

Internationalization and Digitalization: Applying digital technologies to the internationalization process of small and medium-sized enterprises

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“ The biggest part of our digital transformation is changing the way we think. ”

Simeon Preston
Managing Director & COO
FWD Insurance

Digitalization is playing an increasingly important role in the growth of firms and is leading to structural and strategic transformations. The use of digital technologies presents new opportunities for SMEs to expand and succeed in foreign markets. The purpose of this paper is to investigate how the impact of digital technologies on the internationalization process of SMEs has been acknowledged in the literature. It offers an in-depth analysis of five of the most highly relevant recent scientific research papers. The findings are synthesized through key points that highlight how SMEs acting in foreign markets could benefit from digital technologies. This paper complements previous research on the international trade transition initiated by digital technologies and provides a new perspective on contemporary research regarding the internationalization of firms. It concludes by identifying implications for research by scholars seeking to further study the digital aspects of traditional theoretical models of internationalization.

Introduction

Businesses and societies are undergoing a process with multiple transformations. Both are operating within broader complex economic systems. Businesses themselves therefore must understand, in concrete terms, the many elements of dynamic interaction involved (Morua et al., 2015).

With the advent of digital technologies, a new social paradigm is emerging, and disruptive changes are an important part of future progress. Characterized by the convergence of many emerging technologies, whose core is data (big data, artificial intelligence, internet of things, etc.), digitalization leads firms to radical transformations in their systems and processes, as well as in their management methods and workforce. For instance, by reducing operating costs and improving interactions among ecosystem stakeholders - including customers, partners, suppliers and distributors - nascent digital technologies are playing an increasingly important role in company growth (Nambisan, 2017; Reuber & Fischer, 2011, 2014).

Digitalization has started to be addressed at a scientific level in the fields of entrepreneurship and management research, among others (Kraus et al., 2019). However, although international research has been fundamentally influenced by the pervasive effects of technological advances for many years, relatively few studies have investigated emergent digital technologies to theoretically understand and empirically test their attributes in international business management (Hannibal & Knight, 2018; Brouthers et al., 2018, 2016; Neubert, 2018; Ojala et al., 2018; Stallkamp & Schotter, 2018; Watson et al., 2018; Wittkop et al., 2018; Coviello et al., 2017; Strange & Zucchella, 2017; Autio & Zander, 2016; Tanev et al., 2015).

Our research builds upon the recent Hervé et al. (2020) paper, aiming to study the effects of digital technologies on the internationalization processes of small and medium-sized enterprises (SMEs). To this end, the research performs an in-depth analysis of five relevant scientific papers. By using insights and arguments from

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the literature of international business (IB) and international entrepreneurship (IE), we identified four main fields of activities that are at the center of interest for entrepreneurs when acting in international businesses: cost, accessibility, resources and competences; market knowledge; distance and location; relational competences and partner networks. The purpose of our study is to provide a synthesis of the key insights articulated in the five papers and highlight the main impact of digital technologies on these four fields of activities. It aims to contribute to IB and IE research by offering a better understanding of how the use of digital technologies can lead to new entrepreneurial opportunities in foreign markets. This objective is grounded in the current need to contribute to the development of new theoretical foundations for empirical research on internationalization on the interface of IB and entrepreneurship (Keupp & Gassmann, 2009).

By integrating new digital technologies into the value chain and managing a massive amount of data, firms are likely to seize new opportunities with innovative ways to reach potential customers and be instantaneously active on a global scale. In general, digitalization impacts internationalization processes of firms in terms of accessibility of resources, skills, and competence acquisition, as well as in terms of the potential for learning and knowledge-development in foreign markets (Coviello et al., 2017). Other parameters, like location and entry mode choices or time and expansion rate, are also influenced by digital technology usage.

However, in the literature, internationalization theories and models have not been adequately adapted to the possibilities and challenges provided by digital environments. This has been observed mainly through Johanson and Vahlne's (1977) stage model theory, which emphasizes a progressive engagement at the international level, while borders are now becoming more "dematerialized" (Stallkamp & Schotter, 2018). By questioning this stream of thought, scientific debates about the potential impact of the digital context emerge and constitute the starting point of this research (Kriz & Welch, 2018; Coviello et al., 2017). Based on theoretical insights from IB, IE and literature from digital entrepreneurship and information systems, the paper makes a contribution by providing a synthesis that outlines how digital technologies impact the internationalization process of SMEs. To conclude, we discuss the results and highlight suggestions for future

research. The paper also responds to recent calls for more research on the phenomenological field of IB in digital contexts (Coviello et al., 2017).

Literature Review

Internationalization of firms

The internationalization of firms is a subject of interest for numerous scientific communities and has been addressed for several years. Over time, IB theories have suggested different internationalization approaches, that have been aimed mainly at large companies. The stage model approach considers internationalization as a linear and sequential process (Johanson & Vahlne, 1977). According to this model, a firm's knowledge is acquired gradually over time through experience, which is the most crucial resource needed in foreign markets. The authors of the related Uppsala model consider market knowledge (general and experiential) combined with the commitment of resources, as factors influencing engagement decisions and ongoing business activities in foreign markets (Johanson & Vahlne, 1977).

Although various IB theories have coexisted in the literature for several decades, the stage model has been often criticized and the scientific community has gradually relativized its universality (Knight & Liesch, 2016; Welch et al., 2016; Welch & Paavilainen Mäntymäki, 2014; Forsgren & Hagström, 2007; Andersen, 1993; Sullivan & Bauerschmidt, 1990). In response to taking a sequential approach, numerous authors have studied alternative internationalization paths (McAuley, 2010; Ruzzier et al., 2006; Nummela et al., 2006; Lu & Beamish, 2001; Gankema et al., 2000; Coviello & McAuley, 1999; Oviatt & McDougall, 1995). The increasing emergence and growth of entrepreneurial firms aiming at rapid internationalization enabled the development of new perspectives on internationalization models that were more relevant for SMEs.

The emphasis on SMEs firms in scientific research clearly demonstrates their decisive role in global industries. This has given rise to a new current of research developed at the intersection of IB and entrepreneurship theories, now called IE. This research field specifically studies small and young firms that venture abroad from their inception or soon after their launch (Reuber et al., 2018; Autio, 2017; Knight & Liesch, 2016; Jones et al., 2011; Baldegger & Schueffel, 2009; Keupp & Gassmann, 2009; Oviatt & McDougall, 2005;

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Rialp et al., 2005; Zahra & George, 2002; Oviatt & McDougall, 1994). Even if multinationals and small companies have a very similar process for managing their international activities (Oviatt & McDougall, 1995), the impact of globalization on SMEs is particularly strong and even more significant than on large companies (Ruzzier et al., 2006). Furthermore, being more comfortable with technology and more reactive to innovations, small firms can be actively engaged in business outside of domestic markets, and thereby benefit from global trade despite having limited initial resources (Knight & Liesch, 2016).

As these firms discover ways to quickly achieve their international objectives, the IE approach is better adapted than the traditional IB theories. However, although this emerging discipline has grown exponentially, the theoretical foundations of IE remain somewhat fragmented, and too generalized (Jones et al., 2011; Keupp & Gassmann, 2009). Especially due to the lack of a common conceptual framework, IE scientific research has been dominated by concepts that emerge from mainstream IB theories (Keupp & Gassmann, 2009).

Digitalization in firms

To explain the emergence of digital technologies, our research applied the insights of Autio (2017), along with Bell and Loane (2010). The first wave started in the early 2000s with the emergence of Web 2.0 technologies. The introduction of mobile operating systems (iPhone and Android), storage solutions on computer servers (cloud computing), learning algorithms, and big data technologies marked the next significant developments. Data feeds all of these technologies. Its collection and analysis have thus become more accessible for the development of user-centric and knowledge-driven products and services. Digital technologies, such as artificial intelligence, can now be applied to optimize production and distribution, to improve managerial decisions for market entry, to target new customers more effectively, to select relevant partners, to supplement advertising strategies, to take better pricing decisions and to make demand predictions (Kraus et al., 2019; Aagaard et al., 2019; Watson et al., 2018). 3-D printers also represent a crucial advance in manufacturing techniques and allow companies to revolutionize their production and better customize each product to meet the end users' needs. Another major technological advance is the Internet of Things (IoT). This consists of integrating sensors able to collect and process data into smart products and devices, which

can thus communicate and interact with each other (Rüßmann et al., 2015). Finally, firms perceive new opportunities with blockchain technology, which has been defined as, "an open, distributed ledger that records transactions between two parties efficiently and in a verifiable and permanent way" (Iansiti & Lakhani, 2017). Distributed ledger (aka "blockchain") technologies provide firms with storage and transmission of information that is transparent, secure and which operates without third parties based on code.

Thanks to these recent technological advances, powerful information processing and storage resources are now widely available. The widespread adoption of these constituent technologies creates an enabling business environment. On one hand, it enriches interactions between individuals and, on the other, opens opportunities to improve value creation. To recognize opportunities and take advantage of these available tools, companies are faced with a transformation across their entire organization and activities (Kraus et al., 2019; Matt et al., 2015; Porter & Heppelmann, 2015; Bharadwaj et al., 2013). Moreover, because digital technologies support companies at different levels, whether for creating, producing, selling and marketing, delivering, or supporting, they also involve disruptive changes in the value chain (Porter & Heppelmann, 2015).

Ross and colleagues (2017) distinguished two steps in the transformation; become digitized and become digital. The first step takes place at the operational level and involves standardizing business processes and optimizing operations by implementing technologies and software. The second step involves purely digital technologies to articulate, target, and personalize alternative offers in order to define a new value proposition. It is, therefore, by taking the opportunity to redefine its business model and activities that a company becomes digital (Aagaard et al., 2019; Kraus et al., 2019; Ross et al., 2017).

Digital internationalization

Since the late 1990s, online sales turned to a new internationalization model. By dematerializing borders and reducing costs, e-commerce fundamentally changed the way business was conducted (Tiessen et al., 2001). Exporting to foreign markets through online sales became a significant competitive strategy. is particularly true for SMEs (Gabrielsson & Gabrielsson, 2011).

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Table 1. International Trade under Globalization

20 th century globalization	21 st century globalization
Physical goods, capital, and labor-intensive flows	Data, information and knowledge flows
Exchanges of mainly monetized transactions	Greater exchanges of free content and services
Mostly between advanced economies and multinational companies	More participation of emerging economies, SMEs, and individuals
Need for transportation infrastructure	Need for digital infrastructure
Slow diffusion of information across borders	Instant global diffusion and access of information
Innovation capacity and flows from advanced to emerging economies	Innovation capacity and flows in both directions

Source: modified from Manyika et al., 2016

Often faced with a lack of resources, the internationalization path has increased SMEs' agility in targeting markets and expanding their network (Watson et al., 2018; Mathews et al., 2016; Bell & Loane, 2010; Foscht et al., 2006). A study by Coviello and colleagues (2017) recognised that nascent digital technologies have democratised global consumption, paved the way to a wide database for knowledge acquisition in foreign markets, improved communication and information exchange, and facilitated cross-border transactions by increasing intangible flows and reducing location dependencies. These technologies will lead firms to base their production decisions more on proximity to customers than on production costs (Hannibal & Knight, 2018; Strange & Zucchella, 2017)

Methodology

Data collection

This review comprehensively presents the relevant literature and synthesizes the key insights on how digital technologies impact the internationalization process of established SMEs. Little previous research has focused on the integration of purely digital technologies into the internationalization process of established small firms. Therefore, due to an insufficient and highly fragmented research basis, a systematic approach could not be pursued. The limited number of articles corresponding to our criteria led the data collection towards a rather

systematically performed traditional review.

The literature search was bound by specific factors. First, an articles search was performed with SAGE Journals, Google Scholar and Ulysses search engines, and came mainly from scholarly publishers, like Emerald, Springer, and Elsevier. Given the novelty of the subject, it was not possible to limit our research to peer-reviewed articles. We have thus expanded our investigations to include conference papers. We started the search with two main terms, "internationalization" and "digitalization", which, however, did not yield sufficient results to allow further investigation. Therefore, the study broadly expanded the targeted research on themes and keywords: "internationalization theory", "international entrepreneurship", "digital internationalization", "digital technologies", "digital entrepreneurship", and "digital transformation". The search was limited to English papers in the period 2016-2018. Finally, we considered only articles that used the term "digitalization" in the sense of applying purely digital technologies.

Data analysis

Once the relevant articles were identified, we conducted an in-depth analysis and comparison of the articles. After completing the analysis, five suitable papers that offered more systematic reviews and incorporated most of the points found in other articles were selected. The

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novelty of the field could explain the lack of systematic studies. Thus, our choice of these five articles allowed us to adopt a more systematic approach to the synthesis of the key insights. In addition, we observed that the five studies complement each other in terms of specific insights.

Each of the studies was analyzed based on the title, publication period, theoretical framework used, and key findings (Table 2). All studies were first reviewed at an aggregate level to determine general directions. Although the perspective of analysis differs greatly from one study to another, the synthesis we present here is designed through four selected fields of activities related to the main internationalizing criteria. These are: costs, accessibility, resources and competences; market knowledge; distance and localization; and relational competences and partner networks.

Results

Costs, accessibility, resources and competences

Coviello et al. (2017) and Brouthers et al. (2018, 2016) agree that digitalization has a positive impact and helps companies in managing the risks associated with potential additional costs from their operations abroad (liabilities of foreignness). In their arguments, these authors suggested that technological advances also dematerialized distribution and production channels. These circumstances allow companies to specifically decrease transaction costs in foreign markets. For example, the use of IoT will result in changes in the management of geographically dispersed value chains and thus allow firms to reduce costs related to their international production (Strange & Zucchella, 2017). Furthermore, by exploiting digital tools, Autio and Zander (2016) argue that internationally active small firms can significantly reduce the amount of assets needed for operations, as well as cost of location specificity. Because commercial activities are managed remotely, SMEs operating digitally in international markets appear to be able to generate alternative revenues without making significant investments. Resource allocation in several markets, transaction time-savings, and more optimized decision-making processes are additional effects of digitalization.

At an international level, SMEs need to maintain a specific advantage that differentiates them from local competition. To achieve this, they can aim to maximize their entry-mode attractiveness by targeting a niche market and offering innovative high-quality products.

Another way is to collaborate with specific local distributors that are already integrated in a large network. By reducing operating costs and improving communication and interaction with all ecosystem stakeholders - including customers, partners, suppliers, and distributors - digital technologies present new opportunities in terms of skill sharing, open innovation, co-creation, and partnership between companies (Coviello et al., 2017).

Market knowledge

Stage model theories have emphasized that a firm's speed of internationalization depends heavily on its ability to acquire new knowledge about foreign markets. One of the most significant changes related to the acceleration of online exchanges is the ability to capture and disseminate a considerable amount of data (Neubert, 2018). As it is now possible to directly interact with customers, companies can better understand customer needs and personalize their services and offers. Furthermore, by enhancing machine-to-machine and machine-to-human interaction, IoT facilitates product customization. In addition, 3-D printers provide customers with greater influence over the design of their products and over the control of manufacturing origins (Strange & Zucchella, 2017). Thanks to these technologies, firms will better meet end-user requirements. Digitalization in such ways provides new fundamental experiential knowledge to companies.

Autio and Zander (2016) suggested that by combining the theoretical principles of *Lean Entrepreneurship* with the use of digital technologies, like big data and analytics, companies can conduct market experiments faster and in more countries. This allows firms to test products and services directly on potential customers in advance, no matter their location in the world (Strange & Zucchella, 2017). Thanks to these experiments and the market knowledge gained from them, companies have learned how to perform better and benefit from direct contact with consumers by better adapting and customizing their offers (Strange & Zucchella, 2017). Thus, they can frequently introduce advanced versions of their products and services (Strange & Zucchella, 2017; Brouthers et al., 2018, 2016). To improve their position abroad, companies use feedback and comments shared on user community platforms or social networks. These online apps are flourishing with the advent of digital technologies. For that reason, idea sharing is fundamental for market adaptation, as it allows companies to anticipate their marketing efforts, and deploy better-targeted marketing and prospecting

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activities (Brouthers et al., 2018, 2016). By communicating with user communities, SMEs become more responsive to implementing the necessary measures and, consequently, optimizing speed and marketing gains.

Emerging digital technologies are based mainly on the accessibility of internal and external data (Neubert, 2018). The collection of this abundant data (for social or commercial networks, or intellectual market knowledge) is a valuable source of information for companies and reduces cross-border information asymmetry (Autio & Zander, 2016). The data can be processed by predictive algorithms to assess a company's current conditions and future market attractiveness (Neubert, 2018). The decision-making process is also supported by more advanced data-mining techniques, such as machine learning. Based on artificial intelligence and statistical approaches, this technology helps firms to model and interpret collected data for strategic purposes. Market knowledge with deployment of user communities, data collection, and new sources of accessible information underline the market-based approach of most SMEs.

Distance and location

The digitalization effects on distance and location are manifested mainly by border dematerialization and the acceleration of internationalization operations. Not only can a company manage its international activities online, reduce psychological distances, and multiply targeted countries, but the activities will also be led by business networks and user communities. Nascent digital technologies are transforming the location and organization of manufacturing production worldwide and will encourage firms to favor decisions based on proximity with customers rather than production costs (Strange & Zucchella, 2017). In their research, Autio and Zander (2016) affirm that digitalization offers greater transferability of firm-specific assets. It allows small, internationally active firms to benefit from reduced dependence on location-bound assets in home and host countries (Coviello et al., 2017).

SMEs are often strongly advised to use rapid access to international trade promoted by digitalization. These pioneer leading firms create new opportunities to manage their activities from a distance and thereby reach a larger number of markets with the same productive resources by, for example, externalizing location-specific assets. Another aspect linked to distance and location was raised by Brouthers and colleagues (2018, 2016). They argued that when entering

a foreign market, SMEs are confronted with new internationalization obstacles called "liabilities of outsidership". This concept suggests that when a firm reaches a new market, it usually has few relations with other firms, and is consequently considered an outsider. Firms applying nascent digital technologies can counter this liability by generating value through the creation and coordination of a network of users via the construction and management of digital platforms.

However, although a platform is easily replicable from one country to another, transferring the user bases is more difficult. Therefore, small firms are forced to quickly reach a critical mass of users to establish themselves in foreign markets (Brouthers et al., 2018, 2016). A limited number of users does not encourage further interactions and makes market entry harder. And in most cases, because platform costs exceed expected profits, the expansion rate can be significantly slowed down. To counter this, companies need to succeed in attracting potential users to adopt and populate their platform, and rapidly develop a large community of users (Brouthers et al., 2018, 2016).

Relational competences and partner networks

Markets are mainly relationship networks that firms maintain with their distributors, suppliers and customers. Over time, internationalization theories have emphasized the importance of building and integrating networks on a global scale. However, the digital context challenges the very foundations of network theory, such that it is now necessary to fundamentally rethink our actual understanding of relationships across international trade (Autio and Zander, 2016).

First, there are a growing number of market participants acting on both sides, as sellers and as buyers (Coviello et al. 2017). This allows SMEs to integrate customers into their ecosystem and develop direct contact with them. More precisely, Strange and Zucchella (2017) argued that firms can now involve customers *as providers of key information and feedback on products, and even as local manufacturers*. These authors pointed out that the relationship between firms and customers changes dramatically and gets redefined in many ways. Second, markets are current, momentaneous and dedicated to specific transactions (Coviello et al., 2017). This makes it more difficult to conclude long-term relationships with actors integrated at the time into any network in question. Because digital technologies are increasing the number of instantaneous, brief and interrelated

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interactions, the pace of these encounters is also accelerated. It thus allows firms to speed up their market adaptation to reach several new foreign markets at the same time (Coviello et al., 2017). Finally, the intensified use of the Internet has initiated and amplified the creation of one large virtual global "market" for trade involving economic and social transactions, as well as exchanges of tangible and intangible goods (Coviello et al., 2017). This development has led to a broadening market scope, and also afforded better access to local market actors and partners.

Thanks to the wide flow of data, SMEs are now often more oriented towards exchanges than production (Coviello et al., 2017). And these exchanges seem to provide new opportunities for international trade. Indeed, companies have increased access to local knowledge and simultaneously can enhance the reliability of their main relationships. By sharing data and skills with partners, SMEs have new possibilities for integrating targeted networks. To maintain these exchanges, decision-makers are recommended to set up processes and mechanisms to arrange relationships developed with a diversified and dispersed set of actors, both internally and externally (Coviello et al., 2017). Small firms likewise should aim to multiply user communities in several countries, while making sustained use of social networks and mass media deployed there (Brouthers et al., 2018, 2016). In their research, Brouthers and colleagues (2018, 2016) also suggested collaborating with opinion leaders and change agents in foreign markets. These well-known actors and public figures can serve as powerful levers in social media and user communities around the world. They can help a company become known quickly and build its online reputation, resulting in small firms internationalizing faster.

Discussion

This paper combines two research streams to understand their links and relationships. Through our observations, we first noticed a lack of congruence in internationalization research between existing models and the actual environments in which SMEs operate. Then, by taking into consideration scientific research focused on digitalization, we found that there are many untapped entrepreneurial opportunities for firms to undertake successful international trade. These findings corroborated the need to address the digital issue on

traditional internationalization theories and allowed us to highlight the main effects of digital technologies on the activities of small firms abroad. Through the results shown in Table 3, we clarified how SMEs can use digital technologies to achieve successful international activities.

International trades are transforming and dematerializing the rate of digitalization. Our results highlighted the dynamic of a current, international environment constantly in movement. SMEs are immediately connected on a global scale without necessarily requiring specific resources or business networks. Here are some of their impacts:

- they are threatening large companies by sharing their skills via large groups of entrepreneurs;
- transaction costs are significantly reduced;
- communication, distribution, and production channels are dematerialized;
- markets are virtual, instantaneous, and more competitive;
- physical flows are giving way to data flows;
- geographical distances are virtually reduced and allow partner networks to largely dominate trade negotiations between nations;
- seller and buyer meet directly, regardless of distance or time zones;
- consumers are directly integrated into development and internationalization processes; and,
- the emergence of user communities and social media enables firms to test and adapt offers to local markets and, in some cases, to diversify activities.

Digitalization has removed many international barriers and allows larger SMEs to engage in international markets and act like micro-multinationals. Nevertheless, the impact of fundamental uncertainty (Kraus et al., 2019; Ojala et al., 2018) and the need to take into account non-linearity and interdependencies in the internationalization process, increase complexities for

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entrepreneurs, and have a direct impact on the entrepreneurial competences needed in foreign markets. Thanks to our research, we noticed that entrepreneurs and managers are widely encouraged to effectively integrate their organizational capacities and skills, strategically position themselves as market participants, and actively drive their own ongoing digital transformation.

Nowadays, the use of technologies impacts firms by enabling a transformation of not only their operations, offerings and value propositions, but also by enhancing their interactions with customers. Furthermore, it supports the firms' numerous organizational and strategic aspects and allows them to overcome several internal barriers. For instance, at a strategic level, nascent digital technologies affect the configuration and coordination of the entire value chain. They can create essential networks and sources of data that aid and allow firms to directly find investors, recruit talent, and solicit opinion leaders or change agents. Our findings show that digitalizing business functions could involve redesigning a firm's business model in a way that enables new opportunities for internationalizing, creating value, and developing customer relationships. For instance, digitalization facilitates a "servitization" transition in some companies, which means adding different services to complement an earlier product offer, and, thus, adds support for the customer in a broader way (Aagaard et al., 2019).

There are essential factors involved when defining the international scalability of an SME's business model. A B2C-oriented business model designed to reach critical mass that combines with user engagement and a collaborative approach is one of these essential factors. Digitalization will also change the production, transportation, and logistics patterns. In their research, Hannibal and Knight (2018) mentioned the "de-globalized" production and other strategic opportunities with regard to diversification. For example, the use of 3D-printers will allow firms to base their production site closer to consumers and, in this way, favor customization and reduction of transportation and logistics costs. Based on these results, our research calls into question the "international" dimension of international trade. Instantaneous access to foreign markets is a reality and, as shown in our results, a greater role to be played by nascent digital technologies is just beginning to happen.

Conclusion and Agenda for Future Research

In the light of increasing digitalization, our paper contributes to the literature by providing a new perspective on contemporary research involving internationalizing companies. It presented an in-depth analysis of five scientific research papers and aimed at understanding international trades in transition as initiated by global digital technologies. From a managerial point of view, our study addressed digitalization issues involved at the firm's structural and strategic level. Linked with standard internationalization criteria, key points identified in our research (Table 3) show how managers acting in foreign markets could benefit from digital technologies.

We are convinced that the convergence of globalization and digitalization clearly demonstrates the need for business leaders and decision-makers to reassess their strategies. As we are still early in the digital era, significant opportunities remain to be seen. However, most managers currently have little theoretical knowledge of digitalization history or trends. Managers may benefit from the use of digital tools in several ways if they can rapidly master and integrate them into their internationalization process. The faster a company understands the benefits of using digital technologies, the faster it can improve its decision-making processes and accelerate its internationalization speed (Neubert, 2018).

In these circumstances, future research should focus on using quantitative and qualitative data to empirically study the effects of digitalization on internationalization processes. Such data would be valuable to help define how the use of digital technologies affects internationalization models and strategies. In the literature, the risks of digitalization in international trade are not empirically addressed. Although the research we conducted agreed that the use of digital tools has a positive effect on international expansion, the limits of digitalization could be an avenue for future research. Indeed, risks related to digital internationalization, like the increase of price pressures, intensification of aggressive global competitiveness, cybercrime, and the lack of global legal protections, are some examples of topics still largely unexplored. Concerning legal protection, new institutional arrangements and standards will emerge to regulate the growing interconnectivity and complexity generated by

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digital environment, and companies will likewise face new entry barriers and regulatory compliances imposed by governments.

Another interesting research orientation related to digital internationalization is the context of emerging economies. Because the world is more interconnected than ever, scientific research related to internationalization theories should pay more attention to emerging countries, where a multitude of niche markets are rapidly flourishing thanks largely to digitalization, and its “leapfrog” potential. It is the first time in history that emerging markets have become counterparts in more than half of global trade flows, while South-South trade between nations is the fastest-growing type of connection (Manyika et al., 2016). In view of the above, research into internationalization has, therefore, many unexplored avenues of study open and available regarding digital transformation. Researchers should focus on empirical data collection and adapt their approach to realities on the ground (Delios, 2017). Future research on digitalization needs to build new theoretical models better adjusted to the current international trade environment than the frameworks commonly found in the literature.

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Citation: Hervé, A., Schmitt, C., Baldegger, R. 2020. Internationalization and Digitalization: Applying digital technologies to the internationalization process of small and medium-sized enterprises. *Technology Innovation Management Review*, 10(7): 28-40.
<http://doi.org/10.22215/timreview/1373>



Keywords: Internationalization, international business, digital entrepreneurship, digitalization, digital technologies, SMEs.

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Appendix - Table 2. Overview of selected papers used in the synthesis

Authors (year)	Title	Scientific review	Research objective	Theoretical framework	Key results
Autio and Zander (2016)	Lean internationalization	<i>Academy of Management Proceedings</i>	This research explores how digitalization impacts expansion processes of INVs. By focusing on their business operations, authors explain how the use of digital tools affects international trade.	<i>Transaction cost theory</i> <i>Foreign entry mode</i> <i>International Entrepreneurship</i>	Through several proposals, the researchers present the main effects of digitalization on the INV internationalization process. Their proposals suggest that digitalization mainly reduces geographical distances, the specificity of vertical and horizontal assets, and cross-border information asymmetries. By linking lean entrepreneurship practices to digitalization, the authors formulate a new theoretical lens: <i>Lean Internationalization</i> .
Coviello and al. (2017)	Adapting the Uppsala model to a modern world: Macro-context and micro-foundations	<i>Journal of International Business Studies</i>	This study is a counterpoint to the last Uppsala Model version (2017). It examines two missing dimensions to the model: the impact of the digital context at a macroeconomic level and the role of decision-makers at a microeconomic level.	<i>International Business</i> <i>Entrepreneurship</i> <i>International Entrepreneurship</i>	Research results underpin the importance of studying the digital context at a macroeconomic level to create and exploit new opportunities in foreign markets. Based on the Uppsala model, the authors develop a three-level conceptual framework. This model integrates the macro and micro characteristics studied in their counterpoint.
Strange and Zucchella (2017)	Industry 4.0, Global Value Chains and International Business	<i>Multinational Business Review</i>	Based on the main digital technologies (IoT, big data and analytics, robotic systems, and 3D-printers), this research aims to assess how their adoption impacts the location and organization of activities in global value chains.	<i>Industry 4.0</i> <i>International Business</i>	The authors report the way in which digital technologies are disrupting how and where activities are located and organized within global value chains as well as who captures the value added within those chains. Through real facts, their research explains the concrete effects of digital technologies on the practice and theory of international business.
Brouthers et al. (2018, 2016)	Explaining the internationalisation of business firms	<i>Journal of International Business Studies</i>	The authors extend internationalization theories to digital firms. Based on a literature review and case studies, they examine and compare the internationalization process of such firms.	<i>International Business</i> <i>Social network theory</i> <i>Diffusion of innovation theory</i>	Thanks to the use of platforms, the authors suggest that digital firms are less impacted by the liabilities of foreignness. On the other hand, these digital companies might suffer from a lack of relationship with existing networks and be faced with more difficulties in developing potential collaboration across foreign markets (liabilities of outsidership). Based on a multi-case study, their research develops a new theory and testable hypotheses.
Neubert (2018)	The impact of digitalization on the speed of internationalization of lean global startups	<i>Technology Innovation Management Review</i>	This research aims to demonstrate how the use of digital technologies in the expansion process accelerates the internationalization rate of Lean Global Start-ups.	<i>Lean Global Startup</i> <i>International market development processes</i>	Results confirm a significant and positive impact of digitalization on the start-up internationalization process. The authors suggest that the integration of digital technologies allows companies to deploy new knowledge, to rapidly integrate relational network, to improve the efficiency of decision-making processes and, finally, to accelerate the speed of internationalization.

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Appendix - Table 3. Digital effects and opportunities for international trades

	Digitalization effects on internationalization activities	Opportunities for defining new value propositions through digital use
Costs, accessibility, resources, and competences	<ul style="list-style-type: none"> ● dematerialization of distribution and production channels ● reduction of assets and location specificity ● improvement of interaction and exchanges ● reduction of additional cost for foreign operations ● resource allocation in several markets ● time-saving transactions ● optimization of decision-making processes ● asset specificity attenuated ● acquisition of specific resources and competences ● reduction of customers' acquisition costs 	Alternative revenue through digital platforms and infrastructures
		Targeting niche markets and innovative high-quality products
		Sharing of skills and capacities between companies
		Open innovation and co-creation with partners and customers
		Partnership with other companies
		Integrating IoT into the value chain to reduce production costs
		Local market development
		Investment in qualified human capital
		Market knowledge (general and based on experience)
Regular market experiments for product and service adaptations		
More frequent introduction of new product or service versions		
Using customer feedback and comments		
Better targeted marketing and prospecting activities		
Data collection and use of predictive algorithms for modelling and interpreting data		
Using data to anticipate consumer behavior		
Distance and location (psychological and physical)	<ul style="list-style-type: none"> ● border dematerialization ● acceleration of internationalization operations ● reduction of psychological distances ● activities led by networks rather than countries ● greater transferability of a firm's specific assets ● less specificity related to location ● reduction of dependence on location-bound assets ● management of international activities from a distance ● creation of networks of users via platforms ● democratization of consumption ● better access to new targeted markets 	Reaching a large number of markets with the same production resources
		Externalizing location-specific assets
		Developing a large community of users
		Partnerships with local companies via platforms
		Licensing products and services to local firms
		Sharing production and distribution sites
		Prioritizing decisions on proximity with customers over production costs
		Local and niche market development
Relational competences and partner networks	<ul style="list-style-type: none"> ● increasing number of actors in markets ● momentaneous markets for specific and faster transactions and interactions ● larger market scope for selecting targeted markets ● creation of one large virtual market for international trades ● better access to local knowledge, network skills and market actors / partners ● exchange-oriented rather than production-oriented ● better reliability in relationships 	Developing direct interactions with customers
		Data and skills sharing between partners to reach targeted networks
		Setting up processes and mechanisms to maintain relationships
		Using multiple user communities in several countries
		Making sustainable use of social networks and mass media
		Collaborating with opinion leaders and change agents
		Building and maintaining a strong online reputation

Source: from the authors