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Resources and digital export: An RBV perspective on the role of digital technologies and capabilities in cross-border e-commerce

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# **Resources and digital export: An RBV perspective on the role of digital technologies and capabilities in cross-border e-commerce**

## **Abstract**

Building on the resource-based view (RBV) perspective of the firm and firms' competitive capabilities, this study examines the digital export drivers as means for firms to exploit opportunities brought about by digital technologies in their B2C digital marketing activities. By leveraging a unique dataset covering 102 Italy-based firms of different sizes (small, medium, and large), active in three different sectors (design and furniture, fashion, and food and beverage), this work examines the role of firm resources to support internationalization via digital channels. We find that: 1) SMEs do not suffer from a weaker propensity to engage with digital export despite resources constraints; 2) firms leveraging digital technologies are more likely to enhance their digital export, regardless of firm size; 3) digital capabilities are critical as firms employing an e-commerce manager have a higher propensity to undertake digital export than firms relying on a traditional export manager, regardless of firm size.

**Keywords:** digital transformation; digital export; cross-border e-commerce; digital export capabilities; internationalization; resource-based view; firms' capabilities.

## **1. Introduction**

Firms are currently facing increasing levels of uncertainty and complexity due to a fast-paced environment (Ghobadian et al., 2020; Hoisl, Gruber, & Conti, 2020) in which achieving and maintaining a sustained competitive advantage even over short periods of time is progressively more difficult (D'Aveni, Dagnino, & Smith, 2010; Lindskov, Sund, & Dreyer, 2021; Mahto, Ahluwalia, & Walsh, 2018).

One of the major challenges for firms today is to adapt to technological development and embrace the ongoing industrial revolution which has mainly a digital nature (Schwab, 2017). This is especially true for enterprises that were not born digital or global (Hennart, 2014; Wamba & Queiroz, 2020) and are willing to expand their global market share through internationalization. For these companies, digital transformation is a necessary cost-effective means of gaining international competitive advantage. One of the most effective strategies to pursue this goal is to engage in digital export, i.e., using e-commerce to access new international markets (Pergelova, Manolova, Simeonova-Ganeva, & Yordanova, 2019).

Relying on the resource-based view (RBV) theory (Barney, 1991, 2001; Grant, 1991), the strategic management literature has shown that firms can achieve a competitive advantage by means of tangible and intangible resources, which need to be recombined and coordinated through strategic capabilities (e.g., Amit & Schoemaker, 1993; McEvily and Zaheer, 1999) that can be dynamic (Peteraf, Di Stefano, & Verona, 2013; Teece & Pisano, 1994). However, so far literature at the intersection of strategic management and internationalization has not clarified to what extent firms' resources and capabilities contribute to develop a competitive advantage based on a digital export strategy. Indeed, current literature has prevalently described the benefits associated with digital exports (e.g., Martens, 2013; Pezderka & Sinkovics, 2011) and the related costs (e.g., Giuffrida, Mangiaracina, Perego, & Tumino, 2019; Sinkovics, Yamin, & Hossinger, 2007), but virtually no study has leveraged an RBV perspective and examined

how the quantity and quality of resources can make a difference for digital export. The international business literature, after an initial attempt to understand the implications of e-commerce for cross-border investments (see, for instance, de la Torre & Moxon, 2001 and Zaheer & Manrakhan, 2001), has started only lately to rekindle attention on digital export within the ongoing debate on the relationship between firms' internationalization and information and communication technologies (e.g., Alcacer, Cantwell, & Piscitello, 2016). Also, this literature has stressed the strategic role of resources by showing that, although e-commerce has created new international business opportunities, several firms (and SMEs in particular) still suffer from the lack of relevant resources that might challenge their ability to leverage digital export (Schu, Morschett, & Swoboda, 2016; Gregory, Ngo & Karavdic, 2016). In addition, a very recent research note by Tolstoy, Nordman, Hånell, and Özbek (2020) has offered some preliminary insights into the strategic role of capabilities – in addition to resources – in fostering the process of international e-commerce development, by adopting an international entrepreneurship perspective. Nevertheless, this study focuses on retail SMEs and does not provide any strong empirical evidence yet, which explains why the authors themselves open their article by highlighting the urgent need to investigate how firms (and SMEs in particular) can pursue new opportunities in a digital international business environment and conclude by inviting future researchers “to look into how the processes of e-commerce internationalization are conditioned by company-specific and market-specific circumstances” (Tolstoy et al., 2020, p. 11). The scant theoretical and empirical evidence on the antecedents of digital export is very surprising, as both scholarly research and industry reports indicate that firms' resources in the guise of technology, data, organizational capabilities (Davenport & Redman, 2020), skills (Gartner, 2020; Tolstoy et al., 2020), and other intangible and human resources (Verhoef et al., 2019) are of paramount importance to guide digital transformation in business (Deloitte, 2018).

In light of this knowledge gap, and building on the RBV theory of the firm (Barney, 1991; Peteraf, 1993) and on the notion of digital capabilities within digital transformation (Gurbaxani & Dunkle, 2019), the main objective of this study is to examine the effect of firms' resources (in terms of both quantity (i.e., the size of the firm) and quality (under the guise of digital technologies), and of firms' capabilities in the form of managerial skills) on their ability to set up a digital export strategy. Therefore, we address the following inter-related research questions: 1) To what extent do the quantity and quality of firm resources influence digital export? 2) What type of managerial capabilities play a role in digital export beyond resources? To reach this goal, we rely on a unique dataset covering 102 Italy-based firms of different size (small, medium, and large), active in three different sectors (design and furniture, fashion, and food and beverage). Our results provide a threefold contribution to the research stream aiming at extending the resource-based and capabilities approach to the study of export strategy (Dhanaraj & Beamish, 2003). First, we offer evidence that the amount (i.e., quantity) of firms' resources does not play a significant role in achieving internationalization through digital export. Second, we recognize that digital technologies (Rusmann et al., 2015) are key firm resources that make a significant difference in fostering a digital export strategy. Third, we shift our attention from traditional to digital capabilities and provide evidence that firms employing an e-commerce manager are more likely to enhance their digital export strategy than firms employing a traditional export manager.

The paper is organized as follows. In the next section a literature review is illustrated. The third section describes the data and methods. Section four portrays the major findings. The fifth section discusses the findings, elucidates the main theoretical contributions and practical implications, portrays the study's limitations, and explores paths for future research. The sixth and last section puts forward the concluding remarks.

## 2. Literature review

### 2.1 The resource-based view of the firm and firms' capabilities in the digital age

#### 2.1.1 Digital resources

Combining studies rooted in neo-classical economics (e.g., Ricardo, 1817), anti-trust theory (e.g., Demsetz, 1973), evolutionary economics (Nelson & Winter, 1982), and firm resource heterogeneity (Penrose, 1958; Rumelt, 1984; Wernerfelt, 1984), and positioning his work in structure-conduct-performance (SCP) work (Porter, 1980), Barney (1991) laid the foundations of the RBV theory of the firm at the beginning of the 1990s. The theory explains how firms' value and profit are generated based on firms' resources to be conceived as “all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (Barney, 1991, p. 101). More specifically, to be able to create value and profits, firms need to access resources that are a) *valuable* in that they are able either to neutralize threats or exploit opportunities; b) *rare* because a fraction of the current and prospective competitors can access them; c) *inimitable* or, more realistically, non-perfectly imitable by competitors; and d) *non-substitutable* in the sense that there cannot exist strategically equivalent substitutes that “are valuable but neither rare or imperfectly imitable” (Barney, 1991, p. 106).

Interestingly, in his original contribution on the RBV of the firm, Barney observed that “computers or other types of machines, are part of the physical technology of a firm and usually can be purchased across markets” (Barney, 1991, p. 114). He went on to comment that as machines can be purchased by any firm, they are not themselves a source of sustained competitive advantage. However, he further elaborates that when machines and information processing systems are deeply embedded into the formal and informal decision-making process, they might be considered a potential source for sustained competitive advantage.

This is particularly true in today's fast-paced and hyper-competitive global business environment (D'Aveni, 1994, 2010), where firms willing to internationalize have to face mounting levels of uncertainty and complexity and must be fast and responsive in their decision-making process. As such, digital technologies brought about by the ongoing fourth industrial revolution (Rusmann et al., 2015) – also known as Industry 4.0 – are becoming increasingly critical resources for firms to achieve, maintain, and develop a sustained competitive advantage vis-à-vis their competitors (Porter, 1980, 1985) in both manufacturing (Kagermann et al., 2013) and service industries (Mariani & Borghi, 2019) within an international competitive arena. While internet, wireless communication, and mobile technologies are rather common for most of the firms willing to internationalize (Pezderka & Sinkovics, 2011), the role of other technologies has been less explored. For instance, extant literature has widely discussed the role of big data and analytics to create value (Davenport, 2017; Mariani et al., 2018) and argued that firms possessing them can achieve a competitive performance advantage by contributing to more satisfying customer journeys and e-commerce experiences (Akter, Wamba, Gunasekaran, Dubey, & Childe, 2016; Mariani & Fosso Wamba, 2020; Mariani & Borghi, 2020; Vakulenko, Shams, Hellström, & Hjort, 2019; Wamba et al., 2017). In parallel, cloud computing may not only ease internationalization but also contribute to increasing the competitiveness of the firm when the services are deployed by premier suppliers such as Amazon, Cisco, Google, IBM, Microsoft, Oracle, and SAP (Hosseini, Fallon, Weerakkody, & Sivarajah, 2019; Mariani, Ek Styven & Teulon, 2021).

### ***2.1.2 Digital capabilities***

Firms' capabilities have been defined as the "firm's capacity to deploy resources for a desired end result" (Helfat & Lieberman, 2002: p. 725). Extant theorization around firms' capabilities



has defined them as organizational abilities to combine, assemble, integrate, and exploit resources to achieve a competitive advantage (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). Firms' capabilities are part of the wider set of firms' competitive capabilities defined as "a firm's capacity to deploy resources, usually in combination, using organizational processes, to effect a desired end. They are information-based, tangible or intangible processes that are firm specific and are developed over time through complex interactions among the firm's resources. They can abstractly be thought of as 'intermediate goods' generated by the firm to provide enhanced productivity of its Resources, as well as strategic flexibility and protection for its final product or service" (Amit & Schoemaker, 1993, p. 35). These capabilities might be dynamic if they adapt promptly to the changing business environment and are functional to adapt, integrate, and re-configure resources (Teece & Pisano, 1994). These latter capabilities cannot be purchased as they consist of 1) managerial and organizational processes (i.e., routines), 2) present position (i.e., endowment of technology and intellectual property, as well as customer base and upstream relations with suppliers), and 3) the paths available (i.e., strategic alternatives available to the firm and opportunities).

Research in information management and marketing has found that resources by themselves are not always sufficient to generate significant performance gains; rather, they have to be transformed into distinctive capabilities (e.g., Bharadwaj, 2000; Chang, Park, & Chaib, 2010; Dagnino & Mariani, 2004; Melville, Kraemer, & Gurbaxani, 2004; Roberts & Grover, 2012; Trainor, Andzulis, Rapp, & Agnihotri, 2014). Taken together, the findings of the aforementioned literature suggest that investment in technological resources is not necessarily conducive to superior performance. Rather, they suggest that technological resources should be combined with other organizational resources that include a human component consisting of technical skills and an intangible component encompassing organizational culture.

Among the human component of firms' capabilities (consisting of technical skills) there are also digital capabilities (Gurbaxani & Dunkle, 2019; Tolstoy et al., 2020), which are defined as the competences by which companies align the features of digital technology with customers' needs and wants (Chaffey, Hemphill, & Edmundson-Bird, 2015) and which are becoming increasingly relevant for successful digital transformation. Based on a survey of senior executives at 147 U.S. companies, Gurbaxani and Dunkle (2019) find that there are six dimensions of digital transformation, namely: strategic vision, culture of innovation, know-how and intellectual property, digital capability, strategic alignment, and technological assets. The latter ones entail the digital technologies underpinning the digital transformation including internet and wireless communication, mobile technologies, cloud computing, data mining, big data, etc. Interestingly, digital capabilities differ from technological assets and involve: 1) availability of digital expertise; 2) visionary/innovative skills within the company to define the right digital strategy; 3) systems of grading and incentives based on individuals' level of digital transformation knowledge; 4) technical talent for innovation; and 5) digital skills to execute the digital strategy. Digital capabilities are therefore firm-level capabilities that are inclusive of what has been previously termed as internet capabilities (Glavas & Mathews, 2014).

In line with the above discussion, in our study we posit that not only digital technologies but also firms' digital capabilities (in the wider meaning of competitive capabilities, be they dynamic or not) are increasingly relevant for firms' performance, with a focus on export. As such, we contribute to extend the resource-based approach to the study of export (Dhanaraj & Beamish, 2003) as we examine the effect of digital resources (under the guise of digital technologies) and digital firms' capabilities (in the form of digital capabilities subsumed in managerial skills, competences, and knowledge) on the propensity of manufacturing enterprises to undertake digital export. Accordingly, to our knowledge this work is one of the

first attempts to understand the digital export drivers compared to other research focusing on traditional export. In section 2.2 we develop our research hypotheses.

## **2.2 Hypotheses development**

### **2.2.1 Firm size and digital export**

The literature on SMEs' internationalization suggests that small companies are more likely to adopt online channels to invest abroad compared to larger companies. Pezderka and Sinkovics (2011), for instance, argue that digital export means the burden of a direct physical investment can be avoided, thus requiring fewer resources. Beyond the decreased entry costs, additional benefits associated with digital export include the availability of new and faster sales and communication channels, and easier payments (Martens, 2013; Morgan-Thomas, 2009). Furthermore, relying on technology-enabled exports reduces the distance and cost of contact creation with potential foreign partners, allowing SMEs to benefit from direct access to local expertise (Lecerf & Omrani, 2020). Hence, these studies seem to look at digital export as an easier alternative for SMEs than traditional trade.

Nevertheless, other studies within the international business and entrepreneurship literature have stressed the challenges that SMEs face in leveraging digital export due to their scarcer resource availability (Schu et al., 2016) and weaker desire to reconfigure business models that are often family based (Luo, Zhao, & Du, 2005). In addition, SMEs tend to consider the implementation of digital export to be expensive, time consuming, and technologically complex (Hånell et al., 2019). Only companies that make initial (risky) investments in relevant resources can create a sufficient "slack" that enables them to cope with the foreign online market dynamics (Tolstoy et al., 2020).

When considering an RBV perspective, which is the theoretical lens adopted in our study, the size of a company reflects the amount of available resources and capabilities that can

be leveraged to build a competitive advantage (Ramon-Jeronimo, Florez-Lopez, & Araujo-Pinzon, 2019). Having access to a lower amount of resources generally creates barriers to the development of risky strategies such as internationalization. In this regard, SMEs are known to suffer from resource limitations in many aspects that are key for a digital export strategy, such as logistics assets, financial capacity, and ICT knowledge (Stockdale & Standing, 2006). Indeed, while it is true that some types of costs or investments are avoided with digital export, others stay in place or even increase with respect to offline internationalization, e.g., customs and duty regimes and tax laws (Bieron & Ahmed, 2012; Polanski, 2002; Teltscher, 2002), marketing and branding issues (Guercini & Runfola, 2015), cultural aspects (Gefen & Heart, 2006), logistics issues (Ramanathan, George, & Ramanathan, 2014), and uncertainty costs (Giuffrida et al., 2019). All these costs require resources and capabilities to be fully addressed, thus making digital export a less viable option for SMEs.

In fact, selling to online customers involves more than setting up a functioning website (Sinkovics et al., 2007), as it requires a full set of physical assets (e.g., capital or distribution facilities), which still may put SMEs at a disadvantage. There are, indeed, many complexities linked to the establishment of a digital export strategy, which combine the difficulties of e-commerce-based transactions with those of international business. More specifically, on the one hand, digital export requires a more articulated distribution network with respect to national digital transactions. Both delivery and after-sale services are, in fact, more difficult to organize, due to longer distances and different habits or expectations of foreign customers, which might increase the probability of returns with respect to national e-commerce customers (Lee, 2017). Conversely, large enterprises can not only rely on more efficient and/or less expensive distribution networks, but also can afford a larger amount of resources to establish a global presence, which can be employed to gain the appropriate knowledge about international

markets and to organize the required services to deal with foreign customers (Alon, Chen, & Mandolfo, 2019).

On the other hand, offline international trade is typically a B2B process, where the players involved are overseas producers selling bulk products to large-scale retailers through agents or importers; therefore, exporting companies do not have a direct contact with final consumers. Conversely, digital export requires a more direct B2C approach, where the seller has to handle a higher number of fragmented orders. This means that, in order to be effective in reaching the customers and advertising the products, firms need to gain a deep knowledge of how to use the online trade channels and how to design a multidomestic digital marketing strategy, which SMEs typically find difficult to develop due to their limited resource availability (Elia, Giuffrida, & Piscitello, 2019). In addition, the fragmentation of the demand increases the complexity of managing customs clearance and parcel delivery efficiency, which require additional resources to be addressed. Finally, although some federal governments are trying to alleviate the impact of such barriers by providing supportive programs, smaller companies often do not meet the size requirements for benefitting from such programs (Gessner & Snodgrass, 2015). This results in a lower chance for SMEs to embrace the opportunities of digital export.

Hence, despite some evidence of IT and e-commerce positive impact on internationalization (Lecerf & Omrani, 2019), relying on an RBV perspective, which emphasizes the centrality of resources to develop strategies that allow a firm to reach superior performance, we claim that large enterprises would face fewer difficulties than small enterprises in developing a digital export strategy for their international growth. Therefore, we formulate our first hypothesis:

**H1:** The larger the size of an enterprise, the higher its propensity to undertake digital export.

### **2.2.2 Digital technologies as resources driving digital export**

The emergence and consolidation of ICTs in the last decades has enabled firms to reduce transactions costs, e.g., those linked to transportation, communication, and coordination (Alcacer et al., 2016). These benefits have led companies to increasingly adopt ICTs in their internationalization processes (Chen & Kamal, 2016) across a number of different industries and stakeholders (Baourakis, Kourgiantakis, & Migdalas, 2002; Benmamoun, Singh, Lehnert, & Lee, 2019). Nonetheless, adopting technologies also brings an increased need for investments. Especially for complex types of ICTs, high sunk costs and additional costs of coordination among adopting firm units are often involved (Chen & Kamal, 2016; McElheran, 2015). While the net effect of technology adoption is difficult to estimate *ex-ante* and may depend on several contextual factors, it is a fact that digital technologies are becoming increasingly widespread. Recent research has shown that many companies that engage with exporting activities also make use of digital technologies in support of critical areas for their internationalization strategy, such as new product development, marketing and communication, and cross-border logistics (Digital Export Observatory, 2020). The adoption of digital technologies represents one of the most significant international business developments of the past few years. Nonetheless, only a limited portion of academic studies investigates the role of digital innovation in companies' internationalization processes (Gnizy, 2019; Watson, Weaven, Perkins, Sardana, & Palmatier, 2018). On the one hand, similar to ICTs, digital technologies (e.g., the Internet of Things, additive manufacturing, blockchain) have an important role in facilitating the management of both domestic and foreign operations. The coordination and integration of the value chain is more effective thanks to blockchain and the Internet of Things, while additive manufacturing allows higher productivity to be reached, thus leading to better performances and higher international competitiveness (Nassimbeni, 2001; Van Beveren & Vandenbussche, 2010).

On the other hand, beyond the productivity gains brought about by digital technologies, additional benefits arise from the synergies that specific technologies create for the sales and distribution phases when combined with e-commerce. Regarding the former, it is becoming crucial to extract value from the increasing amount and variety of data collected via multiple channels (Colombo & Ferrari 2015; Lee, 2017). The diffusion of online sales channels is progressively shaping the retail industry, leading to omnichannel strategies. These aim to provide a seamless experience to customers shopping via all available channels, such as physical channels, catalogues, online, and mobile channels (Lee, 2017; Vakulenko et al., 2019). The diversification of channels and data sources makes data aggregation more challenging, therefore big data mining is needed to perform market analysis which can help firms predict customer purchase, suggest ideas for cross-selling, and design marketing strategies. This is especially relevant in an internationalization context, where the diversity of data is also linked to the multiple geographies involved. Searching for new markets becomes easier thanks to the combination of artificial intelligence and big data (Borghi and Mariani, 2020; Pillai et al., 2021), while communication capabilities are boosted through the adoption of digital marketing techniques that allow, as much as possible, the tailoring of both the product and the message offered to the potential customers.

The multiplication of channels for the retail industry has also brought significant challenges in the logistics domain. In this regard, the adoption of smart logistics solutions, innovative delivery options like parcel lockers, reception boxes, and pick-up points (Mangiaracina, Perego, Seghezzi, & Tumino, 2019) can lead to increased efficiency and better service to customers, and seamless and transparent processes from the point of purchase to the time of delivery (Nguyen, de Leeuw, & Dullaert, 2018), fostering e-commerce success both within and across borders. Internet of Things applications allowing tracking of vehicles, monitoring of inventory, and warehouse robotics can also boost logistics performances and are

becoming very widespread among major cross-border e-commerce logistics players, like Cainiao, the logistics arm of Alibaba Group (Rimmer & Kam, 2018).

Finally, many studies argue that for a successful digital transformation, companies need a supportive digital culture which is eventually nurtured when digital technologies are well integrated into business operations. If a virtuous cycle is created between technology adoption, technology integration, and the development of a digital culture, it will become easier to extend digital practices to different business functions, including the export department (Cassetta, Monarca, Dileo, Di Berardino, & Pini, 2020). In line with these arguments, we formulate the following hypothesis:

**H2:** Enterprises adopting digital technologies have a higher propensity to undertake digital export.

### **2.2.3 Human capital and digital capabilities as digital export drivers**

People possess knowledge, skills, competences, education, and experience that have been defined as human capital (Becker, 1962), which is a critical firm's resource to create value. For instance, workers' human capital (HC) can enhance productivity, adding both tangible and intangible value to the firm (Hitt Hitt, Bierman, Shimizu, & Kochhar, 2001). Consequently, the decision to recruit from the market or develop HC internally (Hatch & Dyer, 2004) is based on a comparative assessment of the expected returns of workers' productivity (Becker, 1964). However, firms do not own their HC, because it is embodied in their workers/employees, who are free to move from one firm to another (Becker, 1964; Hatch & Dyer, 2004). Accordingly, it is increasingly relevant for firms to attract, acquire, and retain talented workers as they can be conducive to economic value for an organization (Snell & Dean, 1992) and can translate into competitive advantage.



International business studies have recognized and examined the role of HC on internationalization activities and related performance (Daily, Certo, & Dalton, 2000; Hennart, 2007; Sapienza, Autio, George, & Zahra, 2006; Vermeulen & Barkema, 2002). While Hennart (2007) has emphasized the importance of managers' HC for internationalization activities, Vermeulen and Barkema (2002) have found the features of senior management that moderate the performance of a firm during its internationalization, and Wen-Tsung, Hsiang-Lan, and Chia-Yi (2013) have revealed that employee education and training contribute to accelerate internationalization processes. Overall, it appears that there is an inverted U-shaped relationship between investment in employees' HC and degree of internationalization, and that alignment should be found between a firm's internationalization strategy and its investment in HC (Gomez-Mejia, 1988; Onkelinx, Manolova, & Edelman, 2016).

Traditionally, the key professional figure involved in international activities has been the export manager, who is in charge of 1) analyzing the firm's propensity to go international, while identifying its potential positioning on the international market, and defining the internationalization objectives and programs; 2) developing a number of actions by product, market, and distribution channel, including communication plans; and 3) reporting on the progress achieved on the different actions in view of consolidating the company's presence in foreign markets.

However, the emergence and consolidation of digital technologies has brought about new opportunities and challenges for professionals dealing with firms' internationalization. In a study of chief digital officers from various sectors, Tumbas et al. (2017) have found that organizations tend to increasingly hire digital experts to foster one of these three domains: 1) digital innovation; 2) data analytics; and 3) customer engagement. Firms increasingly need to develop, indeed, "digital business capabilities", i.e., the ability to integrate marketing skills and digital technologies in order to satisfy customers' needs in the digital sphere, with the ultimate

purpose of acquiring and retaining foreign markets' customers that can prompt online sales through digital export (Tolstoy et al., 2020). In particular, big data analytics capabilities have been found to positively influence the degree of internationalization when combined with big data analytics infrastructure (e.g., Bertello, Ferraris, Bresciani, & De Bernardi, 2020).

Digital skill gaps for international managers have become salient over the last two decades due to the proliferation of digital media and e-commerce platforms, the fragmentation of market segments, and the increasing number of online channels (Day, 2011), which have translated into a multitude of (online) consumer behaviors and touch points, convergence of industries, and the spread of microsegments (Hagel, Brown, & Davison, 2009). Simultaneously, the huge amount of digital data generated by online customers is empowering companies willing to harness market intelligence by means of data analytics to increasingly recruit employees with skills in digital marketing and analytics, and able to deliver an outstanding online customer experience (Tumbas et al., 2017).

In many manufacturing companies interested in internationalizing, this state of affairs had led to a hiring spree of professionals in digital marketing, namely e-commerce managers with specific knowledge and skills in digital marketing techniques such as social media marketing, SEO, SEM, digital advertising, mobile marketing, and digital analytics. These professionals have the objective of creating customer intimacy and enhance customer engagement by leveraging data analytics to create a consistent customer experience across digital and non-digital channels (Mariani & Borghi, 2021; Tumbas et al., 2017). Moreover, they can improve the firm's capability to adopt e-commerce solutions (Ajmal & Yasin, 2012; Mathews, Healy, & Wickramasekera, 2012).

As e-commerce managers are trained to look at multi and omnichannel marketing (Giuffrida et al., 2019), they have a better and more comprehensive view of what the customers' needs are and can adapt more easily and nimbly to changes in both the online and offline

context compared to export managers that mainly adopt traditional and offline channels. Moreover, the digital skills and experience of an e-commerce manager cannot be easily transferred to an export manager as it requires learning to develop digital marketing skills. Additionally, e-commerce managers need to 1) be able to integrate strategic knowledge with existing “traditional” marketing and communication approaches, while also having a working overview of digital technology; 2) possess specific knowledge of digital technologies as part of their skillset; and 3) be able to measure and track online marketing activities. All of these are unique and distinctive skills of a digital marketing expert (Royle & Laing, 2014) such as the e-commerce manager and certainly not part of the traditional export manager’s skillset. For this reason, the skills of an e-commerce manager in a digital environment are valuable, unique, non-replicable, and not easily imitable, making the e-commerce manager an irreplaceable human resource for a firm, whose coordination with other digital technologies and digital experts generates a distinctive *digital capability* for the firm, thus enabling better export. Accordingly, we hypothesize that:

**H3:** Enterprises employing an e-commerce manager (i.e., possessing digital capabilities) have a higher propensity to undertake digital exports than firms employing a traditional export manager (i.e., not endowed with digital capabilities).

### **3. Research data and methods**

#### **3.1 Data**

The data used in this research was collected through an online survey targeted at Italian companies operating in the main B2C industries, i.e., fashion, food and beverage, and design and furniture. We selected these industries as they are representative of the traditional “made in Italy” activities, as they accounted for about €90 billion of the €163 billion generated by the Italian export of consumer goods in 2019 (Istat, 2020). Defining the population for this study

was not an easy task. Indeed, no official statistics about companies implementing digital export strategies are available. To identify suitable subjects for our survey, we contacted professionals through LinkedIn, a business-oriented social network available worldwide since 2003, which comprised 630 million members as of June 2019. The use of this platform offered several advantages: 1) direct access to each respondent's profile and contacts; 2) an opportunity to build a more informal relationship with the initial sample of targeted managers, thus facilitating information sharing and increasing the response rate; and 3) the possibility to target the most suitable profiles and filter by specific industries, company sizes, and countries. Overall, we focused our research on professionals working in export or e-commerce-related positions as these types of respondents are more likely to be the most appropriate sources of information regarding digital export decisions, thus reducing random and bias errors (Forza, 2002). Over 800 profiles were found matching our keywords in the job title filter section ("digital export", "cross-border e-commerce", "e-commerce", "online sales", "international sales", "global e-commerce", and similar others). This represents our population. We first prepared a pilot version addressed to ten practitioners and three professors, external to the research group, to test the survey's clarity and validate the measures used. Following some wording adjustments to remove any possible ambiguity or misunderstandings, the final version was distributed and stayed active online for five months. Afterwards, we contacted and sent the survey, upon acceptance to participate in this research, to 426 companies, that represent our theoretical sample. As an incentive to participate in the study, the respondents could receive 1) the overall results of the research with descriptive statistics and 2) a personalized elaboration of their answers in comparison with the average responses given by other participants in the same industry or with similar company size, in order to understand their positioning against competitors. The survey was administered via the online tool Opinio between June and October 2019. We received 174 answers (41% response rate). Not all the answers were, however,

usable. After checking for mistakes (e.g., double submissions or logical inconsistencies) and clearing incomplete answers, a total of 138 valid questionnaires were finally available for the analysis. Moreover, to prevent any possible non-response bias, a subset of non-respondents was analyzed, as per Evangelista, Mogre, Perego, Raspagliesi, & Sweeney (2012), Goode and Stevens (2000), and similar studies. Their demographic characteristics, such as type of activity and age of the company, did not significantly differ from the respondent sample. Then, in order to check for response bias, we compared answers submitted at an early stage with later ones, finding no significant differences, as suggested by Lambert and Harrington (1990). As a final step, we integrated the data collected through our survey with financial information obtained from Orbis, Bureau van Dijk. After matching the two databases, we were able to work on a final dataset that comprised 102 Italian firms due to some missing values in Orbis. We checked for the representativeness of our sample with respect to the national data (source: database “Istat”, Italian National Institute of Statistics), by comparing the percentage of firms engaged in digital export for each industry and for three different size categories (small, medium, and large firms)<sup>1</sup>. The Chi-Square test cannot reject the null hypothesis of representativeness of our sample for any of the categories considered, with the exception of the fashion and apparel industry, where the number of firms involved in digital export is slightly underrepresented in our sample.

### **3.2 Variables**

#### ***Dependent variable***

Our dependent variable is *Digital Export*, a dummy taking value of 1 if the company makes a systematic and strategic use of e-commerce to sell its products abroad and 0 in case it does not

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<sup>1</sup> Data about digital export of micro-firms (i.e., less than 10 employees) was not available for the national sample.

use (or use only occasionally) e-commerce for export. More specifically, we assigned the value equal to 1 if the company, answering the question “Select the option that better describes the channel strategy used to export,” selected either “My company mainly uses online channels to export” or “My company uses a multichannel strategy (online and offline) to export,” while we assigned the value equal to 0 if the company answered “My company mainly uses offline channels to export.” In our sample, 56 companies (i.e., 54.90% of the sample) were assigned the value 1, while the remaining 46 (i.e., 45.10% of the sample) were assigned the value 0.

### ***Explanatory variables***

The first explanatory variable is *Assets Size*, corresponding to the total assets of each firm in 2017 (source: Orbis)<sup>2</sup>. This variable is able to account not only for the dimension of the firm, but also, and above all, for the total amount of resources owned by the firm, thus being in line with our RBV approach. Our data shows that the average value of total assets for firms undertaking digital export is lower than the value of total assets of firms not undertaking digital export (€330,611 vs. €2,635,460, respectively)<sup>3</sup>, which seems to be against our first hypothesis.

The second explanatory variable is *Digital Technologies*, taking value of 1 if the company makes use of Industry 4.0 technologies such as smart logistics, blockchain, big data, and artificial intelligence, and 0 otherwise. The number of firms using at least one of these new technologies is equal to 46 (corresponding to 45.10% of the sample), while the remaining 56 (corresponding to 54.90% of the sample) did not select any of these technologies.

The next couple of explanatory variables refer to the human resources, and in particular to the presence of an export and/or of an e-commerce manager in the company. We employed two dummies, i.e., *Export Manager* and *E-Commerce Manager*, accounting for the type of

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<sup>2</sup> We employed 2017 as this was the last year for which financial data was available in Orbis when we collected the data.

<sup>3</sup> Given the large values reflecting the total assets of the firms, the variable has been standardized in order to smooth the scale.

figure that is present in the company. The information comes from the survey question “Which of the following roles does your company have?”, the available options being “No export and e-commerce manager,” “Export manager,” “E-commerce manager,” and “Export and e-commerce manager.” In our sample, 35 companies have both an export and an e-commerce manager (meaning that both dummies take value of 1); conversely, 50 firms have only an export manager while 10 firms have only an e-commerce manager; the remaining 7 companies have neither an export nor an e-commerce manager. The total number of firms having an export manager is, hence, equal to 85 (i.e., 83.33% of the sample), while the total number of firms having an e-commerce manager is equal to 45 (i.e., 44.12% of the sample).

### ***Control variables***

Among the control variables, we employed *Firm's Age*, which is computed as the difference between 2019 and the year of incorporation of the firm (source: Orbis, Bureau van Dijk). We expect the older firms to have a higher probability of undertaking a digital export strategy due to their experience and to the ability to accumulate the resources that are needed to support an internationalization strategy. A second control variable is *Firm's Productivity*, which is computed as the ratio between the turnover and the total assets of the firm in 2017 (source: Orbis, Bureau van Dijk). As suggested by the traditional international business theories (e.g., Dunning & Lundan, 2008), we expect the most productive firms to have a higher propensity to internationalize (and, hence, to undertake also digital export) in order to exploit their competitive advantage. A third control that we employ is *Joint Stock Company*, a dummy taking value of 1 if the company is organized as an incorporated association of two or more shareholders having a separate legal existence (source: Orbis, Bureau van Dijk). These companies can typically rely on a higher possibility to attract investors and raise capital to support strategic decisions such as internationalization, including digital export. Hence, we

expect a positive correlation with our dependent variable. Finally, to control for the idiosyncratic characteristics of the industries in which each firm operate, we employed three dummy variables, i.e., *Food and Beverage*, *Fashion and Apparel*, and *Furniture*, the latter being the base case. In our sample, the firms operating in each of these industries are 36 (i.e., 35.29% of the sample), 44 (i.e., 43.14% of the sample), and 22 (i.e., 21.57% of the sample), respectively. Table 1 summarizes the list of the variables, the proxies, and the main statistics of the variables.

– Insert Table 1 about here –

### 3.3 Methodology

As our dependent variable has a dichotomous nature, we employed a robust probit model to test our hypotheses. Table 2 illustrates the correlation matrix, the mean values, the standard deviations, and the minimum and maximum values of our dependent and explanatory variables. Given that some correlations are above 0.50, we computed the variance inflation factors: all values are below the traditional threshold of 10.00 (Hair, Black, Babin, & Anderson, 2010), thus ruling out potential multicollinearity problems.

– Insert Table 2 about here –

## 4. Findings

Table 3 displays the results of the regression analysis, reporting the coefficients and marginal effects in columns 1 and 2, respectively. The variable *Assets Size* displays a negative and not significant coefficient and marginal effect, meaning that hypothesis 1 is not supported.

Regarding the second hypothesis, the variable *Digital Technologies* turns out to be positively and significantly ( $p < 0.01$ ) correlated with the dependent variable, both in the coefficient and



in the marginal effect. The latter reveals that firms that have digital technologies increase their probability of adopting digital export by about 21.1% compared to firms that do not have any digital technology. Thus, hypothesis 2 is fully supported.

As far as hypothesis 3 is concerned, the variable *Export Manager* displays a negative but not significant coefficient and marginal effect, showing that firms that have an export manager do not have a higher propensity to undertake digital export. Conversely, the variable *E-Commerce Manager* exhibits a positive and significant ( $p < 0.01$ ) coefficient and marginal effect, the latter being equal to 0.428, meaning that firms with an e-commerce manager have a higher probability of adopting a digital export strategy (by about 42.8%). Accordingly, hypothesis 3 is fully supported.

As regards the control variables, the dummy *Food and Beverage* exhibits a negative and significant ( $p < 0.10$ ) coefficient, thus showing that firms operating in this sector are less likely to undertake a digital export strategy.

### ***Robustness checks***

In order to check the robustness of our results, we introduced an alternative measure of size, i.e., *Employees Size*, which is a scale value ranging from 1 to 4, the lowest being associated with micro-firms (1–10 employees), followed by small firms (11–50), medium firms (51–250), and large firms (above 250). The number of firms belonging to each category are 8 (7.84%), 13 (12.75%), 45 (44.12%), and 36 (35.29%) respectively, meaning that most of the firms (i.e., 66, equal to 64.71% of the sample) are SMEs with under 250 employees. This variable not only represents an alternative measure of size, but also allows the capture of another type of resource that companies can leverage besides the total assets, i.e., the HC. Results, which are displayed in columns 3 and 4 (coefficients and marginal effects) of Table 3, show a positive but not

significant coefficient. Hence, hypothesis 1 is not supported even when using an alternative measure of size; conversely, hypotheses 2 and 3 are fully confirmed.

We also employed a more fine-grained variable for digital technologies, named *Digital Technology Intensity*, which accounts for the number of different technologies adopted by each firm. Among the firms with digital technologies, the majority can count on either one or two technologies (22 and 15 firms, respectively), while only 8 firms have more than two technologies (i.e., from 3 to 5). Results, which are displayed in columns 5 and 6 of Table 3, confirm the strong positive effect of this intensity variable ( $p < 0.05$  for the coefficient and  $p < 0.01$  for the marginal effect), thus showing that firms have a higher probability of engaging in digital export when adopting and combining more than one digital technology.

– Insert Table 3 about here –

## 5. Discussion

The key findings of this study are threefold. First, size does not matter in digital export, i.e., SMEs do not suffer from a weaker propensity to engage with digital export despite resource constraints. This finding seems to contradict some of the most recent previous international business research that has stressed the higher challenges that SMEs face when engaging in digital export due to their limited resource availability and lower flexibility in business model adaptation (e.g., Melen Hånell et al., 2019; Schu et al., 2016).

Second, our results are, however, more in line with the recent findings from Tolstoy et al. (2020), who suggest that a digital export strategy requires some initial investments in “relevant” resources – by explicitly mentioning digital technologies as an example – and in digital business capabilities – arising from the integration of marketing capabilities in digital technologies – to be effective. Indeed, our study shows that what matters is not the quantity but

rather the quality of resources and capabilities. More specifically, we provide evidence that, on the one hand, firms leveraging digital technologies are more likely to enhance their digital export. This second key finding seems to corroborate other literature that found that the investment in digital technologies such as big data positively influences the degree of internationalization (e.g., Bertello et al., 2020).

Third, digital capabilities are critical for export as firms employing an e-commerce manager are more likely to enhance their digital export than firms employing only a traditional export manager. This third key finding is rather novel in the internationalization literature and reinforces the idea that digital skills are paramount in order to ride the digital transformation wave (Tolstoy et al., 2020). Theoretical and practical implications are discussed in sections 5.1 and 5.2.

### ***5.1 Theoretical implications***

We make several theoretical contributions. First, in the context of firms willing to internationalize, while IT was recognized as a relevant resource in the very seminal work of the RBV (Barney, 1991), we find that the right combination of digital resources (i.e., digital technologies) and digital capabilities (i.e., presence of an e-commerce manager) can make a difference for firms in gaining a competitive advantage in terms of digital export. Accordingly, this is the first study combining the RBV and firms' capabilities to explain that to achieve an effective "digital transformation" under the guise of adoption of digital export, firms need both digital resources and digital capabilities, with the latter subsuming mere internet capabilities identified in previous internationalization studies (Glavas & Mathews, 2014; Trainor et al., 2014).

Second, and related to the previous point, we show that digital resources (i.e., digital technologies) need to be integrated with digital capabilities to foster a firm-level "digital

competitive advantage” which we propose as an extension of the examined competitive advantage enabled by IT (Pavlou & El Sawy, 2010).

Third, we also find that the amount of resources has a not significant impact, meaning that it is the quality rather than the quantity of resources that affects the propensity to digitally export, together with the digital capabilities. In other words, it is the heterogeneity across firms in terms of digital capabilities (as a result of the HC) that can help organizations that possess those valuable, rare, imperfectly imitable and non-substitutable digital technologies (Barney, 1991, 2001) to achieve high levels of digital export (Priem & Butler, 2001). Our additional evidence shows that the adoption of a digital export strategy is even more likely when firms have more than one digital technology, as they contribute to create digital synergies and complementarities and to form a digital corporate culture.

Fourth, we contribute to international business theory by shedding new light on digital internationalization (Alcacer et al., 2016) and suggesting that firms must possess an ownership advantage founded on both digital resources and digital capabilities to export in foreign markets using e-commerce. In other words, export being the first step of internationalization for several firms (Johanson & Vahlne, 2009), our results seem to suggest that firms can better manage the “liability of foreignness” arising from a digital export strategy by reducing their “liability of digitalness” through the development and combination of digital resources and capabilities.

Fifth, we contribute to the international entrepreneurship literature by answering the “urgent” call launched by Tolstoy et al. (2020) to investigate how firms (and SMEs in particular) can pursue new opportunities in a digital international business environment, by showing the strategic role of digital technologies and digital capabilities.

Sixth, we also enrich the work of Barua, Konana, Whinston, and Yin (2004), who introduce the construct of online information capabilities, suggesting that today’s firms willing to go international need to build on digital capabilities (Gurbaxani & Dunkle, 2019). Digital

transformation is, indeed, defined as the “reinvention of a company’s vision and strategy, organizational structure, processes, capabilities, and culture to match the evolving digital business context” (Gurbaxani & Dunkle, 2019: p. 209). The digital transformation has changed the way companies internationalize themselves but also redefined the markets and industries as customers and suppliers have undergone a digital transformation themselves and global value chains are now digitized.

Finally, we contribute to the ongoing debate of closing the marketing capability gap (Day, 2011) with an emphasis on the relevance of identifying skill gaps for export managers. In particular, we introduce the concept of “digital export capabilities” that can be described as the digital capabilities subsumed in managerial skills, competences, and knowledge that are embodied in the e-commerce manager professional and contribute to make a difference for digital export.

## ***5.2 Practical implications***

In terms of managerial implications, the results of the study suggest that firms should invest in both the adoption of digital technologies and in the development of digital skills if they aim to develop a competitive advantage based on digital export. Businesses today already live in a world that is increasingly digital and interconnected on a global scale. Despite the fact that the investments needed to cope with these digitalization trends are highly demanding, there is ample evidence that many benefits can outweigh the initial costs. Indeed, on the one hand, digital technologies not only can be strictly functional to implement digital export, but they can also offer an indirect contribution by increasing the productivity of the upstream (e.g., production) and downstream (e.g., distribution and after-sales services) value-chain activities surrounding the online sale. In addition, digital technologies contribute to the creation of a “digital culture,” which prompts the firm to also upgrade the corporate strategies, e.g., by

moving from traditional to digital export. This is consistent with prior literature that has found that internet capabilities can trigger better export marketing capabilities in the guise of processes for gathering insights from market export information and decisions about customer services, distribution, communication, and selling (Trainor et al., 2014). On the other hand, firms should try to develop digital skills both to manage more efficiently such digital technologies and to implement more effectively a digital export strategy. This objective can be pursued either by hiring an e-commerce manager or by training the export manager on digital knowledge (e.g., online marketing, digital payments, smart logistics, and legal regulations for e-commerce), in order to upgrade their skills and turn them into a “digital export manager.”

The urge to shift towards digital capabilities and technologies to be more competitive internationally has been made particularly relevant recently, also in the light of the COVID-19 pandemic emergency. This crisis has demonstrated how complicated ensuring continuity of operations can be, especially on a global scale, when companies are not equipped with the right set of skills and resources. The world is becoming increasingly complex and uncertain; disruptive events are not to be considered rare occurrences or black swans, as their likelihood is predicted to increase. All these contingencies should push companies to set digital transformation at the top of their strategic priorities for conducting international business successfully. As this study confirms, this holds for all types of companies, regardless of their size or amount of resources.

### ***5.3 Limitations and areas of future research***

This work is not without limitations, which, however, represent interesting opportunities for future research. First, our study focuses on firms that are already involved in export activities; future studies could expand the analysis to understand the role of digital technologies and capabilities in fostering the propensity to internationalize either through (digital) export or

through alternative types of internationalizations, ranging from offshoring outsourcing to mergers and acquisitions. Future studies should also try to better disentangle the performance effects associated with digital export, e.g., by exploring the percentage of revenues generated by this activity. A more fine-grained analysis of the role of the different types of technologies in fostering digital export is also desirable, together with a deeper analysis of the effects arising from the heterogeneity of the firms (besides their size) and of individuals (by considering other capabilities). In addition, while we focused on the impact of individuals for manufacturing companies, future research should establish to what extent the firm's digital capabilities are dependent on individuals' or managerial teams' digital capabilities (Cattani et al., 2013) and if these capabilities are portable or replicable (Barney, 1991, 2001), and to what extent they might represent a driver of sustained competitive advantage. Overall, future studies might re-conceptualize within digital settings both the RBV and firm's capabilities to explain the digital transformation of enterprises.

Despite these limitations, we believe that our study represents one of the first theoretical contributions – within the RBV and capabilities literature – that discusses and provides evidence of the conjoint role of digital technologies and capabilities in the development of a sustained competitive advantage based on digital export.

## **6. Conclusions**

This study set out to explore the role of firm digital resources – in the guise of both digital technologies and digital capabilities – on digital export performance. Building on the RBV perspective of the firm and firms' competitive capabilities, this work found that firm size does not represent a liability for small firms willing to engage with digital export. We also detected that both digital technologies and digital capabilities are conducive to the enhancement of firms' digital export.

### **STATEMENT OF CONTRIBUTION:**

Stefano Elia, Maria Giuffrida and Marcello Mariani contributed equally (30% each) to the manuscript and must be considered equally first authors. Stefano Bresciani contributed 10% to the manuscript.

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## TABLES

Table 1: Summary of the variables, type, proxy, source, and main statistics

| No. | Variable                    | Type                 | Proxy   | Source                              | Statistics (Total Companies: 102)   |
|-----|-----------------------------|----------------------|---|-------------------------------------|---|
| 1   | <i>Digital Export</i>       | Dependent variable   | Dummy equal to 1 if the firm undertakes digital export                  | Survey “Digital Export Observatory” | Digital export – yes: 46 companies<br>Digital export – no: 56 companies                           |
| 2   | <i>Assets Size</i>          | Explanatory variable | Total assets  | Orbis                               | Digital export companies: €330,611<br>No digital export companies: €2,635,460<br>(Average values) |
| 3   | <i>Digital Technologies</i> | Explanatory variable | Dummy equal to 1 if the firm has adopted a digital technology           | Survey “Digital Export Observatory” | Digital technologies – yes: 46 companies<br>Digital technologies – no: 56 companies               |
| 4   | <i>Export Manager</i>       | Explanatory variable | Dummy equal to 1 if an export manager is present in the firm            | Survey “Digital Export Observatory” | Export manager – yes: 85 companies<br>Export manager – no: 17 companies                           |
| 5   | <i>E-commerce Manager</i>   | Explanatory variable | Dummy equal to 1 if an e-commerce manager is present in the firm        | Survey “Digital Export Observatory” | E-commerce manager – yes: 45 companies<br>E-commerce manager – no: 57 companies                   |
| 6   | <i>Firm’s Age</i>           | Control variable     | Difference between the year 2019 and the incorporation year of the firm | Orbis                               | Average age: 35.5   |
| 7   | <i>Firm’s Productivity</i>  | Control variable     | Ratio between the total sales and total assets of the firm              | Orbis                               | Average productivity: 1.2   |
| 8   | <i>Joint Stock Company</i>  | Control variable     | Dummy equal to 1 if the firm is a joint stock company                   | Orbis                               | Joint stock firms – yes: 70 companies<br>Joint stock firms – no: 32 companies                     |
| 9   | <i>Food and Beverage</i>    | Control variable     | Dummy equal to 1 if the firm operates in the food and beverage industry | Survey “Digital Export Observatory” | Food and beverage firms: 36   |
| 10  | <i>Fashion</i>              | Control variable     | Dummy equal to 1 if the firm operates in the fashion industry           | Survey “Digital Export Observatory” | Fashion firms: 44   |
| 11  | <i>Furniture</i>            | Control variable     | Dummy equal to 1 if the firm operates in the furniture industry         | Survey “Digital Export Observatory” | Furniture firms: 22   |

Table 2: Correlations and descriptive statistics of the dependent and explanatory variables

| <b>Variables</b>              | 1      | 2      | 3      | 4      | 5      | 6       | 7      | 8      | 9      | 10     | 11    |
|-------------------------------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|-------|
| 1 <i>Digital Export</i>       | 1.000  |        |        |        |        |         |        |        |        |        |       |
| 2 <i>Assets Size</i>          | -0.115 | 1.000  |        |        |        |         |        |        |        |        |       |
| 3 <i>Digital Technologies</i> | 0.267  | -0.098 | 1.000  |        |        |         |        |        |        |        |       |
| 4 <i>Export Manager</i>       | -0.035 | 0.048  | 0.088  | 1.000  |        |         |        |        |        |        |       |
| 5 <i>E-commerce Manager</i>   | 0.448  | 0.142  | 0.107  | -0.133 | 1.000  |         |        |        |        |        |       |
| 6 <i>Firm's Age</i>           | -0.119 | -0.028 | -0.061 | 0.173  | -0.093 | 1.000   |        |        |        |        |       |
| 7 <i>Firm's Productivity</i>  | 0.089  | -0.095 | 0.134  | 0.059  | 0.087  | -0.066  | 1.000  |        |        |        |       |
| 8 <i>Joint Stock Company</i>  | -0.146 | 0.091  | 0.061  | 0.095  | -0.038 | 0.359   | -0.201 | 1.000  |        |        |       |
| 9 <i>Food and Beverage</i>    | -0.238 | 0.157  | 0.032  | 0.110  | -0.160 | 0.154   | -0.037 | 0.190  | 1.000  |        |       |
| 10 <i>Fashion and Apparel</i> | 0.193  | -0.094 | -0.034 | -0.248 | 0.422  | -0.123  | 0.102  | -0.008 | -0.643 | 1.000  |       |
| 11 <i>Furniture</i>           | 0.044  | -0.069 | 0.004  | 0.171  | -0.322 | -0.030  | -0.080 | -0.211 | -0.387 | -0.457 | 1.000 |
| Observations                  | 102    | 102    | 102    | 102    | 102    | 102     | 102    | 102    | 102    | 102    | 102   |
| Mean                          | 0.549  | 0.013  | 0.451  | 0.833  | 0.441  | 35.529  | 1.288  | 0.686  | 0.353  | 0.431  | 0.216 |
| Std. Dev.                     | 0.500  | 1.057  | 0.500  | 0.375  | 0.499  | 25.908  | 1.279  | 0.466  | 0.480  | 0.498  | 0.413 |
| Min.                          | 0.000  | -0.132 | 0.000  | 0.000  | 0.000  | 2.000   | 0.000  | 0.000  | 0.000  | 0.000  | 0.000 |
| Max.                          | 1.000  | 10.450 | 1.000  | 1.000  | 1.000  | 172.000 | 12.610 | 1.000  | 1.000  | 1.000  | 1.000 |

Table 3: Results of the robust probit model (dependent variable: *Digital Export*)

|                                       | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|---------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                       | Coefficients        | Marginal Effects    | Coefficients        | Marginal Effects    | Coefficients        | Marginal Effects    |
| <i>Assets Size</i>                    | -1.069<br>(0.808)   | -0.301<br>(0.224)   | -                   | -                   | -1.132<br>(0.798)   | -0.316<br>(0.218)   |
| <i>Digital Technologies</i>           | 0.750***<br>(0.277) | 0.211***<br>(0.075) | 0.779***<br>(0.277) | 0.225***<br>(0.075) | -                   | -                   |
| <i>Export Manager</i>                 | -0.082<br>(0.421)   | -0.023<br>(0.119)   | -0.139<br>(0.423)   | -0.040<br>(0.122)   | -0.002<br>(0.422)   | -0.001<br>(0.118)   |
| <i>E-commerce Manager</i>             | 1.522***<br>(0.364) | 0.428***<br>(0.073) | 1.352***<br>(0.322) | 0.389***<br>(0.069) | 1.509***<br>(0.363) | 0.422***<br>(0.072) |
| <i>Firm's Age</i>                     | 0.003<br>(0.007)    | 0.001<br>(0.002)    | -0.000<br>(0.006)   | -0.000<br>(0.002)   | 0.003<br>(0.007)    | 0.001<br>(0.002)    |
| <i>Firm's Productivity</i>            | 0.005<br>(0.110)    | 0.002<br>(0.031)    | 0.073<br>(0.158)    | 0.021<br>(0.045)    | 0.012<br>(0.115)    | 0.003<br>(0.032)    |
| <i>Joint Stock Company</i>            | -0.415<br>(0.350)   | -0.117<br>(0.099)   | -0.472<br>(0.360)   | -0.136<br>(0.104)   | -0.388<br>(0.353)   | -0.108<br>(0.099)   |
| <i>Food and Beverage</i>              | -0.738*<br>(0.416)  | -0.208*<br>(0.112)  | -0.842**<br>(0.419) | -0.243**<br>(0.115) | -0.643<br>(0.420)   | -0.180<br>(0.114)   |
| <i>Fashion and Apparel</i>            | -0.543<br>(0.469)   | -0.153<br>(0.130)   | -0.527<br>(0.450)   | -0.152<br>(0.128)   | -0.411<br>(0.477)   | -0.115<br>(0.131)   |
| <i>Employees Size</i>                 | -                   | -                   | 0.078<br>(0.195)    | 0.023<br>(0.056)    | -                   | -                   |
| <i>Digital Technologies Intensity</i> | -                   | -                   | -                   | -                   | 0.333**<br>(0.011)  | 0.093***<br>(0.010) |
| <i>Constant</i>                       | -0.176<br>(0.590)   |                     | -0.122<br>(0.662)   |                     | -0.281<br>(0.602)   |                     |
| No. of observations                   | 102                 |                     | 102                 |                     | 102                 |                     |
| Chi-Square                            | 39.299              |                     | 38.527              |                     | 40.474              |                     |
| P-value                               | 0.000               |                     | 0.000               |                     | 0.000               |                     |

Standard Errors between brackets. Please note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01