Firms make use only of structured data ✦ Data is managed in operational silos ✦ Data is a tool for optimising process 	<ul style="list-style-type: none"> ✦ Data is continuously generated everywhere ✦ Challenge of data is turning it into valuable info ✦ Unstructured data is usable and valuable ✦ Value of data is in connecting it across silos ✦ Data is key intangible asset for value creation
INNOVATION	<ul style="list-style-type: none"> ✦ Decisions made based on intuition and seniority ✦ Testing ideas is expensive, slow and difficult ✦ Experiments conducted infrequently by experts ✦ Challenge of innovation is to find the right solution ✦ Failure is avoided at all cost ✦ Focus on finished product 	<ul style="list-style-type: none"> ✦ Decisions made based on testing and validating ✦ Testing ideas is cheap, fast, easy ✦ Experiments conducted constantly by everyone ✦ Challenge of innovation is to solve the right problem ✦ Failures are learned from, early and cheaply ✦ Focus is on minimum viable prototypes and iteration after lunch
VALUE	<ul style="list-style-type: none"> ✦ Value proposition defined by industry ✦ Execute your current value proposition ✦ Optimise your business model as long as possible ✦ Judge change by how it impacts your current business ✦ Market success allows for complacency 	<ul style="list-style-type: none"> ✦ Value proposition defined by changing customer needs ✦ Uncover next opportunity for customer value ✦ Evolve before you must, to stay ahead of the curve ✦ Judge change by how it could create your next business ✦ “Only the paranoid survive”

Table 1.1 Changes in key strategic domains while shifting from the analogue to the digital age (Rogers 2016, p.7)

1.4 “Research Question” and Objectives: Why are we developing this tool?

Digital transformation holds great opportunities for SMEs and can even level out inequalities between small and big companies. In any case, the current state of the European market shows that these enterprises often fail to embrace **DT** and that they are not able to properly implement the change process. This market, and the whole global economy in general, needs to receive tools to support those transformations. This is in line with the European goal of reaching a single digital market and their policy initiatives¹².

SMEs need an innovative **self-learning tool** that can be used directly from the workplace or on the move and that is available online. It should help them to prepare the strategic setting of the **DT** process within the company and to initiate its implementation in the company’s operational processes.

The main objective of this research is to lay the groundwork for the development of this tool through the explanation of each step that an SME should consider while developing its strategy for **DT**. More specifically, the project’s target group is composed of business services SMEs in the European market. As a matter of fact, the business services job sector is the fastest growing in all European countries and is mainly comprised of small and even micro-enterprises, which often lose competitiveness as they are penalised by their size. Just as all other industries, business services are challenged by **DT** and need deep and structured training.

Drawing on the “Think Small First” principle, this work will try to overcome the main obstacles faced by small enterprises in today’s competitive landscape such as, for example, the fact that the majority of new technologies are developed with large organisations in mind. Whereas large businesses allocate resources to external consultants who can train their staff for digital transformation, SMEs often fail to assess the risks and opportunities of digital transformation and do not possess adequate financial resources to finance long and expensive training courses or external consultancies.

On the basis of what has been stated so far, the project aims to:

- ✦ Sensitise the target group to the opportunities and risks of **DT** and the potential of all digital applications;
- ✦ Guide the target group throughout the process of developing and implementing a **DT** strategy in their business;
- ✦ Increase knowledge and competences;

¹² For a deeper explanation of EU policy initiatives and Digital Agenda for Europe see the following Chapter 2.

- ✦ Increase competitiveness and revenues;
- ✦ Help managers and employees to assess the effects of digital transformation on their business;
- ✦ Moderate the process of transformation.

In order to reach those goals, this document will:

- ✦ present a process model which introduces a systematic process to be implemented by SMEs facing a **DT** opportunity;
- ✦ review the theoretical foundation for change processes in SMEs.

1.5 Summary of State Analysis Results

In order to fully understand the current status of the European business services sector, an online questionnaire was developed and distributed in several EU countries. The following data comes from the interview report.

The questionnaire was divided into five (5) sections:

- ✦ Section 1: General Information
- ✦ Section 2: Strategy
- ✦ Section 3: Challenges
- ✦ Section 4: Technologies and Skills
- ✦ Section 5: Opportunities and Risks

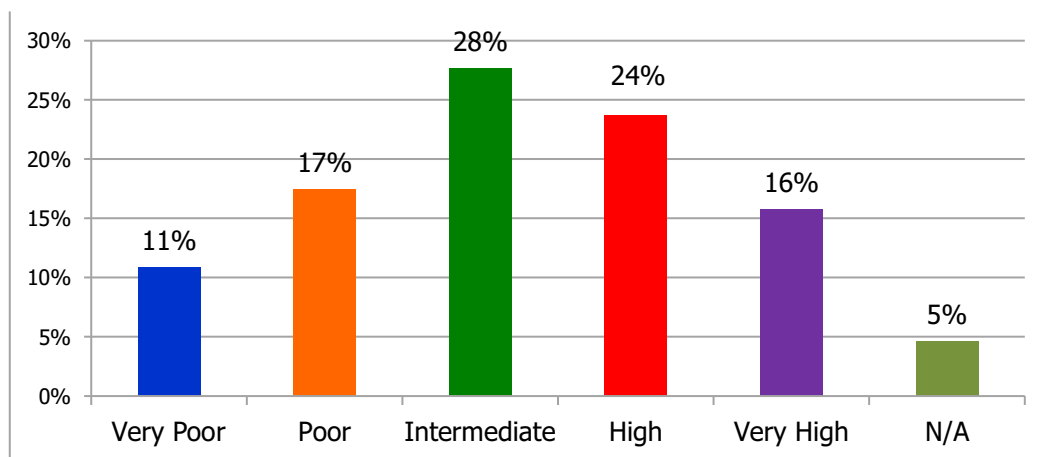
The respondents involved in this survey were 304 SMEs.

Most of the respondents (64%) were micro-enterprises. As defined by the European Commission's "User guide to the SME Definition", micro-enterprises are enterprises that employ fewer than 10 people and whose annual turnover or annual balance sheet total does not exceed 2 million euros. Most of the answers were given by top-level management (presidents, vice presidents, CEOs), people who play an important role in defining the company's strategy. Other job levels/job titles included administrative staff, company owners, IT technicians and consultants.

When answering the question "to what extent is digital transformation part of your company's strategy?" (Graph 1.1), a total of 40% (4 out of 10) of the respondents stated that they have

elements of a digital transformation strategy in their company's strategy (high/very high), whereas 28% (approx. 3 out of 10) stated that their company's strategy does not include a digital transformation strategy (poor/very poor). The rest of the respondents said that digital transformation is somewhat part of their company's strategy. For more than half of the companies, more could be achieved when it comes to digital transformation.

Despite the fact that 40% of the respondents stated that a digital transformation strategy is already included in their company's strategy (q.2.1), only 24% (high/very high) stated that their company has set up a structured framework for implementing such a strategy. Almost 50% (i.e. 140 companies) of the respondents indicated that the extent of implementation of a structured framework regarding **DT** is very poor/poor.



Graph 1.1 – “To what extent is digital transformation strategy part of your company's strategy?”

Digital initiatives such as transition from paper-based processes to digital processes and archival storage of electronic files seem to be used since almost 40% of the respondents indicated that their companies already implement digital initiatives at a high level. This is a first important step towards increased digitalisation.

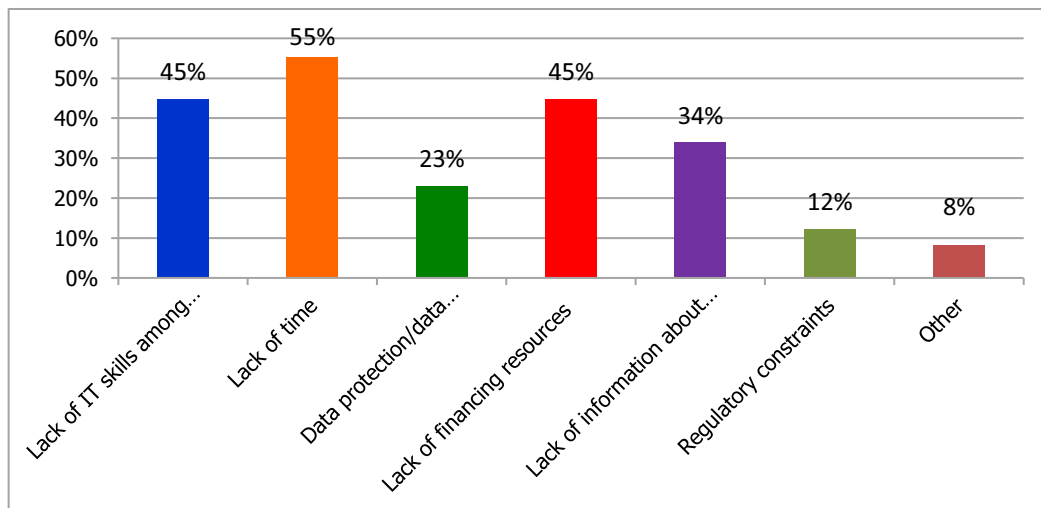
Alongside the 30% that stated that digital initiatives are implemented in their company (in an intermediate level), almost 30% of the companies said that their company does not implement these technologies.

Even though digital technologies appeared to be used by the SMEs to a moderately high extent (38%), there is still more to be done. 60% of the companies stated that these technologies are not used by their companies at a high level, if at all.

The general conclusion in terms of **strategy** is that an average of 30% of the respondents (intermediate level) are ready to move forward to digital transformation, but they most probably do not know how to do it or do not have the resources.

The main concerns and challenges faced by the surveyed companies, as shown by graph 1.2, are a lack of time, a lack of IT skills among employees and a lack of financial resources. These are considered to be the most common reasons restricting an SME's progress towards **DT**. Respondents also considered the amount of information regarding the possible benefits of digital transformation insufficient.

In addition to the above results, the respondents also indicated that **other** restricting factors include the small size of the company and the resistance to change amongst employees. Bad or no internet connection in some areas was also mentioned as a factor.



Graph 1.2 – “What factors restrict an SME’s progress in terms of digital transformation?”

Moreover, a lack of technological skill is considered the biggest challenge that an SME could face when it comes to digital transformation.

According to the report “ICT specialist in employment”, Eurostat, 2016, the employment growth rate for ICT specialists has remained on an upwards path averaging 3 % growth per annum since 2006, i.e. it was more than eight times higher than the average growth rate of total employment over the same period. According to the same report, 91,6% of the ICT skilled persons are already employed.

A lack of vision about the customer’s digital journey and resistance to change are also considered challenges by 21% of the respondents. Only 9% of the respondents stated that

leadership is considered a challenge. This is a relatively low percentage, but we need to take into account the fact that 62% of the respondents are from high-level management.

A respondent stated that exploiting digitisation requires resources, time and specialisation that may be unavailable to most SMEs. Others said that a lack of time, the size of the company, data security and a lack of a comprehensive strategy and support for implementation are considered challenges.

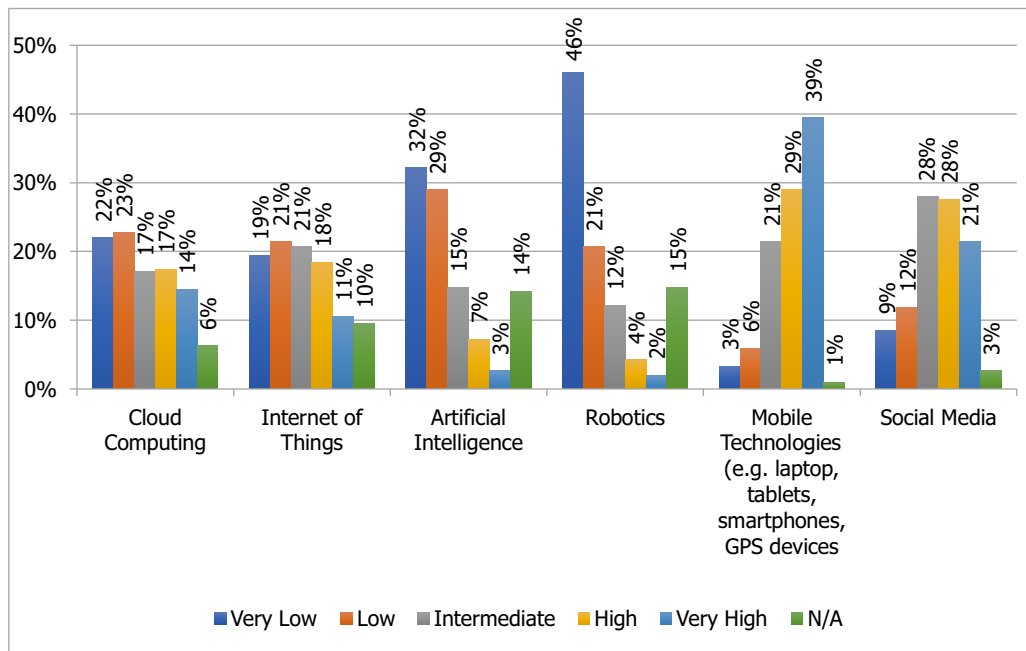
In general, the results show that the respondents understand that their company has a lot to gain from digital transformation. When answering the question *“Does your company have personnel with the skills necessary for the digital transformation of your company?”* 82% of the respondents stated that their company’s personnel has or has to some extent the necessary skills to execute the digital transformation of their company.

41% of the respondents totally agree that the ability to collaborate, to work together through idea sharing and thinking to accomplish a common goal is a significant skill for personnel to have if the company wants to proceed towards digital transformation.

Creativity, effectiveness, adaptiveness and writing skills (social media skills), as well as sharing IT knowledge across the company, score a high percentage of 42%. It is interesting that these skills are more personality skills and character traits, skills and traits that promote team work amongst employees. Mobile development skills and specialised data skills, in other words technical skills, are not scored as highly as other skills.

In terms of the types of technologies with which companies are already familiar (*Graph 1.3*), mobile technologies (laptops, tablets, smartphones etc.) are the most commonly known amongst the respondents since 9 out of 10 companies recognise them (intermediate to very high extent). Social media are also known to a high level.

Robotics, artificial intelligence and even cloud computing are seemingly unfamiliar to the companies. 67% (low/very low) for robotics, 61% (low/very low) for artificial intelligence and 45% for cloud computing.



Graph 1.3 – “To what extent is your company familiar with the following technologies (level of knowledge)?”

Even though the respondents seem to be familiar with digital technologies (Q.4.3), things are different when it comes to implementation. Companies don’t seem to be using technologies such as digital marketing, customer relation management systems (lack of vision of digital customer journey also scored high, Q.3.2) or enterprise resource systems.

The most frequently used technology are websites and social media at a lower level. These are considered basic digital technologies and do not introduce a real digital transformation.

Even if the surveyed companies recognise the opportunities provided by digital transformation, 63% stated that they haven’t explored how digital transformation might impact their company, a percentage that it is considered to be high.

Most of the respondents who stated that their company hasn’t explored how digital transformation may impact their company say that a lack of time, a lack of financial resources and a lack of information are the main reasons for not engaging in this. Others consider the small size of the company and the lack of personnel – 64% of the respondents are micro-enterprises – as a significant barrier. It’s interesting that some of the respondents stated that they are not keen to change the way they operate since no significant results are perceptible from transitioning from the current state of operations to digital operations.

In contrast to the companies that find there to be insufficient information about digital transformation, the companies that have explored and, in some cases, even started digitalising

their processes stated that through benchmarking, relevant seminars, training courses and conferences, they had access to necessary information. Other companies had used consulting services in the area of **DT**, whilst others had used a “trial and error” approach. It is commonly agreed that digitalising processes and procedures saves time, decreases the error rate, reduces costs, increases the level of teamwork and improves customer relationships.

When it comes to digitalising processes and procedures related to suppliers, distributors and customers, companies are much more informed. Market analysis, network discussions, information centres, newsletters, journals, conferences, workshops, consultation and training programmes are some of the methods that companies use to get information about this aspect of digital transformation.

Other companies use methods such as continuous communication with customers through questionnaires, day-to-day discussions, company meetings, “recording” the voice of the Customer, organising customer needs surveys and user environment assessments.

Taking it a step further, some companies stated that they have already introduced digital initiatives to their customers. Social media are used to inform customers and to interact with and receive feedback from them. Files and books are stored electronically (making them easier to find and requiring less storage space), as well as creating a virtual environment for ordering and electronic billing systems.

Analysing the results, it is commonly accepted that digital transformation has endless opportunities and numerous risks.

OPPORTUNITIES:

- ✦ Optimisation of business processes and procedures
- ✦ Improvement in quality and consistency. Increase in productivity and innovation
- ✦ Long-term cost reduction and cost-effective processes / efficiency gains
- ✦ Increased competitiveness and improvement of business models, company expansion
- ✦ Time savings / simplification and speed
- ✦ Direct contact with customers / suppliers / better customer journey
- ✦ New innovative and improved products / automation of standard services and creation of new capacities and business areas
- ✦ Shortening of production cycle / increase in market share / increase in capital turnover rate / safeguarding the future of the company
- ✦ Creation of new jobs / stronger internalisation

RISKS:

- ✦ Data protection / data loss / data misuse / hacker attacks / cybercrime
- ✦ Personnel reduction / minimising involvement of employees / lack of skilled workers / increase in unemployment
- ✦ “Perfect” dependence on electricity / technology / risk of total crash of IT systems
- ✦ High investment cost / training costs / high financial cost in ever-changing technology and time to adjust technologies and personnel
- ✦ Aggravation of digital bureaucracy / uncontrollability of information overload
- ✦ Loss of direct contact with customers / dehumanisation of customer relationships
- ✦ Regulatory constraints and requirements
- ✦ No differentiation between companies, no unique selling points

Chapter 2 – European Policies on Digitalisation

2.1 EU Policy areas and the Digital Single Market¹³

Europe could experience immeasurable growth by fostering the digital transformation of its businesses. In fact, the European industry is noticeably characterised by countless traditional sectors which could significantly benefit from an advancement in digital technologies. The process of digital transformation needs to be encouraged by institutional intervention. This is exactly what European institutions are trying to do through different policy actions aimed at pushing this development ahead.

As things stand, EU businesses are not fully utilising the advanced technologies and innovative business models that have arisen from the new *collaborative (or sharing) economy*¹⁴.

While high-tech, born-global firms are familiar with these innovations, traditional firms are still far from taking advantage of them. Disparities are one of Europe's main concerns, given that they also appear at any possible level of observation:

- ✦ at a European level: among countries
- ✦ at a national level: among regions
- ✦ at a market level: among small and medium-sized organisations versus bigger ones.

EU policy actions are subdivided into different technologies as they entail different implications. However, every intervention is made with a single, clear goal in mind: to create the European digital single market.

*“The digital single market strategy aims to open up digital opportunities for people and businesses and enhance Europe's position as a world leader in the digital economy”*¹⁵.

The main objective of the European Commission is to ensure that both individual consumers and organisations have the opportunity to access the digital market, i.e. all existing online services, under fair competition conditions, with no geographical barriers, where individuals are protected in term of privacy and firms are protected from copyright. *“A digital single market (DSM) is one in which the free movement of persons, services and capital is ensured and where*

¹³ This chapter draws on a section of the European Commission's website about digital transformation (http://ec.europa.eu/growth/industry/policy/digital-transformation_en).

¹⁴ “The collaborative economy, sometimes called the sharing economy, covers a great variety of sectors and is rapidly emerging across Europe. It provides new opportunities for citizens and innovative entrepreneurs. The European Commission is looking at how we can encourage the development of new and innovative services, and the temporary use of assets, while ensuring adequate consumer and social protection”

http://ec.europa.eu/growth/single-market/services/collaborative-economy_en

¹⁵ <https://ec.europa.eu/digital-single-market/>

the individuals and businesses can seamlessly access and engage in online activities”¹⁶, regardless of their nationality or place of residence.

The economic potential of such an initiative is enormous. From a company’s point of view this means that being able to expand your consumer basis, reaching a market of more than 500 million people. Furthermore, it is expected that a complete digital single market would provide 415 billion euros per year to Europe’s economy, creating new jobs and transforming public services. The strategy, part of the *Digital Agenda for Europe 2020*, was introduced in 2015 and includes 16¹⁷ specific initiatives that were only finalised in 2017.

2.2 Specific Initiatives

We will now go through some tech-specific European Commission initiatives: the digital transformation monitor; the Watify awareness campaign; the smart use of ICTs for SMEs; the strategic forum on digital entrepreneurship.

2.2.1 The Digital Transformation Monitor

The digital transformation monitor aims to foster the knowledge base on current state and evolution of digital transformation in Europe. The site provides a monitoring mechanism to examine key trends in digital transformation. It offers a unique insight into statistics and initiatives to support digital transformation, as well as reports on key industrial and technological opportunities, challenges and policy initiatives related to digital transformation. It identifies key trends in digital transformation and measures progress made at national and sector-specific levels¹⁸. It provides statistical and factual evidence on the pace of digital transformation in particular sectors and in all EU countries. It also analyses major national policy initiatives and supports policy development. Every year, the commission publishes a *Digital Transformation Scoreboard* (hereafter DTS) which measures progress on digital

¹⁶ <https://ec.europa.eu/digital-single-market/en/policies/shaping-digital-single-market>

¹⁷ Some of these initiatives include: parcel delivery, e-commerce, European platforms, collaborative economy, geo-blocking, big-data, standards and interoperability, intellectual property rights, e-government, etc.

¹⁸ Sectors analysed by the digital transformation monitor include both products and services. These are: automotive, mechanical engineering, healthcare and pharma, food processing, housing and aerospace. The key technologies are: artificial intelligence, Internet of Things, mobile, blockchain, augmented reality, 3D printing and autonomous cars. For further information see: <https://ec.europa.eu/growth/tools-databases/dem/monitor/>

transformation in EU countries and proposed country-specific policy recommendations. The DTS creates a detailed framework made by:

- (1) the analysis of national data from statistics offices and organisations
- (2) the development and analysis of a survey aimed at obtaining information about the state of the art of digital technologies adoption and eventual impact on companies' performance
- (3) the estimation of interest and acceptance of those new technologies
- (4) the general overview of policies regarding digital transformation.

2.2.2 The Watify Awareness Campaign¹⁹

The *Watify awareness campaign* aims to boost technological transformation through digitisation and the uptake of advanced technologies, especially key enabling ICT tools. It stimulates policy makers to work together with local businesses and other regions to launch and implement joint investment projects, notably within the framework of the smart specialisation platform on industrial modernisation.

It encourages the modernisation of the European industry. The campaign focuses on the technological transformation of traditional SMEs, promotion of regional digitisation, notably *Key Enabling Technologies*²⁰. Watify seeks to boost the rate of European industrial modernisation through increased productivity and efficiency, resulting in improved competitiveness and job creation.

2.2.3 The Smart Use of ICT

Being able to smartly employ information and communication technologies (hereafter ICT) is a critical factor for success. The “smart use of ICT” initiative refers both to manufacturing and services and encourages smaller firms to digitalise because the risk of engaging in an unsuccessful **DT** process is lower than the risk of being cut off from the market if digital technologies are not integrated in the firm's strategy.

¹⁹ <https://ec.europa.eu/growth/tools-databases/dem/watify/>

²⁰ Key Enabling Technologies (KETs) provide the basis for innovation in a range of products across all industrial sectors. They are key elements of European industrial policy since they underpin the shift to a greener economy and are instrumental in modernising Europe's industrial base by driving the development of entirely new industries. KETs include micro and nanoelectronics, nanotechnology, industrial biotechnology, advanced materials, photonics, and advanced manufacturing technologies. For further information see https://ec.europa.eu/growth/industry/policy/key-enabling-technologies/description_en

The European Commission is committed to improving conditions for the smart use of ICT in SMEs²¹. From 2008 to 2014 the Commission introduces 6 major demonstration actions to support the automotive, fashion, transport and logistics, tourism, agro-food and construction sector. The initiative resulted in simplified business processes, common data communication standards, better return on ICT investments and efficiency gains, which were even greater, as the firm was smaller.

ICT standardisation and interoperability are a precondition for the uptake of digital innovations. The challenge is to develop and ensure the adoption of European standards that ensure compatibility between systems and guarantee the competitiveness of European industry and the openness of ICT markets.

With the *Communication on ICT Standardisation Priorities*²² the Commission proposes to focus standard-setting resources and communities on 5 priority areas: 5G, Internet of Things, cloud computing, cybersecurity and data technologies. These are all considered essential for wider EU competitiveness. Action in these areas can accelerate digitisation and have an immediate impact on competitiveness in domains such as eHealth, intelligent transport systems and connected/automated vehicles, smart homes and cities, and advanced manufacturing.

2.2.4 Strategic Policy Forum on Digital Entrepreneurship

Developed between 2014 and 2016, the strategic policy forum on digital entrepreneurship was a think tank in the area of digital transformation and entrepreneurship, which involved businesses, politicians and academics to advise the EU Commission on key policy issues when promoting the adoption of digital technologies among countries. The forum delivered various reports²³ aimed at providing recommendations for better exploiting the opportunities provided by new technologies.

²¹In 2016, for example, it delivered a guide for regional and national authorities named “Fostering SMEs’ growth through digital transformation”. The whole document is available at <http://ec.europa.eu/DocsRoom/documents/19646>

²² <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016DC0176>

²³ “First report on strategic policy forum: Digital transformation of European industry and enterprises”, delivered in March 2015; “Accelerating the digital transformation of European industry and enterprises”, delivered in March 2016; “Big data and B2B digital platforms: The next frontier for Europe’s industry enterprises”, delivered in April 2016; “Blueprint for cities and regions as launch pads for digital transformation”, delivered in May 2016; “Upskilling European industry: New operational tools wanted”, delivered in July 2016; “A digital compass for decision makers: toolkit on disruptive technologies, impact and areas of action”, delivered in July 2016. All those documents can be found at https://ec.europa.eu/growth/industry/policy/digital-transformation/strategic-policy-forum-digital-entrepreneurship_en

2.3 The Unavoidable Precondition: Skills Acquisition and Development

Successful radical technological innovation implies disruptive technological change, modifying the face of the economy worldwide. An unavoidable precondition for this change to be effective and efficient is that workers are trained to fully exploit those technologies. There is an urgent need for workforce change and training to acquire the new skills required to be hired in the digital era.

A lack of knowledge and skills from workers in SMEs creates a bottleneck in the process of businesses' digital reinvention. It also means that enterprises find it difficult both (a) to train their existing employees and (b) to find a workforce on the job market that already possesses these skills.

It is precisely because of this that the European goal is to promote greater professionalism, high-tech skills – for example, the specialisation of workers on specific technologies such as Internet of Things or cybersecurity and cloud computing – and other related capabilities which are crucial for optimising the adoption of new technologies.

Chapter 3 – Digitalisation and Organisational Change

The process of digital transformation requires careful management since it involves a set of technological, organisational, cultural and social changes that impact the firm as a whole. For that reason, in order to reach satisfying results, it is not enough to passively adopt digital technologies throughout the organisation. Instead, it is important to be aware of the key organisational implications of embracing such a change in order to be able to manage the whole process in the best possible way.

For that reason, the present chapter will go through the main theories about organisational change, change management, knowledge management, project management and risk management which form the basis for a successful process of digital transformation. The chapter will then introduce the concept of process models and why they could be useful for managing DT.

3.1 Main Theories about organisational change

Organisational change is unescapable. Even the most successful company needs to continuously revise its strategy and execution in order to maintain its competitive position and not lose its market share. This is particularly true in today's competitive environment where the speed at which innovations are introduced has made flexibility and quick responses to new needs crucial for survival. When researching organisational change, some key questions are: Why do so many organisational change initiatives fail to deliver? How can organisational change processes be implemented in a way that ensures success?

Change is pushed by external environmental forces and it brings both risks, i.e. in terms of higher national and international competition, and increased market speeds, and opportunities, i.e. larger markets, fewer barriers and the increased internationality of businesses. An organisation could engage in 3 main types of change:

- (1) **occasional**: when it needs to react to sporadic modifications of market conditions;
- (2) **continuous**: when market changes occur more frequently, and periods of stability are not very long;
- (3) **radical**: when business rules are completely revolutionised and the whole organisation needs to be restructured.

Change occurs in different modalities and is always aimed at obtaining a strategic advantage. Richard L. Daft (2013) identifies four main typologies of change, which are summarised in table 3.1. Rather than being mutually exclusive, these four typologies are interdependent, meaning that changing one of them will often lead to other changes throughout the organisation. Literature commonly defines organisational change as the adoption of a new concept or behaviour. It starts with the perception of a need or an intuition. This is followed by the decision made by managers or holders of decisional power to adopt this change. The new decision should then be implemented. This requires (1) time, (2) resources, (3) the acceptance of employees and all relevant stakeholders. The third of these is particularly significant since organisational change starts with the individuals belonging to the specific organisation.

Organisational change is complex, so studies tend to explore the topic from numerous complementary or contradictory, but equally legitimate perspectives. The result is a somewhat bewildering fragmentation of theories about organisational change with widely different perspectives.

CHANGE TYPOLOGY	DEFINITION
TECHNOLOGICAL	Changes in the productive process of an organisation, which involves its knowledge and skills. Aimed at providing efficacy and efficiency through the productive process.
PRODUCTS AND SERVICES	Changes relative to the final output of the firm. New products and services could derive from small variations of existing products or they could be completely new. Aimed at gaining market share or reaching new markets, consumers or clients.
STRATEGICAL AND STRUCTURAL	Relative to the overall management of the firm. Those changes affect organisational structure, strategy, policies, reward systems, coordination systems, control, advisory and so on. They are generally implemented with a top-down approach.
CULTURAL	This refers to changing values, norms, attitudes, opinions, ways of thinking which permeate the whole organisation and thus influencing the workforce's behaviour.

Table 3.1 Types of changes – Adapted from Daft (2013). Source: Joseph E. McCann (1991) “Design Principles for an Innovating Company”, Academy of Management Executive, 5, 76-93

3.2 Change Management

In order to manage an effective and successful change it is important to **develop a clear reason, vision, and plan for change**. The plan should be piloted and executed in waves. It is also supposed to be open to changes based on feedback. Encourage opportunities for all employees to speak up. It is then useful to **create a road map with short-term and long-term goals**. Include change agents and look for sponsorship from company executives. Develop communication actions with consistent messages, because trust is the most important dynamic during any period of change. Set and celebrate milestones and acknowledge the importance of recognition. Finally, it is important not to forget to **make and keep all change management human-centric**. Change brings great opportunities for learning, enhancing people's skills, and developing a company. Only by thinking and acting differently will organisations be able to compete and remain sustainable for the future.

Don't forget that managing change means managing an uncertain phenomenon. Decision makers usually do not have enough information about future external changes and these are particularly difficult to predict. This is why it is important to clearly define the purpose of the process of change. Afterwards, don't forget to engage in transformation processes that are functional and coherent with the overall corporate strategy: the final goal of change should be clarified at all levels of interaction, whether individual, team or company, so that everyone is able to understand its relevance.

The goal is also to adopt the right methodological approach for the reengineering of service processes and in particular:

- ✦ to supplement the current methodology with an innovative and truly applicable planning of information systems and technologies;
- ✦ to apply existing processes to both radical change or minor improvements;
- ✦ to apply step by step interventions aimed primarily at restoring efficiency;
- ✦ to apply step by step actions aimed at improving the quality of products/services provided;
- ✦ to be more flexible in concrete ways, allowing the organisation adapt to a new specific situation, also becoming more scalable in complex processes that often involve a plurality of people;

- ✦ to move to a pragmatic and results-oriented approach, adopted by the subjects of change, and able also to enrich the culture and climate of the organisation²⁴.

3.3 Knowledge Management

Knowledge has always been considered an important resource for man and it has even become essential in the productive contexts of companies in the modern world, characterised by globalisation and intense competition regimes. The ability to know how to cultivate, transmit, conserve, in a word, to manage, has become increasingly important over time. Companies that operate in high-speed innovational contexts know that in order to achieve a sustainable competitive advantage it is necessary to continuously create and develop new skills and knowledge.

The term knowledge management (hereafter also KM) emerged in academic literature during the late nineties. Knowledge and knowledge management are complex and multi-faceted concepts (Alavi and Leidner, 2001) which have been defined in various different ways. *Table 3.2* summarises some of the perspectives on knowledge and their managerial implications.

²⁴ Casalino N. (2014), Learning to Connect: A Training Model for Public Sector on Advanced E-Government Services and Inter-Organisational Cooperation, *International Journal of Advanced Corporate Learning (IJAC)*, Volume 7, Issue 1, pp. 24-31.

Perspective	Description	Implications for Knowledge Management (KM)
Data and information	Data is facts, raw numbers. Information is processed data. Knowledge is personalised information.	KM focuses on exposing individuals to potentially useful information and facilitating assimilation of information.
State of mind	Knowledge is the state of knowing and understanding.	KM involves enhancing individual's learning and understanding through provision of information.
Object	Knowledge is an object to be stored and manipulated.	Key KM issue is building and managing knowledge stocks.
Process	Knowledge is a process of applying expertise.	KM focus is on knowledge flows and the process of creation, sharing and distributing knowledge.
Access to information	Knowledge is a condition of access to information.	KM focus is organised access to and retrieval of content.
Capability	Knowledge is the potential to influence action.	KM is about building core competencies and understanding strategic know-how.

Table 3.2 Knowledge Perspectives and KM implications. Source: Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS quarterly*, p. 111

KM is a process of various activities, which can be summarised in the following four main tasks: (1) creating; (2) storing/retrieving; (3) transferring and (4) applying knowledge. Digital transformation requires the creation of new knowledge and therefore requires all the subsequent steps to be performed throughout the organisation. After the emergence of social web and powerful communication and digitalisation technologies, it has become clear that the care and promotion of individual knowledge within a firm is decisive, and that firms should promote their knowledge with specific policies focused on the concepts of *socialising, sharing and collaborating*.

3.4 Risk Management

Organisational concerns in terms of economic performance and professional reputation, as well as environmental, safety and societal outcomes, are often influenced by risks simply embedded into everyday life. It is therefore important to effectively manage risks, especially in an environment that is full of uncertainty. Companies must have multidisciplinary skills and knowledge if they are to keep performing well despite external threats. The digital era complicates and increases business risk concerns.²⁵

In Europe, although around 80% of newly founded enterprises survive their first year of existence, only 44% survive more than five years, according to the Eurostat business demographic statistics. A ‘Lack of planning’ has been identified as the top reason for business failure. Like other organisations, small and medium-sized enterprises (SMEs) are exposed to risks. But only 30% of them actually have a plan on how they would respond and manage if a risk or threat were to become a reality.²⁶

The term risk could have different meanings depending on the perspective of the user and the purpose for which it is analysed. For example, a quantitative definition of risk states that it regards the possibility that a random variable is realised differently from the expected value, so a quantitative phenomenon is risky if there are many different output possibilities and the higher the range of opportunities, the greater will be the riskiness.

²⁵ For example, poor training and understanding of software solutions; poor deployment of solutions; poor user requirements; poor solutions flexibility; dependency on country – city infrastructures (power etc); dependency on key suppliers (e.g. telecommunications, cloud services, electronic payments); technology failures; natural disasters / local disasters; computer crime; cyber threats; people dependency.

²⁶ For example, a PwC survey on information security breaches revealed that: (a) 76% of SMEs faced a security incident in 2012; (b) In more than half of these cases, the incident was serious; (c) An average of between €21,000 and €42,000 was lost when dealing with the consequences of these serious incidents. Source: <https://cassandra-resilience.eu/limesurvey/index.php/671629?lang=en&encode=>

Risk is a current possibility (uncertainty) that may become a reality in the future and, if it occurs, may have a positive or negative consequence (impact) on/for your business²⁷. More generally, it may take the form of:

1. Probability
2. Degree of Uncertainty
3. Varying outcomes
4. Variance from predictions or expectations

ISO 31000 defines risk as the effect of uncertainty on objectives²⁸: the effect is a deviation from the expected and it can be positive, negative or both, and can address, create or result in opportunities and threats. Risk is considered pure when there exists no chance of gain, but there is only a chance of loss or no loss. Instead, it is defined as speculative when the chance is to lose or gain something. In the case of business opportunities of course the type of risk faced is speculative: if the envisioned opportunity is the right one for your business, then you could obtain numerous gains in terms of efficacy and efficiencies.

Risk management is defined as the systematic process of identifying, analysing and responding to risks²⁹. It is aimed at minimising the probability of negative events which could damage the organisation and, on the contrary, it wishes to maximise the probability of positive events.

Developed between 2015 and 2017, the CASSANDRA Project³⁰ was aimed at helping SMEs in the business services sector manage risks, given that even if they are exposed to the same level of risk as big companies – i.e. could be hit by computer viruses, information hacking, loss of key personnel, fires or earthquakes or any other form of disaster or failure – they are more vulnerable because they usually have a lack of awareness about possible risks or a lack of resources to deal with them.

The standard risk classification involves 6 classes of risk: (1) economic, which arises from the whole economy so from operations, finance, marketplace etc.; (2) legal, which is inherent to

²⁷ ISO Guide 73:2009, definition 1.1; Principles of Risk Management, CRMI, the National Alliance for Insurance Education and Research, 2014; Cassandra Project Guide, 2017.

²⁸ <https://www.iso.org/iso-31000-risk-management.html>

²⁹ Definition from CASSANDRA Project (2017), Guide on Business Resilience – for small and medium-sized enterprises, available at <https://cassandra-resilience.eu/moodle/local/cassandra/guide.php> and “A Guide to the Project Management Body of Knowledge” (PMBOK Guide) 2000 Edition; Project Management Institute, Four Campus Boulevard, Newton Square; PA 19073-3299 USA

³⁰ “CASSANDRA” is a European project developed in a Strategic Partnership within the EU “Erasmus+” programme. The main goal of the project was to improve the business resilience of SMEs. The word CASSANDRA is an acronym for “Continuity and Security for SMEs Active in Neutralising Dangers and Risks affecting their Activities”.

compliance or legislative liabilities; (3) political, which could occur in case of changes in law or government policies; (4) social, which arises from image damage or negative public relations; (5) physical, related to property, people or information; (6) juridical, if inherent to court's decisions.

One of the CASSANDRA project outputs was an effective risk management process³¹ made of 7 Steps:

1. Initial preparation: an opportunity for the firm to decide how to approach risk management.
2. Understanding your risk environment: the risks that a business faces depend very much on its nature. The first step towards business resilience should be to examine and consider the particular characteristics of the business and of the environment in which it operates.
3. Identifying your company's risk: failure to identify a specific risk means that none of the following steps can be applied to that risk. The results of a risk identification effort may be more productive (in terms of the number of risks identified) if this is carried out by an expert. It is important to keep in mind that risk identification only provides a picture of the company status within a specific timeframe. It won't be able to convey the firm's risk in a subsequent period. It is good practice to create a risk register document.
4. Prioritise your risks: the risk register makes it possible for you to have a good overview of the basic risks identified. It is then necessary to engage in risk prioritisation, which requires calculating and evaluating the probability (likelihood) and impact (consequences) of each risk.
5. Decide on measures: this step answers the questions "which procedures and techniques will enhance opportunities and reduce risks? What are the specific measures and treatments that will minimise exposure to risk?". Possible treatment strategies are: avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk; taking or increasing the risk in order to pursue an opportunity; removing the risk source; changing the likelihood; changing the consequences; sharing the risk with another party or parties (including contracts and risk financing); retaining the risk by informed decision.

³¹ cassandra-resilience.eu

6. Implement measures: after identifying, analysing and evaluating the risks and after having planned how to treat these risks, it is time to implement the defined measures. This implementation plan must be fully authorised by the management.
7. Monitor and review: step 6 concludes a risk management “life cycle”. It is then important to start the cycle again periodically in order to ensure the highest possible level of resilience for the firm. Monitoring risks involves knowing their status. Controlling risks involves carrying out the risk management plans as risks occur. The main outputs of risk monitoring and control are corrective actions and changes in risk treatments, periodical monitoring of residual risk, new risks and evaluation of effectiveness of risk response planning.

3.5 Project Management

Regardless of their size, all firms carry out work of some kind or other, resulting in operations or projects or both. These daily activities are performed by people who have limited resources, and they are generally planned, executed and controlled on a daily basis. In a **DT** process, being familiar with project management theory is a prerequisite since projects are often applied to manage strategic plans and to obtain the desired results. Unlike other activities, *projects are temporary, and they are undertaken to create a unique product or service*. They are usually introduced to develop or launch new products or services, to make changes to the firm’s structure, staffing or style, or to implement a new procedure or process.

Projects are performed at every organisational level, with small teams or very big ones. They can last from a few months to several years and can be directed to specific units or to the whole organisation. They may even go beyond the boundaries of the firm if performed in collaboration with other firms. Projects are developed progressively so that each aspect is organised in detail and each step comes as a consequence of the one before it.

“Project management is the application of knowledge, skills, tools and techniques to project activities, to meet project requirements”³². Project processes start with the initiating phase, which is followed by planning, execution, control and closing.

Digital transformation does not mean managing one simple change but multiple changes. It therefore requires more effective management of time, costs and scope.

³² PMBOK Guide 2000 Edition, p. 6

DT is about innovation and business efficiency. It makes it necessary to find out about the plans and ideas of people within the organisation, to maintain control over everything they do. Many changes could happen in different parts of the firm and, in an SME, these should be more controllable than in bigger firms.

The required investments and efforts perhaps already made in the pursuit of improved collaboration and activities can lead to an exchange of capacity between different organisations. The level of cooperation often remains far from adequate, however, and leads to problems and difficulties caused by a lack of interoperability. Transparency means knowing the reasons, facts, and logic behind the decision that is being made³³. Unfortunately, organisations continue to operate in a highly fragmented manner, leading to a delay in the delivery of services, a lack of transparency in bureaucratic procedures, and filling out numerous forms with identical sets or subsets of data.

The most important issue is to create a vision that is spread within the organisation and that is not only focused on top executives as project managers. Team engagement is fundamental for providing the firm with all it needs for a successful **DT** process. In fact, disengaged people are one relevant and tricky threat for a company engaging in a process of change since they are the most important drivers of transformation, both in terms of making changes happen and in terms of maintaining the obtained result. Regardless of the way in which you define your project, in today's environment almost everything is related to digital technologies and businesses need to grow in this context. They may be helped and supported throughout the process by technology itself.

3.6 Introduction to Process Models

Once the main theoretical implications of **DT** are clear³⁴, it is noticeable that digital transformation is a process that requires careful management and deep commitment in order to obtain the desired results. The further step is to introduce an organisational tool which is useful in simplifying complex problems, namely process models.

A business process is a set of activities that occur in any business to generate a product or service, achieving a particular goal. They should seek to meet the strategic objectives of the

³³ Casalino N., D'Atri A., Braccini A.M., A management training system on ISO standards for organisational change in SMEs, International Journal of Productivity and Quality Management (IJPQM), Inderscience Publishers, USA, vol.9 is. 1, 2012.

³⁴ i.e. it is a change process which can be managed as a project that implies new knowledge creation, spread and management, flexibility throughout the firm and its members, and effective risk management.

company. We can obtain a more efficient organisation if we are able to improve processes. To this end we must know them in detail because in many cases, the processes are not explicit or are very complex involving several offices/people. It is necessary to model each process to see how the activities are conducted, who the participants are, what the resources are and which information is shared. Once the modelling is complete, it can provide a better understanding and lead to possible business improvements.

In order to better focus on the key process component, a manager must consider three important points of views:

1. Organisational model: *who* is going to do each specific activity?

This step involves identifying actors, users, offices and functional units involved in the process.

2. Process model: *how* will the process work?

This second perspective concerns the ways in which the process is managed (i.e. internally/externally, or the level of interaction)

3. Information treated: *which information are needed?*

3.6.1 Definition and How They Can be Used

A process model is an organisational tool that divides a process into different process units in order to simplify the solution of complex problems. It is a tool that supports the development and implementation of a change strategy, which helps the user to visualise the whole process of change.

Describing and guiding a transformation with a step-by-step approach will help with managing it. Because it is a tool for effective change, the development of a process model must be based on the previously analysed theories of organisational change and change management. Moreover, in order to achieve successful results, it is recommended to take into account what is known about project management, risk management and knowledge management. In other words, firms should think about the **DT** process as a project with its own risks and knowledge implications.

Due to the increasing complexity of the economic scenario, a tool of this nature is particularly useful in helping companies make fast decisions without sacrificing current performance and final results. The process model empowers companies to be efficient in decision-making, saves time and costs, optimises ideas and innovations, and helps to structure the whole activity.

The definition provided by Oracle, Gartner and other strategic consulting firms' websites describes the “**business process management suite (BPMS)** as a tool for designing,

implementing and improving an activity or set of activities that will accomplish a specific organisational goal. The software can help managers provide continuous improvement for business processes by providing process discovery and modelling tools, business rules engines, workflow engines, simulation and testing tools. Business process professionals, business analysts, developers and IT workers can all utilise a BPMS to effectively improve organisational productivity, efficiency, effectiveness and hopefully, profitability”³⁵.

There are 4 types of coverage for a process model:

- ✦ **Activity-oriented:** related set of activities conducted for the specific purpose of product/service definition; a set of partially ordered steps intended to reach a goal.
- ✦ **Product-oriented:** series of activities that cause sensitive product transformations to reach the desired product.
- ✦ **Decision-oriented:** set of related decisions conducted for the specific purpose of product definition.
- ✦ **Context-oriented:** sequence of contexts causing successive product transformations under the influence of a decision taken in a context.

At the same time, literature identifies different types of processes:

- ✦ A **strategic process** is often creative. It requires people’s ideas and strong cooperation among members of the organisation. The process implies: (1) the creation of alternatives, (2) the comparison of proposed alternatives; (3) the selection of the desired output. For example, it may involve investigating alternative ways of doing something and eventually producing a plan for doing it.
- ✦ A **managerial process** is useful for the achievement of a company’s goals. In other words, it consists in the methods and tactics adopted in order to achieve a specific objective.
- ✦ An **implementation process** is the easiest one, since it is directly concerned with details of the *what* and how everything is managed.

³⁵ “A BPMS supports the entire process improvement life cycle — from process discovery, definition and design to implementation, monitoring and analysis, and through ongoing optimisation. Its model-driven approach enables business and IT professionals to work together more collaboratively throughout the life cycle than is possible with other approaches to solution delivery.” Definition of Business Process Management Suite (BPMS) available at <https://www.gartner.com/it-glossary/bpms-business-process-management-suite>

Figure 3.1 summarises the three different processes in a hierarchical representation:

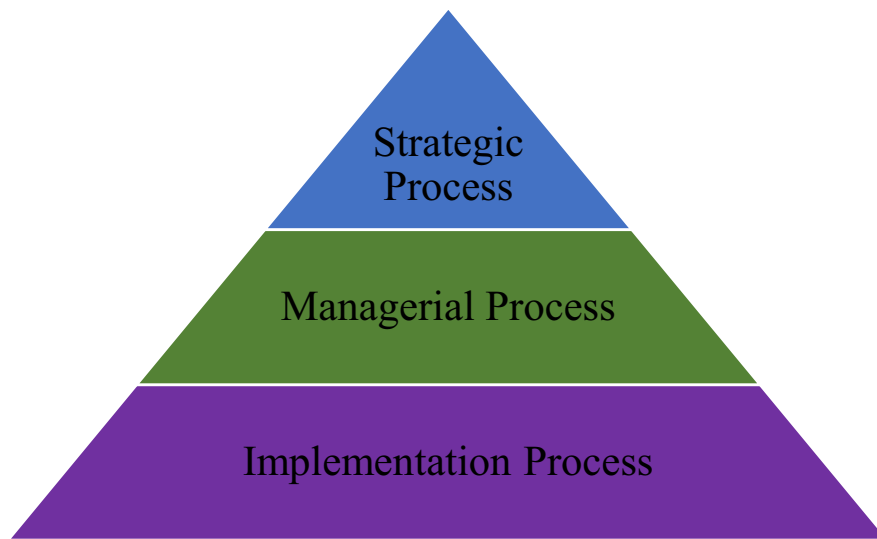


Figure 3.1 – Hierarchy of processes within the organisation.

Business process modelling (BPM) is the analytical representation or illustration of the organisation’s business processes. It can therefore be used to map out an organisation’s current (or “as-is”) processes to create a baseline for process improvements and to design future (or “to-be”) processes, which incorporate those improvements.

3.6.2 Why are they useful in a process of digital transformation?

To realise the full benefits of the **DT** of processes and decisions, SMEs need to ensure that systems, processes, and behaviours are well suited to their intended purpose.

In most SMEs, current processes have been adopted organically, without a clearly designed end state, meaning that process flows are not always rational or efficient.

Operational structures will need to be redesigned before **DT** and decision support can be enabled accordingly.

An organisational and operational model requires new capabilities to drive rapid **DT**. Although risk innovation takes place in a very specific, highly sensitive area, risk practitioners still need to create a real culture of innovation. It is necessary to identify a structured approach to help target groups to plan, manage and optimise the digital transformation of their customers’ processes.

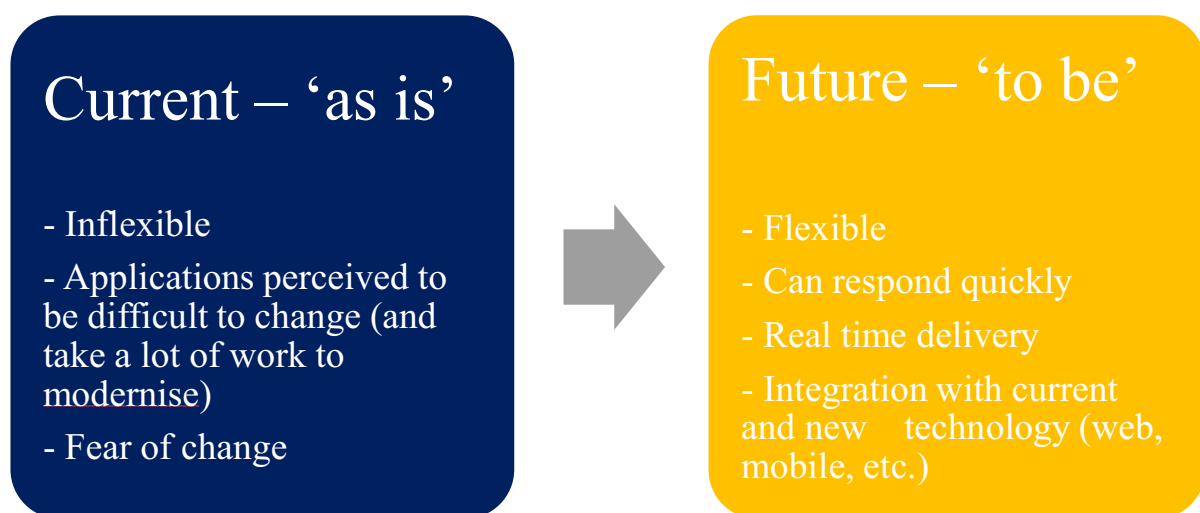


Figure 4.1 Business process modelling utility: from the current situation to the desired future

PART 2

DEVELOPING A DT PROCESS FOR SMES

Chapter 4 – Understanding “Where you are and Where you have to go”: Relevance and Tools

Chapter 5 – Re-designing your Business Model

Chapter 6 – Implications of Digital Transformation

Chapter 4 – Understanding “Where you are and Where you have to go”: Relevance and Tools

This chapter will introduce the key steps for conducting an internal and external assessment of your company's *status quo*. It will also discuss the main technological innovations that SMEs in the business services sector should take into account when considering whether to engage in a process of digital transformation.

4.1 The relevance of a current state analysis

The external environment is continuously changing, thus influencing organisations and presenting them with new opportunities and threats. Being aware of the current state of your business's **DT** process is essential when deciding whether to embrace such a change. All organisations need to identify external factors that could have an impact on their operations or strategy.

So, the first step of a **DT** process starts, exactly as with every other change process, from the current state analysis.

An effective analysis must include:

- (1) A detailed overview of the external environment. This is made of elements over which the organisation usually has no control and cannot influence directly, but that are still important because of the implications they bring;
- (2) An even more detailed self-assessment. This means a profound analysis of the current state of each part of your organisation, including its strengths, weaknesses, concerns or inefficiencies which will be useful for future restructuring.

4.2 Self-Assessment Step 1: Understanding your Business Environment

When looking at the external environment it is important to analyse behaviours of any relevant factors such as:

1. Competitors, sector dimensions, competitiveness, linked sectors
2. Suppliers, related services
3. Job market, education, universities
4. Consumers, both already acquired and potential

5. Technological Innovations, e-commerce, scientific knowledge, information and communication technologies (ICT).

The specific *task environment*³⁶ covers all sectors with which the organisation interacts directly, and which have an immediate impact on the organisation's ability to achieve its objectives. It therefore includes the business sector, human resources and, potentially, the international environment. For European SMEs it would then be extremely important to first assess the market environment in their own country and then to shift to a European level before reaching the analysis of what is happening in the international environment.

Being able to catch future trends before it reaches your own market could provide you with an extraordinary competitive advantage!

An interesting tool to understand the complexity of your environment and to direct your attention to future challenges is the matrix from the American Science Quarterly of environmental change and environmental complexity (*Table 4.1*), which is useful for assessing the uncertainty of the environment in which the firm is working.

The X axis of the matrix captures the simplicity-complexity dimension. A simple environment is one in which external elements, such as competitors, suppliers, clients, law, etc., are not too many and are similar among each other. A complex environment is where the same elements are numerous and dissimilar. In other words, complexity refers to the number and diversity of actors involved.

The Y axis of the matrix displays the stability-instability dimension, defining the degree of dynamism of the analysed environment. The latter is considered stable when it remains unchanged for months or years and when, as changes occurs, they happen in a slow and manageable time-period. On the other side, we consider an environment to be unstable when it changes frequently and in a very fast time period.

³⁶ As defined by Richard L. Daft in his book "Organization Theory and Design".

Change	Simple and stable low uncertainty	Complex and stable low-moderate uncertainty
	1. Low number of external elements which are similar 2. Elements are stable or change very slowly	1. High number of external elements which are dissimilar 2. Elements are stable or change very slowly
	Simple and unstable high-moderate uncertainty	Complex + unstable high uncertainty
	1. Low number of external elements which are similar 2. Elements change frequently and in an unpredictable way	1. High number of external elements which are dissimilar 2. Elements change frequently and in an unpredictable way
Complexity		

Table 4.1 Environmental uncertainty matrix

Nowadays, firms are often challenged to work in environments characterised by high uncertainty, but this is not necessarily true for SMEs working in the business services sector. They should try to analyse their own businesses on the basis of this matrix as follows: first, examining the complexity dimension – i.e. listing every possible external actor that will interact with the firm and briefly describing their characteristics in order to uncover similarities and differences; secondly examining the stability dimension, listing events have already happened throughout the years of activity and highlighting how fast they happened and how long it took to manage them. This analysis is built on the basic assumption that past events can be credibly used as predictors of future events, but this comes with limitations. Firms should then try to imagine what could reasonably happen in the future on the basis of gained expertise.

A second tool that is useful for assessing the environment in which you are working is the **PESTLE³⁷ analysis**, which helps managers to reflect on **political, economic, social, technological, legal and environmental** issues affecting their businesses. As a consequence of globalisation, firms have to deal with wider environments and this technique ensures that you

³⁷ Other possible variations of this tool are: ETPS (Economic, Technical, Political and Social); STEP (Strategic Trend Evaluation Process); PESTLIED (Political, Economic, Social, Technological, Legal, International, Environmental and Demographic); PEST (Political, Economic, Social, Technological); STEEPLD (Social Technological, Economic, Environmental, Politic, Legal, Educational, Demographic).

are adequately considering each possible impact variable. Typical types of questions you could ask are:

- ✦ What are the key political factors of the environment in which I work?
- ✦ What are the important economic factors?
- ✦ What cultural aspects are particularly relevant?
- ✦ Are any other technological innovations likely to occur?
- ✦ Is there any legislation that may impede or simply affect the process of change that I'm currently facing?
- ✦ Are there any other environmental considerations?

For a PESTLE analysis to be effective it is not important to classify correctly each issue identified, for example if you are in doubt about whether a government initiative which is related to the environment belongs in the political or environmental category.

It is important to remember that this tool is primarily aimed at identifying the highest possible number of issues, regardless of their classification. So, don't be afraid of making mistakes, just spend time thinking about everything that could impact your business. Of course, this analysis must be integrated in a comprehensive strategical process.

Firms generally use it when (a) they are planning to launch a new product or service, (b) they are considering exploring a new market opportunity (i.e. new country or region); (c) they are dealing with new projects and teams.

How should you engage with a PESTLE analysis? While developing a PESTLE analysis consider taking the following steps:

- ✦ STEP 1: Brainstorm key issues that are outside your firm's control
- ✦ STEP 2: Identify the key implications of each issue
- ✦ STEP 3: Provide a rating for the relative importance of each issue's impact on your business (use a scale from critical to insignificant)
- ✦ STEP 4: Provide a rating for the possibility of occurrence (i.e. certain, potential, impossible)
- ✦ STEP 5: Consider the implications and possible solutions if the issue were to occur.

4.3 Self-Assessment step 2 – Understanding your own Business

A gap analysis is a method used to assess differences between the current status of development in your organisation and the desired end state. In a digital transformation context, it is a method of assessing the differences in performance between a business' current information systems or software applications and their desired end state. This is used to determine whether business

requirements are being met and, if not, what steps should be taken to ensure they are met successfully. *Gap* refers to the space between "where we are" (the present state) and "where we want to be" (the target state). A gap analysis may also be referred to as a needs analysis, needs assessment or need-gap analysis.³⁸

The "Gap analysis" provides the basis for:

- ✦ the definition of all the actions to be undertaken in order to ensure full compliance with the equipment, skills and effectiveness of a process of digital transformation.
- ✦ the definition of priorities based on the entity and / or the severity of the found "gaps"

A useful step-by-step way to develop your gap analysis is:

- ✦ STEP 1: Create three digital documents or take 3 big blank pages and title them "currently exists", "desired results" and "gaps"
- ✦ STEP 2: In the sheet called "currently exists" make a list of all measurable data related to your current procedures, technologies, or service. In the sheet called "desired result", make a list of what is expected or desired from these sectors.
- ✦ STEP 3: In the sheet called "Gaps" make a list to highlight the differences between what you want the company to achieve with respect to the list under "currently exists". The result is the gap. This analysis process can be performed on almost all products, services and projects that the company intends to monitor and improve. It is also an effective market research tool. Based on what the gap analysis highlights, it is helpful to create additional sheets for data in the form of diagrams and graphs. A thorough analysis always brings useful information for the company's management. With the analysis of the gap you have a 360° view of the investment necessary to achieve the desired goal, and in this way you can identify the activities necessary to achieve it.
- ✦ STEP 4: at this point you just have to go through a detailed analysis of the gaps. Gap analysis is not a standard process and must be adapted to different needs. The goal is to use it to understand what needs to be done to achieve the goals set. It can thus be a long process. It will be good to know the basics of the management analysis before venturing into a gap analysis. It is also essential to have all the critical data relating to the current company situation and in which sector it should improve.
- ✦ STEP 5: Repeat the gap analysis periodically and review it often due to changes in economic and business needs, in order to derive the maximum possible benefit with a rational use of resources.

³⁸ TechTarget, "What does digital transformation really mean?", RFID Journal

4.4 Self-Assessment step 3 – Combining Internal and External Analysis

SWOT Analysis is definitely one of the best-known tools that aims to promote a quick survey of the entire internal and external analysis that is at the basis of the strategic plan. The SWOT analysis is not meant to be limited to the profit-making objective of organisations, but it can be used in any decision-making process in which the objective to be achieved has been well defined.

Endogenous factors are represented by strengths and weaknesses, while the exogenous factors are represented by opportunities and threats.

In terms of the endogenous factors, the analysis must focus on the factors capable of determining a condition of competitive advantage in relation to the phenomenon taken into consideration. In the case of exogenous factors, on the other hand, it consists in the identification of external elements and their evolution and impact on the system in which the company operates, and which may allow the implementation of measures to exploit the foreseeable positive effects and reduce the foreseeable negative effects.

INTERNAL STRENGTHS	INTERNAL WEAKNESSES
EXTERNAL OPPORTUNITIES	EXTERNAL THREATS

Figure 4.1 SWOT Analysis (endogenous and exogenous factors)

Combining both exogenous and endogenous factors in a matrix (Figure 4.2) makes it possible to obtain a clear framework which defines four consequent different strategies:

	STRENGTHS	WEAKNESSES
OPPORTUNITIES	S-O Strategies: exploit new opportunities on the basis of your strengths	W-O Strategies: Remove your weaknesses to explore the new opportunity
THREATS	S-T Strategies: exploit your strengths to remove external threats	W-T Strategies: identify the right strategy to avoid threats that would increase your weaknesses

Figure 4.2 SWOT Analysis Matrix and subsequent strategies

1. S-O strategies aim to exploit the opportunities offered by the external environment based on the existing strengths of the organisation;
2. W-O strategies aim to overcome weaknesses in order to exploit the opportunities that open up;
3. S-T strategies identify ways of exploiting strengths with the aim of mitigating or eliminating threats from exogenous factors;
4. W-T strategies determine defence plans to prevent threats in the external environment from exploiting the company's weaknesses.

Despite being a useful tool and widely used in the decision-making processes of many organisations, the SWOT Analysis has four notable limitations:

- (1) there is a risk of describing the reality in which the organisation operates, both in terms of internal variables and the external environment, too simplistically;
- (2) there is the risk of having a too obvious disconnect between the theoretical and the practical levels;
- (3) there is the risk of a broadly subjective and untrue assessment of the four variables examined;
- (4) finally, it is a particularly challenge not to confuse opportunities and threats with something that is related to your own company: they come from the external environment and offer new opportunities for your business.

4.5 Understanding and Awareness of new Technologies and Innovations

Technologies are increasingly used in every productive process, both for manufacturing and services but, unsurprisingly, available technologies and organisational designs differ among services. The present work will focus only on technologies available for services.³⁹

Services are often intangible, and *labour and knowledge intensive* since the workforce needs to be able to satisfy clients' needs at any moment. This becomes even more true in the *business services sector*, where clients are other businesses which already have specialised knowledge and skills. The *level of interaction* with clients is generally very high and the *quality* that they will perceive and evaluate is typically difficult to measure. For those reasons, businesses in the services sector should do their best to renovate their skills and capabilities and to offer their services in the faster possible way, without sacrificing personalized outputs. In this process of change, **technologies are not the enemy**. They will facilitate increased efficiency and effectiveness throughout the whole productive process. The challenge is to align strategy, structure and processes.

Even for SMEs it is important to consider the different organisational units (i.e. human resources, accounting, research and development, marketing, etc.). These each have different characteristics which require different technologies.

Before considering which technologies are better to manage a determined activity you should identify their peculiarities in terms of two main dimensions: **variety** and **analysability**.⁴⁰

- a. The **variety** of a task indicates the frequency of unexpected events. In order to analyse this dimension you could ask your workforce the following questions:
 - ✦ *Could your activity be defined as routine?*
 - ✦ *Is it correct to say that almost all the employees in this unit do the same job in the same way?*
 - ✦ *Do you usually expire repetitive tasks?*
- b. The **analysability** of a task refers to the possibility of subdividing work into single mechanical steps and clear procedures, based on objective criteria and computation.

³⁹ Given that the target group of this project belongs to the *business services sector*, that is, as explained in chapter 1, the sector that provide support services to other businesses.

⁴⁰ Those two characteristics of activities were identified by Charles Perrow in his work "Departmental Power and Perspective in Industrial Firms" in Mayer N. Zald, *Power in Organizations* (Nashville, TN: Vanderbilt University Press, 59-89; in Daft R. L. (2013), *Organization Theory and Design*, 11th ed., South-Western Cengage Learning.

- ✦ *Is there a sequence of steps that you must always follow in order to complete your tasks?*
- ✦ *Do you always perform your job by employing well-established procedures and practices?*

The step-by-step instructions in this case are:

STEP 1: Identify each relevant activity and business unit

STEP 2: Understand the level of variety and analysability of each activity

STEP 3: Design each business unit separately in a way that is coherent with the previous analysis.

4.5.1 The evolution of ICT and new technologies

Daft (2013, p. 283) continues to discuss the evolution of information and communication technology with the following figure. The X-axis displays the complexity of the ICT system while the Y-axis shows the management level at which that technology can be implemented (*Figure 4.3*).

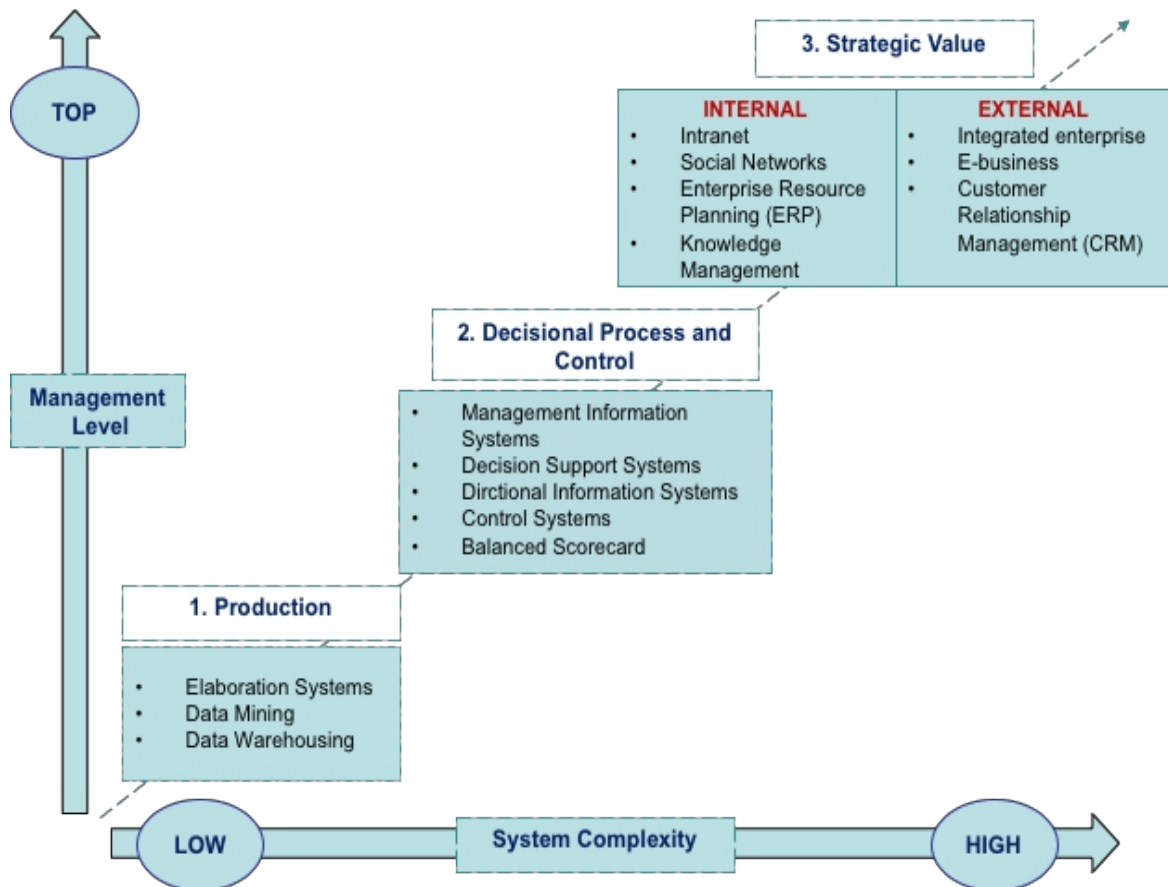


Figure 4.3 Evolution of ICT within the organisation. Source: Daft (2013, p. 283)

As we can easily see from the previous figure, technologies characterised by low complexity can mainly support a production process that is mechanical and standardized. As we move to more sophisticated organisational activities, which have a relevant strategical value and are managed by top management, then the complexity of the technological system rises.

We will now briefly go through all those technologies, starting with the low level of complexity and going to the strategically relevant technologies.

Technologies were first introduced with the aim of making production more efficient, reducing costs and speeding up operations. **Transaction processing systems (TPS)** helped to automate daily routine activities by collecting data and storing them in a database. As technology advanced, databases became an irreplaceable source of advantage for businesses: **data warehousing** and **business intelligence systems** make it possible to exploit information effectively, creating reports and getting answers to what-if queries. For example, when considering a new potential strategy, the software can provide a quantitative response – i.e. possible results that could be achieved – clearly based on the analysis of all previously recorded

transactions and activities. **Business analytics software** interprets huge amounts of data and derives useful information. It offers the possibility to detect the right data and to analyse it in the right way, thus obtaining the right information that will make managers more effective in decision-making processes. Thanks to these computer-based technologies today's managers have all the necessary tools to improve the performance of organisational units through better decisions and control. The **management information system (MIS)** is a computer-based system made of reporting systems, executive information systems and decision support systems. The reporting systems are the most basic types of MIS. They provide reports for first level managers that use information to perform daily operations and to develop personalised marketing plans. The executive information system (EIS) can help managers at higher levels. The software is therefore able to process data and quickly provide relevant material. Finally, decision support systems (DDS) are useful at each organisational level. Users can test different alternative scenarios and then choose the one which best fits the desired goal.

A commonly used system for *management control*⁴¹ is the **executive dashboard**, software programs where companies can intuitively display all company info. Their main function is to report to managers any deviations from the expected values or any unusual trends so that the manager is able to capture the whole picture of the business.

Literature on **decision supporting systems**, such as those described above, has been clear in establishing the relevance of such tools for small businesses, but many studies provided solutions that were mostly inadequate for them. This was shown very clearly by Grabova et al. (2010) "*small enterprises require cheap, lightweight architectures and tools (hardware and software) providing online data analysis*". Surprisingly, the **2017 small and medium-sized enterprise business intelligence market study**, a recent study by *Dresner Advisory Services*, showed that the smaller the company, the higher the priority for growing revenues and finding increased competitive advantages using analytics and business intelligence. Key results from the cited research are briefly summarised in a Forbes article⁴² as follows:

- ✦ *SMEs are driving the highest levels of cloud computing adoption, while concentrating on reporting and dashboards to improve marketing and sales decisions.*

⁴¹ Our suggestion is not to use technologies to control employee's behavior. Stay focused on the results they achieve regardless of how, when and what they do at work.

⁴² Columbus L. (October 2017) Small Businesses Are The Real MVPs Of Analytics And BI Growth <https://www.forbes.com/sites/louiscolombus/2017/10/08/small-businesses-are-the-real-mvps-of-analytics-and-bi-growth/#7e992b9c6ca4>

- ✦ *Growth in revenues and increased competitive advantage are two of the top three priorities SMEs are investing in analytics and business intelligence. SMEs are using analytics and BI to concentrate on winning new customers and keeping existing ones.*
- ✦ *Enterprises with up to 100 employees are nearly 3x more likely than large enterprises to report the highest rates of BI adoption.*
- ✦ *SMEs with up to 100 employees are the most aggressive in their plans for analytics and BI adoption in the 12, 24 and 36-month SMEs look to analytics and BI as a catalyst for new business growth, and for insights on how to compete more effectively.*

4.5.2 Top technology trends of the present competitive environment

Previous activities were mainly related to computer-based technologies, but there are many other technological layers which are important in today's economy⁴³.

1. **CLOUD TECHNOLOGY:** this allows companies to use, via a remote server, software and hardware resources (such as mass storage for data). It is a form of advanced technological tertiarisation. Thanks to the cloud, the supplier will maintain all the necessary infrastructure to manage and distribute services based on demand and with a pay per use formula.

CLOUD is:

- ✦ on-demand and self-service: the end user can obtain autonomously and with a simple request (made with a simple mouse click) all the additional resources he needs, without the timely intervention of a professional or a specific service provider;
- ✦ very broad and generalised access: services are always available from any device or platform accessed;
- ✦ well-defined grouping of resources: the set of resources is made available to all users based on a multi-tenant setting in which each person draws on the basis of his / her needs;

⁴³ The following technological layers have been identified with a desk research, which included big four reports (Accenture Technology Vision 2018, Deloitte Insights 2018, EY Emerging technology trends, Gartner 2018 Tech Trends, McKinsey innovation and technologies, etc.) on technologies, press and events concerning new tech-trends for 2018.

- ✦ flexible: resources can be requested, released and dismissed and reacquired in an often automatic and almost instantaneous way, so that the user has the impression of enjoying and having an infinite amount of resources at will;
 - ✦ tailor-made service: the cloud system automatically monitors and optimizes the use of resources, assigning to each user / end user only the required resources, assigning to each the appropriate level of abstraction;
 - ✦ off-premise: the cloud is "off-site", the service used is outsourced.
2. **INTERNET OF THINGS:** the Internet of Things refers to the set of equipment and devices (smart products), different from computers, connected to the internet and enhanced by technologies: they can be sensors for fitness, cars, radios, air conditioning systems, but also appliances, light bulbs, cameras, pieces of furniture, containers for the transport of goods. In short, any electronic device equipped with software that allows it to exchange data with other connected objects and communicate via wireless network with the internet.
 3. **SOCIAL MEDIA:** marketing experts and professors Andreas Kaplan and Michael Haenlein in 2009 defined social media as *"a group of internet-based applications built on the ideological and technological principles of Web 2.0 that allow the creation and exchange of user-generated content"*.
 4. **ARTIFICIAL INTELLIGENCE:** cognitive computing is the technology that in the future will allow us to interact with computers in a much more immediate and natural way than today, that is, it will allow us to talk with machines and exploit their ability to learn from experience. The main advantages will be found in all those fields where it is necessary to process large amounts of data, possibly available in non-homogeneous formats and therefore difficult to manage from traditional IT applications. Its development is named artificial intelligence, a "set of studies and techniques that tend to the realisation of machines, especially calculators electronic, able to solve problems and to reproduce the activities of human intelligence".
Personal assistant, robotic process automation (RPA), intelligent process automation (IPA), machine learning (ML), and cognitive computing are the most widespread forms of artificial intelligence that have revolutionised the way of working on the one hand and on the other how to use products and services. Machine learning algorithms use mathematical-computational methods to learn information directly from the data, without mathematical models and predetermined equations. They improve their performance in an "adaptive" way as they are provided with more and more examples,

in other words they learn from experience. Artificial intelligence is now applied in various sectors ranging from insurance to business. The most commonly used AI applications are chatbots or assistants that respond to internal agent inquiries and provide guidance on business protocols. Machine learning algorithms are also being applied to client data to deliver tailored products for insurance clients.

5. **ROBOTICS:** robotics is an interdisciplinary branch of engineering and science that includes mechanical engineering, electrical engineering, computer science, and others. Robotics deals with the design, construction, operation, and use of robots, as well as computer systems for their control, sensory feedback, and information processing.
6. **BLOCKCHAIN:** this is a "secure transnational register, shared by all the parties operating within a given distributed network of computers. It records and stores all the transactions that take place within the network, ultimately eliminating the need for "trusted" third parties". The name derives from its distributed nature: each node of the network plays a role in the verification of information, sending it to the next in a chain composed of blocks. In terms of rights and transfer of ownership, blockchain is very valuable for certifying the reliability of information transmitted by objects and sensors.

4.5.3 Some examples of application

Technological evolution has led to new software, databases and devices which are useful strategic tools both internally and for external relationships.

- ✦ To ensure communication and collaboration between members within the organisation, the **intranet** is configured as a private and proprietary system, which exploits typical internet protocols but can only be accessed by people inside the organisation. On the other hand, to ensure communications with suppliers or partners, the **extranet** is a communication system, still based on the internet protocols, that is shared among two or more firms.
- ✦ **Social networks**⁴⁴ are tools that ensure knowledge sharing among members of the organisation. A firm could develop an internal social networks or blogs where employees can share their knowledge about specific subjects. Alexander Stocker and

⁴⁴ Meske and Stieglitz (2013) in their study "Adoption and Use of Social Media in Small and Medium-sized Enterprises" showed that not only social media are important for large firms, but they are also strongly used by small and medium-sized enterprises.

relationships and save money. A study by SOCITM⁴⁶ found that customer interactions cost approximately 10 euros for face-to-face communication, around 3 euros for contact over the phone and about 19 cents for a web transaction.

- ✦ **Digitally capturing data.** Any process that involves gathering data in the field, such as insurance claims or machine servicing, can be improved dramatically through digitisation. Capturing data digitally on a portable scanner, digital dictation recorder, e-pen, smartphone or tablet and routing it electronically to head office enables information to be processed instantly and eliminates unnecessary travel.
- ✦ **Collaborative solutions.** SMEs are not oriented to use collaboration, coordination and communication platforms, even if there are many collaboration platforms and pieces of software which have been developed especially for their needs. It is necessary to train those firms in order to help them understand that collaboration will help to increase productivity and reduce the cost of running their business.
- ✦ **E-commerce and retail digital marketing.** The increase in consumer demand for online purchases will fuel future revenue growth across all B2B and B2C transactional sectors from retail through business services.

⁴⁶ Digitisation for SMEs: transforming business processes through the integration of printed and electronic communications, NEOPOST Digitisation, 2016, https://www.neopost.co.uk/sites/neopost.co.uk/files/neopost-wp-digitisation-may_2016.pdf

Chapter 5 – Re-designing your Business Model

Once the theoretical background is clear, and once the external and internal status analysis has been conducted, SMEs should reflect on their own business model. Digital transformation does not just mean introducing new technologies to perform existing activities: it is a process of re-designing the whole business model. This chapter will try to help SMEs to become more familiar with the business model canvas and to then reflect on possible changes.

5.1 Definition of Business Model

Alexander Osterwalder⁴⁷, who developed the business model canvas, defined a **business model as the logic with which an organisation creates, distributes and captures value**.

A business is able to create value for its clients when (1) it satisfies one of their needs, (2) it helps them manage an important task, (3) it helps them solve a problem. Regardless of the sector of activity, creating value for customers is the main objective of every company that wants to be successful.

It is exactly for this reason that the first document that a firm must develop in their strategic planning is a map of the business model - not the business plan, which can be correctly formed only after the model is understood and validated.

5.2 Describing the Current Business Model

In order to reflect on one's own business model, instead of just talking about it or summarising it in long and detailed documents, a useful tool for representation is the **business model canvas**⁴⁸. This has become a recognised standard for all businesses and allows managers to **visually represent** the way a company creates, distributes and captures value for its own customers.

⁴⁷ For further information about the author see <http://alexosterwalder.com/> and <https://strategyzer.com/app> or the book: Osterwalder, A., Pigneur, Y. (2010). Business Model Generation

⁴⁸ The business model canvas was proposed by Alexander Osterwalder in his first work, *Business Model Ontology* (2004), and then developed by Osterwalder, Yves Pigneur and Alan Smith together with a community of 470 experts in 45 countries around the world. This led to the publication of the book Business Model Generation, a world bestseller translated into 30 languages. Today the Model is recognised as an international standard. It is taught in the best business schools in the world, including Stanford and Berkeley University.

Chapter 5 – Re-designing your Business Model

Once the theoretical background is clear, and once the external and internal status analysis has been conducted, SMEs should reflect on their own business model. Digital transformation does not just mean introducing new technologies to perform existing activities: it is a process of re-designing the whole business model. This chapter will try to help SMEs to become more familiar with the business model canvas and to then reflect on possible changes.

5.1 Definition of Business Model

Alexander Osterwalder⁴⁷, who developed the business model canvas, defined a **business model as the logic with which an organisation creates, distributes and captures value**.

A business is able to create value for its clients when (1) it satisfies one of their needs, (2) it helps them manage an important task, (3) it helps them solve a problem. Regardless of the sector of activity, creating value for customers is the main objective of every company that wants to be successful.

It is exactly for this reason that the first document that a firm must develop in their strategic planning is a map of the business model - not the business plan, which can be correctly formed only after the model is understood and validated.

5.2 Describing the Current Business Model

In order to reflect on one's own business model, instead of just talking about it or summarising it in long and detailed documents, a useful tool for representation is the **business model canvas**⁴⁸. This has become a recognised standard for all businesses and allows managers to **visually represent** the way a company creates, distributes and captures value for its own customers.

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With the business model canvas, everyone has the ability to understand complex elements that affect the operation of the company in a simple and extremely intuitive way. This is because the canvas is based on a visual language that is quick to learn and accessible beyond the professional background. This allows maximum alignment between the people involved and, at the same time, represents the great communicative advantage of the business model canvas. Osterwalder's framework summarises the key nine elements of a firm, each displayed in boxes that must be filled with information regarding the company. Below is a description of each of the key nine elements and a graphical representation of the business model canvas (*Figure 5.1*).

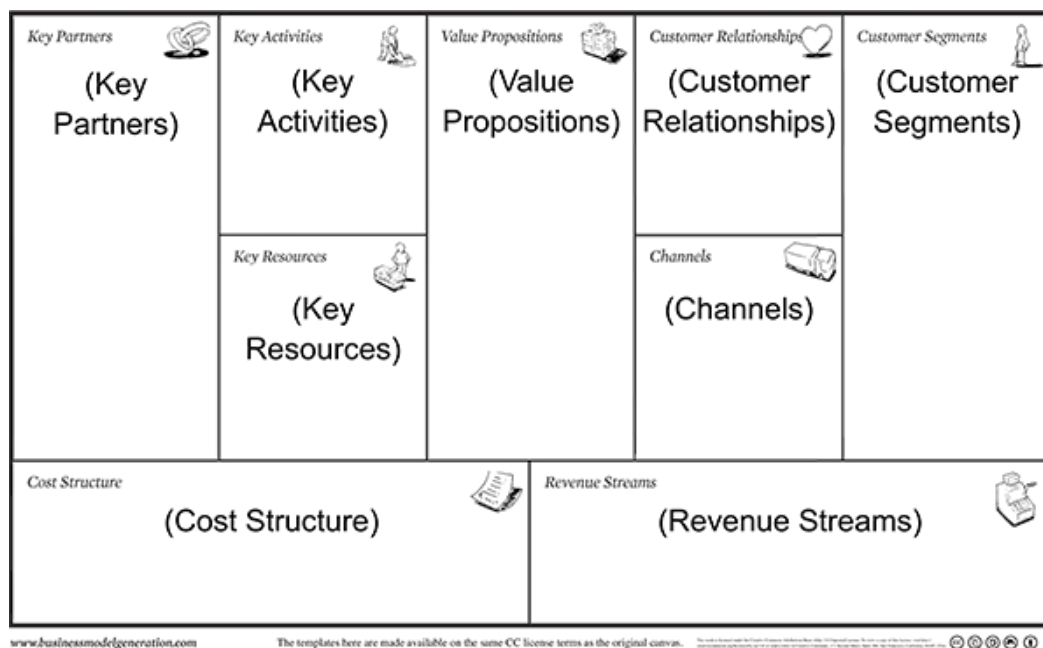


Figure 5.1 Business model canvas; Source: <https://strategyzer.com/>

1. Key Partners

The company is a system that acts in a larger ecosystem. It is not possible to think of it as something that is self-sufficient. Key partners are suppliers or other firms which are necessary to the right functioning of the BM.

In fact, there are strategic external actors that allow the company to fully realize the business model and increase the chances of its market success. These are its *key partners*.

A company may need a network of partners to meet different needs, such as optimising resources and activities; developing economies of scale; reducing the risks of competition; competing in a wider market; acquiring particular resources and activities; spreading the brand to a wider audience; discovering new customers.

There are three main types of partnerships:

- ✦ Strategic alliances between non-competitors: this is the case when suppliers or companies are part of a single production chain.
- ✦ Strategic alliances between competitors: this is the case when companies that are put on the internet provide their customers with similar value within the various points of contact.
- ✦ Joint venture: a collaborative agreement between two or more companies. This could be an excellent solution to developing new lines of business.

It is essential to create valid partnerships so that the firm will be able to respond to different needs that cannot be satisfied through its own resources and activities.

2. Key Activities

The firm's most important activities can be easily identified depending on the business's sector.

There are three main types of key activities:

- (1) Productive. They are typical of manufacturing companies where it is essential to continue to create, produce and distribute products.
- (2) Problem solving. They are typical of business models where the value proposition is the service proposal. Consulting companies are located in this area.
- (3) Maintenance and / or development of platforms / networks. This is the case with companies like Google and Facebook, where the development of the platform is fundamental for the functioning of their business.

SMEs in the business services sector generally perform either (1) or (2).

3. Value Proposition

The value proposition answers the question: *why should customers choose your service?* It is what uniquely distinguishes a firm, thus determining the success or failure of its business model.

Elements to be included are not just products and services (obviously divided into lines and types). It is also important to take into consideration other valuable elements that are offered to the customer, such as particular experience, innovation, affordability, accessibility.

There are several ways to create good value propositions that allow the company to transfer not only intrinsic value in terms of the output offered, but also intangible values such as:

- ✦ Offering an innovation. This creates a new value, giving customers something that was not there before.
- ✦ Making a product / services accessible. This allows customer segments that previously could not use a product / service to access it.
- ✦ Improving a product or service by adding relevant features or modifying the current ones to make them more functional for a specific need.
- ✦ Reducing the price of a product / service. This solves a specific problem, starting with a study of the real and urgent needs of customers.
- ✦ Using the brand to convey an identity.
- ✦ Improving the design of a product.
- ✦ Reducing the risks related to a product / service.

4. Key Resources

Key resources identify what a business needs to make its own business model work. They can be:

- ✦ Physical resources: these include tangible assets such as point-of-sale networks, systems, technologies, machinery and all that physically needs to be made to produce or sell a certain product / service.
- ✦ Intellectual resources: these include a company's know-how, patents, trademarks, copyrights, developed projects, partnerships and customer database. If you think of big brands like Coca-Cola, then you realise the importance of these resources. The same goes for the record and the publishing world.
- ✦ Human resources: HR is important in every business model, especially in the field of services. When you work on this block of the business model canvas, you must first consider strategic resources. Facebook, for example, cannot exist without its programmers, just as Ikea needs designers who develop new solutions.
- ✦ Financial resources: i.e. credit lines, cash or a set of stock options that allow the company, for example, to hire important employees or guarantee supplies. This gives them a competitive advantage over competitors.

5. Customer Relationships

Customer relations describes the type of relationship that the company establishes with its various customer segments.

Depending on the established business model, there are different forms of customer relationships⁴⁹, such as:

- ✦ Personal assistance: the relationship is based on the presence of a customer relations manager who becomes their support when help is requested. Think, for example, of the personal employees dedicated to business customers in the various telephone companies.
- ✦ Dedicated personal assistance: the relationship is constructed and maintained by assigning a specific employee to customers, as in the case with financial advisors. This is a very close relationship that stimulates customer confidence and serenity.
- ✦ Self-service: the relationship with the customer is guaranteed through an indirect relationship, specifically a structure that allows them to have all the tools to do things themselves.
- ✦ Automatic services: this is an advanced form of self-service that is spread across many sectors. Obviously, it differs a lot from business models that provide personal and dedicated assistance, but it can still be effective. For example, online banks offer a personal online profile with which the client can perform many of the actions at the counter.
- ✦ Co-creation: the relationship is based on sharing the value creation process. In essence, the customer actively participates by making choices that change the value proposition of the company. Nowadays, the active involvement of consumers in the value creation process is considered crucial. Think, for example, of the emergence of consumer innovation labs worldwide.

6. Customer Segments

The customer segments block describes the different groups of people and organisations that the company is targeting. It is fundamental since it allows the building of the package of products and services around the precise needs of each specific cluster of customers. An easy way to find out which elements to insert in this box is to classify customers in relation to their

⁴⁹ Another type of customer relationship is community. The relationship is direct and fosters the relationship between consumers, creating shared identity and recognition in a group. Such communities can also be created without the firm's intervention, but they are a source of valuable information. The term refers to all the communities of users, mostly virtual, who follow a brand and interact with the company through initiatives and competitions launched on the web. Think, for example, about brand-lovers communities.

behaviours and needs. It is possible to identify and create different customer segments each time:

- ✦ there are different needs that justify different value proposals;
- ✦ we use different channels to reach different customers (e.g. physical shops vs. virtual shop);
- ✦ different methods of interaction are used (e.g. telephone companies have a customer care dedicated to business customers and one dedicated to individuals);
- ✦ different clients pay for different aspects of the value proposition (e.g. merchants use the POS to cash in, their customers use it to make payments)
- ✦ they determine different profitability.

7. *Channels*

The channels block describes how the company reaches a certain customer segment. Channels are therefore simply the point of contact with clients.

Channels can be direct, if owned by the company, or indirect, if owned by a partner. To identify the key elements to insert in this box, think through the following 5 basic steps from the consumer's perspective:

Create awareness about the product or service and about the company itself.

Help the consumer evaluate the value propositions made by the company.

Offer the product or service.

Allow the consumer to buy the product or service.

Follow the consumer after the sale has taken place.

8. *Revenue Streams*

The variables to be considered in the composition of the revenue streams box are the price and the payment method. Both of these are fundamental for regulating financial flows and making the business model sustainable.

There are two different payment methods that generate different revenue streams and which in turn include other different forms of payment:

(1) payment in one solution.

(2) recurring payments, such as rentals or subscriptions.

Given that we are focusing on the services sector, you should consider whether you are offering your services for a user fee (based on the use of a particular service) or entry free

(which is typical for services offered on an ongoing basis). You may also offer your services for a loan, rental or leasing (typical when customers have the opportunity to use an asset for a specified period of time), licensing, advertising, commissions and so on.

In terms of prices, these can be defined in different ways. If the company is dealing with fixed prices, it can set them, for example, based on its business volume and the identified segment of customers. In the case of dynamic prices, these will be defined in terms of real-time market trends, negotiations with partners and other variables.

9. Cost Structure

In the process of mapping the business model canvas, the cost structure is left until last. This is because it derives almost directly from the structure of the blocks related to key activities, key partners and key resources. By analysing the cost structure, the business model can have:

- ✦ Fixed costs: in this business model the costs remain unchanged as the volume of goods or services produced (rent, wages, production plants) changes.
- ✦ Variable costs: costs vary according to the volumes of goods and services produced.
- ✦ Economies of scale: costs are lowered when a company expands (this is the case with large brands that have much higher price advantages than small producers).
- ✦ Economies of scope: costs decrease by increasing the range of an operation.

A good question to ask is: *is your business cost-driven or value-driven?* In a cost-driven business, each diminished cost represents an additional opportunity to respect the value proposition. In a value-driven company, even if you are still going to optimise costs and reduce waste, the most important thing is to offer a value that the customer perceives to be very high. This depends on your corporate strategy, which can differ across firms within the same sector.

5.3 Re-designing the Business Model

Innovating a business model means understanding and rethinking the company at the highest level, observing all the processes (production, distribution, sales and so on) as a whole and in their synergies, without any particularities. A structural vision makes it possible to identify bottlenecks, unexploited opportunities and dead activities, which can then be cut out.

The business model can also be considered the operating system of a company. To put it simply, it is the upstream logical structure that defines the relationships and the behaviour of each single

element, and that allows it to work in a fluid, optimised and productive way. Making business model innovation is like updating a computer operating system. It is something that a company must do when:

- (1) **New threats** come from outside (viruses in the case of the PC, new competitors in the case of the company)
- (2) **New needs** arise that need a different support (new applications in the case of the PC, new potential customers in the case of the company or new market requirements such as a DT process)
- (3) The system is overloaded, and operations are slow and not very fluid (reduced performance in the case of the PC, reduced marginality in the case of the company)

On the basis of what has been said so far, there are some useful tips below that a business services company should consider when deciding whether to modify its own business plan. We suggest reviewing each box of the business model or creating a new one which is tailored to needs of the digital era.

First, the firm needs to **change its perspective**. Even the largest leading companies worldwide have realised that just using tools as marketing research is not enough. In order to develop a successful business model, it is crucial to understand clients' needs and desires in the digital era (i.e. which services they are expecting and how is it possible to satisfy their new needs). Then **focus on which customer' needs** are real and most urgent. In a preliminary brainstorming phase, it is possible that numerous needs might arise. In the process of revision, the managers should then include only those that should really be prioritised.

Value propositions and needs, activities and customer desires must be in synergy with each other. This makes the difference between a successful business model and a broken business model.

Emotional and social aspects must be taken into account, as well as functional aspects (such as the need for the client to perform a certain activity at best). There are also needs linked to the emotional sphere (such as hidden fears, frustrations and desires), which are just as important.

At an operational level, it is important and strategic to understand how the business model you are building is integrated. Is it adequately supported by the key activities? Is it synergistic with the value you offer? What kind of relationship can be more functional for each customer segment? These considerations will allow the company both to make appropriate choices and to harmonise them within the design process.

The different types of relationships that the company establishes with different customer segments support and structure the customer experience. **Do not underestimate the importance of communicating with clients:** they can help you to be aware of the needs of the target group and from time to time to spread various initiatives, to gain news on offered services and new value proposals. And all without necessarily exposing the company immediately in a co-creation relationship.

Enter only **key strategic activities:** don't consider all the activities that will be part of the business cycle but just the ones that are particularly relevant for the functioning of the business model. Together with key resources and key partners, this block will determine what cost structures the company will have to support.

Keep a clear vision: always keep a clear and concise overview of the business model. This will be particularly useful in translating the business model canvas into subsequent strategic planning documents.

If the firm follows a multichannel strategy, all channels should be considered simultaneously so that it will be easier to create points of contact with people who will benefit from products and services. The digital era is the era of omnichannel environments, where in order to reach the consumer it is important to select the right message and to deliver it at the right time and through the right touchpoints⁵⁰.

Search for partners with whom to create synergies: especially if the firm needs to acquire knowledge and skills about new digital technologies it should consider the possibility of developing a partnership with specialised firms.

In terms of prices, the first questions you should ask are: *What do customers have to pay for? How should they do it? How much do they have to pay?*

Revenue Flows can then be structured along with the cost structure analysis, and this will allow you to maintain the success achieved by making the business model sustainable.

But be aware that it is not helpful to only consider revenues on the basis of price!

There is no single factor that makes revenues sustainable and functional. When you think about your new business model, do not make the mistake of considering revenue based on price. You should also pay attention to payment methods, resources, partners and key activities. In fact, it is important to ask which of these items will have a greater impact on costs.

⁵⁰ McKinsey Customer Decision Journey in the Digital Era.

If you have done the analysis correctly, in the presence of high costs you will have to make a comparison with the revenue streams. Obviously, your business model will become sustainable only if these are higher than the costs.

5.4 New Digital Business Model

If digital transformation is simply approached as a new tool or just an addition to the current firm's structure it will definitely fail. Digital transformation must be implemented as a total rethinking of what must be done in a market where new technologies are continuously introduced and shaping new customer needs. The real challenge in a process of digital transformation is not to keep up with all technological changes – these are countless and getting faster everyday – but to become quicker, more flexible and cost-efficient, and therefore to minimise risk and structural complexities.

In order to ensure that your new business model will work adequately, pay attention to the following useful tips:

1. Development and role of an effective and inclusive leadership: top management clearly and formally sets out the objectives of change, but middle management must be involved with accountability actions to facilitate communication and decisions, thereby involving staff at all organisational levels.
2. Make people aware of the benefits of change: develop an awareness of the effects and benefits of change, for example how it will change the way people work and their roles, so as to facilitate acceptance. It is also good to provide incentives and reward mechanisms.
3. Learning: create a way to develop specific change skills that can be distributed within the organisation, integrating them also with a programme or project management skills. SMEs could distribute some general instructions to their employees or organise *ad hoc* training sessions.
4. Organisational governance: define the role of a change coordinator with a clear and visible mission.
5. Tool, methodologies, check list: provide methods that facilitate and speed up the start of the programmes without having to "reinvent the wheel" every time. Develop instead a permanent operational culture that is dedicated to change.

6. Monitor hard and soft key performance indicators (KPIs⁵¹): activate control mechanisms linked to business objectives (KPI hard), but also KPIs that are soft for communication, alignment with strategies, and company climate. The technology also provides innovative support with change predictive analytics for increasingly effective decisions related to change.

5.5 How should you facilitate a DT process and involve all Stakeholders in a Company?

The following step by step instructions, provided by Gartner⁵² in 2014, facilitate the process of digital transformation within an organisation:

STEP 1: Create the right mind-set and shared understanding;

STEP 2: Put the right leadership in place;

STEP 3: Launch a digital business centre of excellence;

STEP 4: Formulate the digital strategy;

STEP 5: Find, develop and acquire knowledge;

STEP 6: Create new digital capabilities.

⁵¹ Key Performance Indicators (KPIs) are metrics which indicate the level of achievement of a given objective by an individual, a department or a company.

⁵² Gartner Inc. (NYSE: IT) is the world's leading research and advisory company and a member of the S&P 500. With expert-led, practitioner-sourced and data-driven research it steers clients toward the right decisions on the issues that matter most. – Gartner's description from <https://www.gartner.com/technology/about.jsp>



Figure 4.4 Gartner's six key steps for building a digital business. Source: Gartner website and report "Six Key Steps to Build a Successful Digital Business."

<https://www.gartner.com/newsroom/id/2745517>

Chapter 6 – Implications of Digital Transformation

The present work has emphasised that digital transformation is not about simply introducing new technologies to perform organisational tasks. It is, instead, a process of change which involves the organisation as a whole and therefore has organisational, financial, strategic and operational implications which will be addressed in this final chapter.

6.1 Developing a Culture of Change

The hardest part of transforming a business is to change the organisational culture, the mind-set and instincts of the people in the company. The common definition of culture is the set of values, norms, beliefs and knowledge that shapes people's will and needs and is embedded in the place in which they were born and have grown up.

Just as it varies between each different country, so also every organisation has its own values, which characterise people's behaviours and interactions: this has an impact on activities and the way in which they are managed.

When dealing with changes – i.e. introducing new strategies, structures or processes – it is important to clarify whether they are in contrast with basic norms and values shared by the corporate culture. If so, getting the benefits from the change process will be practically impossible. *So, what if your culture is not in line with a process of digital transformation?* In chapter 3 we have already explained that changing an organisational culture means changing values, norms, attitudes, opinions and ways of thinking which permeate the whole organisation and thus influence the entire workforce's behaviour.

It is important to understand and improve a recognition of non-formal and informal learning acquired through work experience in an organisation to overcome, or, at least, to reduce the effects of this crisis. Traditional models of on the job training are often not enough for continuous skills' updates and upgrades as they are too cumbersome and limit learners to prescribed and closed educational/training systems. There are many methods and a variety of techniques for collecting evidence to provide a basis for judgments about whether learning/training outcomes (skills and competences) have been acquired or not. Learning and knowledge support systems have to convey professional knowledge to non-specialists.

Current approaches and information systems, enhanced by Web 2.0, provide a viable solution for fast-paced and multitask-oriented patterns of learning and working today. They enable learning in small steps and with small units of content through social interaction. Innovative

and well-designed processes, aligned with formal learning and embedded in online communities, have the potential to support on-going professional development. As companies seek various new ways and options for the more efficient and effective cross-training of employees, informal learning has become an increasingly valuable alternative⁵³.

Organisational culture has been described in literature as an iceberg (*Figure 7.1*). On the surface there are visible elements, i.e. organisational structures, office layouts, brand, vision, mission, symbols, and all the other elements that can be seen by everyone inside and outside the organisation.

On the other hand, the lower part of the iceberg is made up of all the deep-seated values embedded in people's minds within the organisation, i.e. the assumptions, the opinions, the unconscious mental processes that define their culture.

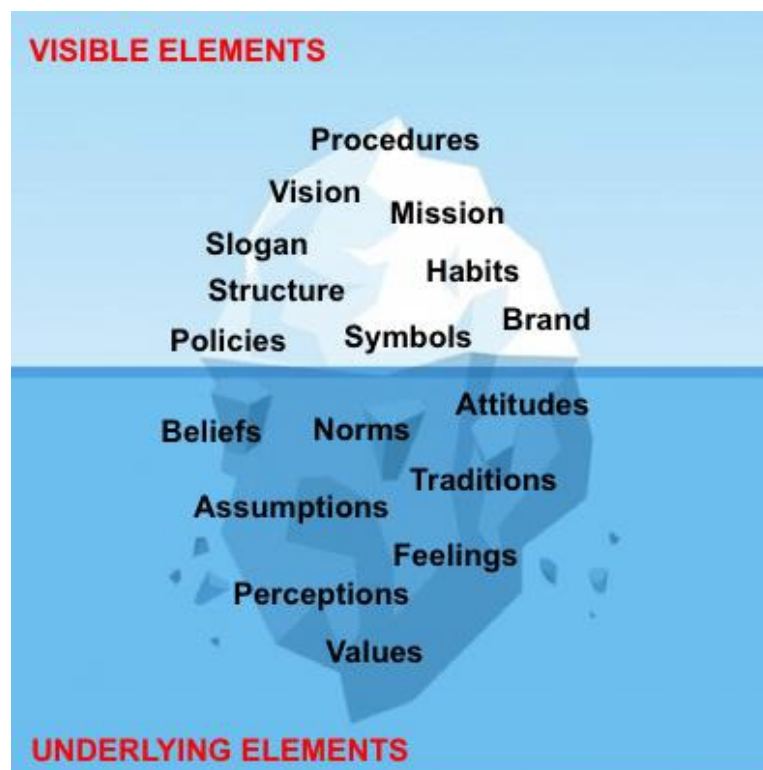


Figure 6.1 – Iceberg model of culture (Edward T. Hall's Cultural Iceberg Model, Beyond Culture (1976) picture re-elaborated)

⁵³ Uskov V. and Casalino N. (2012), New Means of Organizational Governance to Reduce the Effects of European Economic Crisis and Improve the Competitiveness of SMEs, Law and Economics Yearly Review Journal, LEYR, Queen Mary University, London, vol. 1, part 1.

Of course, in order to change the company's culture, it is important to change underlying elements, that will in turn impact all visible elements. It is essential that the management encourages values that are in line with concepts such as innovation, sharing, teamwork, flexibility, responsibility, etc.

There are four main strategies that are considered effective for a successful cultural change:

1. **Business Development.** Managers should introduce the change as a business development strategy aimed at improving the firm's capability to adapt to changes and solve new problems.
2. **Groups.** This is when managers organise a meeting with all the relevant stakeholders of the organisation and they meet outside the firm to reflect on new opportunities and to develop a new plan.
3. **Team Building.** Working together can always be translated into teamwork. Teams can be created to solve problems, to develop new products, to achieve other specific objectives. Building teams can strengthen cohesion and collaboration among employees.
4. **Activities among employees.** Employees that typically perform different tasks are brought together in a neutral place to reflect on ways to make communication and coordination more effective.

6.2 Competences and Employee Training

New technologies imply changes in employees' knowledge, competences and skills. More specifically, each organisation needs to design jobs, and assign goals and tasks that employees must achieve. Managers can intervene with job descriptions when they believe there is a possibility for improving the productivity or motivation of employees. Nowadays, new technologies are often popular interventions, but since they modify employees' work, they are often seen as a threat and are not always easily accepted.

However, although it is true that technologies have often reduced the number of workers needed to perform a task, they should not be seen as a danger. Technology that will not take the place of humans, for humans will always remain at the centre, simply *empowered and supported* by new IT systems.

The possible effects of technology on jobs are:

- (1) *Job simplification*: activities become simple and not very varied, so employees could be unsatisfied with their “mechanic” role⁵⁴;
- (2) *Job enrichment*: there is an increase in responsibilities and competences required to employees, so that they would need training and instructions to perform their tasks effectively;
- (3) *Job enlargement*: the number of tasks performed by a single employee is increased.

In the digitalised world, employees must be ready to learn continuously since new technologies could be introduced nearly every day, changing the way in which the job is executed. Even if they are often negatively perceived, literature suggests that if the role of technologies is well interpreted, employees’ positions will be strengthened and will provide them with new thought-provoking opportunities that also ensure higher satisfaction.

Training is a process through which individuals are helped to learn a skill or technique. Skills may be manual, such as using a keyboard, or intellectual, such as negotiating a contract. Progress in today’s digital era places emphasis on the growth of the individual, relating to acquiring a broad range of planned activities and experience that is most commonly acquired through the extensive use of a computer or other means of modern technology. The internet has far-reaching implications for the availability of information and for education. It is changing the way we work and creating new businesses that support technology. At the same time, technology and the internet also provide new techniques for trainers to use in the process of training itself. However, this can affect interpersonal communication. The basis for most training remains the traditional training process system. This comprises of four main steps, namely identifying training and learning needs, devising a learning plan, delivering training, and evaluating the outcomes.

While establishing your training plan, be sure to stress the relevance of creativity, effectiveness, adaptiveness and flexibility. These are the characteristics which were considered most important by respondents in the current state analysis⁵⁵. In fact, technologies could and will change in the future. People must be ready to adapt and quickly update their knowledge and skills.

⁵⁴ A possible solution could be to introduce job rotation so that everyone can practice different roles and learn new tasks.

⁵⁵ See chapter 1, paragraph 1.4

6.3 Financial Implications⁵⁶

New technologies will also have an impact on the financial activities of the firm. Table 6.1 could be a useful tool for assessing the digitalisation level of the financial office.

How digital is your finance function?		
TOPIC	HISTORICAL PARADIGM	DIGITAL PARADIGM
The role of financial managers	Controller and accountant Working in silos (i.e. accounting separated from controlling)	Advanced analytics provider Integrated finance Fully automated transactions
IT architecture and tools	Complex, redundant infrastructure Data spread Semi-automated accounting and control activities Experience-based analysis No user-friendly analytic tools	Integrated IT structure Unique data repository Advanced data management Advanced analytics Pattern recognition and prediction User-friendly analytic tools
KPI, strategic planning, forecasting	Measurement of value creation Based on historical data Bottom-up process No analytics Limited to internal data	Ability to uncover patterns Insights into value drivers Top-down process Machine learning, predictions Data from internal and external sources
Partnering, performance reporting, analytics	Paper based data Business intelligence data and fixed dimensions	Digital, real time data Data from internal and external sources
Accounting, risk management	Fully or partly manual workflow Fragmented and duplicated spending	Digital workflow Automated machine and analytics Consolidated view of spending

Table 6.1 Finance function digitalisation; Source: BCG Analysis

<https://www.bcg.com/publications/2017/function-excellence-how-digital-cfo-transforming-finance.aspx>

⁵⁶ Information for the development of this paragraph was based on a Boston Consulting Group article available at <https://www.bcg.com/publications/2017/function-excellence-how-digital-cfo-transforming-finance.aspx>

Digital transformation often starts with the ability to capture, integrate, access, and analyse high-quality data. Fortunately, the costs of data storage, cloud infrastructure, and processing power have dropped up to 100-fold over the past decade. That's important because predictive analytics, artificial intelligence and other digital tools are driven by data.

Digital transformation can considerably improve the performance and efficiency of finance organisations and increase the value they can deliver.

From a financial perspective, the main benefits are:

- ✦ **Higher-value business advice.** Digital tools such as predictive analytics, digital dashboards, AI, and advanced algorithms can deliver powerful new insights into how the business can improve its financial performance. For instance, digital dashboards can work as strategic command centres, delivering real-time data to guide business operations. Dashboards can flag up and evaluate the impact of unexpected events such as a new market entrants or supply chain disruption, providing timely analysis to decision makers across the company. Everyone in the firm should be able to access the dashboard so that they can quickly see the information they need to make decisions and do their work.⁵⁷ For example, many law firms use digital software to control their everyday activities. “Suite Lawyer Elite” is a lawyer programme that helps manage legal study. Even though it was first created for medium to large law firms, it is also optimal for individual professionals who want to improve and provide a service of superior quality to their customers.⁵⁸
- ✦ **Improved planning and forecasting.** The market is changing at a faster rate every day, which makes planning or forecasting future actions more and more challenging. Technologies can help firms to become flexible, agile, and able to work in similar environments. The automation of budgeting, planning and forecasting help managers and finance staff to obtain instant feedback from the software once they change the initial assumptions. Automated plans, predictive analysis and algorithms are even more accurate than traditional methods, gaining better results with less effort.

⁵⁷ Read more at <https://www.business2community.com/business-intelligence/why-you-need-to-use-a-business-dashboard-for-your-sme-02067582>

⁵⁸ The software is divided into modules to allow its gradual use and adaptability to the multiple needs of lawyers and collaborators. The modules of Suite Lawyer Elite solve the problems of excess information or its dispersion or heterogeneity, as well as the diversity of sources and internal and external communication. It also allows customers or authorised third parties to share documentation. Further information can be found at <https://ilsoftwarelegale.it/software-legali/1/SuiteAvvocatoElite>

- ✦ **Efficient accounting and compliance.** Regulatory submissions require accurate data gathering and validation. Digital technologies help to speed up the process, minimising errors and ensuring transparency. This quicker, automated process can even simplify the control process, creating benefits for the whole function.
- ✦ **Better decision making.** A natural consequence of better and more up-to-date data is that patterns, trends, insights and changes can be captured more easily. Technologies and evolutions of artificial intelligence can predict unexpected changes for business performance.
- ✦ **Decreased risk and higher returns.** Machine learning and AI algorithms can deliver objective, predictive models to help financial managers obtain greater financial value from investments. It has been proven, in fact, that AI-powered technologies are able to help analyse legal documents and extract critical points and clauses. They have the potential to simplify back-end operations by providing noticeable costs savings and faster reactions so that the financial manager could focus exclusively on value-adding activities – i.e. taking strategic decisions on the basis of data provided by AI.

All these benefits are driven by the fact that digital tools are more efficient and less exposed to possible errors than human work. It is for this reason that even financial activities become more effective and efficient than before.

6.4 Strategic and Operational Implications

Many organisations have already changed their structure due to the introduction of new technologies. This has led to important implications for both strategy and operations. More specifically:

- (1) it would help organisations when responding to customers that are becoming more demanding every day in terms of the speed, comfort, quality and value they expect from companies;
- (2) it would provide advantages in terms of:
 - upgraded decisional process;
 - higher control, efficacy and coordination

Technologies support *agile work*⁵⁹, and this has some important implications for strategy and operations:

1. *Organisations can be smaller.* Some internet-based firms, for example, exist almost completely in the “cyberspace”. There is no formal organisation with offices and big structures, everything could be managed directly from home, reducing the need for large investments in assets and fixed costs.⁶⁰ When dealing with the transformation of SMEs this means that the small dimension of those enterprises is not a weakness,⁶¹ at least for operational and strategic purposes. Thanks to ICT organisations, companies could also outsource many functions and reduce their internal dimensions.
2. *Decentralisation of structures.* Many firms are using ICT to decentralise the decisional power. Nowadays, in fact, there is no need for managers to heavily rely on what the top management says. Thanks to ICT they could have all the information they need at any time, thus being able to take decisions in the most efficient and effective way. Depending on the organisational culture, technology could also be used to strengthen the power of the centralised authority. In this case, they could have an even greater control over all the activities carried out throughout the company.
3. *Better internal and external coordination.* Communication is simplified, and it is the most important thing to ensure coordination among members of the organisation. ICT ensures that people can be connected and that they can work together even if they are located in different parts of the world. On the other hand, a greater flow of information and communications could increase the number of direct interactions among members within the organisation, thus creating new challenges when it comes to supervising the whole process.
4. *Better inter-organisational relationships.* Point 3 also applies to horizontal coordination and collaboration with third parties such as suppliers, clients and

⁵⁹ Sometimes also referred to as smart work or flexible work, agile work is defined as “*an approach to organising work through a combination of flexibility, autonomy and collaboration, which does not necessarily require the worker to be present in the workplace or in any pre-defined place and enables them to manage their own working hours, while nevertheless ensuring consistency with the maximum daily and weekly working hours laid down by law and collective agreements*”. It is, of course, facilitated by new technologies (European Parliament resolution of 13 September 2016 on creating labour market conditions favourable for work-life balance available at <http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P8-TA-2016-0338&language=EN&ring=A8-2016-0253>)

⁶⁰ This is the case with hi-tech start-ups, which are born to be competitive in the international scene and are characterised by flexibility and a high level of innovation.

⁶¹ Instead, as was previously thought, this small dimension could also be a weakness due to the lack of financial resources required to invest in digital transformation.

partners. While traditional interactions with third parties were often considered to be distinct, a growing trend is to level organisational boundaries and promote collaboration as if suppliers were part of the company.

5. *Reinforced networks*. If the transforming SME is working in a network of enterprises, then their work will be optimised by all the advantages carried by ICTs. The continuous flow of information obtained at a lower cost helps companies reinforce their competitive position.

Technologies are almost everywhere in services and they are the most important source of innovation. Incorporating them in the whole firm is essential to optimise strategies. As defined by Huang and Rust (2017), the three major impacts on services are related to: (1) the ability to communicate with clients, (2) the improved storage of data on clients (big data), (3) the ability to analyse this data and better understand clients' needs. These three impacts are all focused on customers. It is therefore clear that technology can help to strengthen relationships with clients, which can be standardised (when technology is used for gaining efficiencies) or personalised (when technology is used to better discover customers' needs)⁶².

6.5 Stakeholders Implications: From Competition to Coopetition

As has been stated throughout this document, the primary implications of digital transformation relate to communication and coordination between various stakeholders, which could be inside the boundaries of the organisation or outside. This paragraph covers the implications of digital transformation for two important stakeholders: suppliers and competitors.

An increasingly widespread trend is the “**integrated enterprise**”. ICT allows companies to communicate and coordinate their work internally, but also to do so with suppliers, clients and partners. Integrating suppliers in the production process makes it easier to satisfy customer needs.

One particularly interesting theory is that of James F. Moore in his work on business ecosystems (*Figure 6.2*). He defines these ecosystems as a system formed by the interaction of a community of organisations and their environment. Companies are entrenched in multiple multifaceted relationships that make them interdependent on each other for success so that we cannot talk anymore about competition, in its strictest sense. Technologies even reinforce this trend, given

⁶² Huang M. Rust R. (2017) Technology-driven service strategy, *J. of the Acad. Mark. Sci.*, 45:906-924

that they often require scales: the more they are used and improved, the more they will be useful for all companies.

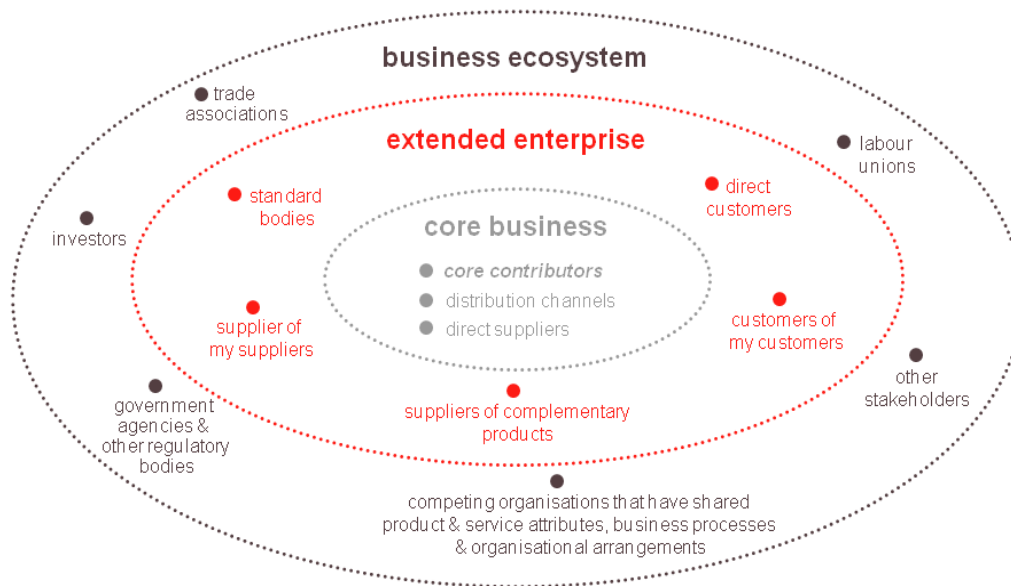


Figure 6.2 Business ecosystems, based on James F. Moore *Death of competition*, John Wiley & Sons, USA 1996, <https://partneringresources.com/organizational-networks-and-business-ecosystems/>

Firms could also think about sharing the costs required by technology investments and creating networks. In organisational ecosystems and enterprise networks cooperation and competition coexist, creating an environment of *co-opetition*. “The term co-opetition was coined by Adam Brandenburger and Barry Nalebuff in a book of the same name. The authors applied game theory to business relationship to show why the right strategy for rival businesses is often a mix of competition and cooperation on different fronts. [...] rival companies must cooperate to “grow the pie” and at the same time they compete to “divide the pie”.⁶³ What is clear from the analysed framework is that firms need to be ready to lose their boundaries in the pursuit of organisational efficiency and market growth. SMEs in the business services sector should learn from the experience of Italian industrial districts, made of small and medium enterprises, that perform traditional activities but still enjoy the benefits of sharing major costs, in some ways

⁶³ Adam M. Brandenburger and Barry J. Nalebuff (1997), *Co-opetition*, New York, Currency Double day, 11-27 cited in Rogers D. L. (2016), *The Digital Transformation Playbook – Rethink your business for the digital age*, Columbia Business School Publishing, New York, pp. 74-75.

thanks to geographical proximity⁶⁴. The same can be done, nowadays, even without being located close to other competitors. Data and information sharing could be the new source of competitive advantage if they allow firms to anticipate their clients' needs.

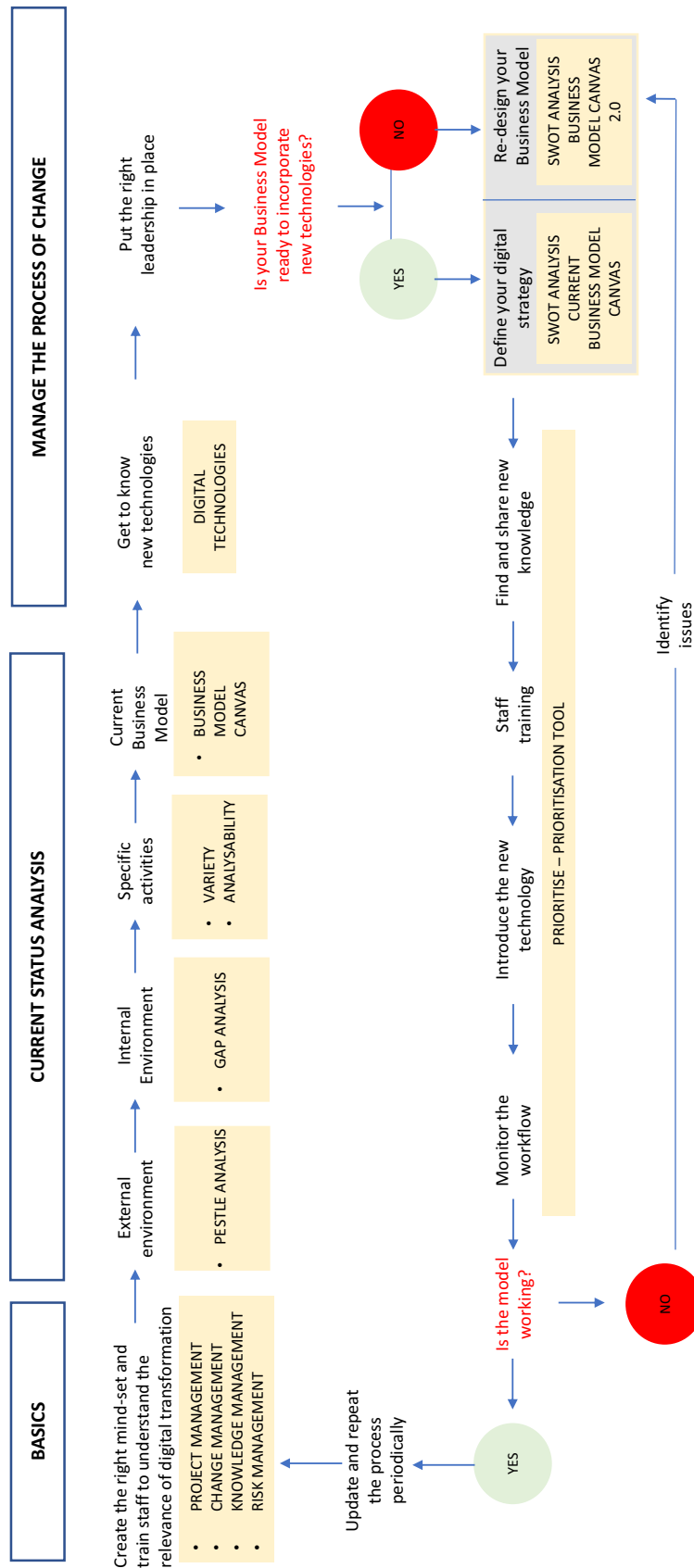
⁶⁴ Carabelli A., Hirsch G. and Rabellotti R. (2006), "Italian SMEs and Industrial Districts on the move: Where are they going?", PRIN research project, MIUR

PART 3

THE DIGITAL TRANSFORMATION PROCESS MODEL

As has been emphasised throughout this whole document, managing a process of change, regardless of the desired type of change, is not an easy task.

Process models help when managing these activities, but further effort is required. These models involve an analysis of existing processes, designing new strategies and becoming clearer about – and sharing – an understanding of how to implement these.



Conclusions

This document has been produced as an output of the “Digitalisation project”, a two-year project (2017-2019), which is funded as part of a "Strategic Partnership" within the EU “Erasmus+” programme. The aim was to develop an innovative self-learning tool in order to facilitate the process of digital transformation of small and medium-sized enterprises across Europe. The result – the online learning tool – is available here free of charge: <https://digital-transformation-tool.eu>

Any information included in this work has the aim of supporting the needs and requirements of business services SMEs and of developing successful process models for those firms to embrace digital change.

Digital transformation follows the rise of new digital skills and the adoption of digital tools. This is a process of transformation which requires the re-structuring of previous business models to make room for new, more effective and efficient, practices. These draw on existing theories of organisational change, change management, knowledge management, project management and risk management. A successful process of digital transformation is a complex task to perform. For this reason, in order to simplify the complexity, process models are useful tools for graphically representing a step-by-step organisational process. Firms should first assess their current status, then be aware of new technologies and innovations. They should then revise their business model, while considering profound implications on culture, training and financial, strategic and operational performance.

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