



**INTERNATIONAL NEW VENTURES IN THE DIGITAL AGE: THE
CASE OF A BIG DATA AND ANALYTICS PROVIDER**

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Abstract

In the international competition context, new opportunities for new venture internationalization arise in sectors related to Industry 4.0 digital technologies. However, little is known about these technologies so far. This aspect can pose challenges as well. In particular, when internationalization and digitalization merge, the dynamics can change. This aspect gives rise to a new area of research. To contribute to enrich the scarce research on these topics, we adopted a case study approach to investigate the internationalization process of a digital international new venture offering services related to big data and analytics. Preliminary findings highlight factors influencing the international growth process of this company, showing opportunities and challenges related to digitalization. Practical implications and future research directions are discussed.

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1. Introduction

As widely recognized by scholars and practitioners around the world, the Fourth Industrial Revolution is coming, as an evolution of the Third Industrial Revolution triggered by the advent of Internet and Information and Communication Technologies (ICTs) in the Seventies. Recently, Coviello, Kano and Liesch (2017) have stressed that digitalization, which expresses the technological context in which modern firms operate, should be now actively considered by mainstream theories, underlining the importance of this aspect at the macro-level (Coviello, Kano and Liesch, 2017). Indeed, since the spreading of internet, technology has increasingly become part of everyday routines of companies, permeating almost all their activities. Consequently, over the years, a growing attention has been devoted to the influence of ICTs on different activities of companies. In particular, several studies have shown that ICT advances are factors that facilitate the internationalization of new ventures (Knight and Cavusgil, 1996; Knight and Cavusgil, 2004; Cavusgil & Knight, 2015). Along this line, most of the studies on international new ventures (INVs), companies that establish international activities soon after their foundation, have analyzed firms operating in high-tech contexts (Rialp et al., 2005).

In this landscape, over the last decades, technological advances have progressed at an accelerated pace. Recently, this evolution has been related to the Industry 4.0 paradigm, with an increasing number of digital technologies evolving fast, interacting with each other and being implemented in different activities of the value chain (Chiarvesio and Romanello, 2018; Hannibal and Knight, 2018). Industry 4.0 digital technologies, though, differentiate themselves from past advances related to ICTs for their functionalities and potentialities. Industry 4.0 includes, among the others, e.g. Internet of Things, Big Data and Analytics (BDA), the Cloud – which can all interact with each other and hence enhance their potential impact. The radical acceleration due to the digital transformation has affected all-sized companies around the world. However, since these technologies are less known, they can pose challenges to small and young companies willing to doing business in related industries (Kleindienst and Ramsauer, 2015). As a counterpart, in a context where internationalization has increasingly become accessible to small and young companies also due to ICT advances, new opportunities related to digitalization activities and sectors can become more and more interesting at the international level. So far, few studies have explored the topic of digital companies in the International Entrepreneurship (IE) field of research, although recent efforts have emerged to summarize the extant research on internationalizing digital companies (Piqueras, 2019). In this framework, though, there is a lack of research on INVs operating in sectors related to the digitalization (Piqueras, 2019) and,

in particular, related to the emerging Industry 4.0 paradigm (Romanello & Chiarvesio, 2019). As ICTs have contributed to determine the internationalization of new ventures, we might expect some impacts of Industry 4.0 technologies on early internationalization as well (Hannibal, 2020). So far, there are few articles investigating the impact of digital technologies, such as e.g. the recent work of Hannibal (2020) addressing the potential impacts of additive manufacturing on early internationalization. Our research aims at contributing to enrich the scarce research on INVs operating in Industry 4.0 sectors, by seeking to understand the determinants characterizing the international growth process of INVs providing Big Data and Analytics (BDA) services.

To this purpose, we developed a case study research based on interviews with the founder-entrepreneur of a high tech SMEs located in Bozen (Italy) that provides BDA-services to both large and small companies. BDA represents one of the nine pillars of Industry 4.0 (Rusmann et al., 2015) and is considered one of the most powerful digital technologies of this digital era (La Valle et al., 2011). We analyzed the internationalization process of the INV by using the growth process framework proposed in prior studies (Gabrielsson et al., 2008; Romanello and Chiarvesio, 2017).

The analysis has highlighted some factors that influenced the internationalization of the INV. More interestingly, the analysis has shown that factors change during the growth of the firm. Responding to recent calls (Romanello and Chiarvesio, 2019), this study mainly contributes to IE literature by investigating INVs, companies that achieve early and rapid internationalization, in relation to the Fourth Industrial Revolution. Moreover, in line with a rising stream of studies on internationalizing digital companies (Piqueras, 2019), this study contributes to INV literature by adding an empirical evidence on digital INVs, a relevant topic in IE literature.

2. Theoretical Background

The internationalization process of INVs

The literature on early and rapid internationalization has its roots in the late Eighties (McDougall, 1989; Knight and Cavusgil, 1996; 2004; Oviatt and McDougall, 1994). In 1989, McDougall noted that among a group of new ventures, some companies distinguished themselves by showing an international orientation. Then, a following study has formally named International New Ventures (INVs) the firms that, soon after foundation, derive most of their competitive advantage by committing resources and selling outputs in foreign countries (Oviatt and McDougall, 1994). Moreover, differing from born global companies which are focused on exporting

activities, INVs coordinate multiple value chain activities across borders (Coviello, 2015; Zander et al., 2015). Scholars have generally highlighted INVs as successful companies because they are able to develop multiple activities of the value chain abroad while being in a start-up phase and launching new products/services. These companies stood up for their capability of overcoming simultaneously the risks related to new products' launch, new venture creation, and internationalization activities (Knight & Cavusgil, 2004).

Since the first published studies on INVs (McDougall, 1989; Oviatt and McDougall, 1994), the literature in this area has rapidly evolved over the years (Rialp et al., 2005; Garcia De Lillo et al., 2017). In this context, a relevant topic concerns the drivers of the internationalization process of INVs (Romanello and Chiarvesio, 2019). Past studies have shown that early internationalizing firms, such as BGs and INVs, tend to experience specific phases during their growth (Gabrielsson et al., 2008), and, more interestingly, that determinants can change according to the growth phase (Efrat & Shoham, 2012; Romanello & Chiarvesio, 2017). Nordman & Mélen (2008) have shown the importance of the pre-founding phase for early internationalizing firms, whereas Gabrielsson et al. (2008) have identified the existence of other two phases beyond this one, including the entry internationalization phase and the post-entry internationalization stage. During the entry phase, the company is founded and achieves early and rapid internationalization, while the post-entry phase concerns the international growth of the company on the long run (Gabrielsson et al., 2008). In addition, Romanello and Chiarvesio (2017) have identified the existence of an additional phase, called Turning Point, which lies between the entry and the post-entry phase and occurs around the 4-5th year of life of the company.

About the pre-founding phase, Nordman and Mélen (2008) have highlighted that different knowledge types possessed by the founders become relevant for the subsequent internationalization of ventures in the biotech industry, because during this stage companies develop a product embedding a global market potential.

During the entry internationalization phase, determinants have been identified at different levels: individual, organizational and environmental. Evers (2010) has underlined the importance of both environmental and individual characteristics for the creation of INVs, where the first ones push companies towards internationalization, but the founders' background and network ties facilitate the decision to internationalize. Evangelista (2005) has, instead, shown that this process of creation implies the interplay of founders, the environment, business processes, and the organization itself. For instance, in the manufacturing industry, evidence has shown the importance of entrepreneurial capabilities to achieve early internationalization (Karra et al., 2008), whereas other studies have underlined that

the first international opportunity discovery process determines the subsequent internationalization process (Di Gregorio et al., 2008; Chandra et al., 2012). Studies examining high-tech born globals have highlighted that environmental factors determine performance outcomes during the entry phase, whereas firm variables become fundamental to survive in the long run (Efrat & Shoham, 2012). According to past literature (Efrat and Shoham, 2012), during the fourth-fifth year of life, early internationalizing firms exit the entry-internationalization phase and enter the post-entry phase. During the transition from the entry to the post-entry phase, these companies face a “Turning Point”, during which the founders need to transfer their entrepreneurial capabilities to other employees and transform them into organizational knowledge (Romanello and Chiarvesio, 2017; Turcan, 2013). However, a general agreement has been achieved on the importance of firm resources and capabilities when firms enter post-entry growth phase, both in manufacturing and high-tech sectors, in order to survive in the long term (Efrat and Shoham, 2012; Hagen and Zucchella, 2014; Turcan and Juho, 2014; Johanson and Martin, 2015). For example, some studies have underlined the importance of firm strategy focused on the product super-premium positioning in order to survive and to, subsequently, finalize a successful exit strategy, such as being acquired by a huge multinational corporation (Coehlo et al., 2014). Another longitudinal study has highlighted that early internationalizing firms experience growth cycles where innovations affect the governance, strategy, organization, processes and products/services. The openness of the entrepreneurial/managerial team and an effective organizational learning process drive the long-term growth (Hagen and Zucchella, 2014).

Although past research has widely analyzed the topic of drivers and determinants of early and rapid internationalization (Rialp et al., 2005; Garcia De Lillo et al., 2017), the literature on this topic has not reached a consensus yet, since findings change according to the sample features and context of analysis (Romanello and Chiarvesio, 2019).

Big data and analytics in the fourth industrial revolution

As the Fourth Industrial Revolution era is beginning, the literature has called for studies investigating early internationalization among digital companies (Piqueras, 2019) and in relation to the under-investigated Industry 4.0 technologies (Romanello & Chiarvesio, 2019). In this context, one of the most impactful Industry 4.0 advances is represented by Big Data and Analytics (Russmann et al., 2015). BDA are techniques used to analyze data derived from multiple sources, and are considered a powerful technology that can be applied at different activities of the value chain, with strong impacts (Chiarvesio & Romanello, 2018; Veglio & Romanello, 2019).

Moreover, this technology can further interact with other digital technologies such as the Cloud and Internet of Things (IoT). In particular, Internet of Things (IoT) allows the inclusion of sensors in physical products and can be applied both in production processes and finished products (Ng and Wakenshaw, 2017). In this last case, it leads to the creation of Smart and Connected Products (SCPs), which include physical, smart, and connectivity components (Porter and Heppelmann, 2014), and can generate a huge amount of data related to, e.g., the location where products are used, people that are using them, or even how these products are used (Porter & Heppelmann, 2015). Through BDA, firms can learn about consumers' behavior during the utilization of the product, increasing their knowledge about customers' preferences and habits after sales (Veglio and Romanello, 2019; Ng and Wakenshaw, 2017). Another situation can concern, for example, production processes and logistic flows. When applied to these products, BDA techniques can become a fundamental asset in order to extrapolate strategic knowledge from raw data and improve productivity (Wamba, Gunasekaran, Akter, Ren, Dubey, and Childe, 2018). Overall, companies could even leverage these technologies for specific uses in order to increase their marginality, with positive returns in terms of overall international competitiveness (Veglio and Romanello, 2019; Wamba et al., 2018).

However, despite the general interest for BDA in management research, studies from an International Business perspective are rare (Sheng, Amankwah-Amoah, and Wang, 2018). Indeed, these techniques have huge potential impacts, but pose even challenges and problems to companies offering these services. There might be problems related to privacy security or lack of regulations defining the rules of the game in these sectors, or related to the use of these tools (Kleindienst and Ramsauer, 2015; Sommer, 2015). Another problem can be related to the general lack of knowledge and information on how these techniques can be used and with which benefits. These problematic aspects can become obstacles to the development of new businesses in this area and their internationalization abroad. For these reasons, it becomes important to analyze companies operating in these sectors and offering BDA services, even in relation to their internationalization process.

3. Research Methodology

Purpose and case selection

The purpose of this study is to investigate the internationalization process of an INV offering BDA services. To this purpose, we decided to analyze a single case study of INV (Eisenhardt, 1989). We selected a single

information-rich case because it was unique and revelatory (Eisenhardt and Graebner, 2007). We chose this firm because it is the most relevant internationalizing BDA provider in South Tirol. A single case study has the advantage to provide rich descriptions of the phenomenon object of study, and is particularly useful when empirical evidence lacks on a particular topic (Eisenhardt, 1989).

Established in 2012, TK is a company that responds to the features of INV as defined by Oviatt & McDougall (1994) since: 1) it has entered foreign markets within 3 years from the establishment, 2) it has opened subsidiaries abroad; 3) it has exported globally and with a Foreign Sales on Total Sales (FSTS) > 25% within three years from the foundation (Knight and Cavusgil, 2004; Coviello, 2015); 4) is still a new venture. According to the entrepreneurship literature, the threshold to distinguish new ventures from other companies is 6 years of life (Cabrol and Nlemvo, 2009). For all these reasons, TK can be considered a successful INV, which is particularly suitable for exploratory purposes (Eisenhardt, 1989).

Data collection and analysis

We collected data through in-depth interviews with the founder of the company in two different points of time: April and June 2019. Each interview lasted between 1 hour and 2 hours. In-depth interviews were fully recorded and transcribed, resulting in 25 pages of transcriptions. Interviews were based on semi-structured questionnaires. The first interview addressed the history of the company, from origins to the contemporary growth phase, whereas the second one explored in-depth the internationalization process of the firm by investigating how foreign clients and opportunities were found during the different growth phases. We also collected additional data from archival documents such as private documents and public ones, like national press and website, for triangulation purposes. Table 1 provides a brief case description.

Tab. 1: case description.

TK		
Features	Main activity	Internationalization
Location: Bozen Foundation Year: 2012 Employees: 10	Industry: Services Main activities: Big data and analytics services related to production, marketing and consumer behavior	Entry timing: Instant exporter First Foreign Sale: USA, 2012 Foreign countries: USA, Canada, UK, France, Spain, Germany FSTS: 90% Foreign Subsidiary: Germany

TK was founded in 2012 in Bozen and benefited from being hosted within a local accelerator. The company was founded by a group of entrepreneurs who had prior working and entrepreneurial experiences in the same sector. The main activities of the firm are related to BDA services in production, marketing and human resources for large and small clients. The firm is focused on the collection and analysis of data derived from sensors and cyber physical systems included in devices, which can collect localization data related to the people interacting with the objects or walking close to the devices. Clients typically belong to retail industry, but devices can be used to collect and analyze data for different purposes: from logistics and production processes improvements, to consumer activities monitoring.

The company is an instant exporter. The first foreign sale was carried on in the USA in 2012, the same year of the firm foundation. Then, TK entered multiple other foreign markets, including Canada, Spain, Germany, France. They entered Italy only after 5 years of activity and it still represents a marginal market in terms of turnover.

We analyzed the internationalization process of the INV by using the growth process framework proposed in prior studies (Gabrielsson et al., 2008; Romanello & Chiarvesio, 2017), which considers four different phases: the pre-founding phase, the entry-internationalization phase (from the establishment to the fourth year), the turning phase (about the fifth year of life) and the post-entry phase (after the sixth year of life).

4. Case Analysis

Pre-founding phase

TK was created by three founders, all of them already involved in the creation of a prior start-up. The first business created was a university spin-off, which is now a consulting company focused on European grants, and research and development activities in ICT industries. This business was founded in 2010 and counts 10 employees.

During this prior entrepreneurial experience, the three founders carried on a pilot project on BDA in the retail industry and had the idea of creating a new business focused on a new innovative service of BDA based on data collected through in-door localization devices and systems.

As regards backgrounds, one of the founders worked for 20 years for a multinational company operating in high-tech sectors and mainly focused on ICT consulting projects. In particular, he was in charge of managing huge ICT design and development projects with public administrations across Europe. For several years, then, he worked on localization systems related to mobile phones.

“For almost 20 years, I was in charge of international contract projects in a large multinational company operating in three sectors: postal automation, banking security and mobile telephony. In this last sector, I worked on a project aimed at developing the first systems of reserving taxis based on the localization of text messages. Through this experience, I developed my interest in localization systems, which evolved over time, offering always more opportunities. Thanks to technical skills and the sector knowledge gained through this experience, many years later, I conceived the idea of creating a venture offering BDA analytics based data collected through localization indoor devices and systems.”

(The founder)

Then, after this working experience, he applied for a European grant which allowed him to move to Japan and work for a leading high-tech multinational company in this industry for two years. After all this, he gained a strong industry experience, a strong technical knowledge, managerial capabilities related to the application and management of grants, contests and projects, and a strong international experience derived from his Japanese working experience. Moreover, he and the other founders had already created a successful high-tech start-up, which now has become a small company. All these elements were fundamental to create a successful start-up, but also to manage the rapid international development of the venture.

The founders leveraged their knowledge, reputation and networks to create a start-up mainly based on the supply of BDA services related to the inclusion of sensors and cyber physical systems in devices positioned inside locations, in order to create in-door localization services of big data collection and analysis. During their prior entrepreneurial experience, they had the idea of selling these services in the retail industry, targeting large scale retail distribution, but they had no strong direct experiences with these types of clients. Their past experiences were useful, though, to search funding and potential investors, overcoming the problems of finance that characterize so many start-ups in this phase.

Entry-internationalization phase

After the creation of the company in 2012, the founders decided to attend an important high-tech contest where they met a hardware provider from Finland. During this contest, they introduced their services to a Finnish hardware infrastructure provider and suddenly understood that their products could be complementary. After this meeting, the Finnish provider invited them to collaborate in a pilot project with an American client interested in including sensors inside its stores to monitor the coverage of salesforce of the different areas of the store. The project was successful, as the American client was able to identify the salesforce who was performing worse,

develop ad-hoc training strategies and change the localization of salesmen inside the store, with subsequent strong marginal improvements in terms of customer sales. After this collaboration, always in 2012, the Finnish provider became a tight supplier of the company with whom the company developed other joint-projects. This was the first international opportunity for the firm, which represented the first approach to internationalization.

“In 2012 our company attended an international contest, where I met the founder of a spin-off of a known multinational company. As I very well knew this sector, I had heard of the reputation of this start-up, which was famous as manufacturer of superior quality indoor localization systems. I suddenly understood our businesses could be complementary. They invited us to take part in a pilot project with an American owner of a chain of home décor and furniture stores. We developed this pilot project together, and, through this experience, we developed a tight relationship with them. Our collaboration has been mutually profitable over the years.”

(The founder)

This first foreign opportunity, which was reactive for TK, became a valuable source of new knowledge about the world of large retailers and the retail industry. Founders understood the global potential of their product and clearly identified North America as an interesting area for their business, for several reasons. First, large supermarket chains are well developed and open to innovation. In contrast, the founders declared that “in Italy, large retailers are absolutely resistant to change and innovation. They look at innovation suspiciously and ask us to develop expensive pilot projects, which can even last for years before we finalize the final contract” (the founder). The second reason, instead, relates to the fact that privacy issues in USA are limited, whereas in Italy and in Europe this aspect has to be carefully managed. In fact, when the firm decided to enter European markets, it became necessary to build specific foreign market knowledge related to these delicate aspects. For these reasons, the founders initially invested in the USA and other North American countries, like Canada.

After this successful first foreign sale, they developed the second international opportunity in Canada in 2016, which again happened serendipitously. They were contacted by a leading Canadian large retailer, which was looking for start-ups specifically specialized in localization devices and BDA services for an on-invitation contest. In the past, this MNC had had a deluding experience with an high-tech supplier who had not been able to successfully solve a problem related to customer-profiling. Hence, this company decided to launch a contest to find a new supplier. TK applied to the contest and won. They suddenly understood the importance of this opportunity because large supermarket chains generally require their suppliers to overcome a long certification process, whereas this contest

represented a chance to rapidly become a supplier skipping this process. The Canadian client had established a budget for the pilot project, so this second order allowed TK to build knowledge on retail industry, to improve their BDA services by developing a huge pilot project with a leading MNC, to become a long-term supplier of this large retailer and to build the foreign market knowledge related to Canada.

“We didn’t know the world of large scale distributors. To become their suppliers, we’ve learnt that a lot certifications and bank guarantees are generally required. Instead, it was possible to skip this process by winning contests for start-ups. This multinational company opened a contest and invited us to apply. They actually found us through web search. So, this was a serendipitous opportunity, but it actually opened a new market and sector.”

(The founder)

After this second international entry, the firm developed other opportunities in France, UK, Germany, Spain. The company leveraged past experiences abroad to identify new international opportunities through contests and fairs, while the founders kept on developing synergies with their main Finnish infrastructure supplier. This relationship always remained a source of new clients and new business opportunities. During this phase, the firm benefited from these profitable collaborations, which then turned into product/service improvements and new foreign market knowledge.

Turning point phase

The initial years led the firm to create a digital platform where free-trials of their services are available. In fact, the founders identified a potential problem in their business model related to the fact that new clients often require a pilot project, which – however – requires high fix costs (device positioning, time to collect data, infrastructures). To be able to answer requests, without being forced to invest in pilot projects or to require huge investments to potential clients, they improved their platform to develop economies of scale related to their main industry: retail.

Besides these technical solutions, they hired new workforce dedicated to sales and marketing activities because the firm was mainly focused on research and development activities during the first years of life and only the founders were committed to commercial activities. In particular, the firm hired a human resource specifically dedicated on managing communication and promoting, who is now searching for opportunities in the domestic market. In addition, the founders decided to open a commercial subsidiary in Germany, where an export manager is in charge of managing and coordinating sales activities for European markets, and partially, for the United

States. However, the relationships with the first clients – who are located in United States and Canada – are partially still in the hands of the founders. Now, the approach towards foreign markets has become more proactive and systemic, particularly in relation to new business opportunities abroad. In general, the founders are supervising the work of new employees to transfer the knowledge gained during their past entrepreneurial activities in this sector and the experience obtained during the first years of activity. Also, founders are particularly conscious of the importance of inter-organizational knowledge inside the company, especially due to the fact that BDA services are relatively new in the marketplace and not yet formally ruled. In this sense, offering this technology makes much more important to preserve the knowledge gained during the past operational years, because this becomes the real source of competitive advantage over competitors.

Moreover, some new Italian shareholders have entered the firm, bringing reputation, market knowledge and network ties. Thanks to these new entries, the firm has recently approached the development of the domestic market, in 2018. After five years of firm activity, the founders still underline that Italian clients require a completely different approach if compared to foreign customers, and Italy for this reason remains a country is less profitable in terms of sales.

“Our company was born global. We have recently approached the domestic market, just because our new shareholders have brought us new Italian clients. However, still it is required a different approach for them, compared with our Canadian and American clients. To this purpose, we hired an employee specifically focused on marketing and pre/post sales activities. This allows us to have a customer orientation, which is particularly needed in Italy to inform and train new customers.”

(The founder)

Table 2 summarizes the most influential variables emerged during the case analysis. As illustrated in the table below, the influence of variables change according to the growth phase.

Tab. 2: Brief description of the most influential variables emerged during the different growth phases of an INV.

Influential Variables	Description of Variables	Growth Phase
Individual	<i>Founders' backgrounds and knowledge: serial entrepreneurs, strong industry knowledge, strong technical product knowledge, strong international experiences and global mindset, networking capabilities</i>	Pre-founding, Entry-internationalization phase, and Turning point
Environmental	<i>Home country characteristics:</i> Italian clients closed to innovation and resistant to changes <i>Industry and host country characteristics:</i> Lack of regulations depending on the country	Entry internationalization phase

Firm	<p style="text-align: center;"><i>Research & Development investments:</i> Technical investments to improve or innovate the product/ services</p> <p style="text-align: center;"><i>Sales and marketing:</i> New salesforce to manage pre-sale and marketing activities, and post-sales</p> <p style="text-align: center;"><i>Knowledge sharing at the interorganizational level:</i> Team meetings and daily/ weekly collaborations to share knowledge among founders and employees</p>	Pre-founding and Turning point
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5. Discussion

The case of TK shows that influential factors change during the growth process of INVs, in line with prior evidence (Efrat & Shoham, 2012; Romanello & Chiarvesio, 2017). In fact, the international process of TK is not dissimilar to those of INVs operating in manufacturing and other high tech sectors. However, three main findings emerged from this research.

During the pre-founding phase, individual variables related to the background and the knowledge possessed by founders were fundamental to conceive a successful service on which develop a new business. Founders can be considered “serial entrepreneurs” (Karra et al., 2008), who leveraged their knowledge and capabilities related to their past working and entrepreneurial experiences to launch successful BDA services and identify potential contests and clients mainly focusing on the retail industry. Meanwhile, founders used their network and reputation to find financial supporters, an aspect that becomes fundamental at this stage to launch the company and progress its initial development. In particular, during this phase, the founders developed a clear orientation towards international markets due to the immaturity of the domestic market regarding the understanding of the potential of BDA. This highlights a clear influence of the environment in the decision of internationalization.

During the entry-stage, the founders leveraged their knowledge related to the industry and the contests to develop the first international opportunity in the United States, while the second opportunity arrived serendipitously. However, it is undoubtable that founders leveraged their industry, technical knowledge and managerial skills to exploit these opportunities and develop a profitable long-term relationship with the second client. In this phase, founders started building new foreign market knowledge and improving their industry knowledge. In general, the founders had a strong global mindset from the beginning and decided not to target the domestic market because Italian people tend to be resistant to change and innovation, while Anglo-Saxon countries are more used to start-up dynamics and interested into their potentialities. In fact, the founders actively looked for

international opportunities, concentrating most of the firm's resources on the technical side, while the international development depended on the ability of the founders who leveraged their industry knowledge (mostly derived from their previous international working and entrepreneurial experiences) at both national and international level. However, the early and rapid international development was possible thanks to the strong technical BDA skills of both founders.

In the entry-internationalization phase, almost all the resources were focused on internationalization activities and foreign market building. According to past literature (Efrat and Shoham, 2012; Romanello and Chiarvesio, 2017), TK has overcome the entry stage and is experiencing the turning point phase. After the fifth year, however, founders hired new employees and trained them to be able to manage the complexity of the business, which is derived both from the fact that technical skills and BDA knowledge are required, and that the company has strongly internationally developed during previous years. The founders are actively managing this transition process by supervising employees working activities and sharing knowledge at the inter-organizational level, in line with past evidence (Hagen and Zucchella, 2014).

Actually, the founders have adopted a group of measures aimed at improving their firm variables. In fact, the founders of the firm are providing incentives for developing the marketing and sales department through new hiring processes, highlighting a clear willingness to transfer to the new workforce the knowledge gained through the first years of activity. For instance, they have hired a new employee fully dedicated to sales and marketing activities. In addition, they have continuously invested in product improvements over the years, but these efforts mostly concentrated during the pre-founding and the turning point phases.

6. Conclusions

This research provides a first evidence of INV offering BDA services. Since Industry 4.0 technologies are relatively new, we analyzed the determinants of the international growth process of the firm. The case of TK, though, once again shows that factors influencing the internationalization of new ventures belong to the individual, environmental and firm levels, in line with prior evidence (Zucchella et al., 2007). Moreover, our analysis also confirms the importance of international opportunities development among early internationalizing firms (Chandra et al., 2012). In this sense, our research on the INV operating in Industry 4.0 sector is aligned with the broader literature on manufacturing and high tech INVs.

However, in our case, environmental variables strongly influenced the internationalization decision. Indeed, the success of a start-up company

depends on the possibility to place orders and grow up, overcoming the different growth phases. Unfortunately, home countries do not always represent the best environment to find opportunities for growth, such as in this case – where Italian customers were not enough responsive to innovative services five years ago. In this case, the founders' global mindset allowed them to recognize and develop the international opportunities, on which they based the future prospects of growth of the firm. In this sense, individual and environmental variables were both highly relevant during the initial phases of growth of the INV, while already during the turning point stage, firm variables became more necessary to survive. Although this is an initial evidence, our findings seem to be aligned with other studies on the determinants of the international growth process of INVs (Gabrielsson et al., 2008; Efrat and Shoham, 2012). Still, further research is needed to analyze more in-depth this aspect in larger and different samples. Moreover, comparisons among internationalizing and domestic new ventures may lead to different and interesting results.

Our work contributes to International Entrepreneurship literature, by providing an initial evidence on INVs operating in Industry 4.0 sectors and enriching the scarce research on this topic (e.g. Hannibal, 2020; Chiarvesio and Romanello, 2019). Also, this study offers some insights for future researches. Our results show, surprisingly, that the determinants of the internationalization process of BDA service INVs, which can be considered an internationalizing digital firm, are similar to the determinants identified in the past, both in manufacturing and high tech contexts. More interestingly, our study confirms that drivers change during the growth process of INV, even if the role of the founders and their individual knowledge and capabilities remain fundamental for the success of the firm along the three phases: pre-founding, entry-phase and turning point. In this sense, our research is aligned with past studies underlining the fundamental role of founders in the creation and growth process of INVs (Karra et al., 2008; Romanello and Chiarvesio, 2019). In fact, individual variables seem to remain the most influential along the whole growth process of the internationalizing digital firm. However, longitudinal future researches could detect whether influential variables change during the post-entry internationalization phase.

Limitations of this study relate to the fact that this is a single case study. Although we carried on methodological measures such as recording interviews and analyzing transcripts in different points of time, still we underline that results could never be generalized to other cases or population. We recognize as a limitation the fact that we interviewed just one informant of the firm, although, considering the firm size, we chose as informant one of the founders, who is the founder and has the overall view of the historical and international growth of the company. The aim of this study was ex-

ploratory in nature. Another aspect concerns the fact that this digital company is focused on BDA, but future researches could explore INVs adopting or developing other Industry 4.0 technologies, such as 3d printing or augmented reality. Future studies could identify other technologies that could be used to facilitate international activities, e.g. in the case of merger and acquisitions or to build new foreign market knowledge. Digital INVs related to Industry 4.0 could behave differently from other high-tech companies or maybe not. Still, research is needed to clarify this point.

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