



**UNIVERSITA' DEGLI STUDI DI PADOVA**

**DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI  
"M. FANNO"**

**CORSO DI LAUREA MAGISTRALE IN  
BUSINESS ADMINISTRATION**

**TESI DI LAUREA**

**"Digital transformation and internationalization:  
How digital transformation affects internationalization strategies of SMEs"**

**RELATORE:**

**CH.MO PROF. DIEGO CAMPAGNOLO**

**LAUREANDA: STEFANIA MICOLI**

**MATRICOLA N. 1179596**

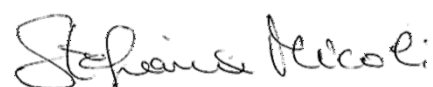
**ANNO ACCADEMICO 2019 – 2020**



La candidata dichiara che il presente lavoro è originale e non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere. La candidata dichiara altresì che tutti i materiali utilizzati durante la preparazione dell'elaborato sono stati indicati nel testo e nella sezione "Riferimenti bibliografici" e che le eventuali citazioni testuali sono individuabili attraverso l'esplicito richiamo alla pubblicazione originale.

*The candidate declares that the present work is original and has not already been submitted, totally or in part, for the purposes of attaining an academic degree in other Italian or foreign universities. The candidate also declares that all the materials used during the preparation of the thesis have been explicitly indicated in the text and in the section "Bibliographical references" and that any textual citations can be identified through an explicit reference to the original publication.*

Firma dello studente

A handwritten signature in black ink, appearing to read "Stefania Nicolini". The signature is written in a cursive style with a large initial 'S'.



## Table of contents

<b>Executive Summary .....</b>	<b>1</b>
<b>Chapter 1 – Internationalization of SMEs .....</b>	<b>5</b>
1.1. Introduction.....	5
1.2. Drivers and restrainers to internationalization.....	5
1.3. Entry modes .....	10
1.4. Internationalization theories .....	12
1.5. Measuring internationalization .....	15
1.6. Post-entry .....	18
1.7. Current state of internationalization of Italian firms.....	21
1.8. Conclusions.....	24
<b>Chapter 2 – Digital transformation.....</b>	<b>27</b>
2.1. Introduction.....	27
2.2. Defining digital transformation .....	28
2.2.1. Digitization, digitalization, and digital transformation .....	28
2.2.2. Digital transformation frameworks .....	29
2.2.3. Importance of balanced approach .....	33
2.3. Technologies for internationalization .....	34
2.3.1. From Internet and ICT to Industry 4.0 .....	34
2.3.2. Enablers and applications for digital transformation .....	35
2.3.2.1. Digital Data .....	36
2.3.2.2. Automation .....	38
2.3.2.3. Networking .....	40
2.3.2.4. Digital customer access .....	42
2.4. Current state of digital transformation for Italian firms .....	43
2.5. Conclusions.....	48
<b>Chapter 3 – Digital transformation impact on internationalization .....</b>	<b>51</b>
3.1. Introduction.....	51
3.2. Digital radar impact on internationalization .....	51
3.2.1. Digital data and internationalization stage .....	52
3.2.1.1. BDA for efficiency and enhanced customer contact.....	52
3.2.1.2. IoT for supply chain innovation and customer integration.....	55
3.2.1.3. IoT and BDA in the firm .....	57
3.2.1.4. BDA and IoT for internationalization .....	58

3.2.1.5.	Specificities for SMEs .....	59
3.2.1.6.	Findings .....	59
3.2.2.	Automation and internationalization stages .....	60
3.2.2.1.	Robotics and bestshoring.....	60
3.2.2.2.	3D printing, co-creation and customization .....	62
3.2.2.3.	Automation and internationalization: anywhere and for anyone.....	64
3.2.2.4.	Specificities for SMEs .....	65
3.2.2.5.	Findings .....	65
3.2.3.	Digital customer access and internationalization stages .....	66
3.2.3.1.	E-commerce and digital platforms for virtual internationalization .....	66
3.2.3.2.	Social media for reaching clients and creating business networks.....	68
3.2.3.3.	Social media and BDA .....	71
3.2.3.4.	Products and services digitalization .....	71
3.2.3.5.	Findings .....	72
3.3.	The impact of digital transformation on time, scale and scope .....	72
3.3.1.	Evaluation and preparation, entry mode, development and growth.....	72
3.3.2.	Technological developments and the risks of virtuality trap .....	76
3.4.	Digital transformation and born global firms .....	78
3.4.1.	Born global definition .....	78
3.4.2.	Internationalization of born globals .....	79
3.4.3.	Born global clusters.....	80
3.4.4.	Digitalization and born globals .....	80
3.4.5.	The future of born globals.....	82
3.5.	Conclusions.....	83
<b>Chapter 4 – Case studies.....</b>		<b>87</b>
4.1.	Introduction and methodology.....	87
4.2.	Case studies.....	88
4.2.1.	Baxi .....	88
4.2.2.	Better Silver.....	90
4.2.3.	Bravo .....	91
4.2.4.	Caseificio Elda .....	92
4.2.5.	DAB Pumps.....	93
4.2.6.	Filoblu .....	95
4.2.7.	Nesite.....	96
4.2.8.	Ono .....	97
4.2.9.	Sariv .....	97
4.2.10.	Stevanato .....	98

4.2.11. Texa.....	99
4.2.12. Facts emerging from the case studies analysis.....	100
4.3. F&P Stock Solution: a traditional digital born global firm .....	106
4.3.1. Development of F&P .....	106
4.3.2. Internationalization.....	109
4.3.3. Digital transformation .....	110
4.3.4. Future expansion .....	111
4.3.5. F&P internationalization in numbers .....	113
4.3.6. How digital transformation is supporting internationalization of F&P .....	115
4.4. Discussion.....	119
4.5. Conclusions: impact of digital transformation on internationalization of SMEs ....	120
4.6. Theoretical implications, limitations, and further research .....	121
<b>References .....</b>	<b>124</b>





## List of Figures and Tables

### Figures

Figure 1: Internet influence on the amount of risk in the internationalization process. ....	10
Figure 2: Models of foreign market entry along the investment and control continuum. ....	11
Figure 3: Alternative paths of internationalization for SMEs. ....	16
Figure 4: Staying local or going global? Average annual ROA comparison. ....	19
Figure 5: Building blocks of digital transformation. ....	31
Figure 6: Digitalization matrix. ....	33
Figure 7: Digital transformation radar. ....	36
Figure 8: Additive manufacturing advantages. ....	39
Figure 9: Digital technologies adoption by firms with >10 employees. Years 2016-2018. ....	44
Figure 10: Firms with >10 employees which planned to invest in digital technologies, by technology. Years 2019-2021. ....	47
Figure 11: Digital maturity data for small, medium, and large firms. ....	48
Figure 12: Results achieved by companies using Big Data Analytics. ....	57
Figure 13: Three axis model of manufactured products. ....	63
Figure 14: Effects on firms with at least 10 employees of digital platforms utilization in the years 2016-2018. ....	68
Figure 15: Percentage of firms with >3 employees that utilized digital platforms in 2018 according to the type of platform. ....	68
Figure 16: Digital transformation mitigation of risks associated to internationalization. ....	76
Figure 17: Total countries entered by F&P (October 2020). ....	113
Figure 18: Market expansion of F&P from 2014 to October 2020. ....	114
Figure 19: Percentage of sales per area in 2014 and 2020. ....	114
Figure 20: Export intensity in Europe (October 2020). ....	115

### Tables

Table 1: Firm's characteristics by internationalization model. Years 2011 and 2014. ....	22
Table 2: Operators and exporters by class of value. Year 2019. ....	23
Table 3: Operators and exports by number of destination countries. Year 2019. ....	24
Table 4: Firms with >10 employees and digital maturity level, for dimension and industry. Years 2016-2018. ....	45
Table 5: Digital transformation effects according to digital maturity. Years 2016-2018. ....	46

Table 6: Eight regions of manufactured products. ....	63
Table 7: Digital radar technologies impact on internationalization stages and effect on time, scale, and scope. ....	75
Table 8: Impact of digitalization on international business competences. ....	81
Table 9: Overview of case studies. Year of foundation, industry and dimension.....	100
Table 10: Overview of case studies. Internationalization mode.....	101
Table 11: Overview of case studies. Digital maturity. ....	101
Table 12: Impact of digital transformation on internationalization of F&P and effect on time, scale, and scope before and after entry.....	118

## **Executive Summary**

The purpose of this dissertation is to investigate the role of digital transformation in the internationalization strategy of a specific type of firms, which are small and medium enterprises (SMEs). In the European Union 93% of enterprises in non-financial business have less than 10 people employed, against the 0.2% of large enterprises. SMEs are important also in terms of value added, generating 43.8% of value added on average in European Union and even 67.3% for Italy (Eurostat, 2016). Considering the important impact of these firms in our economy, it is interesting to study the effects of digital transformation in their international expansion, considering internationalization as a strategy for growth.

Latest research already proposed some connections (Strange & Zucchella, 2017; Chiarvesio & Romanello, 2018); however, a structured approach considering digital transformation as a whole was still missing. For this reason, this research aims at bridging the gap in research, connecting in a structured way the two separate worlds of digitalization and internationalization.

To accomplish this task, first a deep review of the current literature was needed, in order to understand the internationalization process of SMEs and to define digital transformation. Afterwards, the two elements have been combined considering the single technologies impact on every internationalization step. Considering the scarce literature regarding the topic, the literature review was conducted referring to single technologies' impact or by making comparisons with the role of ICT in the globalization of the firms. As a result, a model based on literature review connecting each element of digital transformation to internationalization stages was created. Finally, a case study analysis was conducted to understand whether this conceptual model emerging from the literature review could be observed in the real world.

Despite the conceptual model has not been empirically tested with a quantitative research, we can assume that digital data, automation, and digital customer access, supported by infrastructural and networking technology, can have a positive impact on international growth. Technologies and applications such as Big Data Analytics, Internet of Things, additive manufacturing, social media marketing, e-commerce and online platforms are changing the way firms internationalize, offering new opportunities to SMEs which face additional constraints than larger firms. Digitally-transformed firms, especially those which maintained a balanced transformation, can benefit of it in their international activities. More specifically, digital transformation seems to support faster and broader internationalization, without excessive

commitment in the foreign market. As a consequence, the risks connected to internationalization for SMEs are lowered thanks to digital transformation.

The thesis is structured as follows:

*Chapter 1 – Internationalization of SMEs.* The first chapter focuses in understanding how the internationalization process is structured, understanding the drivers and restrainers to internationalization, the options firms have to enter a market and how internationalization can be measured. The chapter presents the stage model proposed by Johanson and Wiedersheim-Paul (1975) and Johanson and Vahlne (1977) and the new trends of internationalization. From this first analysis it was already possible to identify some aspects that could be affected by digital transformation. The end of the chapter reports a study of the current state of internationalization of Italian SMEs.

*Chapter 2 – Digital transformation.* This chapter's aim is to create a framework for digital transformation. After defining it, the building blocks of digital transformation by Capgemini (2011) were presented. This approach has been chosen because it considers digital transformation in a broader way, not only referring to that as a mere adoption of a specific technology. The second part of the chapter presents the digital radar by Schallmo and Williams (2018) where the key enablers of digital transformation are introduced. Afterwards, the main technologies and applications for each element of the radar are presented. The second chapter concludes with an overview of digital transformation activities among Italian firms.

*Chapter 3 – Digital transformation impact on internationalization.* In the third chapter, digital transformation and internationalization are finally brought together in a structured way. The first part of the chapter focuses on the impact of each single digital application on the stages of internationalization, providing specificities for SMEs. The outcomes of this analysis are then reported in terms of time, scale, and scope of international activities. Finally, the last part considers how digital transformation is supporting new forms of early internationalization, as in the case of born global firms.

*Chapter 4 – Case studies.* This conclusive chapter aims at verifying the hypothesis emerged in Chapter Three. The chapter is split in two parts. The first part reports a case study analysis of eleven Italian firms located in Veneto Region which are involved in digital transformation processes and have international activities. This group included both SMEs and large firms. The second part of the chapter is dedicated to the case of F&P Stock Solution, a company based in Berlin. This firm has been selected as an extraordinary case of born global firm, because it

has achieved almost 80% of sales from international markets in the first year of inception. The chapter concludes with the main propositions regarding the impact of digital transformation on the internationalization of SMEs, limitations and recommendations for further research.



# **Chapter 1 – Internationalization of SMEs**

## **1.1. Introduction**

In order to understand the potentials of digital transformation in the internationalization of companies, it can be useful to provide a general framework regarding the way firms initiate this process, how they enter a foreign country and how they operate once they are international. For this reason, this first chapter will focus on the drivers and restrainers to international expansion, the entry modes, and the internationalization theories. Then, after providing a way to measure internationalization dimensions and introducing the latest trends in internationalization, it will be taken into consideration how international firms operate effectively and stabilize their international presence once they entered in a foreign country. To conclude the chapter, some data about the current level of internationalization of Italian SMEs will be presented. Along the whole Chapter One, a couple of hints regarding the role of digital technologies on internationalization stages will be presented.

## **1.2. Drivers and restrainers to internationalization**

Since the beginning of the 20<sup>th</sup> century, the world has been facing a closer integration and exchange between different countries and people, the so called “globalization”. This process is the outcome of different and interconnected changes, such as the reduction of barriers to trade and investment, the advances in telecommunications, and the reduction in transportation costs (Stiglitz, 2002). On one side, political and trade organizations such as European Union, World Trade Organization (WTO), and North America Free Trade Agreement (NAFTA) operated in their area of competence to reduce the barriers, for example by favoring trade and investments or by promulgating laws reducing the risks connected to operations with foreign partners. On the other side, progresses in communication, given by a broader diffusion of digital technologies and reduced transport costs, have made easier and more frequent the movement of people and exchange of ideas in an international context (Johnson et al., 2011). The combination of the factors characterizing globalization has led to the reduction of the costs of doing business around the world and allowed the companies to source supplies at lower costs, to learn new competences, and to further differentiate products. As a result of the advances in communications, at this stage of globalization companies can create global-collaboration networks and operate worldwide 24/7, 365 days a year. One of the consequences is that world’s market economies are now much more integrated and interdependent (Rothaermel, 2017).

Of course, the world is not flat yet. The increasing convergence combined with the still present differences among countries leaves the space for companies to internationalize. In fact, Yip and Hult (2003) pointed out four drivers to internationalization, some of them leverage the opportunities given by a more integrated world, while others exploit the differences between home and foreign countries.

*Market drivers* are those that rely on the standardization of market characteristics, which can be given for example by the presence of global clients or by the blending of customers' needs and tastes that allows the transferability of marketing activities. A classic example is Coca Cola, but we can also think at Spotify: the Swedish start-up has been able to find the commonalities between customers in different countries and spread its product internationally.

Yip and Hult also mentioned *government drivers*, which include international trade policies, host country government policies and technological standards. Governments can open or close their economies, fostering or restraining internationalization. A quite hot topic nowadays is the one about tariffs, but governments can affect internationalization also through subsidies to firms and intellectual property protection. In this sense, an important work has been made in Morocco in the late 1990s. The government of Morocco simplified the county's tax code, introducing tax exemptions for new investors. It also enhanced the infrastructure quality and property rights protection. Country's competitiveness benefited from these actions and the increased investor confidence boosted foreign investments, putting Morocco at the second place in Africa as destination market for foreign direct investments (FDIs) projects, right behind South Africa (Damoah, 2017).

A third element is the *cost driver*. Companies can decide to go international to achieve economies of scale both in production and supplying, and to distribute costs on a larger market volume, but they also have to consider the costs of transportation of goods among countries. Firms can also realize cost advantages by leveraging the differences between countries, for example for what concerns labor costs. The mechanism of international division of labor is evident if we look at Eastern Europe and South East Asia: these areas are known for their lower manufacturing labor costs.

Finally, Yip and Hult consider *competitive drivers*. The aforementioned growing interdependency between countries can induce companies to open themselves to foreign countries. Moreover, the presence of global competitors must be taken in consideration by



firms, which have to redefine their strategies in order to deal with new players in the international competition.

It is possible to add a fifth driver which has not been considered by Yip and Hult, the *competence driver*. Companies can pursue an internationalization strategy to obtain a competitive advantage through competences. Operating outside the home country can be a way to exploit core competences but also gain access to new ones. In Rothaermel's view, internationalized firms have the opportunity to learn from the countries in which they are operating and should replace a one-way innovation flow by adopting a polycentric innovation strategy. In this way innovation will benefit from location economies, which are defined as "the advantages from locating value chain activities in optimal geographies for a specific activity, wherever that may be" (Rothaermel, 2017). The transfer of competences aspect can be interesting when confronted with the potentials of the new digital technologies.

It is important to underline, that the decision of operating internationally is not always the result of an intentional will of actively expanding, but it can also be obligatory in order to stay in the market. According to Musso (2014), the international expansion can be the response to external requests (passive approach) or it can be driven by the changing conditions of the internal market, such as a declining market or increasing competition (reactive approach). In the case of an active approach, we expect a systematic decision-making process, where objective criteria to select the international opportunities are used. These criteria include systematic and formalized international market research activities, use of statistical sources to differentiate foreign markets, and visits of foreign markets before entry (Brouthers & Nakos, 2005). In the research performed by Karagozoglu and Lindell (1998) it emerged that the smaller firms in their sample lacked international management experience and know-how for obtaining information about new markets. Consequently, SMEs tend to take their strategic decisions in a more opportunistic rather than systematic ways (Van Hoorn, 1979), but the lack of a formal methodology can reduce the odds of success of entry and of penetration in new markets (Brouthers & Nakos, 2005).

In the current years, the innovations connected to digital technologies offer the possibility to evaluate and select the international opportunities in a faster and easier way, requiring a lower financial effort. The availability of financial resources can determine the internationalization pathway of a company (Daszkiewicz & Wach, 2014) and also the possibility to start a digital transformation strategy. One difference between SMEs and large companies is that for SMEs

the access to external finance is hampered by a range of obstacles, limiting the opportunities for innovation and growth (OECD, 2017). For this reason, the higher affordability of the new digital tools is particularly important in order to reduce the gap between SMEs and bigger firms in the earliest stages of internationalization, when SMEs are seeking international opportunities.

The mentioned drivers explain the reasons for which a company might be willing, or forced, to start an internationalization process, but in order to do it, the firm also needs an international entrepreneurial culture, which is made up of six dimensions (Dimiatros, Johnson, Slow, & Young, 2003):

- international market orientation;
- international learning orientation;
- international innovation propensity;
- international risk attitude;
- international networking orientation;
- international motivation.

Therefore, companies planning to broaden their borders should have a propensity to seek superior value for their customers abroad and to accomplish intelligence on foreign market. Furthermore, they should be ready to develop and support original ideas, products, or processes tailored for the new markets. These companies should also be willing to commit resources and to access new ones through cooperative agreements. Finally, all this would not be possible without an overall motivation of management and employees towards internationalization (Dimiatros, Johnson, Plakoyiannaki, & Young, 2016). These activities can be facilitated by the use of Internet-based technologies. In fact, Internet supports the international expansion of exporters and the international market growth. Moreover, it favors the development of business networks and increases the information availability. As a result, digital technologies can back up the internationalization of firms (Bianchi, Glavas, & Mathews, 2017).

Another element that affects the decision to internationalize and its rationality is the subjectivity of the judgments of managers, who respond to objective contextual stimuli (Aharoni, 1966). Managers make decisions consistent with their cognitive orientations, perceptual processes, values and experiences, becoming a key driver behind the success of the internationalized firm (Dimitratos, Petrou, Plakoyiannaki, & Johnson, 2011; Daszkiewicz & Wach, 2014).

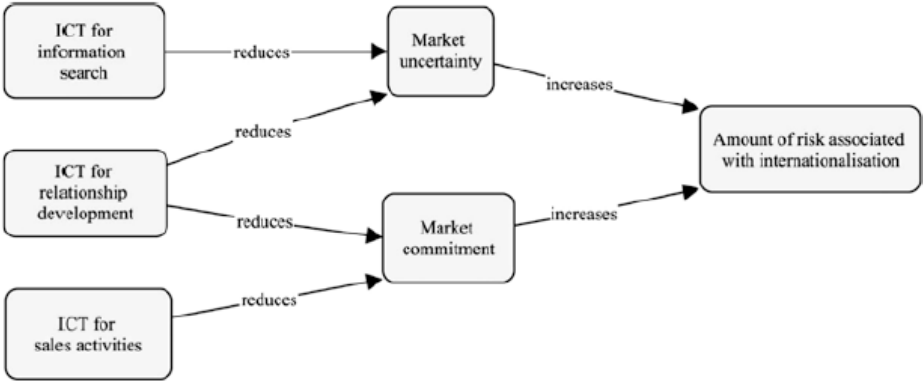
Companies start an international expansion when they believe that they can increase their economic value creation and enhance competitive advantage. Once initiators believe that the international strategy can generate substantial benefits and that the company has the capabilities needed to achieve those benefits, they need to understand if these benefits will outweigh the costs (Alexander & Korine, 2008). Internationalization is an opportunity for growth for SMEs but at the same time it exposes them to a number of risks such as foreign exchange risks, political risks, country and cultural risks, which may negatively influence their performance (Eduardsen & Ivang, 2017). For this reason, initiators have to evaluate not only the drivers, but also the restrainers to an international strategy to balance advantages and disadvantages.

One restraining factor is the one connected to oversimplification. Management should pay attention to the commonplace that tends to excessively emphasize the integration process through a unique and homogenous global market (Johnson, Scholes, Whittington, & Paci, 2014). This simplification can lead the companies to underestimate the differences between countries and consequently the liability of foreignness, which consists of the additional costs of doing business arising “from the unfamiliarity of the environment, from cultural, political, and economic differences, and from the need for coordination across geographic distance” (Zaheer, 1995, p. 341).

Incomplete knowledge is one of the factors affecting the uncertainty and as consequence the risks of internationalization, which consist in “all the limitations, restrictions, or losses for a company engaged in international business” (Ahmed, Mohamad, Tan, & Johnson, 2002, p. 805). As stated by Johanson and Vahlne (1977), the perception of risk can influence the commitment of a firm to foreign market. For this reason, lowering risk is necessary in order to allow SMEs in initiating, developing, and sustaining business abroad.

In the framework proposed by Eduardsen and Ivang, (2017), risk is the consequence of market uncertainty and market commitment. On the one side, incomplete knowledge, which consists in a lack of ability to estimate and predict the future, increases the uncertainty of the decision makers. These uncertainties can be firm-specific, industry-specific or can even affect the whole business context across industries and affect the risk perceived. On the other side, the risk is enhanced by market commitment. Market commitment consists in the size and transferability of tangible and intangible assets invested in a particular foreign market. A large commitment generates entry barriers that enhance the risk faced by the enterprise.

The gap between international knowledge needed and international knowledge possessed can be diminished by increasing the amount of information available through own or external experience, while the risk connected to the commitment can be reduced by relying on entry modes such as exporting, licensing, or joint ventures. According to the two researchers, in the reduction of risks associated with the internationalization, a crucial role is played by the Internet. For this reason, the authors propose the conceptual model illustrated in Fig. 1, where it is shown that the deployment of ICT in information search, relationship development, and sales activity decreases market uncertainty and market commitment and thus the risks connected to internationalization. This model can be a starting point to see if also the latest technologies, those connected to the Industry 4.0, have the same impact on internationalization of companies.



**Figure 1: Internet influence on the amount of risk in the internationalization process.**

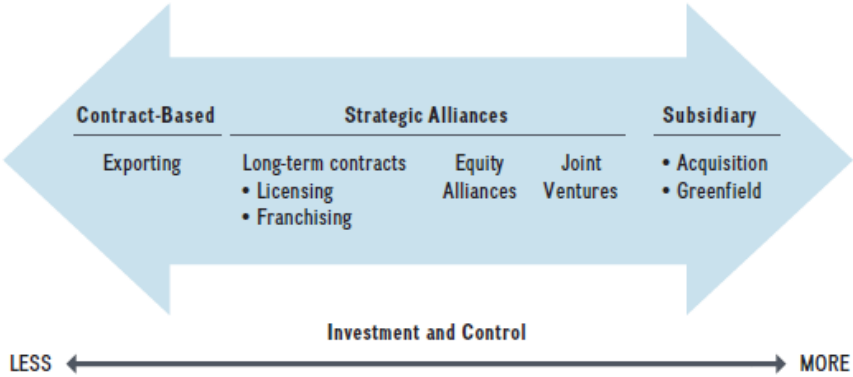
Source: Eduardsen & Ivang (2017).

**1.3. Entry modes**

When is a company considered international? International business describes the activities that expand the borders of a company’s home country. According to the definition proposed by Hill (2008), international business “refers to business activities that involve the transfer of resources (raw materials, capital and people), goods (finished assemblies and products), services (management consulting, financial services, insurance and education, etc.), knowledge and skills (managerial skills, intellectual property rights), or information (databases and networks) across national boundaries”. This definition can be considered as an umbrella term under which we can distinguish international, multinational, transnational and global companies. The main difference between the first type of company and the others, is that international companies have no foreign direct investments (FDIs). When the company invests directly in a foreign country, it can be described as a multinational (MNC) and then the increasing expansion,

complexity and coordination will make them global and then transnational companies (Hines, 2007).

Once the company has established why and where to expand, the decision is about the how. Managers have various options for entering foreign markets that require different investments requirements and control. As seen before, lower levels of resource commitment reduce the risks associated with the internationalization, but at the same time the control managers can exert is inferior (Rothaermel, 2017). Fig. 2 illustrates the various types of entry modes at disposition for the companies along the investment and control continuum (Anderson & Gatignon, 1986).



**Figure 2: Models of foreign market entry along the investment and control continuum.**

Source: Rothaermel (2017).

Companies can internationalize by producing goods in their home country and exporting them in a foreign one. The export can be made directly or through foreign intermediaries like agents and distributors (Peng & York, 2001). Intermediaries are useful for SMEs when entering distant and unfamiliar markets, because they provide their experience and knowledge of the foreign market, reducing the search, negotiation, and monitoring costs. However, using an intermediary is also associated with costs connected to transaction costs and rent extraction (Hessels & Terjesen, 2008). Many exporters are highly dependent on their export channels and for SMEs is often important to avoid conflict and maintain long-term relationship. Nonetheless, the latest innovations regarding the marketing activities of exporting SMEs may have the capacity to replace or substitute tasks performed by traditional intermediaries (Houghton and Winklhofer, 2004). Disintermediation as a result of digitalization is an additional element that can be deepened in the analysis of the connections between digital technologies and internationalization of SMEs.

Another possibility that companies have to internationalize is through strategic alliances such as licensing, franchising or joint ventures (JVs). While licensing and franchising still demand low resources, joint ventures imply a long-term commitment, increasing the exit barriers faced by the company. Due to this fact, they are often considered as a “try before buy”, in the sense that they can be a step toward the creation of a foreign subsidiary. For what concerns SMEs, forming an international joint venture can be a solution to overcome the liability of smallness. Thus, the international joint venture represents an important mode in the internationalization of SMEs (Lu & Beamish, 2006).

The most demanding entry mode in terms of resource investment is the establishment of a wholly owned subsidiary in the foreign country, which can be made through an acquisition or through a greenfield venture. Foreign direct investments can be complex and might require time, but they ensure total control. Despite some researchers used to believe that foreign direct investment is mainly an activity of large firms, new evidence suggests that also SMEs play an important role in FDI (Hsien-Chang & Yang, 2003).

Regarding the international entry modes, the report “The digital economy, multinational enterprises and international investment policy” by OECD states that digital economy is expected to reduce the need for a physical presence in foreign markets, since it allows the global transmission in digital form not only of services, but also of goods, thanks to the use of 3D printing technology. Both market-seeking and efficiency-seeking FDIs are partially undermined by digitalization and entry modes may be shifting toward exporting. The opportunity offered by the digital economy to access international markets with smaller investments is particularly favorable to SMEs, and its impact has been associated with the emergence of micro-multinationals and born-global firms (Gestrin & Staudt, 2018).

#### **1.4. Internationalization theories**

The framework illustrated in Fig. 2, moving from left to right has been suggested as a stage model, indicating a company that increases its international commitment over time. In fact, Johanson and Wiedersheim-Paul (1975) and Johanson and Vahlne (1977) described internationalization of firms as an incremental process made of successive stages. According to the Uppsala model (U-model) they developed, companies start with irregular foreign sales and when these sales become more regular, sales units will be established in the foreign market. The final step is the creation of a manufacturing unit abroad.

The causes of this incremental approach lay in the need for the companies to reduce the psychic distance, which is defined as “the sum of factors preventing or disturbing the flows of information between firms and markets” (Johanson & Wiedersheim-Paul, 1975, p. 308). The U-model assumes that the internationalization process is tied to the level of knowledge of the market. Companies begin with a low commitment and, once they gained international experience, they gradually increase their commitment, with consequent benefits in terms of learning effects. As Kalinic and Forza stated, “the more they learn, the higher the commitment, and the higher the commitment, the more they learn” (Kalinic & Forza, 2012, p. 695). This is the reason why, according to the U-model, the creation of an overseas unit is the last step: only at this point the company has a deep understanding of the local market.

Psychic distance also affects the choice of the foreign country. In fact, since the lack of market knowledge represents an obstacle to international expansion, managers will start the internationalization process by entering neighboring countries, where cultural, economic, and geographical distance is lower. Once they have gained sufficient international experience, they will gradually start entering other markets (Johanson & Vahlne, 2009; Dominguez & Mayrhofer, 2017).

The gradual approach is supported by many authors including, for example, Welch and Luostarinen (1988), who defined internationalization as a process through which a firm increases its level of involvement in foreign markets over time. Even empirical findings showed that the process of internationalization is very lengthy and incremental, especially for small firms (Boter & Holmquist, 1996).

Despite many supporters, the U-model has also been criticized as inadequate in explaining the internationalization of companies. At the beginning of the 1990s, the Uppsala models began to be challenged. Several authors criticized the determinism and linearity of the U-Model, others questioned its validity because of the qualitative and hardly measurable key concepts. Some scholars emphasized that the variables of the model offered only a partial explanation (Dominguez & Mayrhofer, 2017). Indeed, other researchers pointed out the need to consider additional factors such as firm-specific and industry-specific variables or networks (Boter & Holmquist, 1996; Dominguez & Mayrhofer, 2017). Empirical researches confirmed the criticalities of the model, for example by showing that the speed of internationalization may not be constant and linear. Looking at SMEs, researchers found out that some SMEs internationalize more rapidly than the gradualist model predicts, and that knowledge-intensive

and knowledge-based SMEs are likely to skip some stages and have an accelerated internationalization (Kalinic, & Forza, 2012). Furthermore, in some cases traditional SMEs committed in distant markets without prior market knowledge, networks and experience, disconfirming the U-Model. SMEs can even decrease their international commitment and then re-engage in international operations, demonstrating that internationalization path is not always linear (Kalinic & Forza, 2012).

Notwithstanding the criticism to the model, we can say that it can still be relevant for manufacturing companies that are expanding into global operations (Rothaermel, 2017). In their study, Boter & Holmquist (1996) identified two distinct forms of processes for internationalization, one for traditional companies and one for innovative companies. He stated that the stage approach can be used when studying internationalization in small firms that belong to conventional manufacturing industries because, due to their limited resource base, the process of internationalization needs to be executed in incremental steps. On the other side innovative companies, defined as knowledge-intensive and high-tech small firms, can follow a less organized process of internationalization and can structure business activities, company forms, and other functions more freely.

A response to the U-Model has been the International New Ventures (INV) theory by Oviatt and McDougall (1994). According to this theory, internationalization does not necessarily need to be gradual. International new ventures are “organizations that, from inception, seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” (Oviatt & McDougall, 1994, p. 49). An important aspect is that in this case the focus is on the age of firms when they become international, not on the size. INVs have a proactive international strategy since the beginning, but they do not need to own foreign assets, the definition of INV is concerned with value added, not asset owned. The INV theory affirms that some firms can skip stages or not have any stages in the internationalization process. Oviatt and McDougall (2005) also confirmed what stated by Boter, since they asserted that traditional firms adapting well understood technologies tend to follow the Uppsala Model, while knowledge-intensive and knowledge-based firms internationalize faster because they usually hold a competitive advantage that can be exploited in multiple countries.

Daszkiewicz, and Wach, (2014) reported that scholars started differentiating two ways the firm internationalize. On the one side, there are the companies “international from inception” (Oviatt & McDougall, 1994), on the other side, there are those “international by stage” (Johanson &



Vahlne, 1977). These two alternatives only represent two end points of a continuum and thus we might ask if there are, for example, companies that are not international since their founding, but at the same time that do not necessarily follow all the stages.

### **1.5. Measuring internationalization**

In order to understand the latest trends emerging in internationalization and the various types of firms resulting from different patterns, we need to make a step back and define the way internationalization can be measured. Baum, Schwens, and Kabst (2015) reported three variables of the internationalization process, which are time, scale, and scope.

*Time* is an important dimension to analyze small firms' internationalization patterns, because precocity (i.e. the length of time between company foundation and first internationalization) is a useful indicator to distinguish between born-globals, born-again globals and traditional internationalizers (Baum et al., 2015).

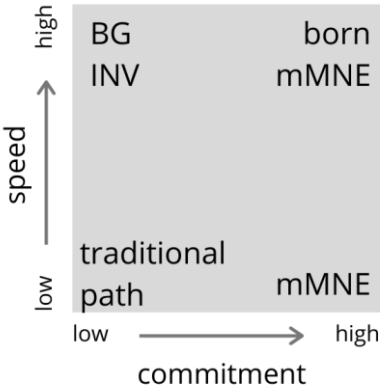
*Scale* indicates the extent of a firm's international operations. It can be calculated as the degree of internationalization, which is usually measured by the percentage of foreign sales to total sales. Another way to define the scale is connected to the level of commitment in the host country and so to the entry mode. The indicators proposed by Sullivan (2014) are the number of foreign subsidiaries, the proportion of foreign assets, the proportion of employees in foreign subsidiaries, and the percentage of added value generated by foreign subsidiaries, but this second approach is less used when referring to SMEs because they mostly rely on non-equity entries such as exports (Baum et al., 2015; Sullivan, 1994).

Finally, *scope* captures the extent of regional concentration opposed to diversification. A common way to measure scope is given by the number of foreign country markets or foreign regions a firm has international activities in, going from exporting to owning a subsidiary. An important limitation to this approach is that for companies located in small countries it is easier to serve numerous neighboring countries. An alternative option is given by measuring the distance between domestic and host country markets. The more culturally and institutional distant the country markets are, the more internationally diversified the firm is (Baum et al., 2015; Casillas & Acedo, 2013).

A similar division is the one provided by Zahra and George (2002), that distinguishes three factors: extent or degree; breadth or scope; and speed. While the extent is analogue to scale,

and breadth is connected to the scope, the concept of speed is similar to the one of time, but it has been further developed by the authors. Considering time in a profound way is necessary to overcome the main critics to the sequential approach, since the duration of each stage has not been considered and since there are companies that do not follow the usual order or that have a rapid internationalization and due to this, the time component should be split in: 1) the time lag between founding and initiation of international operations, which determines the precocity; and 2) the speed of subsequent international growth (Casillas & Acedo, 2013). This post-entry speed can be determined by analyzing the growth in terms of scale (exporting intensity and commitment) and the growth in breadth (Zahra & George, 2002). In this case, an appropriate term could be borrowed by Vermeulen and Barkema (2002), that used “pace” in order to define the evolution of international expansion after the first international initiative.

From these variables, we can identify various types of international firms, summarized by Dimiatros et al. (2015). Fig. 3 is an adaptation of the framework designed by Dimiatros et al. (2016) revised by the author which only considers small and medium enterprises. In this framework, looking at the speed of internationalization it is possible to identify incremental internationalized firms, that are those firms that enter foreign countries long after their establishment, and *International New Ventures (INVs)*, that represent small firms gone abroad from inception. Considering the entry mode, Dimiatros differentiates between exporting small firms and *micro-multinational enterprises (mMNEs)*. Micro multinationals are an interesting phenomenon and indicate SMEs that, despite their dimension, adopt advanced entry modes such as licensing, joint ventures and subsidiaries and that “manage value-added activities through constellation and investment modes in more than one country” (Dimitratos, Johnson, Slow, & Young, 2003, p.165).



**Figure 3: Alternative paths of internationalization for SMEs.**

Source: elaboration by the author adapted from Dimiatros et al. (2016).

Similar to INV there are the *born global* firms (BG), that are globally-oriented since their inception or shortly after (Kalinc & Forza, 2012). At the moment, there is still little agreement regarding the time span. It varies between one and six years or even beyond, and it can be tied to a certain amount of foreign sales over total sales (Baum et al., 2015). For example, according to Knight and Cavusgil (2004), born globals are firms that internationalize within three years after inception and generate more than 25% of their sales from abroad, even though other authors applied from 5% to even 90% foreign sales to total sales (Baum et al., 2015). Another phenomenon emerging in the internationalization of SMEs field is *born-again global firms*. These firms operated for a number of years only on a national base but suddenly, for example due to a critical event, changes their strategy and internationalized rapidly (Dominguez & Mayrhofer, 2017; Kalinic & Forza, 2012).

At this point the question is: what does explain the different internationalization patterns of the firms? According to Dimiatros et al. (2016), these behavioral differences can be attributed to international entrepreneurial culture, but the objective of this work is to understand the role of technology and the way new technologies can affect time, scale, and scope of internationalization of SMEs.

Oviatt and McDougall (2005) developed a model that identifies the forces that can affect the internationalization speed. In this model, technology is presented as an enabling force, since transportation, communication, and digital technology appear to have an important role in the acceleration of internationalization. But technology per se cannot explain the international behavior, what matters is the way the entrepreneurial actor interprets this enabling force. The researchers also identified two moderating forces, that are the international network and knowledge intensity. An international network helps the entrepreneurs in spotting the opportunities, stablishing international relationships, and accessing information. Regarding market knowledge, the authors report that firms remained domestic until they were pushed or pulled internationally by an event because they perceived the lack of foreign market knowledge as an impediment to international expansion, and even after entering the speed was slow (Oviatt and McDougall, 2005). Digital technologies support firms in gathering market knowledge before the entry, impacting entry speed of internationalization.

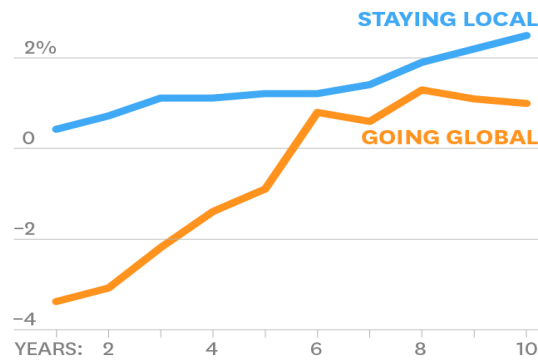
Regarding scale, as previously mentioned, the development of digital technologies has made possible to perform a large variety of activities without the need of physical presence. As stated by Servais, Madsen, and Rasmussen (2006), digital solutions provide firms with a low-cost

access to market. E-commerce, automation, 3D printing, cloud computing and broadband applications are just an example of the possibilities at disposition of the companies in order to be international with a lower commitment. As reported by Eduardsen and Ivang, “the value of the Internet in supporting the cost of international growth lies in its ability to reduce the cost of internationalization, causing resource-constrained SMEs to disregard their size-related constraints” (Eduardsen & Ivang, 2017, p. 272). SMEs face one more challenge in their international expansion with respect to large enterprises and they have the possibility to exploit new technologies in order to overcome their liability of smallness.

Digital transformation can impact also the scope of international activities. As aforementioned, globalization is lowering the distances through an increasing integration, but differences among countries are still present. The concept of distance is particularly important in international business, since it influences the decisions and outcomes of internationalization. Companies operating abroad face additional costs connected to communication and unfamiliarity with cultural, legal, and institutional aspects of the foreign country (Hennart, 1982). Distances among home and host countries increase the struggle that international companies have in transferring their competitive advantages, establishing their legitimacy, securing relationships with suppliers, buyers, and customers (Lu & Beamish, 2006; Fodor, 2017). Distance can put an obstacle to internationalization and the higher the distance, the higher the challenges faced by the firm. Digital revolution can reduce the barriers created by the distance, since it provides low cost access to markets, facilitate communication, coordination, and integration of operations (Fodor, 2017). In this sense, digital transformation can favor the international geographical reach of the companies.

### **1.6. Post-entry**

Once the company entered the foreign country, there is still much to do in order to be successful in the internationalization process. The post-entry stage is delicate and risky; thus, it requires specific attention. There are many firms who experienced failures while internationalizing and had to desist from their expansion ambitions. In an analysis conducted by Stadler, Mayer and Hautz (2015) on over 20,000 companies selling abroad, it emerged that they had an average Return on Assets of -1% for the first five years and that it takes ten years to reach +1% (Fig. 4). Only 40% of companies obtained 3%. Failure can occur for several reasons, for example the firm can make false assumptions about the nature of the international markets, or it might underestimate the operating costs (Vessels, 2012).



**Figure 4: Staying local or going global? Average annual ROA comparison.**

Source: Stadler et al. (2015).

From the entry-mode analysis, it is possible to distinguish between those entry modes that do not require a foreign direct investment, such as export, and those who do. When considering the post-entry stage, this distinction is necessary, since the differences generate peculiar dynamics and needs.

Regarding the first category of entry modes, the main post-entry challenges are connected to two important aspects that have been mentioned above, control and market knowledge. When the company decides to enter the market through direct export, it has full control over the activity and is in direct contact with its customers. In this situation the company obtains information regarding the target market, but the decision to operate directly generally requires more efforts in terms of time, energy, financial and human resources.

In the past, one valid alternative was indirect export through an intermediary, who reduced the control and the opportunity to increase knowledge about the market, but nowadays digital technologies represent a resource leverage in the development of international sales. Through a company website, firms can connect quickly and cheaply to a large customer base; with e-commerce, they can instantaneously enter multiple markets without any investment in assets and activities abroad, improving the export performance (Morgan-Thomas & Jones, 2009). Moreover, the combination between e-commerce and big data analytics (BDA) can further boost the foreign sales, considering that BDA provides e-commerce with real-time customer service, dynamic pricing, personalized offers or improved interaction (Fosso Wamba, Atker, Coltman, & WT Ngai 2015). The use of e-commerce and big data represents an important element that can help companies to have a deeper insight about the foreign market, reducing the commitment needed and maintaining their control over the operations. Empirical findings

suggest that online channel positively supports export performance; however, if firms rely too much on online, they may fall into the so-called “virtuality trap” (Yamin and Sinkovic, 2006). This trap consists in the error of “generalizing scant learning about foreign markets and customers from their online interactions, while actually not fully appreciating the complexities and thus retaining a physical and relational distance from the host market” (Sinkovics e Jean, 2003, p. 132).

In the case the company decides to enter through the establishment of a subsidiary, it is going to take different decisions and face different problems than exporting firms. Becoming international, or even global, brings governance and coordination costs connected to distance (Fodor, 2017). Firms need to decide how to structure their foreign operations, the degree of centralization or decentralization, and how to coordinate with the subsidiaries.

The recognition of the strategic role of the subsidiaries can be favored by the growing complexity and the need to respond to local needs. If headquarters perceive subsidiaries’ potential in the generation of competences and transfer of knowledge, they might increase their autonomy, moving from a hierarchical and centralized model to a more decentralized and collaborative one (Kostova, Marano, & Tallman, 2016) even if, according to Vermeulen and Barkema (2002), catching this kind of benefits appears to be difficult to realize. However, decentralization of decision-making power does not mean total absence of the headquarter. The role of the headquarter in providing direction, supervising and coordinating is still important and its presence is necessary to capitalize and exploit the knowledge and competences generated by the subsidiaries. Pressures towards decentralization imply higher integration of operational activities, this integration can be favored by the advances in information and communication technologies (Yamin & Sinkovics, 2007). ICT are considered as a facilitator for the integration of geographically dispersed operations, since they are able to reduce coordination costs and the costs of communication and transaction (Ambos & Ambos, 2009; Kobrin 1996, Lipsey 1996). Yamin and Sinkovics (2007) recognize the potential of ICT application in controlling and coordinating foreign subsidiaries, but their research confirmed that ICT might entail the risk of a too tight control, which could potentially constraint subsidiary’s initiatives and, in the long-term, their entrepreneurial spirit. For this reason, the implementation of digital technologies in this context requires also specific attention about the possible contraindications.

### 1.7. Current state of internationalization of Italian firms

With the aim of creating a more complete overview on the internationalization, this final part of the chapter will provide some data regarding the state of internationalization of Italian firms. The main information is retrieved by the database of ISTAT, the Italian National Statistics Institute.

In 2017, in order to follow the new trends in internationalization, ISTAT adopted a new taxonomy of the internationalization models, which represents different modes of operating on foreign markets. The new classification, made of mutually exclusive classes, considers first more elementary forms of internationalization and then moves until more complex structures (ISTAT, 2017). The proposed taxonomy is the following:

<i>Only importers</i>	firms that only carry out import but not export activities;
<i>Only exporters</i>	firms that do not import but export to EU countries and/or to less than five non-EU geographical areas;
<i>Two-way traders</i>	firms involved in both import and export activities;
<i>Global</i>	firms exporting to no less than 5 non-EU areas;
<i>MNE_FOR</i>	firms operating in Italy which belong to foreign-controlled groups;
<i>MNE_IT</i>	firms operating in Italy which belong to Italian control groups which have foreign affiliates.

The first four classes identify four categories of trade internationalization, while the last two refer to productive internationalization. With the present classification each firm is assigned to one class, therefore, if an organization has characteristics that are related to more than one class, it will be included in the highest category.

The first data provided with this new taxonomy report the forms of internationalization in the years 2011 and 2014 (Table 1), with an overview on the operators' number, dimensions (in terms of employees), value added, productivity, share of total export and of exported turnover. Since the focus of this research is on SMEs, it is interesting to have a first look on the dimension of the firms analyzed. On average, all the firms belong to the category of SMEs and it is possible to see how the growing dimension is connected to more complex forms of internationalization.

Multinational enterprises, both foreign and Italian, represent the most complex forms, and are also the least represented categories of international firms. They differentiate themselves from the other forms of international firms for the bigger dimensions, since they count on average 115.2 and 118.6 employees, and because they achieve the best results in terms of value added and productivity. Their number is almost stable, but their weight has reduced along the years.

**Table 1: Firm's characteristics by internationalization model. Years 2011 and 2014.**

Source: ISTAT (2017).

	Firms		People employed		Value added (%)	Productivity (value added per person employed; €; median)	Share of total export (%)	Share of exported turnover (%; median)
	No.	%	No. (mean)	%				
<b>2011</b>								
Only importers	167,651	47.1	6.3	17.0	10.8	24,523	-	-
Only exporters	69,907	19.6	6.7	7.5	4.4	30,994	2.2	3.4
Two-way traders	80,963	22.7	15.2	19.9	15.8	44,846	13.8	4.2
Global	12,094	3.4	35.4	6.9	6.4	57,477	16.1	46.1
MNE - Foreign	10,914	3.1	109.6	19.4	24.3	72,689	27.9	7.8
MNE - Italian	14,468	4.1	124.7	29.2	38.3	63,623	40.0	24.4
<b>Total</b>	<b>355,997</b>	<b>100.0</b>	<b>17.3</b>	<b>100.0</b>	<b>100.0</b>	<b>33,456</b>	<b>100.0</b>	<b>5.1</b>
<b>2014</b>								
Only importers	149,246	44.1	6.5	16.2	10.2	21,810	-	-
Only exporters	72,577	21.4	6.1	7.5	4.4	27,572	2.0	4.2
Two-way traders	78,909	23.3	14.9	19.7	16.3	42,327	12.9	4.8
Global	12,926	3.8	34.8	7.6	7.7	57,373	16.9	49.4
MNE - Foreign	10,026	3.0	115.2	19.4	24.2	73,375	29.5	9.2
MNE - Italian	14,837	4.4	118.6	29.6	37.2	62,020	38.7	29.1
<b>Total</b>	<b>338,521</b>	<b>100.0</b>	<b>4.2</b>	<b>100.0</b>	<b>100.0</b>	<b>30,920</b>	<b>100.0</b>	<b>6.1</b>

Not surprisingly, the most diffused form of internationalization for Italian firms is export. Together, only exporters and two-way traders represented, in 2014, the 44.7% of the firms and their percentage has grown between the considered years.

Looking at this table, it is interesting to notice the growing potential of global firms, that are firms that export to at least 5 non-UE countries. The amount of operators of this category is still small compared to the other international firms, but between 2011 and 2014 it has been the one with the biggest improvement in value added (+1.3%), followed by two-way traders (+0.5%), while all the other faced a small contraction. Similarly, global firms, together with MNE-Foreign are those which in the analyzed time increased the percentage of total export, respectively of 0.8 and 1.6 percent. Global firms have a wide international reach while maintaining a limited commitment outside their home country. Furthermore, they can achieve positive results with a reduced average number of employees, since the biggest jump occurs between global and MNE category.



Global firms, but also exporters in general, represent a “light” form of internationalization that permits to firms to achieve important results in foreign markets directly from their home country. For this reason, it can be interesting to analyze how digital transformation can support exporters in improving their international performance.

Moving forward, the Annual Report of foreign trade and international activities of firms published in 2020 provides a detailed analysis of the internationalization state of Italian organizations and the main facts regarding international trade in 2019 (ISTAT, 2020).

Last year Italy registered an increase of value of the goods exported of 2.3%, with an important growth in the export of services (4.1%). On the other side, Foreign Direct Investments abroad and in Italy diminished respectively of 27% and 23.1%. The main destinations of Italian exports are Germany (12.2%) and France (10.5%), followed by U.S. (9.6%), Switzerland (5.5%), and United Kingdom (5.2). Regarding the industries, the main exporters operate in the machinery and equipment sector (38,330 players), followed by rubber and plastic materials (28,586), metal products (28,357) and textiles, clothing, leather, and accessories (28,058).

Analyzing the dimensions, in 2018 the largest contribution to export is given by big enterprises, which performed 48.8% of export. This value shows that the contribution of companies to national exports grows significantly as the size of the company increases. Similarly, in 2019, 135,760 firms performed international trade.

The biggest category in terms of operators is micro-exporters (78,045) which identify firms that generated a limited amount of revenues (up to 75,000 euro), with a contribution to the total value of export corresponding to 0.3%. On the other side, 4.636 firms export more than 15 million euro, generating 71.9% of sales on foreign markets (Table 2).

**Table 2: Operators and exporters by class of value. Year 2019.**

Source: elaboration by the author from ISTAT & ICE (2020).

NUMBER OF COUNTRIES	OPERATORS		EXPORT (million euro)	
1	64,680	47.6%	9,282	2.1%
2	17,603	13.0%	7,240	1.6%
3-5	19,119	14.1%	16,120	3.6%
6-10	11,227	8.3%	27,765	6.2%
11-15	5,487	4.0%	29,752	6.6%
16-25	6,955	5.1%	56,920	12.7%
26-40	6,025	4.4%	85,716	19.1%
above 40	4,664	3.4%	216,249	48.2%
<b>Total</b>	<b>135,760</b>	<b>100%</b>	<b>449,044</b>	<b>100%</b>

A last interesting data emerging from this report is the number of countries where firms perform export activities. As shown in Table 3, 47.6% of international firms exports to one single country, on the opposite side, 4,664 companies have connection with more than 40 countries, generating the 48.2% of exports. This value identifies the scope of Italian export and as a result the 80% of value is generated by the 13% of firms, that are those who operate in at least 16 countries.

**Table 3: Operators and exports by number of destination countries. Year 2019.**

Source: elaboration by the author from ISTAT & ICE (2020).

CLASSES OF EXPORT VALUE (thousand euro)	OPERATORS		EXPORT VALUE (million euro)	
0-75	78,045	57.5%	1,288	0.3%
75-250	15,202	11.2%	2,127	0.5%
250-750	11,115	8.2%	5,248	1.2%
750-2,500	13,975	10.3%	19,847	4.4%
2,500-5,000	6,304	4.6%	22,368	5.0%
5,000-15,000	6,521	4.8%	56,005	12.5%
15,000-50,000	3,242	2.4%	85,117	19.0%
above 50,000	1,394	1.0%	257,044	57.2%
<b>Total</b>	<b>135,798</b>	<b>100%</b>	<b>449,044</b>	<b>100%</b>

The most evident fact emerging from these data is that Italian export is characterized by a large number of operators that internationalize through the simplest internationalization forms, such as export, mainly to EU countries. These firms are mostly SMEs and micro-exporters with minor results compared to the bigger players in the Italian export, almost three fourths of them operate in maximum five foreign countries. It can be interesting to understand if and how digital transformation can support these smaller players in enhancing their international performance.

**1.8. Conclusions**

The aim of this chapter was to dig into the topic of internationalization, in order to understand how the internationalization process works, from the pre-entry to the post-entry stage. This step was necessary for multiple reasons. First, this gives us a structure to analyze internationalization and tools to measure it. Second, this deep analysis offered the opportunity to identify all those aspects in which digital transformation might play a role.

Starting from the very general, progresses in technology are supporting globalization, blending the economies and making firms around the world more interdependent. Digital transformation

opens the firms to a wider range of opportunities and can potentially bring firms in an international dimension, supporting the creation of international business networks. Going more in detail and considering the singular firm, digital transformation can support internationalization in the very initial stages, when companies are still considering whether to expand abroad or not. As we have seen, international expansion requires know-how about new markets and financial resources. Only firms that can gain an adequate level of market knowledge can reduce their uncertainty and consequently the risks of internationalization. In this sense, digital transformation can sustain firms in reducing their market uncertainty and market commitment, thanks to the use of technology in information search, relationship development, and sales activity.

The following step is about market entry. Firms have various options to become international, with a trade-off between commitment and control. The simplest option is export, both direct and indirect through intermediaries which can provide experience and knowledge about the market. As alternative, firms can choose strategic alliances (licensing, franchising, joint ventures) or foreign direct investments. Even if FDIs and JVs use as entry modes for SMEs has increased, export still remains the most diffused entry mode and nowadays it is visible in export the tendency towards disintermediation. This is possibly happening because intermediaries are substituted with new forms of international sales, such as e-commerce or digital platforms. Furthermore, following the digital economy trend, experts sustain that digital economy will reduce the need for a physical presence in foreign markets, not only for transmitting services but also for goods.

The last stage analyzed is post-entry, which is a very delicate and risky one. According to the entry mode, there can be two possible scenarios depending on the presence of equity investments in the foreign country. In case of export, the main issues are connected to market knowledge and control. Technology can support exporters in gaining market knowledge and maintaining control; however, it still does not erase the risk of virtuality trap. In case of FDIs, the headquarter has to structure foreign operations maintaining coordination and supporting knowledge exchange. In this situation, technology can play the role of facilitator for the integration.

The opportunities offered by digital economy and digital transformation also led to the appearance of new types of international firms, such as micro-multinationals, born-global firms, and international new ventures. These new ways of expanding internationally disconfirmed the

gradual model, where internationalization is seen as an incremental approach made of defined steps. Less traditional firms such as knowledge-based or knowledge-intensive ones can internationalize in a not-so-linear way, skipping steps, being faster than predicted, avoiding excessive international commitment or even decreasing commitment over time. These firms can be international from inception and structure their internationalization strategy more freely, seeking value from multiple countries, even countries that are not close. In this situation, a large role is played by digital transformation, which first creates the infrastructure to make this feasible, and second generates new business models that fit this new way of international expansion.

In order to identify and measure these changes, in this chapter there have been presented three variables, which are time, scale and scope. Time can indicate the year of first internationalization and the years of further expansion, which permits us to calculate also the rhythm of internationalization. Scale indicates the percentage of foreign sales on total sales, but at the same time also represents the level of commitment in the host countries in equity-based entry modes. Last, there is scope, which gives us the number of foreign country or regions in which the firm is operating. In Chapter Three it will be shown how digital transformation can impact all these three variables.

Finally, exploring the current situation of internationalization of Italian firms, it has emerged that in Italy internationalization is based on export. The typical Italian exporter is an SME which exports to maximum five foreign countries, usually EU ones. Since export is the main form of internationalization, it can be interesting to deepen the role played by digital transformation on it. This can be particularly useful, considering that this entry mode is performed by a large number of operators with small results in terms of value added. From the data, it also emerges that the larger the scope, the higher the scale in terms of foreign revenues, an additional analysis can be conducted to understand how digital transformation can sustain firms in increasing their scope.

In the next chapter internationalization will be temporarily set aside, in order to give space to a detailed analysis of the topic “digital transformation”. In Chapter Three these two worlds will be merged, in order to provide a complete examination on the way digital transformation impacts internationalization.

## **Chapter 2 – Digital transformation**

### **2.1. Introduction**

The second ingredient of this research is digital transformation, together with its connected technologies. The first part of Chapter Two will focus on digital transformation, providing a definition and making the distinction between digitization, digitalization, and digital transformation clear. Right after, there will be reported the main theories regarding digital transformation and its impact on businesses, which can be summarized in three main building blocks. Finally, given the various areas in which digital transformation can intervene in business, it will be remarked the need of adopting a balanced approach when digitalizing a company. Exploring the field of digital transformation and digging deep inside it will allow us to understand whether there are other touchpoints between digital and international worlds that has not emerged so far.

Once explored the main aspects concerning digital transformation, the successive element to consider are the technologies involved in it. For this reason, the second part of the chapter is dedicated to the technologies for digital transformation that can impact the internationalization process. The role of the Internet has been, and still is, particularly important for SMEs, since even smaller firms can afford an instrument that allows to be permanently connected to the global market (Colombo, Croce, & Grilli, 2013). Its impact on internationalization of firms is evident and has been studied by various authors over the years, but still little is known about the most recent technologies. After a brief introduction regarding the role of the Internet and ICT in moving from the Third to the Fourth Industrial Revolution, there will be illustrated which are the main technologies involved in digital transformation and their potential applications in an internationalization perspective.

The last part of Chapter Two will report an analysis performed by ISTAT regarding the current state of digital transformation of Italian firms. Having updated data regarding Italian firms can help us in understanding the main trends in digitalization and technologies adoption, especially for SMEs. In this way, it will be easier to identify which technologies have already been implemented in smaller-sized firms, and afterwards analyze how they can impact the internationalization of firms.

## **2.2. Defining digital transformation**

### **2.2.1. Digitization, digitalization, and digital transformation**

In order to define what digital transformation is, a necessary initial step is to make clear the differences between digitization, digitalization and digital transformation. Even if these terms are related and often used interchangeably, they have distinct meanings. This distinction is not just a semantic exercise, it is necessary to avoid a confusion which might lead to an underestimation of the power of digital transformation, putting the organizations in peril (Bloomberg, 2018).

Starting with the Oxford English Dictionary (OED) definition, digitization is “the action or process of digitizing; the conversion of analogue data into digital form” (OED, 2010). Digitizing consists in converting analogue streams of information into bits represented as 1s and 0s (Brennen & Kreiss, 2016). It is important to remark that what is digitized is the information, not the process.

Moving to digitalization, the Gartner IT Glossary defines it as “the use of digital technologies to change a business model and provide new revenue and value producing opportunities; it is the process of moving to a digital business” (Gartner, 2019), while the OED provides the following definition: “digitalization is the adoption or increase in use of digital or computer technology by an organization, industry, country, etc.” (OED, 2010). Other researchers’ definitions focus on the impact of digitalization on people and various aspects of social life (Brennen & Kreiss, 2016), but in the business’ perspective we can refer to Gartner’s one, since digitalization consists in the transformation of business operations by leveraging digital technologies and digitized data (Bloomberg, 2018).

The term “transformation” has just appeared in the definition of digitalization; therefore, one question might emerge: “which is the difference between digitalization and digital transformation?”. In this case the distinction is more blurred, but still existing. Digital transformation can influence and change all aspects of human life (Stolterman & Fors, 2004). It can cover different realities, but for the purpose of this study we will use it referring to digital business transformation. Currently this term has no commonly accepted definition, for this reason there will be provided various meanings given by different authors.

### 2.2.2. Digital transformation frameworks

The concept of digital business transformation goes one step further than mere digitalization since it opens the doors of the company to the external, and more specifically to customers. In fact, according to the IT industry analyst Jason Bloomberg, digital transformation “is the customer-driven strategic business transformation that requires cross-cutting organizational change as well as the implementation of digital technologies” (Bloomberg, 2018).

Digital transformation has also been defined as “changes in ways of working, roles, and business offering caused by adoption of digital technologies in an organization, or in the operation environment of the organization”. The digital transformation concept goes beyond the mere technology field, it means “rethinking current operations from new perspectives enabled by digital technology” (Parviainen, Tihinen, Kääriäinen, & Teppola, 2017).

Another point of view is Schwertner’s one, who has defined digital transformation as the application of technology to build new business models, processes, software and systems that results in more profitable revenue, greater competitive advantage, and higher efficiency (Schwertner, 2017). The consulting firm i-SCOOP refers to business model too, describing digital transformation as “the profound and accelerating transformation of business activities, processes, competencies and models to fully leverage the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way.” (i-SCOOP, 2018).

Adopting a broader view, Parviainen stated that digital transformation can impact the entire operation environment of the company and its internal functioning. Moreover, it can change existing business and bring new business opportunities. The researcher identified three spheres of the firm which can be impacted by digitalization (Parviainen et al., 2017):

- Internal efficiency
- External opportunities
- Disruptive change

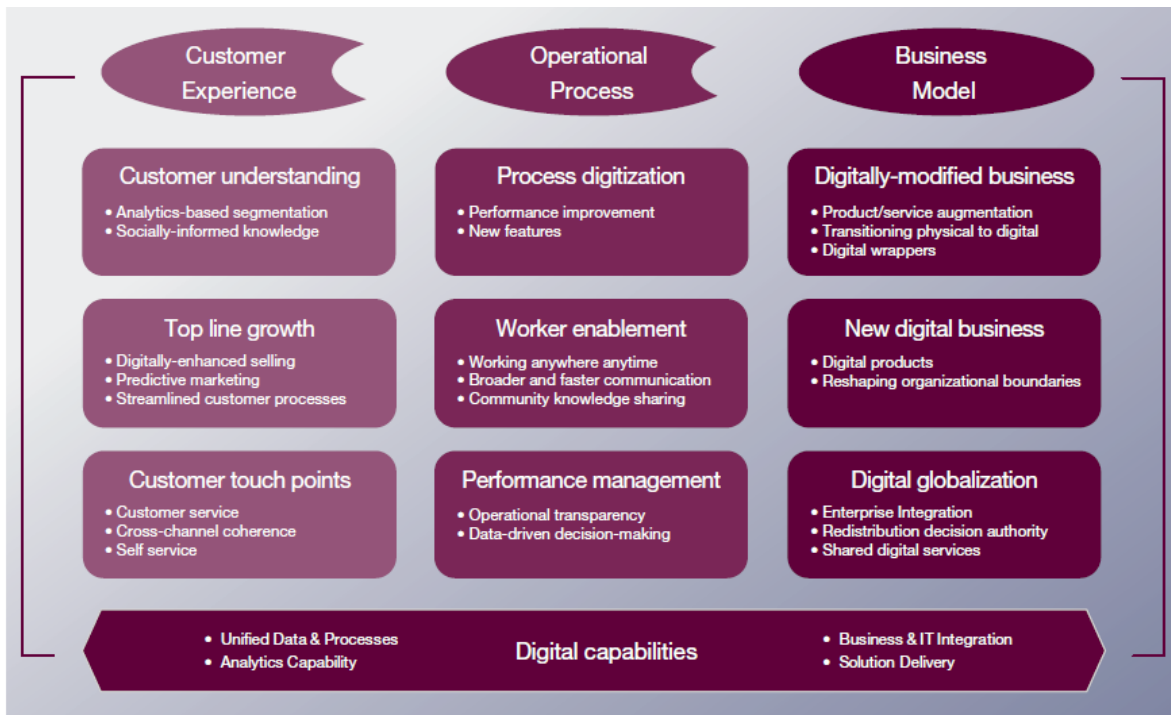
*Internal efficiency* is described as the re-planning of internal process and the improvement of efficiency and quality through the elimination of manual steps, the real time view on operation and result, the integration of data and the automation of routine work, with a consequent cost reduction. Looking at the internal perspective, authors have also pointed out how digital transformation can have an effect on the functioning of the company and its structure. For example, the automatic collection of data, reports and dashboards on digital-process

performance allows managers to address problems before they become critical. This can reshape the internal communication, influence the decision making and, in an internationalization perspective, change the relationship between headquarter and subsidiaries. *External opportunities* represent the possibility to create new opportunities in existing business domain, for example by providing new services, by finding novel forms of more direct interaction with customers or by serving new ones (Matt, Hess, & Benlian, 2015). On the other side, *disruptive change* is considered as the complete change of business roles due to digitalization, it leads to the creation of new business and changes in the operating environment of the company, for example the removal of traditional intermediaries in the value chain (Parviainen et al., 2017; Furr & Shiplov, 2019). As result of digitalization, business models can be redesigned or completely replaced (Downes & Nunes, 2013; Sathananthan, Hoetker, Gamrad, Katterbach, & Myrzik, 2017).

A similar, but more detailed, perspective is the one adopted in the report by MIT Center for Digital Business and Capgemini Consulting, where customer experience, operational process and business model are considered the three pillars of the enterprise that can be subjected to digital transformation. Each pillar is composed by three building blocks (Fig. 5). A final element is represented by digital capabilities, that are an essential enabler for transformation in all areas (Westerman, Calm ejane, Bonnet, Ferraris, & McAfee, 2011). The framework provided by this report will be a useful base to understand which elements of the company can be digitally transformed and which of these are connected to internationalization.

For what concerns *customer experience*, the three building blocks reported are customer understanding, top line growth, and customer touch points. In this field one of the main aspects considered is the importance of analytics capability to understand customers more in detail and being able to consider specific geographies and market segments separately. Other keywords are personalization, integration, and consistency. Through the integration of customer purchasing data, companies are able to provide more personalized sales and customer service and to act in a predictive way. To obtain this result, integration of data and consistency between touch points are fundamental.





**Figure 5: Building blocks of digital transformation.**

Source: Westerman et al. (2011).

Moving the focus back to internationalization, we can assume that the digital transformation of the customer experience pillar can affect not only the way firms deal with local customers, but also foreign ones. Due to a higher information availability, the use of technology can increase the foreign market knowledge and selection, accelerating the entry phase and allowing the firm to access multiple markets. We should also say that through websites and social media, the company is potentially visible and already present in every country of the world. E-commerce and e-commerce platforms allow companies to export in multiple countries without the need to open foreign facilities.

The transformation of *operational processes*, even if less visible than customer experience, allows companies to realize very strong benefits. The report mentions process digitalization, worker enablement and performance management as building blocks of this pillar.

Confirming what stated above regarding the internal efficiency possibilities, in this work are pointed out the efficiency and quality gains deriving by automation. Automation is favored by recent progresses in robotics and digitalization and has the advantage to reduce time and improve quality not only in manufacturing (Ancarani & Di Mauro, 2018), but also in other functions such as HR and R&D, for example. As a result of automation, companies have the opportunity to relocate people on more strategic tasks and enhance their performance. Some scholars mentioned that the growing use of robots may erode the labor cost advantage of

emerging countries (De Backer et al., 2016) which, together with increasing logistics and coordination costs, might affect the geographic location of companies and favor reshoring (Krenz, Prettnner, & Holger, 2018). Similarly, additive manufacturing is supposed to affect global value chains, altering the way production is organized across time and space, with significative effects on geography and size of production activities (Rehnberg & Ponte, 2018).

About worker enablement, through the use of older technologies such as e-mail, collaboration tools, and video conferencing, which are largely diffused in companies and still evolving, employees can collaborate with colleagues or professionals they have never met, separating the work process from the location and favoring the possibility to source know-how worldwide. Digital transformation not only facilitates knowledge sharing, vertical and horizontal communication. According to executives, another fundamental element in digital transformation is performance management, because both internal and customer-facing processes can now provide information that allow executives to make decisions on real data and not on assumptions. Communication and performance management elements are particularly interesting in the perspective of companies' internationalization.

Regarding the last pillar, *business model*, the three building blocks are digitally-modified business, digital business and digital globalization.

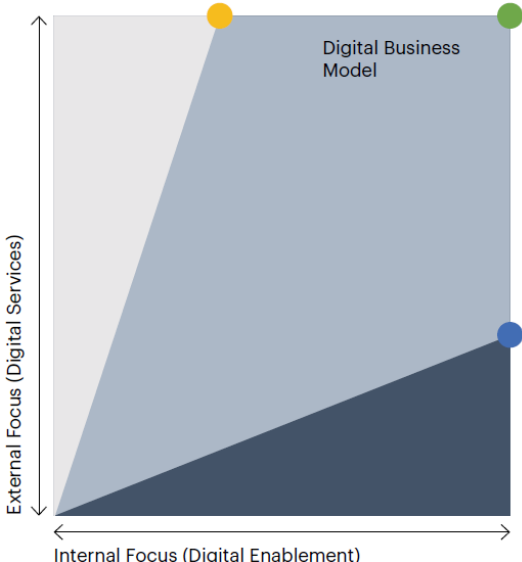
The first two building blocks refer to the fact that companies willing to be digital need to change the way they do business, for example by transforming physical goods into digital, by enhancing the service component or by adding digital around traditional products to complement them. About this topic, an interesting perspective is provided by a study conducted by McKinsey. In their view, digitalization transforms global flows through the creation of purely digital goods and services, through "digital wrappers" that increase the value of physical flows, and through digital platforms that facilitate cross-border production and exchange. Global flows mix is changing due to digitalization and nowadays virtual flows are replacing physical ones (Manyika et al., 2014; Manyika et al., 2016). In this new framework new opportunities emerge for SMEs (Lund et al., 2019).

One new element that emerges from the report performed by Capgemini, and that has not been mentioned in Parviainen's analysis, is digital globalization and the related aspects. According to the report, "digital technology coupled with integrated information is allowing firms to gain global synergies while remaining locally responsive" (Westerman et al., 2011, p. 23), becoming more centralized and decentralized at the same time. The centralization of global shared services allows local managers to focus on strategic activities. Local managers can have a

broader view of the business thanks to the availability of centralized data, this permits to make decision autonomously and tailor business to local needs, relieving the pain of centralization. The way digitalization affects the balance between centralization and decentralization can be relevant in understanding how the relationship between headquarter and local subsidiaries can change due to digital transformation.

### 2.2.3. Importance of balanced approach

From the interviews conducted by the MIT Center and Capgemini, it has emerged that no company has fully transformed all the nine elements yet. In general, only some elements are selected and transformed according to the company’s needs. A relevant aspect to consider is the importance of a balanced approach in order to fully achieve digital transformation. About this topic, Accenture developed the digitalization matrix (Fig. 6), where the digitalization level of companies is assessed. In order to be successful, companies need to respect a preliminary condition: the utilization of balanced digitalization. On the one side, companies should have an internal focus, concentrating on what has been called “Digital Enablement”, which consists in the digitalization of internal operations and processes. On the other side there is the external focus, represented by “Digital Services”, that are the digitalization of product and service portfolio, marketing, sales and after-sales channels and everything that concerns the “customer experience” pillar (Accenture, 2017).



**Figure 6: Digitalization matrix.**

Source: Accenture (2017).

If a company only relies on the digital improvement of internal processes, it will not be able to take advantage of the external opportunities. In opposition, lacking the internal focus could represent a threat too, because firms will miss the necessary structure to implement the digital business models emerging from the outside. For this reason, concentrating only on one aspect is not sufficient and firms need to have both an internal and an external focus. Only those companies that complete their transformation in Digital Services and Digital Enablement areas will be considered as digitally transformed (Accenture, 2016).

## **2.3. Technologies for internationalization**

### **2.3.1. From Internet and ICT to Industry 4.0**

The Internet represents an important element for Information Technology (IT) and Information and Communication Technology (ICT). IT defines anything related to computing technology that is used for the managing and processing of information, in form of electronic data (IGI Global, s.d.), while ICT has its focus on all technologies that provide access to information through telecommunications (Christensson, 2010).

Since the mid-1990s, the Internet has been widely adopted by business organizations due to two main factors. First, its compatible nature with every network and virtual information system allowed companies to reduce setup and operational costs and to eliminate switching costs. Second, the Internet could be deployed both as a communication tool and as a marketing channel, given its enhanced informational and interactive communicative capabilities (Kula & Tatoglu, 2003). As a result, the adoption of the Internet inside the company implied profound changes on various aspects of the firm. Colombo et al. (2013) identified three main changes connected to the adoption of the Internet, which are: *internal strategic changes*, *external strategic changes*, and *organizational changes*. The first case considers how internal processes can be transformed due to the Internet, going from changes related to product and markets, to technological innovation and re-engineering of internal processes. External strategic changes reflect how the adoption of Internet-based applications can redefine the borders of a company and influence the decisions regarding mergers and acquisitions, alliances, delocalization and outsourcing. Finally, organizational change represents change in the firm's organizational structure and managerial process and the way the Internet can influence the delegation of activities and the hierarchical structure of a company. This structure can be replicated to assess the effect of the latest technologies, substituting them with the Internet.

Internet and ICT are closely related to the Third Industrial Revolution since, through the introduction of automation and microelectronic technology into manufacturing, they have been central in the advancement of manufacturing technologies, making flexible manufacturing systems and computer integrated manufacturing possible (Xu, Xu & Li, 2018). Over the years, the Internet confirmed its potential as a connector, allowing firms to create a direct link with customers, suppliers, and distributors and facilitating transactions, processes, and information transfer. Moreover, the use of Internet supported companies to expand their market, allowing them to sell products around the world without any physical presence or offering the possibility to develop new products and services for existing and new customers (Kula & Tatoglu, 2003).

The centrality of Internet and ICT is even stronger nowadays. Indeed, the Fourth Industrial Revolution has been triggered by the developments in ICT. Among these developments, the most significant achievement is represented by cyber-physical systems (CPS), which can be considered as the core foundation of Industry 4.0 (Xu et al., 2018; Tirto, Ossik, & Omelyanenko, 2020). CPS are the basis for Industry 4.0 technologies and represent “a system of collaborating entities that are in intensive connection with the surrounding physical world and its on-going processes” (Xu et al., 2018, p. 2943). This connection, together with the data-accessing and data-processing services, are provided by the Internet and ensure the highest level of coordination between physical and computational elements (Xu et al., 2018). As reported by Tirto et al. (2020), in Industry 4.0 the connection between physical and virtual is total, since it includes things, people and businesses. Moreover, in order to achieve full integration and a competitive strength, these communication technologies should be applied to every aspect of the industries.

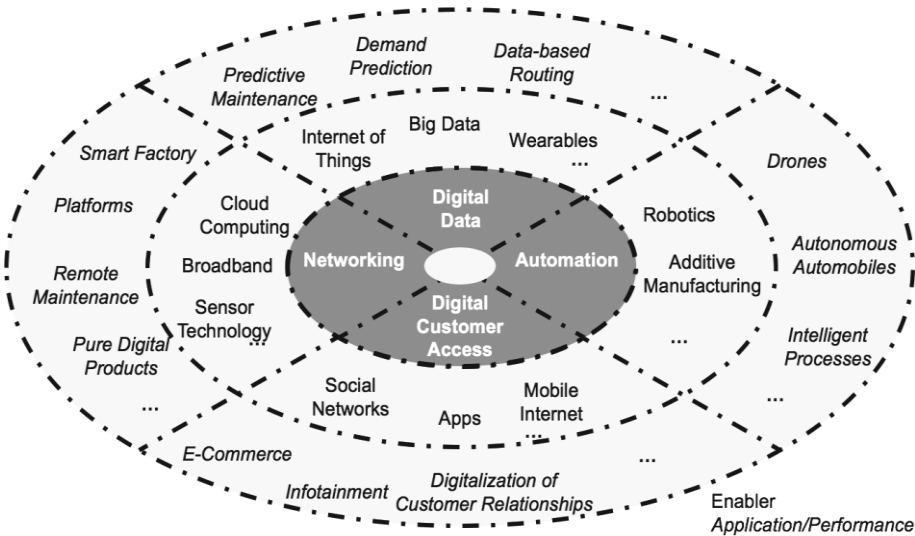
ICT is capable of integrating both new and classical industrial production process, but firms might struggle in introducing CPS and smart-factory technologies. This struggle is given by the fact that Industry 4.0 does not only require ICT, but also new business models and three integration formats: vertical integration, horizontal integration, and end-to-end integration (Xu et al., 2018). Industry 4.0 is pervasive and diffused.

### **2.3.2. Enablers and applications for digital transformation**

One very well-known overview regarding Industry 4.0 technologies is the one provided by Boston Consulting Group. According to the authors, digital transformation is powered by nine foundational technology advances, many of them are already used in manufacturing, but within Industry 4.0 these technologies are fully integrated and automated, and not isolated anymore.

Their deployment can lead to flexible and optimized production and is able to change the interaction between human and machines and among suppliers, producer, and customers. The nine technologies mentioned are: big data and analytics; autonomous robots; simulation; horizontal and vertical system integration; the industrial Internet of Things; cybersecurity; the cloud; additive manufacturing; and augmented reality (Rüßmann et al., 2015). The report only considers manufacturing industry, for this reason it is necessary to add some other technologies that have not been mentioned yet.

A more comprehensive framework is the one developed by Boué and Schaible (2015) and integrated by Schallmo and Williams (2018). In the digital transformation radar they identified four leverages for digital transformation, each leverage is associated to enabler technologies and the related applications (Fig. 7). Most of the technologies mentioned by the BCG studies are also present in the radar. Due to its completeness, this model is more apt for describing the wide variety of digital transformation technologies and applications. According to the authors, digital transformation is enabled by the availability of *digital data*, the *automation* of production processes, the mobile or wired *networking* of value-added chains and by the *digital customer access*.



**Figure 7: Digital transformation radar.**

Source: Schallmo and Williams (2018).

**2.3.2.1. Digital Data**

The digital data leverage comprises all the technologies that permit the collection, processing, and analysis of digitized data to facilitate and improve predictions and decisions. Among these technologies, we can mention Internet of Things and Big Data.

Internet of Things include all the physical products that are equipped with sensors that are able to capture and process data, and to communicate them to other products or people. This integration is very popular among consumer applications, but the potential for business-to-business applications is more far-reaching, since these sensors transmit real-time data that can be used for predictive maintenance, monitor inventory levels and capacity planning (Strange & Zucchella, 2017). The use of these sensors makes all products, even unfinished ones, more connected and smarter. The dimension of connectivity, together with the large amount of data generated, put the basis for remote management systems. In fact, sensors interconnect devices, systems, and services that communicate autonomously, decentralizing analytics and decision making, enabling real-time responses (Rüßmann et al, 2015; Nguyen & Simkin, 2017; Strange & Zucchella, 2017). By looking at this technology through the internationalization perspective, the integration of data between firms, suppliers, and customers deriving from IoT can influence the relationship with foreign clients and distributors, affecting the need for intermediaries. Moreover, IoT can impact cross-border flows along global value chains (Strange & Zucchella, 2017; Chiarvesio & Romanello, 2018).

Connected to IoT, there is Big Data Analytics (BDA), which consists in analytics based on large data sets. BDA has made its appearance only recently in the manufacturing world, bringing optimized production quality, energy saves, and improved equipment service. Given the capacity to collect and evaluate data from equipment, systems and enterprise- and customer-management systems, it is likely that BDA will become an essential element to support real-time decision making (Rüßmann et al, 2015). It is important to remark that the real innovation in this case is given by the “analytics” part: large amounts of data have always been available, but only thanks to the latest developments there is the possibility to merge data coming from different sources and focus on analysis for intelligent decision-making (Hilbert, 2016). BDA not only supports managers in understanding their business and measuring business performance but, as stated by Davenport, Barth and Bean (2012), it is forward-looking and utilizes data to catch new opportunities. This can be one of the reasons why enterprises using data analytics outperform their competitors and observe improvements in productivity and financial performance (LaValle et al., 2011; McAfee et al., 2012). For what regards international business, the potential implications of BDA are mostly connected to the way it can favor companies in monitoring emerging trends and opportunities in foreign markets avoiding huge resource commitments (Strange & Zucchella, 2017). Even if the adoption of BDA in international marketing is still in the early stage of maturity, it is already evident that

it represents a source of knowledge that helps companies convert business information into competitive advantages in the global market (Dam, Le Dihn, & Menvielle, 2019).

#### **2.3.2.2. Automation**

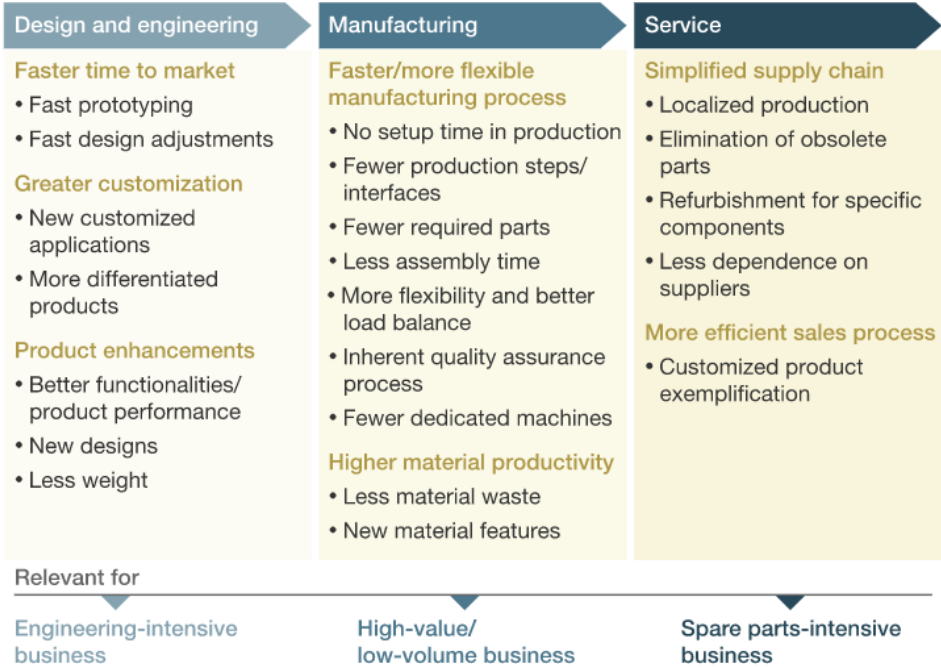
Automation represents the second leverage in the digital radar. It is defined as the combination of classical artificial intelligence technologies that leads to autonomous work and self-organizing systems. The main advantages of artificial intelligence mentioned by Schallmo are the reduced error rates, the increased speed and the possibility to reduce operating costs. These advantages can be pursued by the use of two enablers, that are autonomous robots and additive manufacturing.

Robots have been present in manufacturing since the 1960s, but in the latest years their adoption is even more widespread. As explained by Strange and Zucchella (2017), this evolution is given by the fact that the costs of hardware and software have fallen along time, while the performance has increased, and these improvements have made possible even for SMEs to use robotic systems in production. Robots now are more versatile, are able to perform complex and delicate tasks, and through the IoT can provide and receive feedback from other elements of the production, including humans. In fact, the newest robots are becoming more autonomous, flexible, and cooperative, they are able to interact and work safely with humans, and to learn from them (Rüßmann et al, 2015).

In the automation field, a second important technology is additive manufacturing. Often referred to as 3D printing, additive manufacturing consists in the process of making a three-dimensional product or a part of a product by depositing materials layer by layer (Gress & Kalafsky, 2015). The key distinction from traditional manufacturing is given by the additive nature and the digital file, called STL, that specifies the product and automates the printing process (Rehnberg & Ponte, 2017). At the moment, this technology is mostly used to prototype and produce individual components (Rüßmann et al, 2015), but additive manufacturing applications are becoming available in many industries, since the number of materials that 3D printers can handle is constantly expanding, including new plastics and machines able to print with ceramics, glass, paper, wood, cement, and even living cells.



The main advantages offered by additive manufacturing (Fig. 8) can currently be mostly seen in the design and engineering phase, where its employment has turned fundamental for a faster prototyping and design adjustments, leading to a faster time to market. Moreover, it allows to create products that can be more customized and have better functionalities. Additive manufacturing is also interesting for high-value/low-volume businesses, since it ensures high flexibility, no setup time in production and less waste. In the long run we can expect that additive manufacturing will not only affect the development and production phases, but also lead to a simplified supply chain, changing the way products are distributed, sold, and serviced (Bromberger & Kelly, 2017).



**Figure 8: Additive manufacturing advantages.**

Source: Bromberger & Kelly (2017).

Focusing on how automation technologies can affect internationalization, many scholars agree on the fact that their utilization constitutes one element that might affect the decision of a company on whether to locate the productive activities (Krenz, Prettnner, & Strulik, 2018). Chiarvesio & Romanello (2018) interrogated themselves about the way these technologies may influence the geography of production. Robots and additive manufacturing allow companies to increase productivity in home countries and thus, they can represent an alternative to the internationalization of production.

In the past, labor-intensive activities had the tendency to be located in lower-cost emerging economies, basing the location decision mostly on production costs. With the introduction of

robots, productivity should rise and labor costs fall, allowing firms to base their production location on other factors, such as the proximity to customers (Strange & Zucchella, 2017). According to Gress & Kalafsky (2015), the transformation involving 3D printing technology might lead to a two-sided spatial reorganization. On the one side, additive manufacturing represents an opportunity to transfer production to wealthy countries. On the other side, it increases manufacturing opportunities in remote locations. As pointed out by Strange & Zucchella (2017), the design activity can be performed by anyone anywhere in the world and the production occurs wherever a compatible 3D printer is available, with consequent savings in delivery time and transportation costs.

Summing up, we can say that automation decouples and fastens design, manufacturing, and distribution activities. It affects the geography of global value chains, even if it can drive internationalization to two different sides.

### **2.3.2.3. Networking**

The networking leverage in the digital transformation radar considers the networking of the entire value-added chain through high speed broadband telecommunications. This connection allows the synchronization along the supply chain, which shortens production times and innovation cycles (Bouéé & Schaible, 2015; Schallmo & Williams, 2018). Behind applications such as smart factory, platforms, and remote maintenance, the two main enablers are broadband telecommunications and cloud computing.

Broadband technology refers to a wired or wireless high-speed Internet connection. Widespread, affordable, and high-quality broadband can transform individuals, companies, and countries. Broadband network is already changing industries such as healthcare and entertainment, it is used for emergency services, autonomous driving, drones and virtual reality. Furthermore, it is the base for smart cities, smart work, smart agriculture, and for the innovations in manufacturing, supply chain and logistics (Muluk, 2017).

Cloud technologies provide solutions for the storage of digital data. These data can be accessed by the owners with increased availability and accuracy. The use of the cloud allows diffused data sharing across sites and company boundaries. Thanks to the latest developments, the performance of cloud technologies is improving, reducing the reaction times and, as a result, machine data and functionality are going to be deployed to the cloud and the same might happen to systems that monitor and control processes (Rüßmann et al, 2015). Cloud computing is particularly beneficial for SMEs, but also large businesses are moving to the cloud for a variety

of reasons such as cost savings, remote access, ease of availability, and real-time collaboration capabilities. As a service provided to companies, it allows to manage effectively IT resources and to deal with peak load situations without the need to add additional hardware infrastructures (Aymerich, Fenu, & Surcis, 2008).

Broadband telecommunications and cloud computing can be considered as enablers for the whole process of digital transformation and can affect internationalization in various ways. Potentially, a company can operate remotely wherever broadband is available having real-time results. The first applications can be already seen in industries such as healthcare: lately in China three successful remote surgeries occurred using 5G broadband and robots (Demaitre, 2018). One first consequence is that geographic distance importance is lessened, since a firm can decide to operate in different countries without relocating its employees and, on the other side, it can take advantage of human resources located all around the world. An application of cloud technologies is cloud design. Through the creation of a virtual community, a network of designers, engineers and fabricators permits to utilize resources which are not located in the same place (Xu, Xu, & Li, 2018).

Looking at the manufacturing side, broadband is a necessary infrastructure for the creation of smart factories, that are the result of the integration of IOT technological advances in computer networks, data integration, and analytics. Smart factories utilize technologies that are bonded together to acquire, transfer, interpret, and analyze the information, and to control the manufacturing process (Lee, 2015). Enhanced by the cloud, smart factories can potentially be built in a foreign country and controlled from the headquarter, allowing companies to locate more freely their productive facilities. Another application that can support companies in this process is augmented reality, which can be used as a support for remote maintenance operations (Masoni et al., 2017). A final important characteristic of cloud computing is that it offers flexibility. This characteristic is considered appealing, since it provides the agility for the company to change direction (Interroute, 2017).

We can say that networking technologies reduce the international movement of physical goods, but they enhance internationalization through the exchange of services and information. Countries should provide adequate infrastructure also in terms of broadband network if they want to stay in the game of internationalization.

#### **2.3.2.4. Digital customer access**

Digital customer access is the last element closing the digital radar. Although it has not been considered in Rübmann's analysis of the nine pillars of Industry 4.0, digital customer access represents an important component for the digital revolution affecting companies. The core element in this case is still the Internet, but here the focus is on how the Internet and the connected applications can change the relationship between firms and clients. According to Boueé and Schaible (2015), through mobile applications customer access is more direct and transparent.

Since its introduction in business, the potential of the Internet in enhancing customer relationship management practices was recognized. The Internet offered increased consumer data collection accuracy and speed, cost savings, and greater interaction and better relationships with customers (O'Leary, Rao, & Perry, 2004). The technological advances in this field allow companies to create and reinforce their relationships with customers with more precision. Through Internet-based technologies, firms can leverage their information-processing capabilities and global connectivity potential. Focusing on internationalizing firms, websites and social media can be an instrument for promotion and advertising in order to enhance the reputation of the companies, especially for smaller ones that are not known abroad. For exporting companies that heavily rely on the Internet, e-commerce is gradually substituting the role of traditional intermediaries, since many internationalizing firms are abandoning intermediaries such as foreign distributors and agents in favor of electronic channels (Sinkovics, Sinkovics, & Bryan Jean, 2013). As we are going to see later, the use of the Internet as an alternative to a physical presence does not lead by default to higher export performance.

Looking at a research performed by Interroute analyzing European firms' digital transformation, it has emerged that on average 41% of decision makers engaged in this process in order to enhance customer engagement and experience (Interroute, 2017). Customers are now looking for a customized and high-tech customers experience: they are connected to the industry through social networks, apps and mobile from which companies receive large amounts of data, that are used to better understand the clients and customize offerings. Customization has become possible in the Industry 4.0 era because new machineries have made more efficient to offer products and services that are tailored to the final customer (Salerno, 2018; Newman, 2018). Customization and individualization are going to be even stronger in the future, for this reason it is necessary a full integration of customers and business partners in the value creation process, supported by digital tools (Rennung, Luminous, & Draghici, 2016).

The possibility to customize products and services with reasonable time and costs permit to the companies to satisfy the needs of different customers and, supposing that there might be similarities among individuals from the same geographical area, it makes possible to tailor the offer on a larger amount of countries, increasing the scope of internationalization.

Summing up, the latest applications for digital customer access increase the communication flow between company and customers. In the internationalization perspective, they permit to reduce the knowledge gap in two directions: the company can gather information about foreign customers, and, on the other side, it can inform customers by building a strong online reputation, which is indispensable for smaller firms that are not known outside their home country. A higher knowledge about foreign customers can potentially reduce the need for local intermediaries. Detailed information about clients are necessary for the company in order to tailor its products and services to heterogeneous needs and tastes, allowing the firm to adapt quickly and serve multiple markets and the same time.

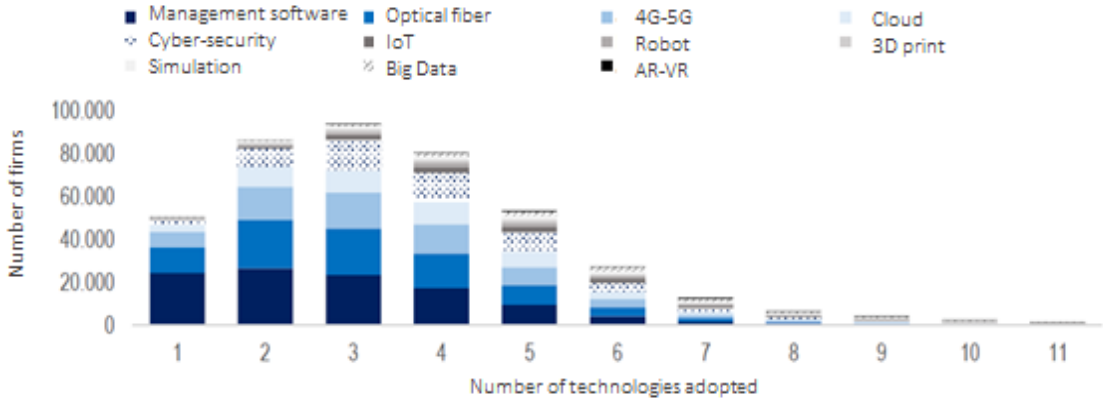
#### **2.4. Current state of digital transformation for Italian firms**

Before moving to the next step and analyzing the way digital transformation can affect the internationalization of firms, it can be interesting to investigate the current state of digitalization of Italian firms. For this part, a useful overview is provided by the first edition of the Permanent Census of Firms performed by ISTAT about the topic “Digitalization and technology in Italian firms”. This census focuses on digital transformation, technologies, and innovation, since these can affect entrepreneurial strategies, the creation of new innovative projects and new business models (ISTAT, 2020).

One first obstacle faced by the authors of this census has been the definition of digitalization, due to lack of a common accepted definition in the literature. Current statistics just consider the diffusion of ICT technologies, ignoring the transformations that technologies can ignite in business processes.

In order to assess the “digital maturity” level of the interviewed companies, instead of limiting the research to a mere counting of the diffusion of infrastructural technologies (broadband, cloud services, etc.), the survey submitted for this research considered not only the investments in infrastructures, but also in those applicative technologies which signal a movement towards a higher embracement and utilization of digital resources. In fact, considering exclusively infrastructural technologies might bring to the illusion of a digital maturity which in the reality is just potential. As shown in Figure 9, between 2016-2018, 77.7% of Italian firms with

minimum 10 employees invested in at least one of the eleven technologies considered in the survey, which are: management software, optic fiber, 4G-5G, cloud, cyber-security, IoT, automation, 3D printing, simulation, BDA, and AR-VR (augmented reality).



**Figure 9: Digital technologies adoption by firms with >10 employees. Years 2016-2018.**

Source: ISTAT (2020).

A high number of firms is prioritizing infrastructural technologies, while just the 16.6% of firms has adopted at least one applicative technology (IoT, AR-VR, BDA, automation, simulation, 3D printing). The digital transformation process can be seen as a two-phase process, where in the first part infrastructures are built, creating the technical and cultural conditions to begin the process and in a second step more complex solutions are adopted in order to enhance productivity and efficiency.

The obstacles in the transition between the two phases can be technical, organizational and cultural, but an important variable is given by the dimension of the firm. Digital investments have been performed by 73.2% of the companies with 10-19 employees and by the 97.1% of large enterprises (above 500 employees). In terms of industries, the main sectors for technology adoption are telecommunications, R&D, IT, finance, publishing, and insurance, followed by pharmaceutical and chemical industries. Industries with the heaviest investments in digital transformation are in services and not in manufacturing.

From the survey conducted, there have been identified four clusters of firms with increasing level of digital maturity according to the combination of different technological solutions:

1. *Asystematic* group includes firms that between 2016 and 2018 adopted a management software, together with infrastructural technologies such as cloud or optical fiber. These firms perceive the potential of digital transformation but due to limits in terms of industry or dimension, do not improve their level of digital maturity;

2. *Constructive* firms are those which have identified a clear digital strategy, they utilize infrastructural technologies and integrate them with additional technologies, both in services and in manufacturing;
3. *Experimental* firms are close to the digital maturity, they experimented and combined different technological solutions in order to enhance efficiency and productivity, with the largest amount of investments in information flow, simulation and robotics;
4. *Mature* companies represent the small group of firms that employ all the technologies considered in the survey in an integrated way, representing a reference point for all the firms.

**Table 4: Firms with >10 employees and digital maturity level, for dimension and industry. Years 2016-2018.**

Source: ISTAT (2020).

	Asystematic	Constructive	Experimental	Mature	Total
Total firms	47,091	74,815	36,424	6,281	164,611
% of firms	28.6	45.4	22.1	3.8	100.0
% employees	20.0	28.0	35.3	16.8	100.0
% value added	17.9	21.6	37.9	22.7	100.0
<b>Classes of number of employees (% firms)</b>					
10-19	29.1	50.6	18.1	2.3	100.0
20-49	29.5	42.1	24.2	4.2	100.0
50-99	27.3	33.1	32.5	7.1	100.0
100-249	24.5	26.3	38.5	10.6	100.0
250-499	19.0	21.7	44.3	15.0	100.0
above 500	12.8	15.0	49.2	23.0	100.0
<b>Sector of economic activity</b>					
Manufacturing - % of firms	30.8	42.4	21.6	5.2	100.0
Manufacturing - % of employees	23.0	25.5	32.2	19.4	100.0
Manufacturing - % of value added	19.1	18.8	34.4	27.7	100.0
Services - % of firms	27.0	47.7	22.5	2.8	100.0
Services - % of employees	18.0	29.6	37.3	15.1	100.0
Services - % of value added	16.6	24.3	41.2	17.9	100.0

From Table 4 we can see how constructive firms represent the largest group of the four (45%), while the experimental ones have the highest value added (37.9%). The dimensional component is also visible, since larger firms are closer to digital maturity than smaller ones. While firms below 100 employees are still in the initial phases of the digitalization, the larger ones are in the phase of experimenting new technological and organizational solutions, following the example of the small group of firms (3.8% of the 164,611 firms interviewed) that has already achieved the result of being digitally mature. Regarding the industry, there are no consistent

differences between manufacturing and services with respect to the four clusters, except for mature firms, where the percentage of digitally mature firms in manufacturing is almost the double of the percentage of service firms which have achieved digital maturity.

A first step towards digital transformation is achieved through the digitalization of digital processes and the adoption of management software, in order to automatize repetitive processes. Around 67.2% of the interviewed firms already adopted some software for document management, while 50.7% is utilizing systems for warehouse monitoring. In order to manage a wide number of clients, 33% of firms is adopting Customer Relationship Management solutions.

The main results of digital transformation, from the point of view of the companies interviewed, are that internal knowledge and information sharing has been enhanced. Part of them also experienced some improvements in the efficiency of productive processes, while just a lower percentage believes that digital transformation supports the acquisition of knowledge from the external. Effects such as the increased possibility of outsourcing, the risk of losing efficiency during the transition, or the reduced productivity due to excessive investments in digital transformation are almost neglectable (Table 5).

**Table 5: Digital transformation effects according to digital maturity. Years 2016-2018.**

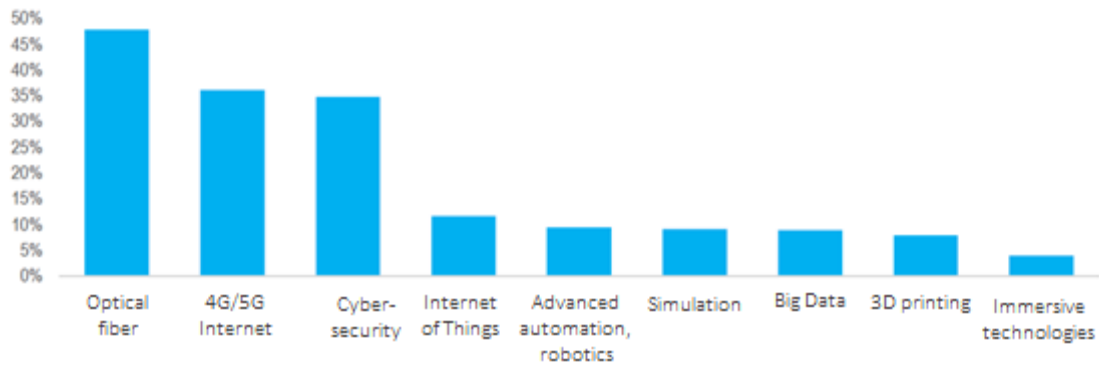
Source: ISTAT (2020).

	Asystematic	Constructive	Experimental	Mature
Information and knowledge in the firm (+)	61.2	56.8	81.9	82.2
Production efficiency (+)	41.7	30.3	56.0	71.7
Knowledge from the outside (+)	12.2	15.1	22.8	22.8
Purchase quality (+)	9.8	8.1	13.5	20.1
Outsourcing (+)	2.6	2.7	5.8	6.8
Efficiency (-)	1.6	1.4	2.2	2.5
Digitalizaiton (-)	0.6	0.6	0.5	0.5

It is interesting to notice that firms that have a higher intensity in terms of investments in digital technologies are also those with better perceptions regarding the effects of digital transformation.

Regarding future investments, except for infrastructural ones, only 10% of firms is considering applicative technologies in their future plans (2019-2021), except for IoT, which is slightly above this level, and for simulation and automation just in the specific case of manufacturing. The largest investments will be performed by firms with over 250 employees in IoT, BDA, automaton/robotics, even though these firms already have a good base in terms of adoption and diffusion of these technologies (Figure 10).



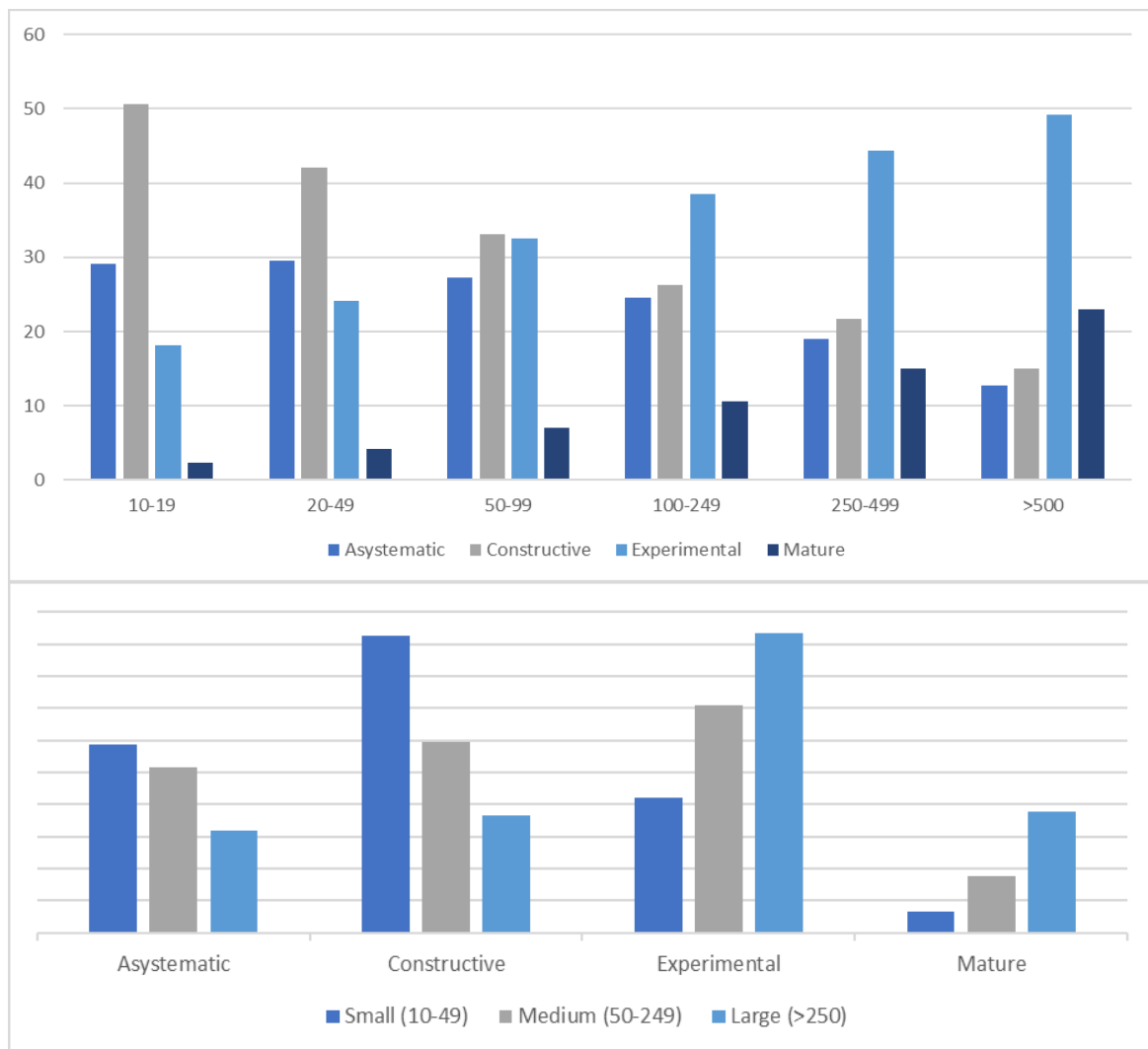


**Figure 10: Firms with >10 employees which planned to invest in digital technologies, by technology. Years 2019-2021.**

Source: ISTAT (2020).

This study is showing two main results:

1. Despite the big interest in digital transformation and the positive effects connected to it, many Italian firms are still at the early stages of digital transformation. They are investing in infrastructural technologies and just few of them expect to implement new technologies in the years between 2019 and 2021.
2. There is a large gap in digital maturity level between SMEs and large firms. This difference is already visible by visualizing the data from Table 4 through Figure 11, especially when these data are aggregated for small, medium, and large enterprises. It is possible to see how asystematic and constructive digital transformation is the most frequent situation for smaller-sized firms, while the number of experimental and mature firms grows together with the dimension.



**Figure 11: Digital maturity data for small, medium, and large firms.**

Source: elaboration by the author from ISTAT (2020).

## 2.5. Conclusions

The various definitions provided for digital transformation are a demonstration that digital transformation can be seen under different viewpoints, but one common point is clear: it is more than just turning the existing processes into digital versions. Digitization is a necessary requirement to digitalization, and digitalization is the road to digital transformation. Using Bloomberg's words, we could say that "we digitize information, we digitalize processes and roles that make up the operations of a business, and finally we digitally transform the business and its strategy" (Bloomberg, 2018).

Another element that defines digital transformation is the simultaneous transformation of different areas of the company. Digital transformation not only affects the internal functioning of firms, but also their environment, with effects on productivity, innovativeness, sales (Matt,

Hess, & Benlian, 2015) and on internationalization, the focus of the present study. Both Parviainen's and Capgemini's perspectives pointed out how digital transformation, in order to be successful, requires changes and efforts on multiple fronts. These efforts, as remarked by Accenture, require an adequate balance between the internal and the external in a way that allows the company to have the right structure to catch the opportunities arising in the changing environment.

Summing up what exposed regarding digital transformation technologies, we can say that in the Fourth Industrial Revolution there are often employed technologies that are not new, but that have recently become more efficient, precise and cheaper. A key word in this case is interconnectivity: an effective digital transformation requires the connection between machineries, human and business, generating CPS. This means that employing one technology is not sufficient to digitally transform a business, companies need to focus on the various aspects of digital transformation in order to benefit from it.

Considering the specific case of SMEs, as seen from the ISTAT research about the current state of digital transformation of Italian firms, SMEs are still at the initial stages of digital transformation. In this phase, most of SMEs are only implementing infrastructural technologies or have just defined their digital transformation strategies. The adoption of the latest technologies from Industry 4.0 is still not in the plans of most firms in the next years. This lag between large firms and SMEs have multiple reason, one of which can be the lack of resources in terms of financing and capabilities. An additional explanation could be the fact that in some industries the adoption of technologies such as IoT, automation, BDA is not indispensable yet, and smaller players are waiting until new industry benchmarks are set.

Given that the aim of the present work is to investigate if and how digital transformation affects the internationalization of SMEs, we can look at the example of larger firms and see how the latest technologies are supporting the international expansion of firms, but it makes also sense to see how infrastructural technologies are impacting the way SMEs operate outside their national boundaries. From what has been discussed until now, the latest technologies are interconnected and can affect internationalization in multiple ways. Furthermore, even the singular technology might impact the way the company operates internationally on different sides with opposing results. For these reasons, unraveling the tangle of digital transformation is not an easy task, but is a necessary step in order to define the role of each technology in the internationalization process of firms.



## **Chapter 3 – Digital transformation impact on internationalization**

### **3.1. Introduction**

After exploring the topics of internationalization and digital transformation, the time of merging these two worlds has arrived. Some connections between internationalization and digital transformation have already been pointed out, but in Chapter Three the links between foreign expansion and each technology cluster will be presented in a more detailed way.

At the beginning of the chapter, the applications of each element of the digital radar will be analyzed, connecting the technologies to the various steps of internationalization process. There will be considered three elements of the digital radar: digital data, automation, and digital customer access. For every element, there will be a summary of the main findings, together with considerations regarding the specificities for the internationalization of SMEs.

Following this, as a conclusion of the analysis, the results will be illustrated providing an overview on the outcomes of digital transformation on evaluation and preparation, entry, and development and growth phases, in terms of time, scale, and scope. In this part, the risks of virtuality trap will be presented.

The final part of the chapter is dedicated to the phenomenon of born global firms, which is particularly relevant due to the fact that these firms show a very specific international development, that does not follow the traditional model. Many researches have been conducted on born globals in order to understand how they can achieve early internationalization. However, still little is known about the role of digital transformation on their internationalization path.

### **3.2. Digital radar impact on internationalization**

This first part of the chapter will be dedicated to the analysis of the impact of each single element of the digital radar on the different aspects of internationalization (Fig. 7, Ch.2). From the four digital transformation leverages that have been identified, only digital data, automation and digital customer access will be considered. The fourth element, networking, will not be included in this analysis. The reason behind this choice is given by the fact that broadband communication and cloud are substantially infrastructural technologies. This does not mean that they have a marginal role in digital transformation, since they represent a basis for the applicative technologies and the development of new business models. However, until now many researches have been conducted on the connection between ICT and internationalization,

and the leverage of networking can be seen as an “enhanced” ICT. The topic of infrastructural technologies still remains important, because as emerged in Chapter Two, most Italian firms are still at the early beginning of digital transformation, implementing this kind of technologies.

### **3.2.1. Digital data and internationalization stage**

One of the first group of technologies identified in the digital transformation radar is digital data, which includes applications and technologies such as Big Data Analytics and Internet of Things.

#### **3.2.1.1. BDA for efficiency and enhanced customer contact**

Big Data (BD) describes data sets that are so large, unstructured, and complex that require unique technologies to store, visualize, analyze, and manage (Xu, Frankwick, & Ramirez, 2016). These data can be collected through a wide variety of sources such as CRM systems, social media, websites, e-commerce sites, customer reviews and government sites (Dam, Le Dinh, & Menvielle, 2019). Big Data differ from traditional data sets in terms of velocity, volume, and variety of data (McAfee et al., 2012; Hurwitz, et al., 2013), this change has been made possible by recent developments in telecommunication bandwidth, data storage systems, and digital computational capacities (Hilbert, 2016).

The necessity to overcome the processing capabilities of traditional data management approaches has led to Big Data Analytics, which is identified as the capability to process large volume, high velocity and numerous varieties of data to extract meaningful insights in order to enable organizations to gain competitive advantage (Fosso Wamba et al., 2015, 2017). BDA supports organizations in the decision-making process and improves their strategy, operations efficiency, and financial performance. Companies who adopt data analytics are able to extract value from the data collected and thus can overtake their competitors by developing a deeper understanding of the business, measuring their results with more accuracy, intensifying customer engagement, optimizing daily operations, and capitalizing on new sources of revenue (LaValle et al., 2011; Pauleen and Wang, 2017; Weinberg et al., 2013; Wang, Gunasekaran, Ngai, & Papadopoulos, 2016). Firms that inject BDA into their value chain experience 5–6 % higher productivity than their competitors (McAfee et al., 2012).

Even though there have been high expectations regarding the deployment of data analytics in supply chain, its adoption is facing some difficulties. In fact, in an interview conducted by Accenture, 97% executives reported having an understanding on how BDA could benefit their

supply chain, but only 17% already implemented analytics in this field (Pearson et al., 2014). The data collected, for example, can be analyzed in order to enhance the accuracy of product demand forecasts, affecting the whole supply chain (Hofmann & Rutschmann, 2018).

### **Market research**

In terms of customer contact and internationalization, BDA can be applied on several fronts. BDA can be a valuable tool for the activities of customer intelligence and market research.

Big Data will change market research. In some areas of market research BDA is already established, for example in social media analytics and the use of cookie data. Going beyond the concept of the 3Vs (volume, velocity, and variability), there is one more major difference that characterizes BDA, which is the origin of data. In traditional market research, data are collected actively, while with Big Data information is collected and processed passively, avoiding human interactions and interviews, which are slow, have limited capacity and are subject to human error. Passive measurement represents a fundamental paradigm change in market research, generating efficiencies and economies of scale (Bosch, 2016).

### ***Social media and websites***

Social media and websites are two typical sources of Big Data for market research. By analyzing words from online postings in blogs, media, and web pages it is possible to predict actions or activities (Hilbert, 2016). Content intelligence allows companies to extract information from competitors' websites and monitor their products reputation by an analysis of customers' reviews, also allowing a better comprehension of foreign markets (Dam et al., 2019). According to Cavusgil and Knight (2015), the data collected from social media can be used for international marketing in order to access foreign market opportunities and build trust. Given the increased number of interactions between firms and customers in form of tweets, it has also been performed a study regarding the possibility to utilize unstructured data from customer interactions on Twitter in order to improve customer service (Wamba, Gunasekaran, Papadopoulos, & Ngai, 2018). The opportunities offered by technology nowadays permit to push customer intelligence even further, analyzing not only texts, but also images or videos on social media or web pages (Dam & Le Dinh, 2019; George et al. 2014; Intezari and Gressel 2017). One of the main limitations of using social media as data source are the behavioral differences that might emerge when individuals utilize social media, since their behavior online can be subjected to a sort of self-censorship (Hilbert, 2016). This factor should be taken into consideration in the case decisions are taken based on these data.

## ***E-commerce***

Another source of valuable data for enterprises is represented by e-commerce. The use of BDA for e-commerce allows firms to track each user's behavior and convert onetime customers into loyal buyers, enhancing the conversion rate. According to Columbus (2014), analytics into e-commerce permit to extract value by serving new customers, creating new products and services, expanding into new markets, and increasing sales and revenues. Big Data for e-commerce can be used to customize services and products, set dynamic pricing, enhance customer service, for example through proactive maintenance, and to increase supply chain visibility and consequently the transparency for customers (Atker & Wamba, 2016).

An example of the application of BDA on e-commerce comes from one of the biggest online retailers, Amazon. Its success was based on the utilization of Big Data in order to understand customers behavior. Amazon could track not only what customers bought, but also what they were interested at, how promotions, reviews, and layouts affected their buying decisions, how they navigated through the website, and similarities across groups. In this way, they have been able to develop algorithms to predict which books the individual customer would like to read. Furthermore, these algorithms could perform better every time the customers reacted to a recommendation (Mc Afee et al., 2012).

## **Product innovation**

The analysis of Big Data supports firms in developing new products following the global consumers' needs. By the combination of data such as geospatial information, social media interactions, e-commerce transactions, customers' feedback, and product evaluations in foreign market, firms can offer better product and service innovation (Davenport, 2013; Uden and He 2017; Xu et al. 2016, Dam & Le Dinh, 2019). BDA nowadays provides firms with methods to develop products consumers are more willing to buy. A deep understanding of consumer taste is necessary in order to create products and services which are attractive to customers, but taste can suddenly change, especially in more dynamic environments. Through a combination of IT expertise, marketing analytics, and customer knowledge, BDA supports new product development, by providing real-time insights on consumers, market, competitors, and products. Traditional marketing analytics and Big Data Analytics together can increase the success of new products and services (Xu, Frankwick, & Ramirez, 2016).



### **3.2.1.2. IoT for supply chain innovation and customer integration**

Supply chain management and Big Data Analytics are also connected together through the second Industry 4.0 application identified in the digital transformation radar, which is Internet of Things (IoT).

IoT offers a platform which interconnects devices, systems and services, bringing intelligence of the Internet to physical products (Hoffman & Novak, 2015). The autonomous and seamless communication between these elements in a smart environment enables information sharing across platforms. Data generated by more connected and smart products can be processed in order to reveal trends, unseen patterns, hidden correlations, and new information, bringing to the so called IoT Big Data Analytics (Marjani et al., 2017).

#### **Supply chain management**

As previously mentioned, IoT potential can also be applied to supply chain management, and in particular to supply chain innovation. The latter has become critical for organization to access new opportunities of improvement in dynamic business ecosystems, affecting various phases such as sourcing, production, and distribution. Through IoT data, organizations can gather real-time information about suppliers, operations, and customers, supporting the decision makers in activities such as the identification of new market trends or changes in customer behaviors and allowing them to quick respond to these issues, by developing new products or updating existing ones, by enhancing customer satisfaction, for example through the provision of value-added services to customers, or by identifying new customer segments and business opportunities (Li & Li, 2017; Lee & Lee, 2015; Green, 2015).

IoT can be applied in the Industrial Internet of Things (IIoT) not only through innovative information and analytical services, but it can also support manufacturing and operations through the provision of manufacturing assets, maintenance, and repair (Ehret and Wirtz, 2017). IIoT allows a constant monitoring on equipment performance, energy usage, and environmental conditions (i.e., machine utilization, temperature). This real-time performance track permits to detect areas of potential improvement, optimize operations, and predict future outcomes. As a result, enterprises that implement IIoT can reduce their costs and increase productivity (Lee & Lee, 2015).

IoT also supports supply chains with technologies that provide in-transit visibility, such as Radio Frequency Identification (RFID) and cloud-based Global Positioning System (GPS). Location, identity, and tracking information provide detailed visibility of products shipped from

a manufacturer to a retailer. Through the application of these technologies, supply chain managers can enhance automated shipment and obtain accurate delivery information, making better predictions on the time of arrival of pallets and containers (Marjani et al., 2017). Moreover, these data can also improve the shipment experience of customers.

### **Customer integration**

An additional way through which IoT can affect companies is the integration of end-users into the manufacturing and supply chain, leading to the creation of customized products and services targeted at the final consumer (Ehret and Wirtz, 2017).

IoT provides a real-time channel for the voice of customers, allowing companies to collect useful data for the designing of products and services. In this sense, IoT can support co-creation with customers, which has become a best practice in many product and service development processes (Li & Li, 2017). The more the companies manage to engage the consumers, the more data they will be able to collect, and consequently, the better they will be able to improve and develop their processes and products, meeting the needs of their customers and reaching more easily potential ones. An example of the application of IoT in customer engagement comes from Coca-Cola Freestyle touch screen soda fountain, which allows the customization of Coca-Cola in over 165 flavors. The data collected by these beverage machines have been used for new product development, leading to significant market gains for the company (Woods, 2015)

Since information sharing occurs not only between things, but also between people and things (Lee & Lee, 2015), even retail experience is changing, with physical stores adopting IoT solutions in order to gather data from customers, providing several benefits to retailers. From an analysis of customer data, retail companies can predict trends and demand, optimize pricing plans and plan promotions efficiently in order to maximize profit (Marjani et al., 2017). Retail shopping will be accompanied by IoT retail technologies, changing the whole customer experience and, in the case these technologies will require customer interaction (e.g. apps to check in-store price) the better results will be achieved by those technologies that are easy to use, functional and with aesthetic appeal (Balaji and Roy, 2017). Moreover, these instruments can represent a point of interaction between marketers and customers. Marketers will have to quickly react to customers' interactions and feedbacks, and convey the right message at the right time, for example by sending personalized promotions or offering support (Mitchell, s.d.). Finally, IoT can also support customer service, providing remote access and diagnostic through embedded sensor technologies (Marjani et al., 2017).

### 3.2.1.3. IoT and BDA in the firm

In practice, digitalization and Big Data Analytics challenge business models of many traditional industries. Those who are able to adapt their business models and adopt digital data in their firms can gain several advantages (Loebbecke & Picot, 2015; Hilbert, 2016). From the use of BDA and IoT, executives expect to create organizations that have a cross-functional view of the supply chain, that are forward-looking and can predict and quickly react to changes (Hilbert, 2016). These applications not only support the strategy but can also be a useful instrument for day-to-day operations in demand planning, procurement, production, inventory, and logistics (Wang et al., 2016).

The use of BDA leads to several results, such as an improvement in customer service, better customers and supplier relationship, greater integration across the supply chain and the increase in supply chain efficiency (Fig. 12).



**Figure 12: Results achieved by companies using Big Data Analytics.**

Source: Pearson et al. (2014).

These results are mostly achieved in those organizations who put their focus on developing a strong enterprise-wide analytics strategy and who have been able to embed BDA in supply chain operations to support decision making across the whole organization. A third element that ensures the achievement of the expected results is hiring people with a unique mix of analytics skills and knowledge of the business in order to produce valuable insights from the data. LaValle et al. (2011) sustain that organizations mostly face managerial and cultural barriers,

since they lack understanding of how to use analytics to improve their business. Unfortunately, the absence of in-house capability to execute analytics initiative is one obstacle that has emerged between the concerns regarding the application of BDA, while the main one remains the large investment required (Pearson et al., 2014). These impediments can be even stronger for SMEs.

#### **3.2.1.4. BDA and IoT for internationalization**

Moving the focus to internationalization, it is given that in order to face the challenges deriving from internationalization, firms need to develop a deep understanding of the new business environment, including the foreign market and customers insight, and succeed in offering attractive products and services.

On this side, Internet of Things and Big Data Analytics allow respectively to collect and analyze information that enterprises can convert into competitive advantages on a global scale. Nevertheless, even if the most adoption of Big Data in marketing is in e-commerce and marketing intelligence (Chen et al., 2012), the use of digital data in international marketing is still in the early stage of maturity (O'Connor & Kelly 2017; Tian 2017, Dam & Le Dinh, 2019).

Market knowledge is pivotal for the internationalization process, but in order to exploit it, firms need to build knowledge management capabilities. Through the acquisition and application of knowledge related to markets, competitors, customers, distributors, and other partners, organizations can detect and exploit opportunities, predict customer's propensities and build the firm's own network position in foreign markets (Navarro-García et al., 2016; Sousa et al., 2010; Dam & Le Dinh, 2019).

Moving to post-entry phase, digital data can also sustain international growth, whose extent is tied to the resource and competencies allocation - or the commitment - for foreign markets. Nowadays the availability of technological infrastructures such as cloud-based platforms and intranets can support Big Data adoption for internationalization (Wamba et al. 2017), while for IoT the vision is that every object is digitally connected anytime and everywhere in the world and can create a global network infrastructure that allows to easily exchange services and information (Majeed & Rupasinghe, 2017; Tu, 2018).

Technical feasibility confirmed, international companies should enhance their absorptive capability, which is the knowledge created through the interaction with international customers and key international partners (Efrat et al., 2017; Cardoza & Fornes, 2011; Dam & Le Dinh,

2019). This capability, defined as organizational learning, can shorten the psychic distance between home and foreign country and compensate any lack of resources in foreign market penetration (Mathews, 2006; Sousa et al., 2010; Dam & Le Dihn, 2019).

A final insight comes from work organization. According to Loebbecke & Picot (2015), digital transformation and Big Data Analytics sustain the creation of cross-location teams. This can generate new opportunities that go beyond the boundaries of the company, allowing a flexible integration of external freelancers or even the organization and development of cooperation between enterprises.

#### **3.2.1.5. Specificities for SMEs**

Considering the utilization of digital data in SMEs, one of the main issues is that often they are incapable of acquire and utilize Big Data in the decision-making process regarding internationalization (Ahi et al., 2017). Only few SMEs adopt Big Data for market intelligence activities, to understand and enter foreign markets (Jacobsen & Van Vugt, 2017; Dam & Le Dihn, 2019). This late adoption can be reconducted to resource limitations, but also to other reasons, such as lack of organizational learning supporting internationalization, limited network for co-creation of value in foreign markets, and reduced commitment to foreign markets (Dam & Le Dihn, 2019). A possible solution in this situation can be to gradually adjust the level of commitment, based on the specific advantages on the market (Sui & Baum, 2014). In addition, SMEs do not necessarily need to gather and analyze data directly, but they can utilize social media and e-commerce platforms that provide specific tools that exploit the information that is already collected. For example, a small manufacturer can advertise its products on Facebook by targeting a specific segment of customers, even outside its home country. This segment has been created through the data that Facebook daily collect about the users. In this case, what makes the difference is the capability to exploit the data in order to generate value from them.

#### **3.2.1.6. Findings**

In conclusion, digital data can sustain the international development since they offer the possibility to gather information from the market, create or catch opportunities, identify the target country and the most appropriate entry strategy.

Additionally, given that IoT provides a solution to collect data passively, the need of physical presence in order to interact with suppliers, customers, and other key partners is reduced. This can affect the entry mode, since firms can decide to be international by staying local, choosing

entry modes who do not require a foreign direct investment or a direct presence in the new market. In this sense, even the role of intermediaries can be questioned.

Overall, IoT and BDA provide transparency to the entire supply chain, allowing efficiency gains which can bring a competitive advantage first in the home, and then in the foreign market. For this reason, in order to sustain their international expansion, it is important to support SMEs in overcoming the barriers to digital data adoption.

### **3.2.2. Automation and internationalization stages**

Automation, the second element defined in the digital transformation radar, includes two main enablers, which are robotics and additive manufacturing. According to the Global Digital Operations report, by PWC (Geissbauer et al., 2018), digital transformation and smart automation will drive operations costs down, leading to higher productivity and wealth. Since the 1990s, the number of industrial robots has grown, especially over the last decade, driven by the advancements and falling costs of this technology (Ancarani & Di Mauro, 2018). Robots, 3D printers, and devices based on machine learning have improved their ability to perform labor tasks, increasing productivity and reducing manual labor costs (Krenz, Prettnner, & Strulik, 2018). The era of smart manufacturing has started, and it will lead to a high involvement of technology in manufacturing and full automation, through the use of machines and devices that are adaptive, fully integrated, analytical, and more efficient (Majeed & Rupasinghe, 2017).

#### **3.2.2.1. Robotics and bestshoring**

As a result of more efficient and less operationally expensive digital factories, some companies anticipate reshoring and increasing production in their home country as an opportunity, on the other side, other companies expect to increase manufacturing abroad, located close to the end-consumer (Geissbauer et al., 2018). In the case of automation, digital transformation affects the internationalization of firms not much by facilitating the entry or the development in a foreign country, but mostly in the locating and entry mode decisions. In fact, smart manufacturing now offers to firms the opportunity to be international from their home country and just export, and to those that have factories abroad, it opens the possibility to reshore. For this reason, it can be interesting to discuss the impact of automation on the locating decision of companies. Since in the last years it has been a topic of particular interest, most of the studies concentrate on Industry 4.0 and reshoring, but these studies can be easily reconducted to the decision of manufacturing in the home or foreign country.

The decision to move the production in a foreign country was mostly driven by labor costs savings, but in the last years the rising of labor and logistics costs have made questioning this choice (Kinkel, 2014; Simchi-Levi et al., 2012). Long and complex global value chains allow to take advantage of location factors, with a positive impact on productivity and efficiency. On the other side, this length and complexity can limit companies' responsiveness to stocks and changing preferences in consumer demand (De Backer et al., 2016). Furthermore, there are some other factors that might push companies to reshore the manufacturing activities, such as increasing coordination costs, low product quality, and the value attributed by customers to the "made in" (Ancarani & Di Mauro, 2018).

Since companies need to be quick in responding to changing in demand and preferences, the configuration of supply chain implies a decision that goes further than a mere cost calculation. More than reshoring, we should think about "bestshoring" (De Backer et al., 2016), where companies base the manufacturing location decision on costs, flexibility, and quality.

Starting from cost-oriented decision, by reducing the labor component, automation acts as a cost equalizer and might render the return of manufacturing to high cost countries feasible and sustainable (Bals et al., 2016). According to Krenz, Prettner, & Strulik (2018), within manufacturing sectors, an increase by one robot per 1000 workers is associated with a 3.5% increase of reshoring activity, with saving on tariffs and other costs of producing away from the home country. For this reason, for cost-oriented companies it is opened up the possibility to choose between manufacturing in foreign and home country supported, especially in the latter case, by automation (Ancarani & Di Mauro, 2018). However, this does not automatically imply the decision to reshore or to start manufacturing exclusively in the home country, since companies still have to consider other factors.

Industry 4.0 has created new opportunities and, consequently, higher expectations for customers, that now demand customized products and flexible production. Due to this fact, companies need to provide solutions that increase flexibility in terms of volumes and variety and that are fast in catching customers' needs or requests (Ancarani & Di Mauro, 2018). One possible solution can be to shorten value chains, localizing manufacturing close to the final consumer, even if it can imply duplication of production centers (De Backer et al., 2016). In the current time, robotics has lowered the costs of flexible production, making this option feasible (Lu, 2017).

Finally, quality-oriented firms that are affected by the "made in" value, can decide to keep the production local in order to maintain this value. Since they can rely on the premium price

justified by the higher quality, they do not necessarily need to adopt robotics and labor-saving technologies (Ancarani & Di Mauro, 2018).

In general, automation supports manufacturing reshoring when design and product innovation are involved. Thanks to digital transformation, companies can now choose between more options than previously, moving from a cost-based to a customer-oriented location decision.

### **3.2.2.2. 3D printing, co-creation and customization**

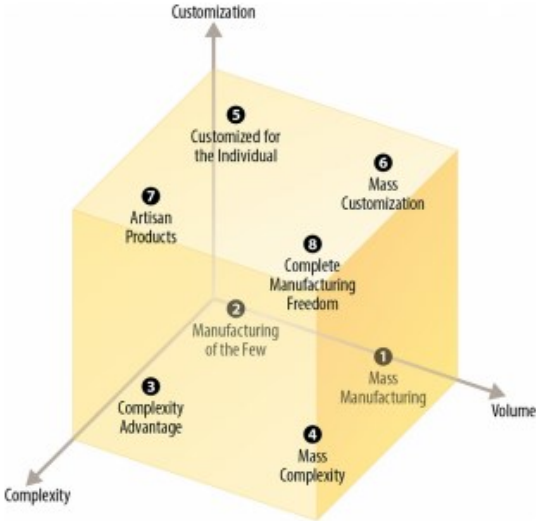
Another technology that can strongly impact the locating decision is additive manufacturing. According to Chen (2016), the use of 3D printing will bring the manufacturing activities closer to the final customers. Allowing customization at point of delivery, consumers will become co-creators of the products. As a consequence, global freight volume and inventory levels will decline.

Additive manufacturing can be described through the slogan “anything, anywhere”. Anything, since objects of any complexity can be produced in a single step, anywhere because anyone with a 3D printer, the necessary materials and a digital build file can locally manufacture almost any product. On an industrial scale, 3D printing is more sustainable, energy-efficient, flexible, and fast than traditional manufacturing. Typical applications involve sectors such as aerospace and defense, automotive, mechanical and plant engineering, pharma and healthcare, and the textiles, jewelry, furniture, and food, and include rapid prototyping and the production of spare parts, even though the utilization of 3D printing is increasing also for direct manufacturing on an industrial scale (Fey, 2017).

As stated by Mohr & Khan (2015), additive manufacturing affects companies in multiple ways. Firstly, as already mentioned, 3D printing allows mass customization at reasonable costs without sacrificing production efficiency. Each customer can be involved in the design and production activity, obtaining individualized offers. Moreover, it makes the supply chain more responsive to customers’ changes. Secondly, it creates new opportunities in the area of supply chain decentralization and local-for-local manufacturing, even providing the possibility to reach disconnected markets and remote locations. Finally, additive manufacturing, could lead to a substitution of physical flow by a digital one (Mohr & Khan, 2015). Furthermore, 3D printers can also be combined to IoT, creating a connection between the 3D printer and the computer aided design (CAD) software which potentially can be geographically dispersed, allowing a global collaboration based on the sharing of real-time information globally (Li & Li, 2017).



Based on the degree of production volumes, customization, and complexity, Conner et al. (2014) identified eight regions of product manufacturing, analyzing for each of them the potential benefits of 3D printing compared to traditional techniques (Fig. 13, described in Tab. 6). Production volume refers to the number of parts made in a given time frame, customization involves the uniqueness of the product, and complexity is related to the number of features of the product and in general, the more complex the product, the more difficult will be to manufacture through subtractive or formative methods.



**Figure 13: Three axis model of manufactured products.**

Source: Conner et al. (2014).

**Table 6: Eight regions of manufactured products.**

Source: elaboration by the author adapted from Conner et al. (2014).

Region	Volume	Complexity	Customization
1. Mass manufacturing	High	Low	Low
2. Manufacturing of the few	Low	Low	Low
3. Complexity advantage	Low	High	Low
4. Mass complexity	High	High	Low
5. Customized for the individual	Low	Low	High
6. Mass customization	High	Low	High
7. Artisan products	Low	High	High
8. Complete manufacturing freedom	High	High	High

Additive manufacturing is likely to be more competitive than traditional manufacturing in regions 3 to 8, when it involves the production of items with high level of complexity, customization or a combination of both. 3D printing can be utilized by individuals for the creation of their own personalized product and by firms in order to deliver complex products. Since 3D printing permits to avoid inventory and tracking costs of parts to be assembled, labor costs for specialized assemblers and capital costs for equipment, complexity with additive manufacturing comes “free”. The main challenge is given by volumes. At the moment 3D printing allows the creation of both complex and customized products, but volumes to reach complete manufacturing freedom are still limited. Regarding the first two regions, mass manufacturing model guarantees that the high costs required for tooling can be amortized over the large number of units produced. An opportunity for 3D printing in this case lays in the fabrication of tooling for conventional manufacturing, which consists in region 2. In this situation, additive manufacturing can be implemented with the aim of rapid prototyping, reducing tooling costs and making the production more agile.

A particular application of 3D printing is in remote prototyping and spare parts manufacturing. In a study conducted by Geissbauer, Wunderlin & Lehr (2017), it has emerged that through additive manufacturing suppliers will be able to make and send parts on-demand and locally, close to where the parts are needed. Spare parts suppliers face obstacles in meeting the needs of their customers, for this reason 3D printing seems to be a viable option. In fact, within five years authors expect 3D printing to be incorporated by 85% of spare parts suppliers, making it the standard method for the production of prototypes. As a consequence, companies will be able to shift to make-to-order, eliminating stocks and improving lead times. Since set-up times will be almost null, even production interruptions can be avoided. In the future, companies will sell copyrights instead of actual parts, the customer will receive a digital file from the supplier and print the spare part with its own equipment.

### **3.2.2.3. Automation and internationalization: anywhere and for anyone**

In the perspective of internationalization, 3D printing potential lays in the great capacity to connect firms and customers. If producers can easily adapt their products to specific tastes and needs, it will be easier for them to develop a product appealing to new clients, facilitating first the entry in a new country and then the international growth. Additionally, regarding the “anywhere” factor, with additive manufacturing companies can potentially reach any corner in the world through a digital file. At the moment, firms still might not be aware of the full potential to be gained from 3D printing, but those which will immediately start investing in the

capabilities and technologies needed, will have a competitive advantage in the future. The biggest challenges in this moment are connected to a lack of expertise and technical feasibility. In addition, future issues will be related to the managing of intellectual property (Geissbauer, 2017).

#### **3.2.2.4. Specificities for SMEs**

Manufacturing companies struggle in introducing Industry 4.0 because in many cases they do not know how to face this challenge and how to implement these concepts. This struggle is stronger for SMEs, which might find even harder to adopt Smart Manufacturing (Mittal et al. 2018). The advances in robotics have reduced the costs of automation, and the introduction of 3D printing creates an opportunity for small scale manufacturers. As stated by Mohr & Khan (2015), technology can reshape the laws of competition in certain industry sectors both for domestic and international markets, because even SMEs can establish a sustainable business model without the need of large upfront investments.

#### **3.2.2.5. Findings**

Summing up what discussed regarding automation, we can say that smart manufacturing, made of robotics and 3D printing, is affecting internationalization in the locating decisions. In fact, besides supporting firms in reducing costs and enhancing efficiency, which is necessary to ensure a balanced approach in digital transformation, robotics can completely change the way firms “physically” internationalize. Considering that automation is lowering the production costs, firms’ decision on where to locate plants is not as much tied to manufacturing costs as before. In fact, companies can now decide to reshore, but also to locate closer to the final consumer. For this reason, automation can lead to bestshoring, which means that firms locate themselves according to costs, quality, and flexibility. Similarly, additive manufacturing will allow firms to reach every corner of the world and to adapt products for customer, which will become co-creators.

For all these reasons, we can say that automation will support internationalization, but of a new kind. Companies will have the opportunity to be “international from home”, reducing the commitment in foreign country in favor of export. The flow of goods will be partially substituted with the flow of digital information.

### **3.2.3. Digital customer access and internationalization stages**

The following element included in the radar of digital transformation, and the last that will be analyzed, is digital customer access. Through enablers such as mobile internet, social networks, and apps, companies can start their own e-commerce and digitalize customer relationships.

Since its introduction in the business environment, Internet has been supporting online internationalization of firms. Online internationalization indicates companies which conduct business transactions across national boundaries in a virtual domain. This includes products and services that are totally digitalized and can be fully performed online (e.g. music, online banking), but also the aspects of the value chain (e.g. sales or after sales support) that are conducted online for those products and services that are not digitalized. Compared to traditional internationalization, the digital one does not require any level of foreign investment, it squeezes the time of entry, and permits companies to be reached by customers worldwide almost instantaneously, thanks to the ability of the Internet to overcome spatial barriers (Yamin & Sinkovics, 2006). Due to these properties, the use of Internet as a medium has also been defined as the “death of distance” (Cairncross, 2001).

The concept of distance requires particular attention. Previously, companies tended to begin internationalization in physical close markets, based on the assumption that close countries are more familiar, and easy to manage. However, physical closeness did not automatically translated into similarity, leading to difficulties or even failures in managing operations in foreign countries. For this reason, the concept of psychic distance arose. Psychic distance is defined as “the degree of uncertainty about a foreign market resulting from barriers to learning about the market” (O'Grady & Lane, 1996, p. 330).

#### **3.2.3.1. E-commerce and digital platforms for virtual internationalization**

Various authors identified e-commerce and Internet in general as an alternative path to internationalization, due to the ability to overcome this psychic distance (Yamin & Sinkovics, 2006; Kuivalainen et al., 2013). This result can be achieved because ecommerce allows a virtual interaction with customers that permits to detect cultural and local determinants of the foreign customer demand. In this way, the learning barriers about the market can be reduced, overcoming the uncertainty of internationalizing firms (Yamin & Sinkovics, 2006).

The Internet has made early internationalization a more viable and cost-effective option and thanks to its use, exporters nowadays can access markets and receive customers on a global

basis. Online channels support positively also SMEs, enhancing their export and overall performance. Internet can be beneficial as a sales channel, but previous studies stated that it does not represent an alternative to a physical presence, due to the so-called “virtuality trap”, whose concept will be explained in more detail later in this chapter.

E-commerce still remains a useful instrument for companies to internationalize, since it lowers the costs of extending the geographic reach and facilitates cross-border trade, supporting the interactions between firms and customers. Customers can collect information about suppliers and make informed decisions (Tiessen, Wright, & Turner, 2001, Castleman & Cavill, 2001). What is necessary is to have realistic expectations of what this kind of transaction can deliver to the company, having in mind physical and personal links in some situations might also be necessary in order to develop local knowledge (Tiessen, Wright, & Turner, 2001).

However, firms’ own websites digital traffic might be limited and attract a reduced number of visitors. Furthermore, set-up and maintenance costs are high. As an alternative to having their own e-commerce, companies can now sell digitally through digital platforms (Box 1), which provide regular online traffic and low participation and maintenance fees. For these reasons, online platforms such as Alibaba can represent an effective and efficient channel for SMEs’ internationalization. Despite the numerous advantages, digital platforms also entail some risks, such as price information exploitation by competitors. Tensions between firms and foreign distributors might arise, given the dis-intermediary nature of digital platforms, which allow to replace some functions offered by export intermediaries (Kim & Cavusgil, 2020).

**Box 1. Italian firms and digital platforms.**

This box reports the results of a study performed by ISTAT and published in August 2020. This study has been conducted on Italian firms with at least three employees which had online presence through digital platforms.

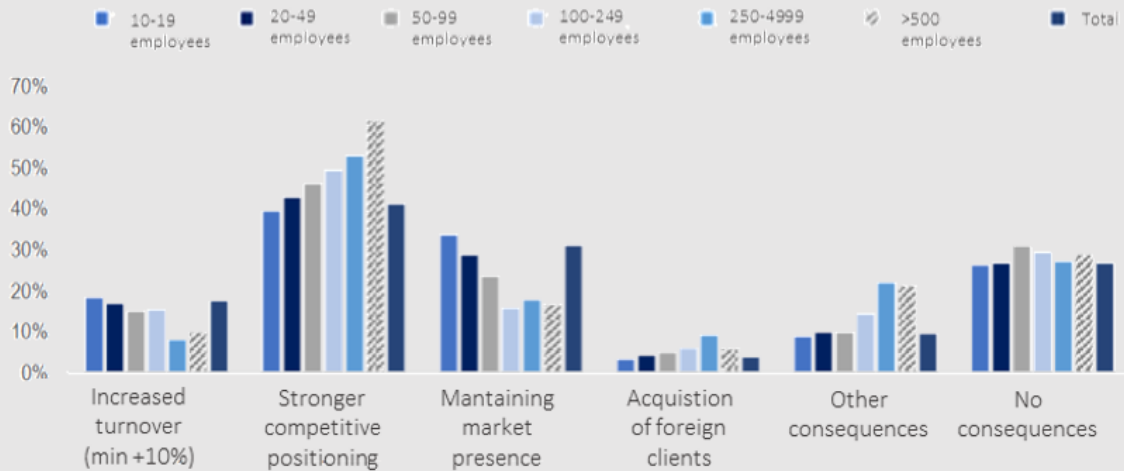
In 2018, **99,814 firms with at least 3 employees**, of which 75,206 had less than 10, **sold their goods or services on at least one digital platform**, which corresponds to around one tenth of the total interviewed firms (9.7% of firms with less than 3 employees, 11.6% of firms with at least 10). For the latter group, in terms of volumes, sales through digital platforms correspond on average to the 2.4% of total revenues. The main sectors involved are tourism and mobility, where almost the 80% of firms with minimum 3 employees are present on at least one digital platform. In these sectors around 27.7% of revenues is generated from platforms in companies with at least 10 employees that have digital presence.

In industries such as tourism, **traditional channels have to be combined with presence in digital platforms**, while in other cases digital platforms do not bring important results in terms of revenues but are **necessary for increasing visibility in the market**. This occurs in industries such as publishing or food and beverage production. In other cases, like for car trade, real estate, or constructions, the role of digital platforms is still not clearly affirmed. In these markets, digital platforms’ aim is to **compare prices**, some of them do not offer the possibility to purchase directly from the platform, while others also include the opportunity to buy directly goods and services through the platform. Despite this unclarity, firms that are on this kind of digital platforms get between 10-20% of their revenues from it.

The main results achieved by the interviewed firms are:

- Increase in revenues (17.3%)
- Strengthening of the competitive position (41.4%)
- Maintaining market position (31%)
- Acquiring new foreign clients (3.5%)

In the perspective of **internationalization**, it seems that Italian firms are not exploiting the opportunity provided by digital platforms to open up the national boundaries towards international clients. Only 3.5% of firms acquired foreign clients through digital platforms (Fig. 14).



The main platforms utilized by interviewed firms are international ones, but in many cases they create a connection between local firms and local clients. The largest deployment of platforms occurs in (Fig. 15):

- Tourism *Booking, Expedia, TripAdvisor, AirBnB*
- Multi-sector sales *Amazon Marketplace, Ebay, Etsy*
- Food delivery *Deliveroo, Just Eat, Uber Eats*
- Professional services *ProntoPro, Fazland*
- Fashion and furniture *Shopify, Westwing*
- Electronics / Technical equipment *Direct Industry*
- Transport *Volagratis, Skyscanner*
- Delivery *Glovo, TakeMyThings*

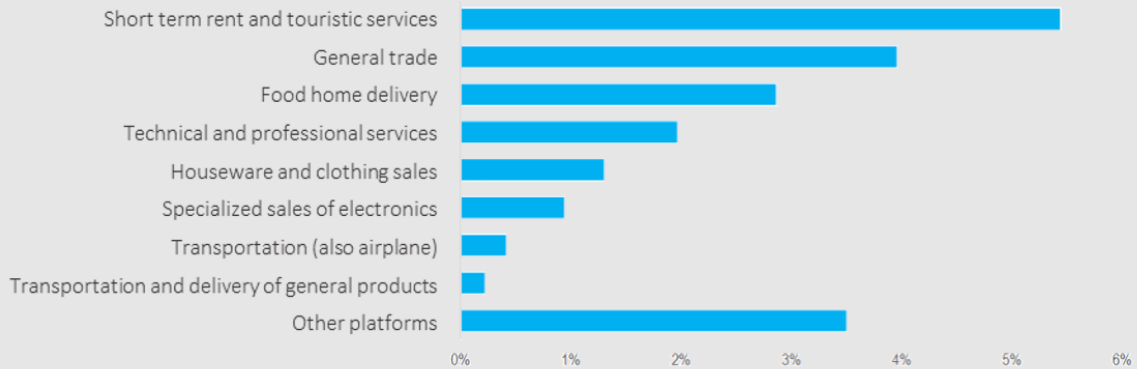


Figure 15: Percentage of firms with >3 employees that utilized digital platforms in 2018 according to the type of platform. Source: ISTAT (2020).

### 3.2.3.2. Social media for reaching clients and creating business networks

An additional element that deeply affected the way firms establish international presence is social media. According to Rialp, Alacron and Rialp (2014), social networks enable firms, especially SMEs, to perform marketing efforts at international scale. The shift towards social media can be reconducted to several factors, such as technology developments, lower costs,

declining interest on traditional media and conventional marketing, and change in customer preferences who trust more friends and other users' opinions (Gillin, 2007).

The raise of social media affects firms' international interactions on two sides. First, they support companies in establishing and strengthening business relationships in international markets; secondly, they changed the way firms reach and interact with foreign customers.

According to the network theory, small firms that are embedded in a business network can gain improved market intelligence and benefit for an easier access to critical resources. These networks determine the organization's ability to mobilize resources, identify business opportunities, and attract customers (Paniagua, Korzynski, & Mas-Tur, 2017). Consequently, business networks and the relationships inside the network facilitate SME's internationalization efforts (Johanson and Mattson, 1998). Social ties support size-constrained firms to access information and reduce the risk associated to unfamiliarity with foreign markets (Zhao & Hsu, 2007). Thanks to the advent of social networks, social ties can be created even for those SMEs whose professionals lack international experience, allowing firms to establish international business relationships and identify new business opportunities from the home country.

Online social media accelerate the internationalization of small businesses for several reasons. They do not only represent a low-cost advertising tool to engage with customers (Kaplan & Haenlein, 2010), but they also foster the development of professional and personal relationships with foreign partners such as distributors or importers. Thanks to their standardization, global reach and non-transactional nature, social media such as Facebook, Twitter, Instagram and LinkedIn are suitable to initiate a dialogue with potential partners and foster the development of a strong relationship, through the creation of trust and commitment (Arnone & Deprince, 2016).

The study performed by Arnone and Deprince (2016) identified three levels on which social media can strengthen relationships in small businesses, situation in which the person-to-person relationship gains more importance. At the company level, social media can be particularly helpful in the pre-contact and initial interaction stages, when the SME is looking to access new business opportunities. After this first contact, in order to quickly verify the identity and reliability of the company and of the people with which international business relationship could be developed, managers tend to use social networks to access personal and professional online profiles of potential partners. For this reason, social media also act on a professional individual level, in order to generate mutual trust. Finally, on a private individual level, it is possible to observe a mixing of professional and private relationships. This proximity between

individuals accelerates the process of reaching an intimacy level between business partners. Through all these three levels, social ties are generated. These social ties can be exploited by SMEs managers in order to speed up and improve their access to foreign markets (Zhao & Hsu, 2007).

By posting and tweeting companies can extend their reach into foreign countries at a point that in some cases social media are embedded in firms' internationalization strategy (Paniagua, Korzynski, & Mas-Tur, 2017). Social media can be a vehicle for firms to increase foreign market knowledge, create brand awareness, affirm their reputation and identity (Kietzmann et al., 2011; Tsimonis & Dimitriadis, 2014). This affects not only B2B communication, improving the performance of SMEs (Wang, Pauleen, & Zhang, 2016), but also the communication between firm and customers.

By the use of online social media firms can connect with customers through a medium with greater reach, providing information, announcing new products and services or promotions. Moreover, firms can acquire new customers in a more targeted way or reach out people that could not be reached otherwise (Dong-Hun, 2010). Social media support firms in generating customer engagement. People visiting a page in social media is also likely to create traffic for the brand's website, boosting online sales (New Media Age, 2010).

Nevertheless, there is one main characteristic of social media that could be considered as a revolution in the communication, which is the possibility to establish a two-sided interaction between the company and its customers, engaging clients (New Media Age, 2010). They permit to express feelings and thoughts which allow the organizations to better understand their clients, handle possible issues and enhance the relationship with them. Furthermore, the interaction between customers offers the opportunity to identify problems and even to develop solutions for the company (Paniagua, Korzynski, & Mas-Tur, 2017; Shashi, 2012). Informal discussion about products and services, reviews and evaluations, make consumers part of the promotion or demotion of brands, influencing the purchase of new clients (Berthon, Pitt, & Campbell, 2008). All these characteristics can be transferred also in international marketing, since also in this case social media facilitate the rapid dissemination of information (Berthon, Pitt, Plangger, & Shapiro, 2012).

Social media give to marketing researchers to possibility to collect information about consumers' preferences, desires, and needs. For this reason, all the value added by customer interactions should be caught and managed by the firm (Tsimonis & Dimitriadis, 2014). In fact,



firms that develop social CRM enhance their performance (Paniagua, Korzynski, & Mas-Tur, 2017).

### **3.2.3.3. Social media and BDA**

The value generated by customer interactions on social media is presented in the form of data. In fact, as explained by Fan, Lau, and Zhao (2015), social media generate a large amount of data that can be processed into insights to support decision-making and marketing intelligence. Instead of relying on traditional market surveys, by mining social media data with BDA technologies it is possible to identify customers' opinions and other key factors for strategic marketing decision. The wide amount of data available also permits to identify and target specific segments of customers or even to profile each individual in order to reach one-to-one marketing. Besides the product - or service - social media and BDA can be combined to gain insights about the other three "P" of marketing, allowing firms to assess the different responses of customers to pricing and promotions and elaborate specific strategies to maximize the effectiveness of price and promotion. Even about place, location-based services provide personalized information regarding location at a specific time, enabling the so-called location-based advertising.

### **3.2.3.4. Products and services digitalization**

Besides social media, digital transformation also affects customer interaction through the digitalization of products and service offerings and the development of innovative digital business models. As customers' expectations change, retail and consumer goods companies need to digitally transform their products, business models and value chains in order to be responsive, maximize revenues and minimize costs (Dutzl, Schmaus, Schrauf, Nitschke, & Hochrainer, 2016). Taking the internationalization perspective, nowadays firms can establish an international presence and reach foreign customers by the development of digital business models, which identify those business models that leverage digital technologies to improve several aspects of an organization (Cuofano, G., s.d.). Digital transformation should reshape the way firms create value for the customers, offering new digital products. Instead of thinking how to use digital to sell more product, companies should try to imagine how they can use technology to deliver value, shifting from digital experiences to digital products. In the example reported by Nigel Fenwick (2019), instead of producing cars, car manufacturers should start thinking how technology can help people to get from point A to point B or instead of offering banking services, banks have to understand how digital instruments can help customers in

achieving their financial goals. Big players such as Netflix or Uber already succeeded in creating these digital products, but there is space also for SMEs to rethink how to generate value for customers in local and foreign market.

#### **3.2.3.5. Findings**

Summing up what emerged in this section, customer access digital transformation can support internationalization in multiple ways. First, the presence of more sophisticated systems can reduce psychic distance between the firm and the foreign country and in turn, lower the risks of entry. Second, e-commerce, digital platforms and social media, thanks to their scalability, allow every firm to be potentially present worldwide almost instantaneously. Also, during the very first phases of internationalization, websites and social media sustain the company's marketing intelligence activity, they permit to detect new opportunities and to create personal bonds with potential partners and can help the firm in generating trust and reliability. Third, thanks to a double-way communication, firms can involve clients and listen to their specific needs, adopting a more individualized approach. In this sense, the clients' geographical location importance is reduced, and companies can approach each foreign client according to his/her specific requirements. Lastly, digital transformation has also led to the creation of digital services that change traditional business models and permit to these digital firms to have a global presence in much shorter times. For these reasons, digital transformation on customers' side supports internationalization of companies during the various stages, it can squeeze the time of entry, enhance the scope and simultaneously reduce the scale, in terms of commitment and investments in the foreign countries.

### **3.3. The impact of digital transformation on time, scale and scope**

#### **3.3.1. Evaluation and preparation, entry mode, development and growth**

From what has emerged so far, it is possible to design a model, reported in Table 7, that illustrates the connection between a group of technologies and its impact on time, scale, and scope at the different stages of the internationalization process.

#### **Evaluation and preparation**

Starting from the evaluation and decision phase, it is possible to see how digital transformation, through BDA and digital customer access technologies can reduce the market investigation time. At this preliminary stage, owing to technological developments, firms can identify more opportunities and collect data that support them in analyzing the potential of foreign markets.

Furthermore, the worldwide visibility permits to these firms to catch opportunities arising in multiple countries. As a result, the availability of data and the chances emerging at a global level permit to squeeze the time of evaluation and decision stages. Moreover, scale, in terms of international commitment, can be visibly reduced, since the investment required for market intelligence is lowered and can be spread more easily on a larger number of countries. It is also possible to say that by reducing the market commitment the risks associated to internationalization decrease, favoring international expansion, especially for SMEs. This risk represents “the dangers firms face in terms of limitations, restrictions, or even losses when engaging in international business” (Ahmed et al. 2002, p. 805). A reduced commitment lowers the exit barriers and the risks of potential losses. In this way foreign business operations are eased.

### **Entry mode decision**

Moving to the entry stage, entry mode varies according to the level of commitment in the foreign country. Firms can decide to reduce their commitment in a specific country and operate directly from the home country. Automation can be a driver to reshoring from those countries where costs are rising, especially labor costs. Even the developments in digital customer access can drive digitally transformed businesses into this direction, since foreign presence can be substituted by their own e-commerce or by digital platforms, that act as facilitators and intermediaries between the firm and the final consumer. For these reasons, digital transformation seems to reduce the scale of internationalization but to enhance the scope, as investments in digital customer access permit to be spread among more countries.

### **Development and growth**

Finally, at the development and growth step, all the technologies identified in the digital transformation radar can support the company in establishing its foreign presence. Through digital customer access, firms can increase their knowledge about customers. IoT permits to collect information from products and utilizers, allowing the company not only to strengthen the relationship with the clients, but also to refine internal processes. The availability of data and the capability to analyze and exploit them leads to improvements both internally and externally. Automation and additive manufacturing also play a role in the international growth, affecting new product development and time to market. By the combination of all these different technologies, firms can improve their international presence and increase their international scale in terms of foreign sales on total sales. Moreover, ICT and networking

technologies ensure data flow and support coordination between branches, facilitating the establishment of international presence.

Overall, digital transformation can reduce time of international expansion, it requires lower international commitment but positively impacts the scale in terms of foreign sales on total sales and permits to enter more markets in a shorter time, increasing the scope of internationalization. These results are particularly important for SMEs, which might find difficult to commit a large amount of resources in a foreign market and for whom the uncertainty and risks connected to internationalization seem higher.

There is an additional element that has not been considered until now, which is international experience. International experience is a factor that affects the time of new market entry and, as a consequence, is a determinant of internationalization speed (Aygoren & Arsen Kadakal, 2018). Organizations dealing with international expansion are affected by bounded rationality that implies imperfect and time-consuming decision making (Simon, 1959). While entering a foreign country, firms have to learn how to operate in an unfamiliar setting, but their capacity to learn is limited (Vermeulen & Barkema, 2002). However, this capacity can be increased over time when the firm accumulates international experience. Firm's international experience is an important source of knowledge for internationalization, as experiential learning represents a well-established way to reduce uncertainty (Eduardsen & Ivang, 2017).

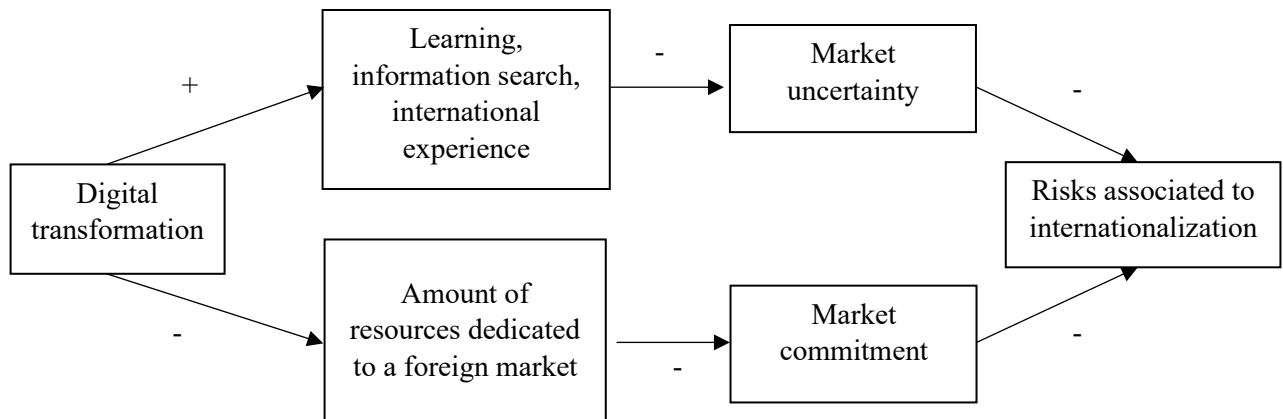
Digital transformation supports internationalization by increasing the knowledge necessary to reduce the uncertainty related to foreign operations. As a result, firms that already have international experience can benefit from digital transformation by accumulating knowledge even faster, increasing the speed of internationalization, while firms without any experience can compensate this lack with the information gathered through digital tools, services, and instruments.

As a consequence, digital transformation reduces the uncertainty thanks to enhanced knowledge, which in turn derives from the easiness in information search and learning. On the other side, digital transformation requires smaller commitment of the firms in internationalization. These two factors brought together reduce the risks faced by companies, especially SMEs, when deciding whether to expand internationally or not. Due to this, the model by Eduardsen & Ivang explaining the impact of ICT on internationalization (Fig. 1, Section 1.2) can be extended also to digital transformation (Fig. 16).

**Table 7: Digital radar technologies impact on internationalization stages and effect on time, scale, and scope.**

Source: elaboration by the author.

		Internationalization stages		
		<i>Evaluation and preparation</i>	<i>Entry mode decision</i>	<i>Development and growth</i>
<b>Digital radar technologies</b>	<b>Digital data</b> IOT BDA	Eases collection of data from the market. The availability of data permits to decide which market to entry.	BDA supports the market knowledge creation and, as a consequence, entry mode decisions are more information-based.	IOT generates data, BDA permits to combine multiple sources of data and analyze them in order to guide firm's next steps in the market.
	<b>Automation</b> Autonomous robot Additive manufacturing	Affects the decision to internationalize. Potentially production can be moved without any constraints about labor costs.	Affects entry mode decision, producers might decide to avoid FDI and just export. But through 3D printing products can be produced locally/everywhere.	For companies that already produce abroad, automation opens up the possibility to reshore production to home country.
	<b>Digital customer access</b> Websites Ecommerce Social Media Apps	Permits to be immediately accessible worldwide and to catch opportunities that emerge in new markets even when a passive/reactive approach is adopted.	Distance is shortened, available data might reduce the need to work with intermediaries.	These enablers are source of constant data that can guide the firm in understanding the potential of the market.
	<b>Networking</b> Broadband telecommunication Cloud computing	Serves as infrastructure for all the other technologies. Softens spatial distances, permits to collaborate from different countries and to develop new business models. Can be reconducted to ICT applications.		
		<b>Overall effect of digital transformation on time, scale, and scope (+ increases, - reduces)</b>		
<b>Measures</b>	<b>Time</b> -	Digital transformation reduces time of international expansion both in the evaluation and preparation and in the development and growth phase. Time is reduced for first entry and also subsequent entries, accelerating foreign expansion.		
	<b>Scale (commitment)</b> -	International commitment is reduced. In the initial phases no commitment in the foreign country is necessary, while for a successful development and growth firms still need to commit resources, but not necessarily in the foreign market.		
	<b>Scale (foreign/total sales)</b> +	International sales increase. Digital transformation enables digital sales, it permits to obtain more information about foreign market and to understand customers' needs, it fastens and eases communication with customers.		
	<b>Scope</b> +	Scope is enlarged. Thanks to a lower commitment, firms can approach multiple markets in the same time. Moreover, digital transformation brings instantaneously the firm worldwide.		



**Figure 16: Digital transformation mitigation of risks associated to internationalization.**

Source: elaboration by the author of model by Eduardsen & Ivang (2017).

### 3.3.2. Technological developments and the risks of virtuality trap

However, digital transformation does not represent a magic formula for successful internationalization. There are some aspects that have to be taken into consideration. As mentioned in Chapter Two, in order to be sustainable, digital transformation should be balanced. Companies that pursue the digitalization of internal processes exclusively might not be able to catch external opportunities or to adapt or develop new products in line with the needs of new digitalized customers. On the other side, firms that have excessive external focus and the ignore internal side will lack the necessary structure to sustain new digital business models.

Even for those enterprises that manage to pursue a balanced approach to digital transformation, there is an additional element that can harm the success of firms' international expansion, which is the so-called "virtuality trap". In this sense, the study performed by Yamin & Sinkovics (2006) is particularly helpful in identifying the problems that emerge when firms rely exclusively on online internationalization. Virtuality trap has been defined as:

"the perception by the internationalizing firm that the learning generated through virtual interactions obviates the need for learning about the target markets through non-virtual means" (Yamin & Sinkovics, 2006, p. 340).

Interaction between buyer and seller is fundamental both in domestic and cross-border contexts. Online interactivity is a form of mediated interactivity that can be suitable to initiate and maintain relationships and to learn, especially in the presence of special barriers that are typical

of cross-border interactions. Online internationalization generates insights on customer preferences and behavior and thus reduces psychic distance. With online internationalization, it is possible to target specific market segments and adopt a one-to-one approach with clients, but due to squeezed times of entry, the time devoted to studying each market is reduced. This can lead to an unclear view of less visible aspects of the foreign culture, institutions and business environment, with a consequent reduced effectiveness of market entry.

As a result of the virtuality trap, firms with stronger commitment to online internationalization might generalize the scant learning about foreign market and customers coming from online interactions and not perceive the complexities of the host market. Firms can also mistakenly assume that the knowledge they gather from customers is sufficient and will put excessive reliance on online interaction, forgetting the importance of non-virtual and on-site ones. Thus, this physical and relational distance can result in a poor performance in foreign markets (Kuivalainen et al., 2013). In a study conducted by Castleman and Cavill (2001) regarding Australian SMEs exporting in the US through ecommerce, it has emerged that the majority of companies found it necessary to have an office or agents in the host country, or at least a broker who could introduce them to the new market and provide local market information.

Of course, more experienced firms will be able to identify their knowledge gaps and commit resources to gather this lacking knowledge, but yet the risk of getting caught in the virtuality trap is high, especially in case of digitalized products, because all activities take place online. For these reasons, firms should be careful and not over-rely on online experience and do not assume that if they understand the customer, they understand the environment. Structured and market-based research regarding the foreign market is also important for a successful establishment of international presence and market penetration. Success in internationalization is tied to a deep understanding of the business and operational environment of the targeted country.

It is important to remark, that most of research about virtuality trap has been conducted almost a decade ago. In the meantime, many technological advances have been made, Industry 4.0 began, and new tools for digital customer interaction appeared. For this reason, all these aspects are still valid but can be softened thanks to the improvements in technology over time. In the past, Internet was perceived as an instrument to transmit information, but not to understand it. Right now, with technologies such as artificial intelligence, information can also be processed and understood automatically. Moreover, customers have a more positive attitude towards mediated interaction, which is currently richer than before and permits the exchange of a larger number of information in a more accurate way. Also, the shift towards a more tailored approach

with customers permits to focus on the individuals, segmenting clients according to their needs and preferences and not on their geographical position. However, all these advances do not entitle the internationalized firm to ignore the differences between geographical markets. It is still important to allocate resources, in terms of money, people, time, in order to develop a deeper understanding of the foreign markets' business environments and institutions.

What can be seen as an advantage compared to the past, is that right now firms can approach multiple markets at the same time, without making any specific investment, and then decide in which market it is worth to put extra effort and resources for creating a country-specific knowledge.

### **3.4. Digital transformation and born global firms**

#### **3.4.1. Born global definition**

As mentioned in Chapter One, facilitated by globalization, the Internet, and modern communication technologies, also smaller companies started their foreign expansion and new internationalization paths have been emerging in the last decades, including the born global firms. These firms do not follow the traditional internationalization steps but are international from their inception. Many researches have been conducted on born globals, we can now add one additional element, which is the impact on the digital transformation on this very specific type of internationalizer.

Knight and Cavusgil observed this phenomenon of early and rapid internationalization of young, entrepreneurial start-ups that initiate international business soon after their inception. These companies usually begin by exporting their products or services in foreign market, gaining a substantial portion of total revenue from sales in international markets. According to what observed by Knight and Cavusgil, most of the interviewed firms obtained at least 25% of total sales from foreign markets within three years of founding (Knight & Cavusgil, 2005, p.16). However, only very few firms are actually born global, most of them start with a regional, and not global, internationalization (Knight & Liesch, 2016; Lopez, Kundu, & Ciravegna, 2009).

Although very similar, born globals have to be distinguished from International New Ventures (INVs), defined by Oviatt and McDougall (1994, p. 49) as "business organizations that, from inception, seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries". The definition of born global is narrower, it only considers young firms with poor resources that export globally as their main international entry mode. On the other side, INVs potentially include new ventures launched in older



multinationals, a range value of value chain activities (firm is not the only unit considered), and various entry strategies besides export.

### **3.4.2. Internationalization of born globals**

Moving back to born globals, this phenomenon is not new, but the numbers of born global firms has been increasing lately and it is also including small firms with limited resources, which in the past had no opportunity to internationalize (Knight & Liesch, 2016). Previously, early internationalization was expected in countries with smaller domestic markets, but now it is also happening in economies with larger markets, such as the United States (Eurofound, 2012).

One reason could be the fact that founders of born globals consider the world as their marketplace, which is consistent with the globalization macro-view. Actually, born global firms are able to identify a transnational profile of customers worldwide (Cavusgil & Knight, 2015) or to serve each customer segment in the most proper way. Founders possess typical distinctive entrepreneurial skills and sometimes previous managerial experience in international markets. The strong international orientation, combined with the entrepreneurial one, are reflected by early commitment of specific resources to generate foreign sales (Knight & Cavusgil, 2005).

The typical born global is a firm located in a small home market, operating in a niche that is often too small to generate economies of scale and offer competitive process, for this reason early and rapid internationalization is necessary for survival. In general, born global lack of financial and human resources, but at the same time they are endowed with intangible resources and capabilities. Due to the lack of financial resources, early internationalization becomes more challenging, because the firm has to manage the very first steps such as product development and in parallel also sales and foreign market development, without any international experience (Neubert, 2016; Knight & Liesch, 2016).

According to Gabriellsson et al. (2005), in order to solve this problem, in the first phase of internationalization the firm will need external partners (i.e. bigger firms, distributors, etc.), global customers and/or global networks. In this way, with the support of collaborators, distributors, agents, representatives, and suppliers, firm can obtain the resources needed to internationalize (Gabriellsson et al., 2005). An additional solution to support internationalization is “regionalization”, which means that born globals in the initial phases enter a limited number of foreign markets which have low cultural, administrative, geographic, and economic differences, combined with high market attractiveness and the possible presence of an existing network (Coviello, 2015), in this way, the risks of entry are lower.

### **3.4.3. Born global clusters**

Knight & Cavusgil (2005), identified four clusters of born global firms, according to their organizational orientations and generic strategies (cost, focus, and differentiation leadership). He assessed organization orientation through international entrepreneurial orientation and technological leadership within the respective industry/product category. From this analysis he identified four clusters of firms:

- a. Entrepreneurial strategy and technology leaders
- b. High-tech focusers
- c. Cost leadership
- d. Stuck in the middle

Cost leadership as sole source of competitive advantage seems not to be enough for born globals, because of the competition of larger volumes of MNEs. The first cluster pursues a cost leadership strategy, but at the same time maintained the focus and technological leadership too, while cluster two showed high scores in technological leadership and focus strategy. These two clusters are those with the best international performance. For this reason, young internationally-oriented firms should emphasize the development of entrepreneurial and technological orientation, together with focus and differentiation strategies.

### **3.4.4. Digitalization and born globals**

If we consider the role of digital in born globals, there is no doubt that the Internet allows firms to quickly access key information and intelligence about markets, customers, competitors, and countries (Cavusgil & Knight, 2015). Furthermore, born globals heavily rely on communication technologies to achieve their international goals and these technologies enable low-cost, global, communications and the acquisition of market and other data from around the world (Knight & Cavusgil, 2005). Digital transformation is also changing business models, creating the so-called “digital firms”. These firms can provide a product that is entirely digitalized, an interface for digital product/mobile device, digital elements in a physical object, or a physically rendered service bought digitally (Zhang et al., 2015). In fact, many born global firms are technology firms. However, this phenomenon is spread beyond the technology sector. In any case, all these firms leverage advanced information and communications technology (ICT) to segment customers and serve them according to their needs. Thanks to ICT, firms can process information efficiently and communicate with partners and customers worldwide at zero cost (Tanev, 2012). In Chapter Four it there will be provided examples of traditional firms that are also born globals.

One interesting study regarding the role of digital transformation in the early internationalization of born globals is the one conducted by Lee, Falahat & Sia (2019). These results can be easily applied to all SMEs that are digitalizing and pursuing an internationalization strategy. According to their study, digital transformation has a moderating role on international business competences of SMEs and this, on the speed of internationalization, for this reason, the capability to leverage digitalization is likely to accelerate the internationalization process of a firm.

When referring to the organization, in order to be successful outside the domestic market, firms need to possess international business competences. The authors identified the following competencies: a) entrepreneurial orientation; b) international knowledge; c) network; d) marketing capability; e) digital capability; f) innovation capability; g) learning capability. Each of these elements affects the speed of internationalization and digital transformation can enhance this effect, as summarized in Table 8.

**Table 8: Impact of digitalization on international business competences.**

Source: adaptation of the author from Lee, Falahat & Sia (2019).

<i>Entrepreneurial orientation</i>	Early internationalization is mostly found in high-technology industries, where the whole ecosystem is more digitalized. However, the digitalization of supply chain among traditional industry in activities such as sourcing, purchasing, manufacturing, and marketing can create opportunities also in non-high-tech industries.
<i>International knowledge</i>	International knowledge determines the commitment decisions for internationalization. Many born globals or SMEs lack of international knowledge gained through experience. This experience can be brought by founders or can be accumulated step-by-step. Digitalization can accelerate internationalization through accelerated knowledge accumulation or also by providing solutions that allow to reach foreign markets with a reduced commitment.
<i>Network</i>	Strong relationships with authorities, investors, business partners, suppliers, distributors, customer and other enterprises allow born globals to overcome the constraints of scarce resources and create competitive advantage. Networks affect scope and are a source of new knowledge. The development of a network is sustained by digital communication,

	which allows to maintain close relationships shortening physical distances.
<b><i>Marketing capability</i></b>	Firms with high marketing capability can develop strategies that meet customer requirements, and this supports a rapid market entry. Through online platforms and social media, digitalization has lowered the costs of marketing. Moreover, digital technology has made easier to target customers, to position a product and to set the right price, increasing the profitability of investments in foreign markets.
<b><i>Digital capability</i></b>	The ability to apply digital technologies for value creation is essential for rapid internationalization. Born globals should be able to adopt digital technologies in order to achieve a better international performance. By doing this, they can optimize their processes, develop new products and services, strengthen the relationships with customers and business network, facilitating also the information flow.
<b><i>Innovation capability</i></b>	Innovation capability permit to offer new products and services in a market that is constantly changing. Creating attractive products and services is fundamental for born global fast internationalization and overall performance, because it permits to accelerate also the time-to-market.
<b><i>Learning capability</i></b>	Learning capability permits to sustain competitiveness in international market. Firms need to develop and maintain market-focused and internally-focused learning capability. Learning capability is fundamental to overcome any lack of foreign market knowledge. When this knowledge can be obtained from the internet with minimal costs, internationalization is accelerated.

### **3.4.5. The future of born globals**

At this point, in the longer term, born global concept will just become outmoded and turn into a typical type of international firm (Knight & Cavusgil, 2005). This will happen because even for smaller firms, physical boundaries will not be important, and the location of customers and suppliers will become a secondary aspect. The next-generation entrepreneurs will not take into consideration the location of sales and value chain activities, so that the international dimension of international business might become irrelevant (Cavusgil & Knight, 2015; Knight & Liesch,

2016). In this process, digital technologies play an important role, because they facilitate full-time availability, personalized treatment, and instant delivery of standardized offerings to potentially large markets, at lower cost and with lower risk. Even small firms, thanks to digital technologies, can appear large (Knight & Liesch, 2016).

### 3.5. Conclusions

Excluding the macro-level and the way progresses in digital technologies affect globalization, the aim of this chapter was to present in a detailed and organized way how digital transformation impacts the internationalization process of firms, with a focus on small and medium enterprises.

Starting from the technologies, besides the infrastructural ones, the literature is still scarce. However, many interesting aspects have emerged. The *digital data* world, including BDA and IoT, provides new solutions for firms to establish an international presence. While IoT represents an instrument for passive data collection, BDA is the ability to analyze these data and utilize them to create value. BDA increase market knowledge of the firm, which can support entry decision. Furthermore, the ability to manage data is also essential for an internal digital transformation which, as mentioned in Chapter Two, is necessary to ensure a balanced approach to digital transformation.

Moving to *automation*, first we can say that automation allows smart manufacturing, which permits to reduce costs, increase efficiency, and flexibility. Second, taking the internationalization perspective, it has emerged that technologies such as robotics and additive manufacturing affect internationalization in a very peculiar way, impacting locating decisions and how firms reach customers. Automation allows firms to detach their production locating decisions from exclusively costs reasons, while 3D printing permits to reach customers everywhere in the world, with customized products.

Finally, regarding *digital customer access*, various aspects have emerged. The digital world is a source of information that can reduce psychic distance between the firm and the foreign market, reducing the risk of entry. Also, e-commerce, digital platforms and social media represent an instant way to be potentially present at a global level and to detect new opportunities. Moreover, digital platforms and social media “simplify the job” for SMEs, providing the infrastructure to start internationalizing without large investments. Digital customer access technologies also permit a two-sided communication between firms and clients, whose needs can finally emerge and be listened by the company.

Overall, considering the whole digital radar, what has emerged is that due to digital transformation:

- New digital products and services will be developed, new business models will emerge;
- Goods (and people) flows will be partially substituted with digital information flows;
- The need of physical presence is reduced, firms can be international “from home”;
- Geographical borders are less relevant, customers are segmented by similar needs;
- Information search and learning are facilitated, reducing uncertainty to internationalize.

Observing the internationalization stages, it is possible to identify many aspects in which digital technologies and digital transformation can have an impact. Internet-based technologies not only changed the global economy dynamics, affecting internationalization drivers, but at the same time they have the capacity to compensate and overcome some barriers that might make companies desist from their foreign expansion projects. They can affect the first phase of *market evaluation*, creating opportunities and providing instruments to analyze foreign markets and reduce the uncertainty and risks connected to internationalization. They can influence *the entry mode*, helping SMEs in overcoming not only the liability of foreignness, but also the liability of smallness. The use of digital technologies can accelerate the internationalization process and favor the geographic dispersion of the activities, thanks to a reduced commitment in the foreign country. Once the entry in the foreign country is made, in the *development and growth* phase, they can sustain the sales performance or, in the case of the establishment of a subsidiary, digitalization represents an instrument at disposal of the headquarter to coordinate and integrate the activities. Firms can increase their knowledge about local customers also by passive collection of data, automation and additive manufacturing allow customization and reduce time to market and infrastructural technologies support coordination between branches. Considering the dimensions of time, scale, and scope, it is possible to confirm that:

- Digital transformation accelerates international expansion of firms (time);
- Digital transformation reduces the need of foreign commitment (scale);
- Digital transformation supports foreign sales (scale);
- Digital transformation allows firm to reach more markets (scope).

All these statements are valid under specific conditions. First, as mentioned in the previous chapter, digital transformation has to be balanced in order to be effective. Second, firms that internationalize cannot completely rely on digital interaction, otherwise they might fall into the “virtuality trap”, even though this risk can be lowered thanks to more recent digital applications. Third, the largest scope is just temporary. Digital transformation permits to approach

instantaneously multiple markets with low commitment, but in order to guarantee growth, at a certain point firms need to invest resources in the most promising markets, if they want to have further development in there. Finally, there is a set of international business competences that a company should have so that digitalization can support the internationalization process of firms. A SME is more likely to be successful internationally when the founder has a digital entrepreneurial orientation and international knowledge and/or network, and when the firm possesses digital, innovation, marketing, and learning capability.

These characteristics are typical of born global firms, those firms which obtained at least 25% of total sales from foreign markets within three years of founding. Therefore, born global firms are fast internationalizers, and the typical born global operates in high-tech industries and is also a born digital firm. However, considering that, as shown in Chapter One, most of the Italian internationalizers operate in more traditional industries, it can be interesting to investigate the different outcomes of digital transformation strategies of firms that operate in different industries. For example, we can compare the results of born digital firms and those that are involved in traditional sectors, seeing how digital transformation impacts differently the internationalization of these firms.





## **Chapter 4 – Case studies**

### **4.1. Introduction and methodology**

The aim of this final chapter is to understand whether the statements deriving from literature review and the speculations made regarding the impact of digital transformation on internationalization are verified.

In order to do this, two main sources of qualitative data have been utilized, including both secondary and primary data. The decision to utilize two different types of data comes from the fact that secondary data where necessary to give some indications regarding the trends in digital transformation, while the second part of data included more detailed information after a framework regarding the connections between digitalization and internationalization has been designed.

Section 4.2 includes secondary data are about case studies from eleven companies located in Veneto. Except for SARIV, which has been included later, the other ten companies that are part of the case studies have been interviewed by Professor Diego Campagnolo in the context of a project connected to the impact of Industry 4.0 on internationalization of firms. These interviews have been conducted in the mode of semi-structured interviews with the key figures for digital transformation in every company. Further information has been retrieved from company's websites and AIDA database, to add details regarding the year of funding and the latest data available about turnover and employees, in order to calculate the dimension of the firm.

These case studies have been selected to represent the current state of digital transformation among both large, medium, and small enterprises operating in different industries. All these firms are present not only in the home country, but also in foreign markets with different internationalization modes. For each company there is a description of the business, digital transformation activities and internationalization. At the end of Section 4.2 there will be a discussion regarding the digital transformation strategies of the firms, considering the effects of dimension, age, different approach. Although these companies also perform international sales or have facilities in other countries, little can be discussed regarding the impact of digital transformation on the internationalization strategy of the firm due to the lack of precise data regarding the foreign expansion of these companies over the years.

For this reason, Section 4.3 presents the case of an additional firm, for which data have been directly collected from interviews and eight months observations. The semi-structured interviews involved three people: Founder/Managing Director, Head of Sales, and Senior

Marketing Director. The 30-minutes-long interviews have been performed at the company's headquarter in October 2020 and recorded. Punctual data about internationalization numbers have been afterwards provided by the Chief Financial Officer of the firm, including data from 2014 to October 2020.

One could argue that this last firm is very different from the other cases analyzed, especially geographically, considering that it is located in Germany. However, the decision to select this firm as a case study comes from two specific reasons.

The first reason is that the company is an example of young born global SME operating in a non-high-tech sector. Most of the researches conducted concentrate on digital born global firms, without considering traditional sectors. Moreover, fashion overstock wholesale is a sector that is also diffused in Italy due to the high quantity of manufacturers and brands, so also in Italy there are companies like the one selected for this case study. The second reason is that the possibility of observing directly the dynamics of the firm, together with the availability from the company's side to perform interviews and share information, helped in overcoming the difficulties in collecting primary data. Thanks to this availability, Section 4.3 includes a description of the company business model, the beginning and the first steps in international expansion, the way digital solutions impacted initial and current internationalization, and data about company's internationalization. The second part of the discussion will conclude the section.

At the end of the chapter, Section 4.4 will summarize the main findings, together with specifications for SMEs, implications and recommendations, limitations and further research.

## **4.2. Case studies**

### **4.2.1. Baxi**

Baxi Italy is a company located in Bassano Del Grappa, founded in 1925. By the end of the 70's the company focused its production on heating sector and by mid-80's, after consolidating its position in Italy, it began the expansion toward foreign markets. In 2009 Baxi Group and De Dietrich Remeha Group created the BDR Thermea. Today Baxi designs and produces in the biggest European plant of the industry more than 9 million boilers, and BDR Thermea operates in more than 70 countries worldwide. The group employs more than 6,400 people across Europe, with a turnover of €1.8 billion.

The internationalization strategy of the group involves marketing under multiple trade brands, with strong national operations in the major European economies allowing for rapid reaction to

changes in local demand. The group has achieved top market position in six key countries: UK, France, Germany, Spain, the Netherlands and Italy and strong positions in the rapidly growing markets of Eastern Europe, Turkey, Russia, North America and China, where the company has commercial and productive facilities. Furthermore, the company is present in Australia, North Africa and South American countries like Argentina and Chile. Two-thirds of total revenue come from export and intra-group transactions.

In Baxi, digital transformation impacted the production, with the creation of flexible productive lines which allow maximum customization of the products. All products from the different 15 product lines now have a digital component and the most recent product line is able to track everything connected to the boiler. Previously, this tracking was manual, slow, and subject to human error, while now the tracking is digitalized. Data now are collected automatically and permit to create statistics which fasten and facilitate maintenance and enable also predictive maintenance. The tracking not only occurs downstream, but also all the components utilized arriving from suppliers must ensure compatibility with Baxi systems.

Regarding other technologies, the firm is already utilizing additive manufacturing in the prototyping phase and the company is also working on the substitution of ERP, which is going to integrate e-kanban and digital lean that at the moment are not included in the ERP. Still on the internal side, many administrative tasks are digitalized. An additional step is the digitalization of customer service, to anticipate information and thus reduce the time.

BDA is not implemented because data collected are still not enough and there is not yet a plan on how to manage these data. At the moment information is filtered by distributors, while IoT permits to reach directly installers, who are those in direct contact with the final customers. The company anticipates that data collected might help the R&D in developing products tailored on different customers' needs, permitting to bypass the role of distributors.

For Baxi digital transformation is source of new opportunities and is necessary in order to create a differentiated product. However, the challenge of digitalization is both internal and external. On one side, the company has to act fast, overcoming the hierarchical structure and integrating new solutions to the previous systems. On the other side, Baxi has to deal with its primary customers, the installers. Not many of them are ready to embrace digital transformation, the main challenge for Baxi is to present these changes as something that can support, not harm, their jobs.

#### 4.2.2. Better Silver

Located in the province of Vicenza, Better Silver is not only an example of Italian excellence in jewelry production but also of a company which fully embraced the digital transformation idea. Better Silver has always believed in the fact that digital transformation would have brought benefits to the company, so in the last 10 years it decided to invest 15-20% of total investments in digital transformation, becoming first movers among their competitors.

Digital transformation began by digitalizing internal processes: fully integrated ERP, paperless archives, CRM that allows to track customers' history were part of this internal transformation. Benefits occurred also on the external side, since this real-time control permits to provide data and information to their partners, B2B clients and their branch in Romania, with whom communication occurs more smoothly than before. On production's side, 3D printing has been introduced and machineries are controlled remotely.

The digital revolution has also changed the way Better Silver approaches the market. The company, in order to have a more direct insight on the final market, opened in 2007 an online platform for sellers. This website required important investments in terms of infrastructure, personnel, and communication but it allowed the company to reach a wider market and disintermediate, since intermediaries were narrowing company's vision on the market.

From this experience, Better Silver developed a better knowledge of the market, which turned useful when the company decided to launch Roma 1947, their B2C project which included e-commerce and retail stores. Roma 1947 stores are located in touristic cities such as Venice, Rome, Milan, and Florence, while the e-commerce operates worldwide. The main characteristics of the stores is that they are fully digital and tracked. On real-time it is possible to check the number of receipts and the average value, number, gender and nationality of customers and even the weather at the time of the purchase, since it appeared that weather also affects the sales. These data are useful to the company and can also be sold to other resellers. Fidelity cards allow to track and retain customers, enhancing cross-selling occasions. Advertising is made just digitally and is customized according to location. The costs of retail stores are high, but stores support the company in understanding the real value of their product, giving advantage to Better Silver when dealing with B2B customers, that still count for the 90% of revenues. Better Silver can now set the price based on how the market values the products and not on the production costs, increasing their margins.

Regarding internationalization, Better Silver used to work with wholesalers in the US and Middle East, but recently the focus has moved to Asian countries, following the path set by big

players such as Swarovski and Pandora. The firm is now present in 90 different countries worldwide. Entering a foreign market is not easy, even for close countries such as Germany, and Better Silver recognizes the need to make specific investments according to the country. Digital transformation has also brought to disintermediation, creating a direct relationship with final sellers. E-commerce has enhanced international growth, making the brand recognizable abroad at events and meeting specific for the sector, since these kinds of traditional events are still very important for the company. A further step will be approaching digital platforms such as Amazon, and since Better Silver is fully digitalized, the structure should be ready to automatically fit with Amazon's requirements.

### **4.2.3. Bravo**

With more than 50 years of history, Bravo represents the excellence in the production of machines for gelato, pastry and chocolate for shops and restaurants. The firm was founded in the Province of Vicenza in 1967 by Genesisio Bravo, who started the production of gelato machines. In 1972 Mr. Bravo patented the "Trittico", the multi-machine system at the base of the company's initial success, sold in Russia and USA in the early 80s. During the years Trittico has been improved with complex software and advanced technology which make the machine able to control many types of processes automatically. In the same time, the company has opened new branches worldwide: Bravo France in Paris, Bravo Asia in Singapore, Bravo North America in Charlotte, Bravo Deutschland in Munich and Bravo Middle East in Dubai. The international expansion is aimed at reaching closeness to final customers, since Bravo provides assistance, support and training to the users both directly and indirectly, through over 200 dealers and distributors in the world.

Bravo can be considered as an innovator in B2B marketing. In the first years of 2000 the company already had automated machines who could partially substitute some steps in the patisserie production, but it lacked proper marketing activities. For this reason, the company started this activity in 2005 with online catalogues and video-courses in order to train the final users, increasing the utilization of the web between 2006 and 2007 with digital assistance, online manuals, YouTube videos and QR Codes. The company was always a step forward in digital marketing, but the receivers still were not fully ready for this. However, digital marketing had positive effects on sales.

In 2008 Bravo opened Bravo Asia in Singapore, also thanks to the experience of one of the entrepreneurs who had lived in Japan. Asia was a very attractive market due to the absence of competitors and, in fact, Bravo Asia sustained Bravo Group during the years of the crisis. From

2009 the company focused on the production of artisanal gelato which could be conserved at home. Even though the company was still a B2B seller, it worked on the perception by final consumers with television and web advertising. In 2010-2011 Bravo implemented augmented reality to explain the machines, but the innovation was not fully understood by the receivers. In the meantime, the company improved the website and YouTube channel, providing real-time support to users. With the advent of Facebook and Instagram, a dedicated team of three people started working on these social and Bravo focused its marketing activities on these social media, involving important gelato and pastry masters and celebrities such as Alessandro Borghese and Iginio Massari. Traditional channels such as television lost their importance, while trade fairs still had a certain impact.

Bravo could focus on marketing because the machineries needed little changes. However, lead users have been involved to improve the equipment. In the years, the business model of Bravo has slightly changed. First, in order to access the lower-end market, Bravo founded Gelita, which produces machines for the creation of a standard product. Second, Bravo nowadays created a franchising of gelato and patisserie shops, providing not only the machineries, but also management software and all the support needed. Bravo also sells recipes to those who do not utilize their machineries, but the company does not foresee a jump from B2B to B2C, mainly for costs reason.

Today Bravo Group employs more than 100 people and has 15 million-euro revenues, 20-25% of which is coming from Italy. This percentage is eroding in favor of foreign markets such as France, Asia, United States and South America.

#### **4.2.4. Caseificio Elda**

A successful case of a company that has been able to be international through automation is Caseificio Elda, which, back in the 90s, had the intuition to limit its production to one single product, ricotta. Since then, Caseificio Elda innovated the production process, moving to a manual and simple one, to a more automated and standardized. Automation has been mostly driven by a complex situation that the company had been facing, given the low contractual power with its business customers, large-scale distributors, which could set the prices of the product. In order to stay in the market, Caseificio Elda had to reduce labor costs and human error, and automation provided the solution to this problem. However, automation also brought something more: through a continuous monitoring of the production process, Caseificio Elda managed to standardize the production process and then product. The new product can last longer, allowing worldwide shipping without compromising the quality.

The first international step has been made 15 years ago with UK, the only country that knew ricotta at that time. Caseificio Elda at that time could not explore the market by itself due to lack of resources but, through distribution partnership with their business clients, the company now is present in more than 20 countries. 30% of revenues are generated in foreign countries, 10% of which outside Europe (US, Korea, Australia, Japan). The next objective is to reach 50-60% of revenues from outside Italy within 2 years.

In the meantime, the firm kept investing in digital transformation, through a technological support in all processes such as production, packaging, and maintenance. Automation also reached the warehouse. All the data generated by production, logistics, and sales are integrated and utilized to perform business intelligence activities. The value of these data is recognized not only by the company, but also by the clients. Today Caseificio Elda produces five different categories of products, with 150 different varieties, 50 of which carry the own Caseificio Elda brand. In the future they might consider the creation of a new production plant, exploiting the possibilities of remote control.

The example of Caseificio Elda shows how a SME managed to innovate first the process through automation and then the product, creating a product that could be more easily exported. Automation in this case supported the firm, allowing it to outperform its competitors in the home market and to catch new opportunities in the foreign one. A particularity of this situation is in the way Caseificio Elda approached foreign markets. Through the support of bigger players, such as Parmalat, the company reached the shelves of supermarkets worldwide. There are for sure many reasons for which large distributors chose Caseificio Elda rather than another competitor, but it is easy to believe that these distributors also positively evaluated a firm which is digitally transformed, automated, standardized, and transparent.

#### **4.2.5. DAB Pumps**

DAB Pumps is a company located in Mestrino. For over 40 years DAB has been a main player in the sector of the technologies for the movement and management of water, developing technological solutions for agriculture and irrigation, residential and commercial building service. In 2019 DAB generated 362-million-euro revenue, it has over 1700 employees in 6 productive plants in Italy, Hungary and China and 14 commercial offices, in UK, Germany, Netherlands, Belgium, Spain, Russia, Poland, USA, Mexico, South Africa, United Arab Emirates, China, Indonesia, and Oceania.

DAB digital transformation strategy has started with the creation of the DAB Digital Committee, a team which involves IT, finance, operations, product (R&D and marketing), sales,

and HR. The aim of this team is to spread digital transformation in the whole organization, with the aim to achieve a balanced digitalization and to create standard, integrated and digitalized processes. The committee also created a digitalization manifesto divulged in the whole company to clarify the aims and pillars of digital transformation in DAB. The firm is also supported by external consultants but considers fundamental the role of internal connectivity ambassadors that support digital transformation through the whole company.

One key-world for the digital transformation of DAB is product connectivity, which is fundamental to control remotely the pump by the service company and the final user. This topic was already taken into consideration 2-3 years ago, but the market was not very receptive. They already have products which are connected and are still ahead than competitors but could have invested more in this project. However, now all new products that are developed must be connectable. DAB is still deciding what to do with the large amount of data, but connectivity is followed by a project manager and some macro milestones have already been set.

It is clear for DAB that the product cannot be radically transformed, and little changes are possible, for this reason it is necessary to offer something extra to the product, which is connected to service. For this reason, DAB has created platforms that connect the company to distributors and final customers. Furthermore, also production has been digitalized and this is affecting the relationship between DAB and its suppliers, that now are automatically connected to the firm. In this way, the distance between supplier, DAB and final user is reduced.

Regarding other Industry 4.0 technologies, DAB is already using 3D printing for prototyping and has developed pumps that adapt to conditions thanks to artificial intelligence. Digital transformation has also reached HR offices, with the adoption of digital recruiting systems. Moreover, HR is strongly involved in digital training.

Despite the efforts on digital training, some resistance to change is still present in the company. This can be due the average seniority (15-20 years) but also due to mistakes in communicating change both in the internal and in the external side. Internally harsh resistance has been made against the use of electronic bracelets which could interface with machineries like a tablet. Externally, the innovations are hardly accepted by distributors and installers. For this reason, DAB has created online trainings and webinar programs in six languages with live training services, pre- and post-sales technical consultancy and support for installation.

According to the management, digital transformation facilitates international expansion. Good business models are easily scalable because digitalization shares the same language. Now the market does not focus just on price, but positively rewards differentiation and product and



service innovation. The main difficulty in their view is being ahead of times, since first movers are those which are able to set standards. Once a new standard is created, lock-in effect makes it hard to switch to a new model.

#### **4.2.6. Filoblu**

FiloBlu is a business accelerator for brand and retailers founded in 2009 by Christian Nucibella. Headquartered near Venice, Filoblu has offices in Milan, Naples, Prague, New York, Shanghai, and Hong Kong and a team of more than 150 people. The core business of the firm is to develop e-commerce and support retailers in the fashion, lifestyle, and food industry in sales, aftersales, and store management activities, through an omni-channel strategy.

FiloBlu internationalizes to follow the needs of their clients. The first foreign office was opened in Prague in 2015. New offices are created not only for logistics reason, but also to develop a better knowledge of the foreign market. Some markets, such as Europe and US, have similar tastes and needs, while others like China, India, EUA and Japan require specific resources and a local partner. Having local partners is fundamental for FiloBlu, because the partner has knowledge of the specific market and due to this the training time is lowered, squeezing the time-to-market.

E-commerce development is the core business of FiloBlu. According to the firm, e-commerce supports clients in their geographic expansion, which is faster and has lower costs. However, specific marketing investments are needed. FiloBlu collects data from different sources (social media, e-commerce, physical retail) and in this way it is able to detect the most interesting countries in terms of performance. The client can understand which products, markets, channel are more profitable, from where traffic is generated, which factors create customer conversion and these data are available real-time. From this, the client can decide where to allocate resources to foster foreign expansion. For this reason, FiloBlu is not just a simple service provider, but can be considered as a strategic partner which develops foreign expansion and international performance of its clients.

Most of FiloBlu clients already tried e-commerce and want to enhance e-commerce performance, while others were unsatisfied with other services. Usually the most common reasons of failure are connected to a superficial approach, with lacking commitment and resources, no adequate marketing strategy, not sufficient attention in choosing the right product for the right market. Other clients simply never approached e-commerce, even though they can be also big players in their respective markets. Finally, FiloBlu client base is also composed by born digital firms looking for partners to accelerate their growth.

As a strategic partner, it is important for FiloBlu to have a deep knowledge of the product. They are specialized in fashion, lifestyle and food but work in any sector. Internal resources should be specialized and fast to react quickly to clients' needs and market changes. Once the company has gained experience on one specific industry, their business model is easily scalable. This is also the reason why in the last few years FiloBlu has been able to achieve an extraordinary growth. In 2020 revenue where 51 million Euro, +28% on the 40 million of 2019 (28.6 in 2018 and 19.4 in 2017).

#### **4.2.7. Nesite**

Nesite is a company specialized raised floors, custom-made furniture and interior renovation. It is located in the Province of Padua and is part of the Transpack Group, a group founded more than 50 years ago whose core business is industrial packaging and factory logistics. The group has two branches in Croatia and Slovenia, to serve the local market but mostly to provide a service to Italian clients operating in these countries.

Nesite began as a side business in order to diversify from logistics and packaging. At the beginning floors were considered as a very technical product, while now they have become a piece of furniture even in public spaces such as offices, airports, museums, malls. In fact, Nesite collaborated in projects such as the "Nuvola" by Fuksas or the "Louvre Abu Dhabi" by Jean Nouvel. Nowadays, Nesite offers high-quality solutions for a product that is totally customizable. Raised floors are created with maximum attention for design and details and new floors are also enhanced by the latest technologies. For example, they can be customized with led illumination, controllable via app, or with specific designs that can be reproduced with the support of 3D printing, and they can also be integrated with security systems. Furthermore, Nesite is collaborating with a Sardinian start-up which has created a floor that produces energy and gathers data, for example regarding how many people have passed and at which time. New floors are interconnected.

About other technological implementations, after two sales managers left, the company implemented for the first time the CRM. It also adopted an automatized software to create offers in multiple languages automatically. The firm is also conforming to a new standard set by the market, "BIM object", that is a document which includes all the details about a product that is going to be part of a project. Furthermore, the company has changed its communication, focusing marketing activities on architects and reaching them through newsletter, company blog, regular video-meetings and a magazine.

In 2018 50% of revenues (11 million euro) came from export. The focus of the company has moved to United Arab Emirates and Kuwait. These markets have high demand and competition from China for cheaper solutions is harsh, for these reasons Nesite decided to develop high-class products, obtaining important projects in Riad, Abu Dhabi and in Kuwait. Overall, the company is present in Europe, Middle East, Asia, North Africa and Central America. The company had few projects in Russia and no presence at all in the USA, due to entry barriers connected to certifications and specific requirements.

#### **4.2.8. Ono**

ONO Lean Logistics is a spin-off of Tor.Mec Ambrosi Group, a company at the forefront of technology in the fields of precision mechanics. The group is continuously investing in research and development to access new potential applications and collaborates with highly selective companies and Italian universities to raise the company know-how.

From the collaboration with MediaSoft, which took care of the artificial intelligence side, the group developed ONO Lean Logistics Racks, a solution for assembly lines and production facilities which represents a revolution in the fields of warehouse logistics. This system integrates artificial intelligence and software, facilitating companies that need to store and move goods and production materials frequently in an automated way, eliminating waste of time and resources. In easy words, ONO Lean Logistics Racks can be considered as a warehouse automatic supermarket, where goods or components move quickly without the need of moving people. ONO Racks bring together technical and mechanical competences and lean production. The full digitalized data is used by artificial intelligence algorithms for machine learning. Racks can adapt to production and predict the future needs, supporting the just-in-time production. Further advantages of this solution are the customization to the specific needs of the user and the possibility to expand the capacity over time with minimal and low-cost interventions.

The spin-off grew in few years, involving 50 people in two productive plants and 15 technicians around the world, and is nowadays serving over 30 sectors, collaborating also with big Japanese multinationals such as Mitsubishi. The whole group is present in 127 countries worldwide.

#### **4.2.9. Sariv**

An excellent example of a SME which managed to digitally transform and gain advantage of the large amount of data generated by its equipment is SARIV. Located in the Italian province of Padua, SARIV produces blind rivets since 1990. Blind rivets are a standardized and hard to differentiate product, mostly used in the automotive industry.

As a reaction to the 2008 crises, SARIV began a digital transformation process which transformed the company in a paperless firm, where all data are digitalized, information is totally tracked and supports quality control and predictive maintenance of the equipment. In this way, SARIV has been able to add information value to the product, which is highly recognized by its customers, allowing the company to reach new markets and clients that previously seemed impossible to reach.

Nowadays, SARIV counts 40 employees, it has one production factory in Italy and five commercial branches in Croatia, Poland, Czech Republic, Slovakia and Russia and 85% of the 8 million revenues are generated in foreign markets (Confindustria Veneto, 2019).

#### **4.2.10. Stevanato**

Another firm that through digital transformation has impacted the customer access in Stevanato. By adopting a balanced approach of digital transformation, the company has been able to grow without compromising its dynamism and flexibility. Organizational processes and informational systems have been tied in order to guarantee a smooth collaboration between the 14 plants and branches in 9 different countries. The IT structure has been created with the aim of collecting and integrating data coming from multiple sources.

To support the sales performance, Stevanato completely reviewed its marketing strategy, starting from the CRM. Missing information about over 15,000 clients have been filled through a process of data normalization. By the possession of full data, the company is able to adopt specific actions towards customers and assess their reactions. Since the activity of customer profiling is time consuming for sales agents, many information is inserted and processed automatically, and in many cases even the client is encouraged to enter data about his business through a mechanism of rewards such as invitations to webinars.

Even if traditional events such as fairs are still important for Stevanato, the investments in digital marketing allowed the firm to reach all the smaller clients that otherwise the company would had reached only with huge investments and efforts by the sales team. Human component embedded in one-to-one interaction has partially been substituted by digital marketing. This might sound as a contradiction, but the finest applications right now allow to establish a personalized approach with each client. In fact, at the moment Stevanato's clients are segmented according to their needs and not on their geographical location. To support the digital marketing strategy, the website has been reviewed, with an important activity of content creation. The new website boosted the visits and number of leads, with increasing requests from

United States and India, markets where the company was already present but where the website has helped in creating brand awareness and enhancing sales.

An additional advantage of digital marketing pointed out by Stevanato is that through digital it is possible to reach important results with a lower investment than the traditional way. Furthermore, the results are easier to measure, and all the data collected by digital marketing activities can be used to support decision making for future campaigns.

#### **4.2.11. Texa**

Texa is a company located in the province of Treviso, founded in 1992 by Mr. Vianello, a global leader in development, industrialization and production of automotive diagnostics, exhaust gas analysis and air conditioning recharging systems for five different sectors: cars, trucks, motorcycles, off-highway, and marine engines. Lately, the company has added a new business line, focuses on remote diagnosis. With over 730 employees, of which 23% from overseas branches, and 135 million euro net sales, Texa is a large firm.

The company believes in the importance of a direct local presence; therefore, it has a global network of fully owned subsidiaries. The first subsidiary was opened in Spain (2000), followed by Germany (2002), UK and France (2005), USA (2006), Poland and Russia (2008), Japan (2009) and Brazil (2014). In the country without direct presence, Texa operates through a network of local partners, with 700 distributors in over 100 countries. In 2019 25% of sales came from Italy, 60% from EU countries and 15% from extra-EU. Despite this global reach, one pillar of Texa is to maintain the production in Italy. The company stands against delocalization and all products by Texa are Made in Italy, also thanks to highly automated production lines.

Another important element in Texa is the constant research of new solutions. The company invests every year 10% of turnover in R&D. In the early 2000 the firm entered in the business of connectivity, developing solutions that permitted cars to remotely communicate with the car workshop for diagnosis. Then, following the latest restrictions in term of emissions, the company proposed new solutions for constant monitor of vehicle status, which also permitted predictive maintenance of trucks.

The latest field explored by Texa is telemobility, offered in different solutions for fleet management and corporate car sharing. These systems remotely transmit data to and from vehicles and permit to companies that own large fleets to optimize the management of the fleet, improve safety and reduce operating costs. Telemobility is still targeted to Italian market,

reaching clients such as Telecom, Enel, Poste Italiane but it is also a technology that can be used by insurance company, since the systems can provide constant monitoring for driving style and can prompt intervention in case of emergency. From the users point of view, Texa solutions permit to have pick-up and drop-off via smartphone, tablet, or app, while companies adopting this system have geotracking and further data available in one unique portal, permitting to have a constant monitoring of the fleet.

Similarly, the company is developing data plug solutions, in collaboration con Volkswagen, in order to create interconnected cars with small devices that can bring the car to the online dimension. Drivers are involved and can benefit from the data collected, for example they have info about their driving style which can affect the guarantee by the producer or can have hints for saving on fuel consumption. This product represent a jump to the B2C. Texa was first developing solutions for B2B market, but through these new applications it collects data directly from the final user.

Texa is not only developing solutions of digital products, but is also digitalizing itself. For example, accounting and controlling are fully digitalized. The firm also understands the need to support users which could not be prepared for such transformation. The strategy of Texa was to begin with bigger clients, more ready for the change, and then approach smaller garages. Solutions allow remote monitoring and support, but clients can also count on call center or trainings.

#### 4.2.12. Facts emerging from the case studies analysis

The eleven companies analyzed are very different in terms of dimensions and industry, but all of them have undergone to a process of digital transformation, with different approaches and intensities. The firms considered in the case studies are achieving important results regarding internationalization, performing important shares of their sales from foreign markets. In Tables 9, 10, 11 there is a quick summary of the main information about the companies.

**Table 9: Overview of case studies. Year of foundation, industry and dimension.**

Source: elaboration by the author. See below the table.

Company	Year of foundation	Main activity	B2B/ B2C	Employees	Turnover (€, M)	Dimension
Baxi Italy	1925	Heating and cooling systems	B2B	772	276	Large
Better Silver	1977	Jewelry production and retail	B2B/ B2C	100	48	Medium
Bravo	1972	Cooking machineries production	B2B	59	11	Medium

Caseificio Elda	1917	Food Production	B2B	32	12	Small
Dab Pumps	1975	Water management solutions	B2B	1700	326	Large
Filoblu	2009	Online sales and marketing	B2B	161	39	Medium
Nesite / Transpack	1980	Interior Solutions	B2B	28	11	Small
Ono / Tor.Mec	1990	Warehouse Logistics	B2B	45	12	Medium
Sariv	1990	Blind Rivets	B2B	42	6.4	Small
Stevanato	1949	Pharmaceutical and healthcare	B2B	4000	570	Large
Texa	1992	Car Appliances	B2B	497	117	Large

Data retrieved from AIDA database and companies' official websites, including last data available for the firm.

**Table 10: Overview of case studies. Internationalization mode.**

Source: elaboration by the author. See below the table.

Company	Internationalization mode	
Baxi Italy	FDI	2/3 international sales; foreign commercial and productive plants
Better Silver	FDI	Sales in 90 countries and one plant outside Italy
Bravo	FDI	75-80% international sales, worldwide facilities
Caseificio Elda	Exporter	In more than 20 countries; 30% sales from foreign markets
Dab Pumps	FDI	6 production plants and 14 commercial offices worldwide
Filoblu	FDI	Offices in Asia, America and Europe
Nesite / Transpack	Exporter	50% international sales
Ono / Tor.Mec	Exporter	Group present in more than 127 countries
Sariv	FDI	85% international sales; 5 offices in Eastern Europe
Stevanato	FDI	Export in 150 countries, 9 branches and 14 plants
Texa	FDI	75% international sales in more than 100 countries; 9 subsidiaries

Data retrieved from interviews and companies' official websites.

**Table 11: Overview of case studies. Digital maturity.**

Source: elaboration by the author. See below the table.

Company	Digital radar technologies	Digital transformation pillars/focus	Digital maturity
Baxi Italy	Infrastructural/networking, digital data, automation	Internal focus / Operational process	Experimental
Better Silver	Infrastructural/networking, digital customer access, digital data, automation	Balanced approach	Mature
Bravo	Infrastructural/networking, digital customer access, automation	External focus / customer experience	Experimental
Caseificio Elda	Infrastructural/networking, digital data, automation	Internal focus / Operational process	Experimental
Dab Pumps	Infrastructural/networking, digital data, automation	Internal focus / Operational process	Experimental
Filoblu	Infrastructural/networking, digital data, digital customer access	Business model	Mature

Nesite / Transpack	Infrastructural/networking	External focus / customer experience	Constructive
Ono / Tor.Mec	Infrastructural/networking, digital data, automation	Business model	Experimental
Sariv	Infrastructural/networking, digital data, automation	Internal focus / Operational process	Experimental
Stevanato	Infrastructural/networking, digital data, automation, digital customer access	Balanced approach	Mature
Texa	Infrastructural/networking, digital data, automation	Internal focus / Operational process	Experimental

Data retrieved from interviews with the companies.

### **Age of the firm**

Starting from the year of founding, we can see that the age of the company does not seem to have an impact on dimension and digital maturity. Older firms might not be born digital, but within the years have been able to renovate, change, and implement digital solutions to keep the pace, as in the case of the oldest one, Caseificio Elda, founded in 1917 and of most of the companies part of the case study. Even Baxi, a worldwide leader in heating and cooling systems, was founded in 1925 or Stevanato, which is the largest firm of the sample with the best achievements in digital transformation, was born in 1949. All the other companies were established in the 70-80-90ies, before the Industry 4.0 revolution. Only Filoblu is a “millennial”.

### **Internationalization mode**

Regarding internationalization mode, all large firms have FDI with commercial branches and productive plants. FDI are also common for medium firms, but only for commercial offices. Smaller firms are mostly exporters, the only exception was from SARIV which has local presence in Eastern Europe. Export is performed both directly and indirectly and even larger firms rely on local partners or intermediaries in the countries where they are not directly present. The reason for having foreign facilities is justified by the fact that these firms still need a local presence to gather knowledge regarding the market. This occurred also for born digital companies such as Filoblu. Another possible element affecting this result is that the firms analyzed in the case studies are B2B firms, where face-to-face interaction and local presence are still important also to generate trust and reliability. There is no information available regarding the future plans of these firms, but at the moment Nesite, Caseificio Elda, and Ono are the three out of eleven cases of firms that are international from home. It seems that the establishment of a foreign commercial branch still is like a natural development of the firm, connected to its growth in dimension and scope.

### **Digital transformation strategy**



As expected, large firms have the highest turnover and more possibilities to invest in digital transformation, with a clear and defined digital transformation strategy. However, also SMEs have been adopting different technological solutions, reaching a wide range of markets not only in Europe, but in other countries worldwide too. As previously mentioned, all the firms considered are B2B firms, except for Better Silver which has also a B2C channel. This can have an impact on the analysis, since most of these firms showed an internal focus in digital transformation, where all the efforts are aimed at the improvement of operational processes through automation, or at the development of digitally-enabled products. Using the classification provided by ISTAT and considering as digital transformation the elements of the digital radar (infrastructural/networking, digital data, automation, and digital customer access), all firms reach at least the level of experimental firms. Besides infrastructural and networking technologies, firms are adopting robotics and 3D printing, IoT and BDA. Digital customer access aspect was not much emphasized in experimental firms with internal focus, which are mainly B2B manufacturers.

### ***Traditional vs born digital***

The only firm with poorer results in terms of digital transformation was Nesite. The company is mostly investing in infrastructural solutions with some efforts in digital customer access; however, Nesite is outsourcing production and collaborating with startups to develop new digital products. This example shows a limitation in the ISTAT approach, because it only considers the number and types of technologies adopted, not taking into consideration the specificities of the different industries or other solutions such as outsourcing.

While Nesite represents a more traditional industry, Ono and Filoblu are two examples of born digital firms. Both of them have been founded with the aim of providing products or services for digital transformation of other firms. Ono developed a warehouse system that with the use of machine learning analyzes data generated to automatize warehouse processes and support production. Filoblu rode the wave of e-commerce offering to firms a service that fully covers the needs of companies in terms of online marketing and sales. As a spin-off from Tor.Mec, Ono can be considered as an International New Venture, while Filoblu as a Born Global firm.

Later in the chapter there will be discussed one case of born global firm in a more traditional industry, in order to understand whether also these firms can benefit from digital transformation.

### ***Internal vs external focus***

Looking at the remaining companies, it is possible to group firms according to their digital transformation focus:

- Internal focus: Baxi, Caseificio Elda, Dab Pumps, Sariv, Texa
- External focus: Bravo
- Balanced approach: Better Silver, Stevanato.

Regarding firms with internal focus, starting from Caseificio Elda, it is interesting to see how automation has been fundamental to control the costs of the company and ensure a standardized and controlled production. Automation supported product innovation which has turned fundamental for the internationalization of Caseificio Elda. Without innovation and automation, the scope of the firm would have been narrower, because of the limit of having a perishable product.

Automation and data integration are also the base of success of Sariv. This company manufactures a very standardized product. Thanks to the wise use of data, Sariv managed to add a new value component on a commodity product and this value lays in information. On the other side, automation ensures a control on costs which is still important in the production of standardized products.

Moving to the large firms, Baxi, Dab Pumps, and Texa represent the group of interviewed companies ahead in the innovation, which adopted different technologies to develop new products for a digitalized world. The main element in common between these companies is product connectivity. These three firms created new solutions to bring digital into their products, from pumps, to heating and cooling systems or car appliances that generate large amounts of data. One issue that has emerged in this case is that firms still do not have a clear idea of how to manage the data collected. Theoretically, the information generated by final consumers will reduce the barriers to information flow created by intermediaries. This is already happening in Baxi and also in Texa, considering that the new connected cars will automatically bring Texa closer to the drivers. Considering this indecision in how to use data, these firms can be considered as experimental in terms of digital maturity.

On the other side, Bravo could already count on an innovative product and this allowed the company to focus its digital transformation efforts on digital customer access, being a pioneer in the use of the Internet as a mean for sustaining the company's growth. Videos, posts and apps do not only support the first sale but are fundamental to ensure full support to their customers in the use of the machines and nowadays 75-80% of Bravo sales are from foreign markets, also through the supports of subsidiaries in Europe, Asia and America.

### ***Balanced approach***

Two very good examples of companies that have been able to achieve important international results through a balanced digital transformation approach are Better Silver and Stevanato. The first operates in the jewelry industry, while the second is in the pharmaceutical and biotechnology industry. Stevanato and Better Silver adopted solutions for internal and external focus, reaching digital maturity and representing a benchmark for their respective markets.

For Stevanato digital transformation represents first of all the key to collect and integrate data from multiple sources, also considering the fact that along its development the group acquired many firms. Besides the efforts in digitalizing production, one important aspect emerged during the interview is the way Stevanato has revolutionized its marketing and sales strategy.

A key element in this strategy was to create a clear database of customers, by entering information or by stimulating clients to enter these data themselves. From this, the company is now able to have an individualized but digitalized approach and segments clients according to the needs, not per geographical location, confirming what stated in Chapter Three. Moreover, investments in marketing made new leads emerge, allowing the firm to detect smaller clients that otherwise were not worth to reach, because of the high efforts needed by sales team to find and approach them. This demonstrates that with small investments (compared to traditional marketing) digital transformation can support international sales.

Another element that characterizes Stevanato is that, due to the dimension and resources available, the company can have one Digital Director and a team dedicated to digitalization which can coordinate digital transformation projects and define a clear strategy.

Moving to Better Silver other interesting aspects emerge. First, compared to Stevanato, Better Silver is a medium enterprise with 100 employees and €48 million turnover. Despite the smaller dimension, also Better Silver has achieved great results in terms of digital transformation and international sales, demonstrating that good results are not exclusively for large groups.

Regarding production, the company is utilizing 3D printing and controls remotely machineries, operating directly from the headquarter in their production facility in Romania. Digital transformation also ensures a smooth communication with the plant abroad.

Looking at the external focus, digital transformation has changed the way the company performs sales. Born as a B2B firm, the decision to open e-commerce and retail stores for end users allowed the firm to disintermediate and access directly the information from the market. In this way, the company has been able to understand the real value of their products and

increase their margins. Now this information can be used when dealing with B2B customers. This represents a wise use of the data collected by the firm, which could be an example for all the firms mentioned until now that receive data from digitally-enabled products but still have no clear idea on how to exploit them. Besides this, being fully digitalized also makes it possible for Better Silver to meet the requirements of digital platforms such as Amazon, which could potentially become an additional channel for the company.

A final element in common between Better Silver and Stevanato is that both firms, even though the big efforts on revolutionizing their digital marketing and sales activities, still considered important the role of events and specialized trade fairs for the success of their business, showing that even for the most digitalized firms, face-to-face meetings and human interaction remained important.

### **4.3. F&P Stock Solution: a traditional digital born global firm**

F&P Stock Solution is a German company located nearby Berlin specialized in the wholesale of fashion overstocks, liquidations and customers' returns from brands, retail stores and online platforms. The company was founded in 2013 by the current managing directors Julius and Ole and since then F&P has achieved continuous growth, counting now on around 60 employees and a global network of clients.

#### **4.3.1. Development of F&P**

##### ***Early years***

The idea of F&P came when Ole Schneikart and Julius Göllner met in Zalando working in the off-price business unit. The internationally known online retailer was putting in place B2C activities in order to sell unsold textiles, shoes, and accessories with discounted price, through online shopping clubs and physical outlet stores. For the remaining products, the company needed to find reliable and professional B2B partners which would sell these goods outside Zalando's core markets. F&P was born with the aim of being a trustworthy partner for liquidations of retailers and brands.

One "promise" in order to obtain the goods, is that the company will sell the products outside suppliers' core markets. By law there is no limitation, but these restrictions represent an unwritten agreement between F&P and the suppliers that, if respected, ensures long-term relationships with suppliers and the possibility to have a stable offer of regular products. For this reason, from the beginning F&P had to be export oriented.

In order to decide where to export, the company followed two main criteria. First, they needed to find countries where there was awareness of the brands in their portfolio of offers. Second, they had to target countries which had availability to pay, so regions with raising middle-class and medium-high income. These two criteria were necessary first because the brands included in the offers were, and still are, mainly internationally known (Adidas, Nike, Tommy Hilfiger, Michael Kors, ...) and German brands (S. Oliver, Esprit, Tom Tailor, Tamaris, ...). For the first group of brands there is already awareness, so these products can be easily sold because they are very demanded by final clients. On the other side, German brands might be not very known, so they require additional efforts to be explained and accepted. In both cases the prices of these products are higher, because of the brand or because of the quality of the materials and of the goods. For this reason, the company had to target countries with clients available to pay for these brands and this quality. A medium-high income is necessary also because the company, differently from other overstock wholesalers, does not include in its portfolio of offers cheap unbranded clothing.

As a result, they decided to start with Eastern Europe countries, both EU and non-EU ones such as Ukraine, Poland, Russia and Kazakhstan. With the intention of understanding the target markets' interest, the company started by testing some offers on B2B platforms and with trips in the foreign countries to have an idea of the fashion retail structure and demanded brands. With this approach, within one year after the start of the company around 77% of sales were already originated from foreign markets, mostly Eastern Europe.

### ***F&P Academy***

In 2016 the sales team was made of 3-4 people. The main market was still Ukraine and F&P had some strategic partners in Hungary, Bulgaria, Poland and Latvia. With the aim of growing, the company thought about a solution to reach new markets, but as a startup, funds were limited and mostly used to purchase the stocks. The idea that came out was "F&P Academy" which at that time was an internship program where international university students had the possibility to make an internship in Berlin, in the headquarter they received the training, and then worked as sales agents on commission from their home countries as a side job. In this way the company could have local people speaking local language which could walk through the cities and find shops, understand the market, sell the assortment, and create meaningful connections between retailers and F&P. If the company identified any potential, a sales manager for the country was hired. Sales managers could overcome the language barrier, considering that not all the clients could speak English or German.

In 2017 the success of the Academy in creating contacts was visible; however, the company perceived that local sales agents were performing better from the headquarter. One reason explaining this problem was connected to the fact that the firm, as a startup, was very sales/revenue oriented, while processes and structures were still not developed enough to ensure that local agents could work remotely. One strong evidence of this is the increase of sales in Bulgarian market after the local sales agent moved to the headquarter: in 2017 sales to Bulgaria were 5% of total sales, while now they represent almost one-third of total revenue. With B2B platforms barriers and problems were basically zero, while with academy the main difficulty was to find reliable, skilled, and talented people.

### ***Online marketing***

Besides B2B platforms and sales agents, F&P also began to reach new potential clients through social networks such as Facebook, LinkedIn, and later also Instagram. In 2019 F&P dedicated one person exclusively for marketing activities such as paid advertising on Facebook. Until then, all market research was performed by salespeople, the company had a website where clients could register and one Facebook page mainly for general information and employer branding.

Once the company started this online B2B marketing project, the main difficulty was to target the right people and understand how to advertise in the right way. The firm created one Facebook page dedicated to advertising and began with advertisement in German and English. After a couple of tests and adaptations in pictures and texts, the company started getting many leads. At the beginning they were not reaching the right people and there were problems in converting visits to registrations. Once F&P found the right target groups, interested leads started registering in the website. Paid advertising was then made in different languages and, thanks to the translations and rephrasing from sales managers, the language barriers were easily overcome. With a minimum investment F&P can reach new registrations every day. But this requires many trials and research to understand how to address the right people.

An additional step to generate new leads and catch new opportunities comes from SEO (Search Engine Optimization), whose aim is to optimize the content of information in the website to increase the visibility on search engines (mainly Google and Yandex for Russia) and increase organic visits. In the last year, the company created a corporate design and redesigned the website. In this situation the biggest difficulty of the project was to find the right keywords and create the content for the website including these keywords. Moreover, the quantities of translations for this project were higher than simple Facebook Ads. In terms of results, SEO

works better than Facebook. With Facebook, the number of registrations is high, but it is harder to convert them into paying clients, while through SEO the company is reached by highly interested clients. In terms of revenues generated by these two channels, 75% is coming from SEO (organic) and 25% from Facebook (paid) leads.

F&P online marketing activities are performing very well in customer acquisition. The company is thinking about paid Google Ads to improve the quality of the leads and about future developments in the use of Instagram, where many new potential clients are opening online shops. Marketing activities should also be focused in reaching out existing customers. Newsletters with offers are already sent to clients with good results, but there is still the possibility to improve.

### **4.3.2. Internationalization**

#### ***Internationalization strategy***

The strategic approach on sales side to internationalize is first to identify potential markets for existing products. Potential markets are identified:

- from market intelligence activities, also looking at competitors and wholesalers’;
- from warm leads, generated from B2B platforms, SEO, social media;
- from cold leads, for contacts found through market research.

When the company receives leads from new markets and there is no sales manager speaking the local language, sales are conducted in English, even though not all clients and markets can speak it fluently. According to the Head of Sales, when deals can be closed easily even in the presence of language barriers, then this might be a signal that more deals could occur with a native speaker sales manager, assuming that this person will be able to overcome these barriers and create even more connections. When markets show this kind of potential a sales manager is hired. With this approach, the firm can first test the new market and then, if it is worth, investing in human resources.

#### ***Restrainers***

The main limits that the company is facing in foreign country expansion are connected to the lack of data about target markets which make it hard to identify the companies and have a preview of the results. Some developing countries are not digitalized, do not use social media for professional purposes or do not even do Google research. This situation is changing and there is an overall improvement in the digitalization on the potential customers’ side.

### ***Internationalization experience***

What the company has learned so far, is that every market is different in terms of culture, retail structure, needs, and regulations. One copy-paste approach is not feasible because every market requires specific learning. However, there are some best practices that the company developed for international expansion. One consists in the way new leads are generated, the other is regarding basic behavioral rules. For a salesperson knowing the product, being polite, nice, and empathetic permit to overcome any cultural barrier. After this, it is up to every sales manager to understand what the best approach for his/her own market is, and this comes with the experience.

#### **4.3.3. Digital transformation**

As stated by one of the founders who took part to the interview, F&P people are young digital natives. The firm does not have a defined digital transformation strategy, but every department is focused on digital renewal. Digital tools and software are seen as a major factor of success of the company.

### ***Customer experience***

Looking at the external side, digital transformation is supporting sales managers in customer acquisition, and through a savior use of online marketing activities the costs of customer acquisition have dropped. Even the simple activity of phone calls has become cheaper through WhatsApp and Skype, ensuring real-time communication at almost zero cost. In the past, 80-90% of the customers were visiting the warehouse while now, thanks to these digital tools, most of sales are performed via video-calls and pictures. The availability of pictures and videos bridges the gap between customers and sellers in a market where the lack of information is very common. Still, for some clients it is necessary to have a first visit, or they might need guidance to understand some offers, but nowadays F&P is most of the times selling digitally.

### ***Operational process***

From the internal side, digital transformation had a strong impact on the whole company. All information regarding customers are gathered in a CRM that permits to collect data in an organized and univocal way. These data are at disposition for forecasting and planning future developments of the company. All the departments are connected through a project management software which permits to track the status of every deal. Even hiring now most of the time is performed digitally. Many interviews are conducted via online meetings and



Academy is recruited also via AIESEC, that connects the company with a global network of talented students that can potentially open F&P to new unexplored markets. In general, the firm is trying to move away from the “pen and paper logic” to a more digitalized one.

One of the biggest digital transformation changes on the internal side is the development and implementation of WCS, a software which is going to be the backbone of all processes in F&P. Keeping the warehouse as the central element, WCS will connect all the teams including purchasing, accounting and sales/merchandise, becoming an end-to-end system digitalizing all the processes of the firm. At the very first steps, this system will permit to track all movements in the warehouse and pallets will be equipped with smart tags that allow to get information about the content of every box. The main difficulties faced in this internal transformation are connected to the fact that there were no solutions in the market which could fit all the needs of the company. For this reason, WCS has been developed internally with the support of a third-party team. As all transformations, some obstacles to adoption have emerged. The company can rely on young and tech-savior personnel; however, adaptation to new systems requires time and these new applications have to be explained to users.

### ***Business model***

Regarding the digital transformation of the surrounding environment, F&P is connected to the dynamics of the fashion industry. The whole industry has been shifting to online sales, affecting the offline retail, which is the focus of F&P business model. In the early years of the company, online sales were a strict restriction from suppliers, while now the dynamics of the market have changed and in 2019 one of the biggest clients was an online shop. The company is already shifting towards online and online retailers and is getting ready for the transformations in the fashion industry.

#### **4.3.4. Future expansion**

F&P aims to expand by becoming stronger in the markets where the company is already present and by identifying new markets, still following the criteria of brand awareness and possibility to pay. For example, one interesting country identified by F&P is Nigeria, where middle-class is raising and demanding branded and higher-quality products.

The company does not perceive any difficulty in expanding in the European Union countries, while for ex-EU there are some limitations to international development that are beyond the control of the company such as import/export regulations or political factors. On the other side,

logistics does not represent a big problem anymore and F&P and payment possibilities, which used to represent a big issue for some countries, are improving thanks to technology.

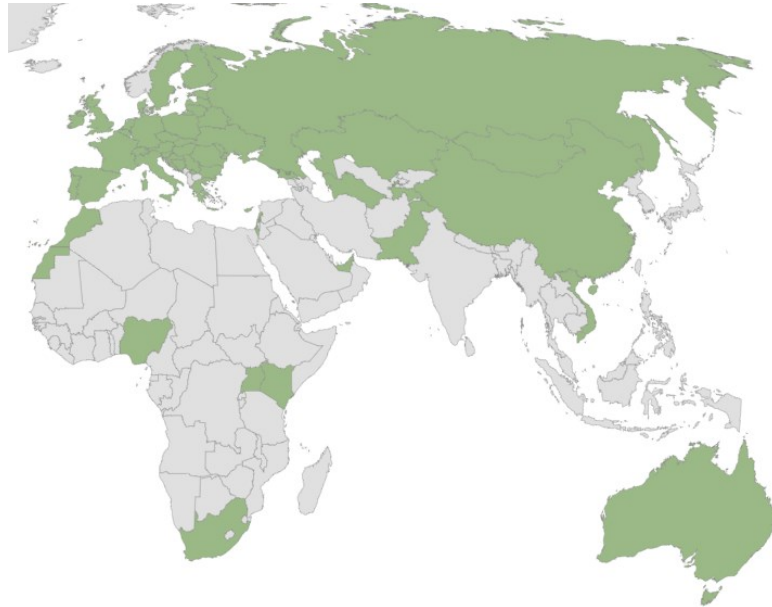
Until now, the firm has been able to match demand and supply, providing the right product to those that became the core markets of F&P. According to the Head of Sales, the fashion industry is so vast in terms of products, segments and retail structure, that there is always a potential client for the current offers. However, he is also aware that every market has specific requirements in terms of products, and it might be needed a product portfolio expansion in order to offer the right products for the right markets.

Looking at the changes deriving from digital transformation, the company expects to grow while remaining centralized in Berlin. In the past, approaching retailers directly was hard and companies, in order to open new markets, needed infrastructure and goods “on the ground”, while now this local presence is not necessary anymore. In any case, F&P does not exclude the creation of local warehouses which could work as B2B cash-and-carry for some markets, or a new experience in the B2C.

According to the directors, the more the clients will become digitalized, the more the company will succeed in replacing local presence with digital interaction. At this point, some business trips are still necessary to see what the digital has not revealed yet. Regarding the possibility to fully substitute sales managers with digital tools, the company recognizes the importance of people in decision making, complaint management and in generating trust. Substituting people with artificial intelligence is not in the plans of the firm, this scenario can only occur if also customers will replace their decision makers with AI.

#### 4.3.5. F&P internationalization in numbers

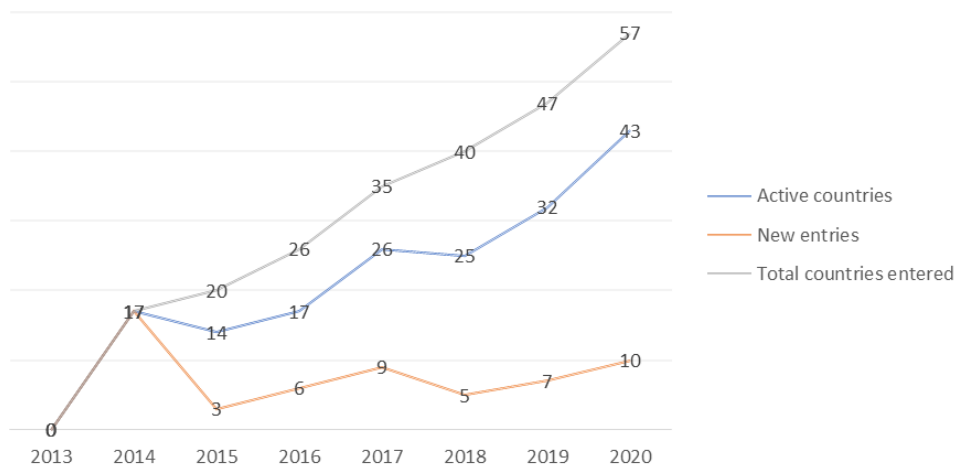
Looking at the data regarding F&P's international expansion it is visible that from the beginning the company can be considered as a born global firm, achieving 77% of sales from foreign market from the first year of inception and entering new markets every year. Until now, the company had sales in 57 different countries worldwide (Fig. 17).



**Figure 17: Total countries entered by F&P (October 2020).**

Source: elaboration by the author.

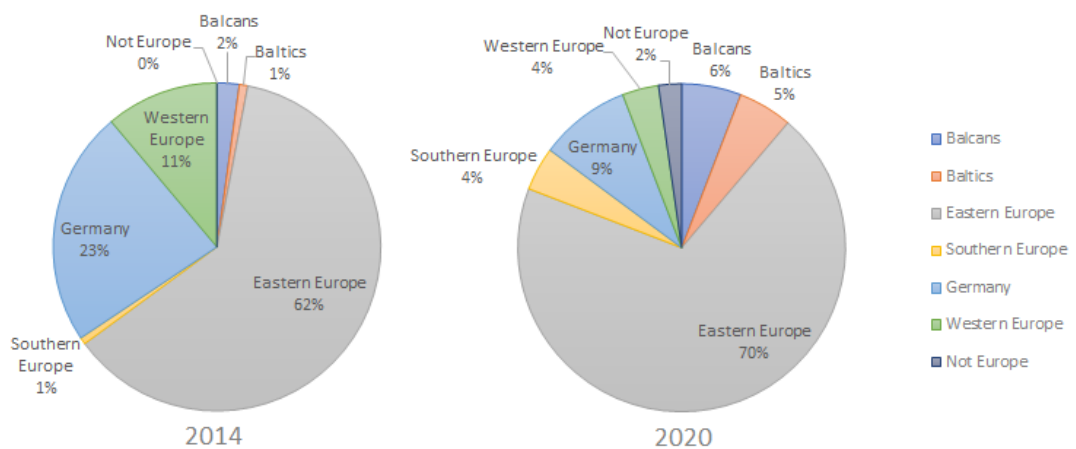
Most of sales are performed in Europe (both EU and non-EU countries) but the last data show small improvements in non-European countries (around 2% of total sales), reaching markets in the Middle East, Asia, Africa, and even Oceania. The necessity to find new markets is also connected to the current pandemics, which forced the company to reach out new potential clients in markets less affected by lockdowns. In fact, this year the company entered 10 new markets and new leads are coming from Tanzania, Singapore, South Korea and many other countries. Fig. 18 shows the total countries entered by the firm, together with information per year regarding the new entries and the total active countries. These data reflect not only the entry of new sales managers in charge of new markets, but also the results of SEO activities which generated new contacts globally.



**Figure 18: Market expansion of F&P from 2014 to October 2020.**

Source: elaboration by the author.

Having a look at the distribution of the sales between countries over the years (Fig. 19), it is possible to see that in the initial phases, German market still represented a large portion of sales, while in the current year the percentage moved to 9%. Initially, the home country was in the top position, followed by Ukraine and Poland, while now it moved to the third position, after Bulgaria and Ukraine. New markets approached still represent a small portion of total sales, showing that after the first entry there are some difficulties in penetration. One possible reason is related to the fact that these new markets are not the core markets for F&P's products. Furthermore, some countries have been approached just recently, while Eastern European countries like Poland, Bulgaria, and Ukraine where from the beginning the main target of the company. In fact, as visible in the map illustrating the details about Europe (Fig. 20) most of the sales are oriented to the East of our continent.



**Figure 19: Percentage of sales per area in 2014 and 2020.**

Source: elaboration by the author.



**Figure 20: Export intensity in Europe (October 2020).**

Source: elaboration by the author.

#### **4.3.6. How digital transformation is supporting internationalization of F&P**

F&P Stock Solution represents a very interesting case study for the purposes of the present dissertation. Even though this firm is not located in Italy as the other examples presented, it can be easily related to the Italian firms for the dimension (SME), the traditional industry in which it operates, and for the main mode of internationalization which is export. F&P is manifesting many aspects emerged along the previous chapters and embodies the perfect example of digitally transformed international SMEs. Furthermore, the fact that the company achieved almost 80% of foreign sales within one year from inception also makes F&P an extraordinary case of born global.

Starting with the motives of foreign expansion, being international from the beginning was a mandatory requirement for the company in order to ensure a constant supply. Born global theory sustains that in the initial phases the companies are mostly born regional, approaching close markets. In the case of F&P, Eastern Europe represented a geographically close market but, especially for ex-EU countries, administrative – and also partially cultural – differences were higher than, for example, other adjacent Western European countries.

In order to overcome these distances, at the beginning the company used digital solutions (B2B platforms) to approach the new markets, but also business trips were necessary. This constraint is given by a lack of digitalization which is coming from customers' side. Now the situation is

improving, with markets and potential clients digitalizing day-by-day; however, this still represents one risk connected to the virtuality trap, because if the company relies only on the knowledge generated from online interaction, it might risk to generalize this knowledge without understanding the complexities of the foreign market. This problem is partially solved through the decision to hire sales managers with knowledge of the local market; nevertheless, without local presence what is not online is hardly visible to the eyes of the sales manager and of the company, especially in terms of potential clients, products and prices. A market research based on online search can reduce the possibilities of success if clients do not have online presence. Many retail stores and smaller shops nowadays have a Facebook or Instagram page, which makes it easier to find and reach them, but wholesalers or other intermediaries tend to be more hidden and harder to detect. Also, in terms of products and prices, sales managers working distant from their markets might lose the perception of which products are demanded in the market and of the prices at which these products are sold. Online research cannot be always helpful, because overstock fashion is mostly offline-based, and information transparency online is low. In this situation, sales managers have to rely on their own knowledge, perception or assumptions, on their personal and professional connections, and on their mostly reliable customers.

The case of F&P confirms what expected. Goods and people flow will be gradually substituted with information flow. Nowadays F&P is performing most of the sales in a digital form. Furthermore, from the internal side, sales agents working in the foreign country did not have enough support from the operations point of view while now that operations are structured and digital, there is not the necessity of having local people in the market, because all activities are centralized in Berlin.

Looking at the digital transformation side, the technologies and solutions adopted are more into the direction of infrastructure/networking and digital customer access, with both internal and external focus. Nevertheless, the company itself perceived the need to rebalance its digital transformation, implementing new solutions on the operational processes side. The development and introduction of WCS was necessary to ensure an adequate structure to sustain the excellent results achieved on the customer experience side. First, this confirms the importance of balanced digital transformation; second, it demonstrates that digital transformation can be done also by firms with limited resources – F&P was initially a startup – and that if these limited resources are used wisely even SMEs can achieve great results. Moreover, as already emerged in the first part of the discussion (Section 4.2.12), when

evaluating the digital maturity of a firm it is necessary to utilize a model that takes into consideration the differences between industries and the consequent technology requirements.

Moving to the internationalization strategy aspects and the effects of digital transformation on it, it is highly visible how technology had a strong impact on the way F&P, but also firms in general, structure their internationalization steps. New markets are identified both actively through market intelligence, research, and B2B platforms and passively, thanks to the efforts in website's optimization and social media advertisement. Only when a market has potential, a sales manager is hired to try to convert this potential into results.

With this approach, time of first and subsequent entries is squeezed in the whole internationalization process. In the evaluation and preparation phase, market investigation is faster and does not require trips in the new market or the search of local intermediaries guaranteeing a fast entry in case of potential. In the development and growth step, digital tools permit a fast communication with clients and the possibility to reach new ones. Regarding scope, website and its optimization gives a global visibility which makes the firm potentially present worldwide. This permits to receive new leads also from unexpected countries and this would not have been possible without digital transformation.

A separate analysis is necessary for scale. Considering scale as commitment in the foreign markets, digital transformation permits to SMEs to access new markets without local commitment, as in the case of F&P. Nevertheless, some commitment in the home country is still necessary in order to achieve growth in these markets. In fact, talking about scale as percentage of foreign sales on total sales, digitalization is definitely supporting sales team in reducing the distance barriers and allowing low cost and easy communication with clients. Moreover, digital solutions are gradually substituting intermediaries, ensuring to internationalizers a better control on the market and the possibility to develop directly market knowledge via actual clients' feedbacks and contact or through further research. However, to increase foreign sales in the new market, companies have to commit in terms of people, time and financial resources. This is visible even in the data from F&P, considering that the growth in the whole Europe besides Germany are connected to investments in expanding the sales team, moving from 77% (2014) to 89% (2020) sales in all European countries except the home country. Overall, F&P case confirms that companies will be able to foster their international expansion by remaining centralized, or, as said in Chapter Three, digitally transformed companies can be "international from home". The results for F&P are summarized in Table 12.

**Table 12: Impact of digital transformation on internationalization of F&P and effect on time, scale, and scope before and after entry.**

Source: elaboration by the author.

		Internationalization stages	
		<i>Before entry</i>	<i>After entry</i>
<b>Digital transformation focus</b>	<b>External focus</b> B2B platforms Website/SEO Facebook Ads WhatsApp Skype Newsletter Payment methods	New opportunities emerge both passively and actively from website and SEO, social media advertising, B2B platforms, online market research	Pictures and videocalls via WhatsApp or Skype digitalize and facilitate sales. Newsletter permit to keep existing clients, social media Ads to reach new ones and information available online reduce need for intermediaries. New payment methods facilitate money transfer
	<b>Internal focus</b> CRM Project management software ERP Videocalls	Internal solutions are the backbone supporting the whole digital transformation. CRM systems permits to collect information about all clients, for forecasting and planning future developments. Project management software connects all the departments. Videocalls sustain hiring international people. The new self-developed ERP will integrate even more all the departments	
<b>Measures</b>	<b>Time</b>	Time for evaluation is reduced, opportunities emerge quickly, and evaluation is easier. No trips needed.	Communication with actual clients is faster, new clients can be reached more easily. The firm accumulates experience supporting pace of further expansion
	<b>Scale (commitment)</b>	Initial commitment is reduced. With small investments the company can approach and evaluate multiple markets	In order to develop in a market commitment is necessary, but it does not necessarily have to be in the foreign market anymore
	<b>Scale (foreign/total sales)</b>	No effect	Digital tools eliminate social distance, facilitate communication and exchange of information, supporting foreign sales
	<b>Scope</b>	Larger scope. Website gives global visibility and company can be reached or can approach multiple markets without any geographical limitation	Scope connected to resources (human, time, financial) committed to enter successfully multiple markets



#### 4.4. Discussion

Each of the case studies is showing one or more aspects considered in Chapter Three, meeting the author's expectation. Digital transformation is creating new business models, as for Filoblu, or digital products, as in the case of Texa, Baxi and Dab Pumps. Many firms are already international from the home country, like Caseificio Elda or Nesite even because, due to digital transformation, information flows are partially substituting goods and people's ones. Stevanato, one of the most ahead company in terms of digital transformation, also confirmed that the geography of the client is losing importance, in favor of a more customer-centric approach. In addition, digital transformation is supporting firms in information search and further learning, as it is happening for F&P, and can reduce more and more the need of local intermediaries.

Looking at the internationalization stages and based on what observed in the case studies, we can say that as a result of digital transformation, all three stages of internationalization are affected. In the first step, digital transformation makes new international opportunities arise and sustains the firm in gathering knowledge, facilitating the evaluation and preparation phase. Thereafter, digital transformation is creating new internationalization possibilities for SMEs that can now achieve important results without local presence, affecting the entry mode decision. Finally, digital transformation can sustain development and growth both in case of export and FDI due to a facilitated integration, coordination and knowledge development.

By measuring internationalization in terms of time, scale, and scope, the case studies showed that overall digital transformation plays an important role in accelerating the international expansion of firms, both for the first and subsequent entries.

*Proposition 1:* Digital transformation reduces the *time* of international expansion.

Second, digital transformation permits firms to reach multiple markets with smaller investments in the foreign country, meaning that companies can exploit digital solutions to enlarge their scope with lower scale, in terms of commitment.

*Proposition 2:* Digital transformation allows SMEs to internationalize without initial foreign market *commitment*.

*Proposition 3:* Digital transformation increases the *scope* of SMEs international activities.

Finally, considering commitment as foreign sales on total sales, the cases confirm that digital transformation is supporting international sales both for exporters and companies with foreign

branches, because digitalization enables digital sales and facilitates internal and external communication, integration, and learning.

*Proposition 4: Digital transformation sustains foreign sales.*

Considering these aspects from a different perspective, the observation of the case studies has confirmed what proposed in Fig. 16 (Section 3.3), showing that digital transformation is affecting internationalization by reducing the uncertainty and commitment connected to the new market. Therefore, we can also state the last following proposition:

*Proposition 5: Digital transformation reduces the foreign market uncertainty and commitment, and, as consequence, the risks associated to internationalization of SMEs.*

It is important that companies guarantee a balanced digital transformation in order to take maximum advantage from the transformation. Firms with excessive external focus might not be able to provide an adequate structure, on the other side, firms that digitally transform exclusively with internal focus might miss opportunities from the outside. However, having a balanced approach does not necessarily mean that the firms have to adopt all the latest technologies. It is true that each technology and application can differently affect every step of foreign expansion, as shown in Table 7 (Section 3.3), but this does not mean that a firm can be digitally mature only if it adopts all the newest technologies. Firms should wisely understand which technologies are fundamental for their internationalization and prioritize their implementation.

The virtuality trap still represents a limit to the possibility of firms to be international from home and in fact case studies show that all the bigger firms in the sample have foreign operations, and even born digital firms as Filoblu have commercial offices worldwide. Differently from what expected, this result shows that, in order to overcome distance, companies still feel the need to invest in the foreign country to have a local presence. However, due to digital transformation, this investment can come in a second phase, when the company already has detected the potential of the market. In this way, the risks faced by the firm are reduced.

#### **4.5. Conclusions: impact of digital transformation on internationalization of SMEs**

The purpose of this research was to understand if and how digital transformation is affecting the internationalization of SMEs. Through an accurate literature review and the analysis of the case studies, it is possible to say that digital transformation impacts the internationalization of SMEs on multiple sides. Different technologies affect internationalization in every single step,

from the preparation to the penetration of the market, with overall impact on time, sales and scope on internationalization.

Literature review and case studies considered not only SMEs but also large firms, assuming that it would be helpful to include large firms to provide an example and create a comparison. As mentioned along the present work, differently from large firms, in internationalization SMEs do not only suffer of the liability of foreignness, but also of the liability of smallness. SMEs can have constraints in terms of resources, not only financial but also human. This can represent an obstacle both to digitally transform and to internationalize. Nevertheless, firms that invest in digital transformation can overcome this liability and sustain international sales.

The main change brought by the recent technologies is that now companies can be digital and international without excessive investments. As discussed, SMEs do not need to develop their own e-commerce or to collect and process Big Data, but they can take advantage of these tools. For example, they can rely on digital platforms or advertise on social media which are already processing these large amounts of data. Digital transformation is offering many possibilities to SMEs to reach new customers worldwide. Moreover, manufacturing SMEs do not need large investments thanks to the advances in automation. Automation and 3D printing are allowing customization also for smaller batches and firms can decide more freely where to locate their production. Even in the case they decide to open a foreign plant, smart manufacturing permits to control remotely and allows predictive maintenance.

Besides the changes in the overall environment, the new trends in products and services digitalization and business models emerging, one very important direct effect of digital transformation on internationalization which is supporting in particular SMEs is that digital transformation permits to firms to gather opportunities from the whole world and then, according to the interests, potential and constraints, SMEs have the option to gradually adjust the level of their commitment.

#### **4.6. Theoretical implications, limitations, and further research**

The impact of digital transformation on internationalization is getting attention between scholars. However, most of the current literature has been focusing on specific technologies (mostly Industry 4.0), particular types of firms (mainly high-tech ones) or on one unique measurement of internationalization (for example time). The contribution of this research to the literature stays in the fact that the two topics have been connected analyzing how each element of the technology radar is impacting every single step of internationalization, with consequences in time, scale, and scope. In order to create this framework, a deep review of both

topics has been fundamental, permitting to find the appropriate models to explain and analyze digital transformation in function of internationalization and some connections between these two blocks.

One limitation of the present research is in the companies chosen for the case studies. All the companies interviewed are from the same Italian region and except for one, none of them is in B2C. It could be interesting to investigate more in this topic, to understand if SMEs in B2C are facing similar consequences from digital transformation or if there are additional aspects that have not emerged in the analysis of B2C. However, the main limitation stays in the lack of quantitative data to confirm these results. Quantitative data have not been used because of the absence of secondary data that could fit the needs of this research and the difficulties in collecting primary quantitative data. This difficulty comes from the fact that, in order to have usable information, a large amount of data would have to be entered by companies in a potential survey, also because every company has its own very specific internationalization mode and these specificities have to be taken into consideration for an accurate and meaningful analysis. Nevertheless, further research might concentrate on collecting quantitative data to verify the hypotheses emerged along the chapters, following the framework created by the present research and the propositions presented in in Section 4.4.



## References

- Accenture. (2016). *Demystifying digitalization: how Germany's Top 500 overcome digital hurdles*.
- Accenture. (2017). *Accunter Turkey Digitalization Index*.
- Aharoni, Y. (1966). *The foreign investment decision process* (Vol. 403). Boston: Division of Research, Graduate School of Business Administration, Harvard University.
- Ahi, A., Baronchelli, G., Kuivalainen, O., & Piantoni, M. (2017). International market entry: how do small and Medium-Sized enterprises make decisions?. *Journal of International Marketing*, 25(1), 1-21.
- Ahmed, Z. U., Mohamad, O., Tan, B., & Johnson, J. P. (2002). International risk perceptions and mode of entry: A case study of Malaysian multinational firms. *Journal of Business Research*, 55(10), pp. 805–813.
- Akter, S., & Wamba, S. F. (2016). Big data analytics in E-commerce: a systematic review and agenda for future research. *Electronic Markets*, 26(2), 173-194.
- Albach, H., Meffert, H., Pinkwart, A., & Reichwald, R. (2015). *Management of permanent change*. Springer Fachmedien Wiesbaden.
- Alexander, M., & Korine, H. (2008). When you shouldn't go global. *Harvard Business Review*, 86(12), pp. 70-77.
- Altomonte, C., Aquilante, T., Békés, G., & Ottaviano, G. I. (2013). Internationalization and innovation of firms: evidence and policy. *Economic policy*, 28(76), 663-700.
- Ambos, T. C. & Ambos, B. (2009). The impact of distance on knowledge transfer effectiveness in multinational corporations. *Journal of International Management*, 15(1), pp. 1–14.
- Ancarani, A., & Di Mauro, C. (2018). Reshoring and Industry 4.0: How Often Do They Go Together?. *IEEE Engineering Management Review*, 46(2), pp. 87-96.
- Anderson, E. & Gatignon, H. (1986). Modes of entry: a transaction cost analysis and propositions. *Journal of International Business Studies*, 17(3), pp. 1-26.
- Arnone, L., & Deprince, E. (2016). Small firms' internationalization: Reducing the psychic distance using social networks. *Global Journal of Business Research*, 10(1), 55-63.
- Aygoren, O., & Kadakal, C. A. (2018). A Novel Measurement of Speed in Early Internationalization of New Ventures. *International Journal of Marketing Studies*, 10(3), 1.
- Aymerich, F. M., Fenu, G., & Surcis, S. (2008). An approach to a cloud computing network. In *2008 First International Conference on the Applications of Digital Information and Web Technologies (ICADIWT)*, 113-118, IEEE.
- Balaji, M. S., & Roy, S. K. (2017). Value co-creation with Internet of things technology in the retail industry. *Journal of Marketing Management*, 33(1-2), 7-31.

- Bals, L., Kirchoff, J. F., & Foerstl, K. (2016). Exploring the reshoring and insourcing decision-making process: toward an agenda for future research. *Operations Management Research*, 9(3-4), 102-116.
- Baum, M., Schwens, C., & Kabst, R. (2015). A latent class analysis of small firms' internationalization patterns. *Journal of World Business*, 50(4), pp. 754-768.
- Berthon, P. R., Pitt, L. F., McCarthy, I., & Kates, S. M. (2007). When customers get clever: Managerial approaches to dealing with creative consumers. *Business Horizons*, 50(1), 39-47.
- Berthon, P. R., Pitt, L. F., Plangger, K., & Shapiro, D. (2012). Marketing meets Web 2.0, social media, and creative consumers: Implications for international marketing strategy. *Business horizons*, 55(3), 261-271.
- Bianchi, C., Glavas, C., & Mathews, S. (2017). SME international performance in Latin America: The role of entrepreneurial and technological capabilities. *Journal of Small Business and Enterprise Development*, 24(1), pp. 176-195.
- Bloomberg, J. (2018). Digitization, digitalization, and digital transformation: confuse them at your peril. *Forbes*.
- Boermans, M. A., & Roelfsema, H. (2016). Small firm internationalization, innovation, and growth. *International Economics and Economic Policy*, 13(2), 283-296.
- Bosch, V. (2016). Big data in market research: why more data does not automatically mean better information. *Marketing Intelligence Review*, 8(2), 56-63.
- Boter, H., & Holmquist, C. (1996). Industry characteristics and internationalization processes in small firms. *Journal of Business Venturing*, 11, pp. 471-487.
- Boué, C and S Schaible (2015). Die Digitale Transformation der Industrie. Studie: Roland Berger Strategy Consultants und Bundesverband der Deutschen Industrie eV, Berlin, 46, 78.
- Brennen, J. S., & Kreiss, D. (2016). Digitalization. In K. B. Jensen, E. W. Rothenbuhler, J. D. Pooley, & R. T. Craig, *The International Encyclopedia of Communication Theory and Philosophy*.
- Brouthers, L. E., & Nakos, G. (2005). The role of systematic international market selection on small firms' export performance. *Journal of Small Business Management*, 43(4), pp. 363-381.
- Cairncross, F. (2001). The death of distance 2.0: How the communications revolution will change our lives. Texere, London.
- Cardoza, G., & Fornes, G. (2011). The internationalisation of SMEs from China: The case of Ningxia Hui autonomous region. *Asia Pacific Journal of Management*, 28(4), 737-759.
- Casillas, J. C., & Acedo, F. J. (2013). Speed in the internationalization process of the firm. *International Journal of Management Reviews*, 15(1), pp. 15-29.
- Castleman, T., & Cavill, M. (2001). Voices of Experience: Developing Export Capability Through eCommerce in Australian SMEs. *BLED 2001 Proceedings*, 46.

- Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. *Journal of International Business Studies*, 46(1), 3-16.
- Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. *Journal of International Business Studies*, 46(1), pp. 3-16.
- Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS quarterly*, 1165-1188.
- Chen, Z. (2016). Research on the impact of 3D printing on the international supply chain. *Advances in Materials Science and Engineering*, 2016.
- Chiarvesio, M., & Romanello, R. (2018). Industry 4.0 technologies and internationalization: insights from Italian companies. *International Business in the Information and Digital Age*, pp. 357-378.
- Colombo, M. G., Croce, A., & Grilli, L. (2013). ICT services and small businesses' productivity gains: An analysis of the adoption of broadband Internet technology. *Information Economics and Policy*, 25(3), 171-189.
- Conner, B. P., Manogharan, G. P., Martof, A. N., Rodomsky, L. M., Rodomsky, C. M., Jordan, D. C., & Limperos, J. W. (2014). Making sense of 3-D printing: Creating a map of additive manufacturing products and services. *Additive Manufacturing*, 1, 64-76.
- Coviello, N. (2015). Re-thinking research on born globals. *Journal of International Business Studies*, 46(1), 17-26.
- Dam, N. A. K., Le Dinh, T., & Menvielle, W. (2019). A systematic literature review of big data adoption in internationalization. *Journal of Marketing Analytics*, 1-14.
- Damoah, K. A. (2017). Inward Foreign Direct Investments to Morocco: Competitiveness and Dynamics. IEMed. Mediterranean.
- Daszkiewicz, N., & Wach, K. (2014). Motives for going international and entry modes of family firms in Poland. *Journal of Intercultural Management*, 6(2), pp. 5-18.
- Davenport, T. H. (2006). Competing on analytics. *Harvard business review*, 84(1), 98.
- Davenport, T.H., Barth, P., & Bean, R. (2012). How big data is different. *MIT Sloan Management Review*, 54(1), 43-46.
- De Backer, K., Menon, C., Desnoyers-James, I., & Moussiégt, L. (2016). Reshoring: Myth or reality?., OECD Science, Technology and Industry Policy Papers, No. 27, OECD Publishing, Paris
- Dimitratos, P., Johnson, J. E., Plakoyiannaki, E., & Young, S. (2016). SME internationalization: How does the opportunity-based international entrepreneurial culture matter?. *International Business Review*, 25(6), pp. 1211-1222.



- Dimitratos, P., Johnson, J., Slow, J., & Young, S. (2003). Micromultinationals: New Types of Firms for the Global Competitive Landscape. *European Management Journal*, 21(2), pp. 164-174.
- Dimitratos, P., Petrou, A., Plakoyiannaki, E., & Johnson, J. E. (2011). Strategic decision-making processes in internationalization: Does national culture of the focal firm matter?. *Journal of World Business*, 46(2), pp. 194-204.
- Dominguez, N., & Mayrhofer, U. (2017). Internationalization stages of traditional SMEs: Increasing, decreasing and re-increasing commitment to foreign markets. *International Business Review*, 26(6), pp. 1051-1063.
- Dong-Hun, L. (2010). Growing popularity of social media and business strategy. *SERI Quarterly*, 3(4), 112-117.
- Downes, L., & Nunes, P. (2013). Big bang disruption. *Harvard business review*, pp. 44-56.
- Dutzl, H., Schmaus, B., Schrauf, S., Nitschke, A., & Hochrainer, P. (2016). Opportunities and challenges for consumer product and retailer companies. PWC report.
- Eduardsen, J., & Ivang, R. (2017). The Internet's Influence on Market Commitment, Uncertainty and Risk in the Internationalization Process of SMEs. In *Value Creation in International Business* (pp. 271-308). Palgrave Macmillan, Cham.
- Efrat, K., Gilboa, S., & Yonatan, M. (2017). When marketing and innovation interact: The case of born-global firms. *International Business Review*, 26(2), 380-390.
- Ehret, M., & Wirtz, J. (2017). Unlocking value from machines: business models and the industrial internet of things. *Journal of Marketing Management*, 33(1-2), 111-130.
- Eurofound (2012). *Born global: The potential of job creation in new international businesses*. Luxembourg: Publications Office of the European Union.
- Fan, S., Lau, R. Y., & Zhao, J. L. (2015). Demystifying big data analytics for business intelligence through the lens of marketing mix. *Big Data Research*, 2(1), 28-32.
- Fey, M. (2017). *3D printing and international security: risks and challenges of an emerging technology*. Report n. 144.
- Filippetti, A., Frenz, M., & Ietto-Gillies, G. (2011). Are innovation and internationalization related? An analysis of European countries. *Industry and Innovation*, 18(5), 437-459.
- Fodor, V. (2017). Does digitalization drive firms' internationalization?. University of Amsterdam.
- Fosso Wamba, S., Akter, S., Coltman, T., & WT Ngai, E. (2015). Guest editorial: information technology-enabled supply chain management. *Production Planning & Control*, 26(12), pp. 933-944.
- Furr, N., & Shiplov, A. (2019, July-August). Digital Doesn't Have to Be Disruptive. *Harvard Business Review*, pp. 94-103.

- Gabrielsson, M., Arenius, P., & Sasi, V. (2005). Rapid internationalization enabled by the Internet: The case of a knowledge intensive company, *Journal of International Entrepreneurship*, 3(4), 279-290.
- Geissbauer, R., Luebben, E., Schrauf, S., & Pillsbury, S. (2018). *How industry leaders build integrated operations ecosystems to deliver end-to-end customer solutions*. PWC Digital Champions Global Digital Operations Study 2018.
- Geissbauer, R., Wunderlin, J., & Lehr, J. (2017). *The future of spare parts is 3D. A look at the challenges and opportunities of 3D printing*. PWC
- George, G., Haas, M. R., & Pentland, A. (2014). Big data and management.
- Gillin, P. (2007). *The New Influencers. A Marketer's Guide to the New Social Media*. World Dancer Press, Sanger, California, CA.
- Green, H. (2015) Cognitive IoT: Making the internet of Things Deliver for All of Us.
- Gress, D. R., & Kalafsky, R. V. (2015). Geographies of production in 3D: Theoretical and research implications stemming from additive manufacturing. *Geoforum*, 60, 43-52.
- Hagen, B., Denicolai, S., & Zucchella, A. (2014). International entrepreneurship at the crossroads between innovation and internationalization. *Journal of International Entrepreneurship*, 12(2), 111-114.
- Hennart, J. F. (1982). *A Theory of Multinational Enterprise*. University of Michigan Press.
- Hessels, J., & Terjesen, S. (2008). SME choice of direct and indirect export modes: Resource dependency and institutional theory perspectives. *Zooetermer: SCALES*.
- Hilbert, M. (2016). Big data for development: A review of promises and challenges. *Development Policy Review*, 34(1), 135-174.
- Hill, C. (2008). *International business: Competing in the global market place*. *Strategic Direction*, 24(9).
- Hoffman, D. L., & Novak, T. P. (2015). Emergent experience and the connected consumer in the smart home assemblage and the internet of things.
- Hofmann, E., & Rutschmann, E. (2018). Big data analytics and demand forecasting in supply chains: a conceptual analysis. *The international journal of logistics management*.
- Houghton, K. A., & Winklhofer, H. (2004). The effect of website and e-commerce adoption on the relationship between SMEs and their export intermediaries. *International Small Business Journal*, 22(4), pp. 369-388.
- Hurwitz, J. S., Nugent, A., Halper, F., & Kaufman, M. (2013). *Big data for dummies*. John Wiley & Sons.
- Ibarra, D., Ganzarain, J., & Ignaci, J. (2018). Business model innovation through Industry 4.0: A review. *Procedia Manufacturing*, 22, pp. 4-10.
- Ignat, V. (2017). Digitalization and the global technology trends. *IOP Conf. Series: Materials Science and Engineering*, 227.

- Interroute. (2017). *The challenges facing European IT Decision Makers engaged in digital business transformation. A comparative survey of key IT decision makers across Europe.*
- Intezari, A., & Gressel, S. (2017). Information and reformation in KM systems: big data and strategic decision-making. *Journal of Knowledge Management.*
- ISTAT (2017). *A taxonomy of Italian firms' internationalization models.* ISTAT Experimental Statistic.
- ISTAT (2020). *Digitalizzazione e tecnologia nelle imprese italiane.* ISTAT Censimenti permanenti imprese.
- Jacobsen, O., and M. Van Vugt. 2017. The Role of Business Intelligence in the Internationalisation process of SMEs.
- Johanson, J., & Mattson, L. G. (1988). Internationalization in industrial systems: a network approach. *Strategies in global competition*, Neil Hood and Jan-Erik Vahlne, London.
- Johanson, J., & Vahlne, J. E. (1977). The internationalization process of the firm. a model of knowledge development and increasing foreign market commitments. *Journal of international business studies*, 8(1), pp. 23-32.
- Johanson, J., & Vahlne, J. E. (2009). The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership. *Journal of international business studies*, 40(9), pp. 1411-1431.
- Johanson, J., & Wiedersheim-Paul, F. (1975). The internationalization of the firm—four swedish cases. *Journal of management studies*, 12(3), pp. 305-323.
- Johnson, G., Scholes, K., Whittington, R., & Paci, A. (2014). *Strategia aziendale.* Pearson.
- Kalinic, I., & Forza, C. (2012). Rapid internationalization of traditional SMEs: Between gradualist models and born globals. *International Business Review*, 21(4), pp. 694-707.
- Kaplan, A., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53, 59-68.
- Karagozoglu, N., & Lindell, M. (1998). Internationalization of small and medium-sized technology-based firms: An exploratory study. *Journal of small business management*, 36(1), 44.
- Kietzmann, J. H., Hermkens, K., McCarthy, I. P., & Silvestre, B. S. (2011). Social media? Get serious! Understanding the functional building blocks of social media. *Business Horizons*, 54(3), 241-251.
- Kim, D., & Cavusgil, E. (2020). Antecedents and outcomes of digital platform risk for international new ventures' internationalization. *Journal of World Business*, 55(1), 101021.
- Kinkel, S. (2014). Future and impact of backshoring - Some conclusions from 15 years of research on German practices. *Journal of Purchasing and Supply Management*, 20(1), 63–65.

- Knight, G. A., & Cavusgil, S. T. (1996). Advances in International Marketing. The Born Global Firm: A Challenge to Traditional Internationalization Theory. 8, pp. 11-26.
- Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. *Journal of international business studies*, 35(2), pp. 124-141.
- Knight, G. A., & Cavusgil, S. T. (2005). A taxonomy of born-global firms. *MIR: Management International Review*, 15-35.
- Knight, G. A., & Liesch, P. W. (2002). Information internalization in internationalizing the firm. *Journal of Business Research*, 55(12), pp. 981-995.
- Knight, G. A., & Liesch, P. W. (2016). Internationalization: From incremental to born global. *Journal of World Business*, 51(1), 93-102.
- Kobrin, S. J. (1996). The architecture of globalization: State sovereignty in a networked global economy. *Governments, globalization, and international business*, pp. 146-171.
- Kostova, T., Marano, V., & Tallman, S. (2016). Headquarters–subsidiary relationships in MNCs: Fifty years of evolving research. *Journal of World Business*, 51(1), pp. 176-184.
- Krenz, A., Prettner, K., & Strulik, H. (2018). Robots, reshoring, and the lot of low-skilled workers. *Center for European Governance and Economic Development Research (CEGE)*, (351).
- Kuivalainen, O., Sundqvist, S., Saarenketo, S., McNaughton, R. B., Sinkovics, N., & Sinkovics, R. R. (2013). The internet as an alternative path to internationalization?. *International Marketing Review*.
- Kula, V., Tatoglu, K. (2003). An exploratory study of Internet adoption by SMEs in an emerging market economy. *European Business Review*, 15(5), 324-333.
- Kuo, H. C., & Li, Y. (2003). A dynamic decision model of SMEs' FDI. *Small Business Economics*, 20(3), pp. 219-231.
- Kyläheiko, K., Jantunen, A., Puumalainen, K., Saarenketo, S., & Tuppur, A. (2011). Innovation and internationalization as growth strategies: The role of technological capabilities and appropriability. *International Business Review*, 20(5), pp. 508-520.
- Laplume, A. O., Petersen, B., & Pearce, J. M. (2016). Global value chains from a 3D printing perspective. *Journal of International Business Studies*, 47, pp. 595-609.
- LaValle, S., Lesser, E., Schockley, R., Hopkins, M.S., & Kruschwitz, N. (2011). Big data, analytics and the path from insights to value. *MIT Sloan Management Review*, 52(2), 21-31.
- Lecerf, M. A. (2012). Internationalization and innovation: The effects of a strategy mix on the economic performance of French SMEs. *International Business Research*, 5(6), pp. 2-13.
- Lee, I., & Lee, K. (2015). The Internet of Things (IoT): Applications, investments, and challenges for enterprises. *Business Horizons*, 58(4), 431-440.
- Lee, J. (2015). Smart Factory Systems. *Informatik Spektrum*, 38(3), 230-235.

- Lee, Y. Y., Falahat, M., & Sia, B. K. (2019). Impact of Digitalization on the Speed of Internationalization. *International Business Research*, 12(4), 1-11.
- Li, B., & Li, Y. (2017). Internet of things drives supply chain innovation: A research framework. *International Journal of Organizational Innovation*, 9(3), 71-92.
- Lipsey, R. (1996). Globalization and national government policies: An economist's view: State sovereignty in a networked global economy. In J. Dunning (Ed), *Governments, globalization, and International Business*. Oxford: Oxford University Press
- Loane, S. (2005). The role of the internet in the internationalisation of small and medium sized companies. *Journal of International Entrepreneurship*, 3(4), 263-277.
- Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, 24(3), 149-157.
- Lopez, L., Kundu, S., & Ciravegna, L. 2009. Born global or born regional? Evidence from an exploratory study in the Costa Rican software industry. *Journal of International Business Studies*, 40(7), 1228–1238.
- Lu, J. W., & Beamish, P. W. (2006). Partnering strategies and performance of SMEs' international joint ventures. *Journal of Business Venturing*, 21(4), pp. 461-486.
- Lu, Y. (2017). Industry 4.0: A survey on technologies, applications and open research issues. *Journal of Industrial Information Integration*, 6, 1-10.
- Lund, S., Manyika, J., Woetzel, J., Bughin, J., Krishnan, M., Seong, J., & Muir, M. (2019). *Globalization in Transition: The Future of Trade and Value Chains*. McKinsey Global Institute.
- Majeed, A. A., & Rupasinghe, T. D. (2017). Internet of things (IoT) embedded future supply chains for industry 4.0: An assessment from an ERP-based fashion apparel and footwear industry. *International Journal of Supply Chain Management*, 6(1), 25-40.
- Manyika, J., Bughin, J., Lund, S., Nottebohm, O., Poulter, D., Jauch, S., & Ramaswamy, S. (2014). *Global flows in a digital age: How trade, finance, people, and data connect the world economy*. McKinsey Global Institute.
- Manyika, J., Lund, S., Bughin, J., Woetzel, J., Stamenov, K., & Dhingra, D. (2016). *Digital Globalization: The New Era of Global Flows*. McKinsey Global Institute.
- Marjani, M., Nasaruddin, F., Gani, A., Karim, A., Hashem, I. A. T., Siddiqa, A., & Yaqoob, I. (2017). Big IoT data analytics: architecture, opportunities, and open research challenges. *IEEE Access*, 5, 5247-5261.
- Masoni, R., Ferrise, F., Bordegoni, M., Gattullo, M., Uva, A. E., Fiorentino, M., ... & Di Donato, M. (2017). Supporting remote maintenance in industry 4.0 through augmented reality. *Procedia Manufacturing*, 11, 1296-1302.
- Mathews, J. A. (2006). Dragon multinationals: New players in 21 st century globalization. *Asia Pacific journal of management*, 23(1), 5-27.

- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, 57(5), pp. 339-343.
- Matt, D. T., Modrák, V., & Zsifkovits, H. (2020). Industry 4.0 for SMEs: Challenges, Opportunities and Requirements.
- McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. (2012). Big data: the management revolution. *Harvard business review*, 90(10), 60-68.
- Microsoft. (2016). *Digital transformation: the age of innocence, inertia or innovation?*
- Mittal, S., Khan, M. A., Romero, D., & Wuest, T. (2018). A critical review of smart manufacturing & Industry 4.0 maturity models: Implications for small and medium-sized enterprises (SMEs). *Journal of Manufacturing Systems*, 49, 194-214.
- Mohr, S., & Khan, O. (2015). 3D printing and supply chains of the future. In *Innovations and Strategies for Logistics and Supply Chains: Technologies, Business Models and Risk Management. Proceedings of the Hamburg International Conference of Logistics (HICL), Vol. 20* (pp. 147-174). Berlin: epubli GmbH.
- Moini, H., & Tesar, G. (2005). The Internet and Internationalization of Smaller Manufacturing Enterprises. *Journal of Global Marketing*, 18(3-4), pp. 79-84.
- Morgan-Thomas, A., & Jones, M. V. (2009). Post-entry internationalization dynamics: differences between SMEs in the development speed of their international sales. *International Small Business Journal*, 27(1), pp. 71-97.
- Muluk, T. (2017). Broadband for Digital Transformation. *TU Regional Workshop on "Organizational and Technical Aspects of Broadband access Development* (p. 1-20). Odessa: Intel ITU Telecom World.
- Musso, F. (2014): *Lo sviluppo dei mercati esteri*. Published in: Tunisini A., Pencarelli T., Ferrucci L. (eds) *Economia e management delle imprese*, Hoepli, Milano, pp. 392-411.
- Navarro-García, A., Peris-Oritz, M., & Barrera-Barrera, R. (2016). Market intelligence effect on perceived psychic distance, strategic behaviours and export performance in industrial SMEs. *Journal of business & industrial marketing*.
- Neubert, M. (2016). How and why born global firms differ in their speed of internationalisation-a multiple case study approach. *International Journal of Teaching and Case Studies*, 7(2), 118-134.
- Nguyen, B., & Simkin, L. (2017). The Internet of Things (IoT) and marketing: the state of play, future trends and the implications for marketing. *Journal of Marketing Management*, 33(1-2), 1-6.
- Nguyen, B., & Simkin, L. (2017). The Internet of Things (IoT) and marketing: the state of play, future trends and the implications for marketing.
- O'Connor, C., & Kelly, S. (2017). Facilitating knowledge management through filtered big data: SME competitiveness in an agri-food sector. *Journal of Knowledge Management*.

- OECD. (2017). *Enhancing the contributions of SMEs in a global and digitalized economy*. Paris: OECD Publishing.
- O'Grady, S., & Lane, H. W. (1996). The psychic distance paradox. *Journal of international business studies*, 27(2), 309-333.
- O'Leary, C., Rao, S., & Perry, C. (2004). Improving customer relationship management through database/Internet marketing: A theory-building action research project. *European journal of marketing*, 38(3/4), 338-354.
- Onetti, A., Zucchella, A., Jones, M. V., & McDougall-Covin, P. P. (2012). Internationalization, innovation and entrepreneurship: business models for new technology-based firms. *Journal of Management & Governance*, 16(3), 337-368.
- Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. *Journal of International Business Studies*, 25(1), pp. 45-64.
- Oviatt, B. M., & McDougall, P. P. (2005). Defining international entrepreneurship and modeling the speed of internationalization. *Entrepreneurship theory and practice*, 29(5), pp. 537-553.
- Paniagua, J., Korzynski, P., & Mas-Tur, A. (2017). Crossing borders with social media: Online social networks and FDI. *European Management Journal*, 35(3), 314-326.
- Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International journal of information systems and project management*, 5(1), pp. 63-77.
- Pauleen, D. J., & Wang, W. Y. (2017). Does big data mean big knowledge? KM perspectives on big data and analytics. *Journal of Knowledge Management*.
- Pearson, M., Gjendem, F. H., Kaltenbach, P., Schatteman, O., & Hanifan, G. (2014). Big Data Analytics in Supply Chain: Hype or Here to Stay. *Accenture: Munich, Germany*.
- Peng, M. W., & York, A. S. (2001). Behind intermediary performance in export trade: Transactions, agents, and resources. *Journal of International Business Studies*, 32(2), pp. 327-346.
- Poon, S., & Jevons, C. (1997). Internet-enabled International Marketing: A Small Business Network Perspective. *Journal of Marketing Management*, 13(1-3), pp. 29-41.
- Raymond, L., Bergeron, F., & Blili, S. (2005). The assimilation of e-business in manufacturing SMEs: determinants and effects on growth and internationalization. *Electronic Markets*, 15(2), pp. 106-118.
- Rehnberg, M., & Ponte, S. (2018). From smiling to smirking? 3D printing, upgrading and the restructuring of global value chains. *Global Networks*, 18(1), pp. 57-80.
- Rennung, F., Luminosu, C. T., & Draghici, A. (2016). Service provision in the framework of Industry 4.0. *Procedia-social and behavioral sciences*, 221, 372-377.

- Rezk, R., Srari, J. S., & Williamson, P. J. (2016). The impact of product attributes and emerging technologies on firms' international configuration. *Journal of International Business Studies*, 47(5), pp. 610-618.
- Rialp, J., Alarcon, C., & Rialp, A. (2014). Social media capability of exporting firms and its effects on performance. *Proceedings of the 43th Annual conference of the European Marketing Academy*, Valencia, EMAC.
- Rothaermel, F., (2017) *Strategic Management*. New York, NY: McGraw-Hill Education.
- Rüßmann, M., Lorenz, M., Gerbert, P., Waldner, M., Justus, J., Engel, P., & Harnisch, M. (2015). *Industry 4.0. The future of productivity and growth in manufacturing industries*. The Boston Consulting Group.
- Sashi, C.M. (2012). Customer engagement, buyer-seller relationships, and social media. *Management Decision*, 50(2), 253-272.
- Sathanathan, S., Hoetker, P., Gamrad, D., Katterbach, D., & Myrzik, J. (2017). Realizing digital transformation through a digital business model design process. *Internet of Things Business Models, Users, and Networks*, pp. 1-8.
- Schallmo, D. R., & Williams, C. A. (2018). History of digital transformation. In *Digital Transformation Now!* (pp. 3-8). Springer, Cham.
- Schmidt, R., Möhring, M., Härting, R.-C., Neumaier, P., Jozinović, P., & Reichstein, C. (2015). Industry 4.0 - Potentials for creating smart products: empirical research results. *International Conference on Business Information System* (pp. 16-27). Cham: Springer.
- Schwertner, K. (2017). Digital transformation of business. *Trakia Journal of Sciences*, 5(1), pp. 388-393.
- Servais, P., Koed Madsen, T., & Rasmussen, E. S. (2006). Small manufacturing firms' involvement in international e-business activities. In *International Marketing Research* (pp. 297-317). Emerald Group Publishing Limited.
- Sheikh, A. A., Shahzad, A., & Ishak, A. B. (2016). The mediating impact of e-marketing adoption on export performance of firms: a conceptual study. *Journal of Technology and Operations Management*, 11(1), pp. 48-58.
- Simchi-Levi, D., Peruvankal, J. P., Mulani, N., Read, B., & Ferreira, J. (2012). Is it time to rethink your manufacturing strategy?. *MIT Sloan Management Review*, 53(2), 20.
- Simon, H. A. (1959). Theories of decision-making in economics and behavioral science. *The American economic review*, 49(3), 253-283.
- Sinkovics, N., Sinkovics, R. R., & Bryan Jean, R. J. (2013). The internet as an alternative path to internationalization?. *International Marketing Review*, 30(2), 130-155.
- Sousa, C. M., Ruzo, E., & Losada, F. (2010). The key role of managers' values in exporting: Influence on customer responsiveness and export performance. *Journal of International Marketing*, 18(2), 1-19.



- Stolterman, E., & Fors, A. C. (2004). Information Technology and the Good Life. In B. Kaplan, D. P. Truex, D. Wastell, A. T. Wood-Harper, & J. DeGross, *Information Systems Research: Relevant Theory and Informed Practice*. London, UK: Kluwer Academic Publishers.
- Strange, R., & Zucchella, A. (2017). Industry 4.0, global value chains and international business. *Multinational Business Review*, 25(3), pp. 174-184.
- Sui, S., & Baum, M. (2014). Internationalization strategy, firm resources and the survival of SMEs in the export market. *Journal of International Business Studies*, 45(7), 821-841.
- Sullivan, D. (1994). Measuring the degree of internationalization of a firm. *Journal of international business studies*, 25(2), pp. 325-342.
- Tanev, S. (2012). Global from the start: The characteristics of born-global firms in the technology sector. *Technology Innovation Management Review*, 2(3).
- Tian, X. (2017). Big data and knowledge management: a case of déjà vu or back to the future?. *Journal of Knowledge Management*.
- Tiessen, J. H., Wright, R. W., & Turner, I. (2001). A model of e-commerce use by internationalizing SMEs. *Journal of International management*, 7(3), 211-233.
- Tirto T., Ossik Y., Omelyanenko V. (2020). ICT Support for Industry 4.0 Innovation Networks: Education and Technology Transfer Issues. In: Ivanov V. et al. (eds) *Advances in Design, Simulation and Manufacturing II. DSMIE 2019. Lecture Notes in Mechanical Engineering*. Springer, Cham.
- Tsimonis, G., & Dimitriadis, S. (2014). Brand strategies in social media. *Marketing Intelligence & Planning*.
- Tu, M. (2018). An exploratory study of Internet of Things (IoT) adoption intention in logistics and supply chain management. *The International Journal of Logistics Management*.
- Uden, L., & He, W. (2017). How the Internet of Things can help knowledge management: a case study from the automotive domain. *Journal of Knowledge Management*.
- Van Hoorn, T. P. (1979). Strategic planning in small and medium-sized companies. *Long range planning*, 12(2), pp. 84-91.
- Vermeulen, F., & Barkema, H. (2002). Pace, rhythm, and scope: Process dependence in building a profitable multinational corporation. *Strategic Management Journal*, 23(7), 637-653.
- Wamba, S. F., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2015). How 'big data' can make big impact: Findings from a systematic review and a longitudinal case study. *International Journal of Production Economics*, 165, 234-246.
- Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, 70, 356-365.

- Wamba, S. F., Gunasekaran, A., Papadopoulos, T., & Ngai, E. (2018). Big data analytics in logistics and supply chain management. *The International Journal of Logistics Management*.
- Wang, G., Gunasekaran, A., Ngai, E. W., & Papadopoulos, T. (2016). Big data analytics in logistics and supply chain management: Certain investigations for research and applications. *International Journal of Production Economics*, 176, 98-110.
- Wang, W. Y., Pauleen, D. J., & Zhang, T. (2016). How social media applications affect B2B communication and improve business performance in SMEs. *Industrial Marketing Management*, 54, 4-14.
- Weinberg, B. D., Davis, L., & Berger, P. D. (2013). Perspectives on big data. *Journal of Marketing Analytics*, 1(4), 187-201.
- Welch, L.S. and Luostarinen, R. (1988). Internationalization: evolution of a concept. *Journal of General Management*, 14, pp. 44–60
- Westerman, G., Calm ejane, C., Bonnet, D., Ferraris, P., & McAfee, A. (2011). *Digital transformation: a roadmap for billion-dollar organization*. MIT Center for Digital Business and Capgemini Consulting.
- Woods, D. (2015). How Internet Of Things Data Improves Product Development.
- Xu, L. D., Xu, E. L., & Li, L. (2018). Industry 4.0: state of the art and future trends. *International Journal of Production Research*, 56(8), 2941-2962.
- Xu, Z., Frankwick, G. L., & Ramirez, E. (2016). Effects of big data analytics and traditional marketing analytics on new product success: A knowledge fusion perspective. *Journal of Business Research*, 69(5), 1562-1566.
- Yamin, M., & Sinkovics, R. R. (2006). Online internationalisation, psychic distance reduction and the virtuality trap. *International Business Review*, 15(4), 339-360.
- Yamin, M., & Sinkovics, R. R. (2007). ICT and MNE reorganisation: The paradox of control. *Critical perspectives on international business*, 3(4), pp. 322-336.
- Yi-Long, J., & Chen, C. (2006). The influence of the Internet in the internationalization of SMEs in Taiwan. *Human Systems Management*, 25(3), pp. 167-183.
- Yip, G. S., & Hult, T. (2003). *Total global strategy II: updated for the internet and service era*. Upper Saddle River, NJ: Prentice Hall.
- Zaheer, S. (1995). Overcoming the liability of foreignness. *Academy of Management journal*, 38(2), pp. 341-363.
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of management review*, 27(2), pp. 185-203.
- Zhang, J.J., Lichtenstein, Y., & Gander, J. (2015). *Designing Scalable Digital Business Models*, *Advances in Strategic Management*, 33, 241 - 277.

Zhao, H., & Hsu, C. (2007). Social ties and foreign market entry: An empirical inquiry. *Management International Review*, 47(6), 815-825.

## Websites

Baxi (2019). *International Baxi. About*. Retrieved October 22, 2020, from International Baxi: <https://international.baxi.it/about/>.

Bravo (s.d.). *Bravo. About us*. Retrieved October 22, 2020, from Bravo: <https://www.bravo.it/en/page/about/about-us/>.

Bromberger, J., & Kelly, R. (2017). *Additive manufacturing: A long-term game changer for manufacturers*. Retrieved November 25, 2019, from McKinsey & Company: <https://www.mckinsey.com/business-functions/operations/our-insights/additive-manufacturing-a-long-term-game-changer-for-manufacturers>.

Christensson, P. (2010). *ICT Definition*. Retrieved November 13, 2019, from <https://techterms.com/definition/ict>.

Columbus, L. (2014). *Making analytics accountable: 56% Of executives expect analytics to contribute to 10 % Or more growth in 2014*. Retrieved April 23, 2020, from Forbes: <https://www.forbes.com/sites/louiscolumbus/2014/12/10/making-analytics-accountable-56-of-executives-expect-analytics-to-contribute-to-10-or-more-growth-in-2014/>

Confindustria Veneto (2019). *Industria 4.0 Veneto. I 100 luoghi di Industria 4.0*. Retrieved May 12, 2020, from Confindustria Veneto: <http://100luoghi.industria40veneto.it/gate/contents/video?openform&id=DD93D9701205E916C125849E0039EAEF#mappa>

Cuofano, G. (s.d.). *Digital Business Model Map*. Retrieved June 17, 2020, from FourWeekMBA: <https://fourweekmba.com/digital-business-models/>

Dab Pumps (2020). *Dab Pumps Fast Fact*. Retrieved October 22, 2020, from Dab Pumps: <https://dabpumps.com/it/dabpumps>

Demaitre, E. (2018). *Remote surgery using robots advances with 5G tests in China*. Retrieved November 28, 2019, from The Robot Report: <https://www.therobotreport.com/remote-surgery-via-robots-advances-china-5g-tests/>

Elda Rictotteria (2020). *L'azienda*. Retrieved October 22, 2020, from Caseificio Elda: <https://www.eldaricotteria.it/azienda/>

Eurostat. (2016). *Statistics on small and medium-sized enterprises*. Retrieved November 03, 2020, from Eurostat Statistics Explained: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20191125-1>

Eurostat. (2018). *Statistics on small and medium-sized enterprises*. Retrieved May 27, 2019, from Eurostat Statistics Explained: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics\\_on\\_small\\_and\\_medium-sized\\_enterprises#General\\_overview](https://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_small_and_medium-sized_enterprises#General_overview)

- Fenwick, N. (2019). *2020: The Year Of Digital Products*. Retrieved June 17, 2020, from Forrester: <https://go.forrester.com/blogs/2020-the-year-of-digital-products/>
- Gartner. (2019). *Gartner IT Glossary - Digitalization*. Retrieved September 16, 2019, from Gartner: <https://www.gartner.com/it-glossary/digitalization/>
- Gestrin, M.V., & Staudt, J. (2018). *The digital economy, multinational enterprises and international investment policy*. Retrieved October 14, 2018, from OECD, Paris: <http://www.oecd.org/investment/investment-policy/The-digital-economy-multinational-enterprises-and-international-investment-policy.pdf>
- Hines, A. (2007). *Get Your International Business Terms Right*. Retrieved October 15, 2018, from CBS News: <https://www.cbsnews.com/news/get-your-international-business-terms-right/>
- IGI Global. (s.d.). *IT Definition*. Retrieved November 13, 2019, from <https://www.igi-global.com/dictionary/impacts-of-ewom-on-hotels-from-the-consumer-and-company-perspective/14539>
- i-SCOOP. (2018). *Digital transformation: online guide to digital business transformation*. Retrieved September 16, 2019, from i-Scoop: <https://www.i-scoop.eu/digital-transformation/>
- ISTAT & ICE. (2020). *Commercio estero e attività internazionali delle imprese*. Retrieved September 10, 2020, from Annuario ISTAT ICE: <http://www.annuarioistatice.it/index.html>
- Mitchell, D. (s.d.). *5 IoT applications retailers are using today*. Retrieved April 22, 2020, from SAS: [https://www.sas.com/en\\_us/insights/articles/big-data/five-iot-applications-retailers-are-using-today.html](https://www.sas.com/en_us/insights/articles/big-data/five-iot-applications-retailers-are-using-today.html)
- Nesite (s.d.). *Nesite company*. Retrieved October 22, 2020, from Nesite: <https://www.nesite.com/company/>
- New Media Age (2010). *Social media relationships take serious commitment*. Retrieved May 25, 2020, from EConsultancy”, available at: <http://econsultancy.com/gr/nma-archive/38406-social-media-relationships-take-seriouscommitment/>
- Newman, D. (2018). *Four Digital Transformation Trends Driving Industry 4.0*. Retrieved November 30, 2019, from Forbes: <https://www.forbes.com/sites/danielnewman/2018/06/12/four-digital-transformation-trends-driving-industry-4-0/#2f196b16604a>
- OED. (2010). *Oxford English Dictionary - Digitalization*. Retrieved September 16, 2019, from Oxford English Dictionary: <https://www.oed.com/view/Entry/242061?rskey=DS7GA2&result=2&isAdvanced=false#eid>
- OED. (2010). *Oxford English Dictionary - Digitization*. Retrieved September 16, 2019, from Oxford English Dictionary: <https://www.oed.com/view/Entry/240886?redirectedFrom=digitization#eid>

- Ono Logistics (s.d.). *Chi siamo*. Retrieved October 22, 2020, from Ono Logistics: <https://www.onologistics.com/chisiamo/>
- Pambianco News (2020). *FiloBlu cresce nel 2020, Ricavi a circa 51mln (+28%)*. Retrieved October 22, 2020, from Pambianco News: <https://www.pambianconews.com/2020/10/22/filoblu-cresce-nel-2020-ricavi-a-circa-51mln-28-302900/>
- Salerno, A. (2018). *Industria 4.0, al centro dell'innovazione c'è la customer experience*. Retrieved November 30, 2019, from Industry4Business: <https://www.industry4business.it/ricerche/industria-4-0-al-centro-dellinnovazione-ce-la-customer-experience/>
- Stadler, C., Mayer, M., & Hautz, J. (2015). *Few Companies Actually Succeed at Going Global*. Retrieved October 14, 2018, from Harvard Business Review: <https://hbr.org/2015/03/few-companies-actually-succeed-at-going-global>
- Stevanato (2019). *Stevanato Group in numeri*. Retrieved October 22, 2020, from Stevanato Group: <https://www.stevanatogroup.com/it/il-gruppo/sg-in-numeri/>
- Texa (2020). *Texa Company Profile*. Retrieved October 22, 2020, from Texa: [https://www.texa.it/upload/Files/Company\\_Profile\\_V8.pdf](https://www.texa.it/upload/Files/Company_Profile_V8.pdf)
- Transpack (2020). *Chi siamo*. Retrieved October 22, 2020, from Transpack Group: <https://transpack.group/corporate/>
- Vessels, J. (2012). *Want to go global in 2013? Beware the five reasons companies fail in international expansion*. Retrieved October 15, 2018, from Heureka Conference: <https://heureka-conference.com/international-expansion-fail/>