

Digitalization, Entrepreneurial Orientation and Internationalization of Micro-, Small- and Medium-Sized Enterprises

Annaële Hervé, Christophe Schmitt, Rico Baldegger

“ In the new world, it is not the big fish which eats the small fish, it's the fast fish which eats the slow fish. ”

Klaus Schwab,
Founder and Executive Chairman,
World Economic Forum

Nowadays, we are living in a digitally connected global economy that is completely transforming trade in foreign markets and exposing firms, particularly micro, small and medium-sized enterprises (MSMEs), to major changes and new opportunities. As the use of digital technologies is creating more fluidity and nonlinearity across time and space in entrepreneurial processes, our research adopted a conceptual process to investigate how the digital transformation of MSMEs will support decision-makers in international businesses. Based on a quantitative research design, we demonstrate that the more a company digitalizes its functions, the more it favours entrepreneurial behavior to lead successful strategic decisions in foreign markets. Our results are discussed in detail and we propose several ways to benefit from opportunities arising from the use of digital technologies.

Introduction

With the advent of digital technologies, a new industrial revolution has arrived, bringing disruptive changes along with future progress (Schwab, 2017). At the heart of this, businesses and society are transforming in such a way that institutions are faced with a fundamental need for radical changes in their structure and operating methods. They are developing complex economic systems that must grasp, in a concrete manner, many elements involving dynamic interactions (Morua et al., 2015). Nowadays, the digital context is transforming the very paradigm of international business. This requires companies to find new opportunities to maintain their competitive advantage not only domestically, but also abroad. The changes are major and, given the fact we are living in an increasingly hyperconnected world, micro, small and medium-sized enterprises (MSMEs) are particularly exposed to new challenges and opportunities in foreign markets (Manyika et al., 2016).

For decades, trade in goods and services between nations has defined the image of globalization.

However, although the dynamics of physical flows are currently moderate, globalization is not slowing down. On the contrary, many flows of data continuously move across borders and their volume has increased considerably. As a result, globalization is dematerializing and redefining itself with the faster pace of these information and data exchanges. In this context, digital technologies and platforms have been created to reach new markets, serving to resize the economics of cross-border business, notably by reducing costs, shortening transactions and increasing market knowledge through greater interactions. In other words, as outlined by Manyika and colleagues (2016), *digital globalization is changing who is participating, how business is done across borders, how rapidly competition moves, and where the economic benefits are flowing.*

To date, research has clearly demonstrated that in order to make a difference in foreign markets, companies need to adopt an entrepreneurial orientation (EO) by being innovative, proactive, and risk-taking in their decisions. Because emerging technologies are creating more fluidity and nonlinearity in entrepreneurial processes

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and activities across time and space (Nambisan, 2017), we are convinced their use supports firms in adopting new behaviors for differentiating themselves from competitors, anticipating future changes, and undertaking investments with uncertain results. Indeed, the use of digital technologies —and, in particular, their convergence - offers a range of possibilities to optimize operations and redesign value creation. Over the last decade, research has been conducted to address either particular aspects of digitalization and internationalization of firms (Ziyae et al., 2014; Autio & Zander, 2016; Coviello et al., 2017; Hagsten & Kotnik, 2017; Strange & Zucchella, 2017; Brouthers et al., 2018; Hannibal & Knight, 2018; Neubert, 2018; Ojala et al., 2018; Stallkamp & Schotter, 2018; Watson et al., 2018; Wittkop et al., 2018; Enjolras et al., 2019) or EO and internationalization of firms (Knight, 2001; Jantunen et al., 2005; Covin & Miller, 2014; Brouthers et al., 2015; Reuber et al., 2018). However, few studies have relied on empirical evidence to test the effects of digitalization on internationalizing firms, and none of them have integrated the concept of EO.

In light of these observations, our research aims to propose a new look at traditional theories by introducing a conceptual process regarding the relationship between digitalization, EO, and the internationalization of MSMEs. On the basis of a quantitative survey, this study aims to (1) investigate the relationship between the degree of digitalization and the degree MSMEs' EO, and (2) investigate the relationship between each EO component and the internationalization intensity of MSMEs. The focus of the study is on gaining an understanding of how the use of digital technologies can support entrepreneurs' behaviors, that in turn, will support decision-making to enhance the propensity to internationalize. By exploring a significant phenomenon for the future of MSMEs (Manyika et al., 2016), the study aims to provide a new dynamic for contemporary research on globalization and to illustrate the reality on the ground (Delios, 2017).

Literature Review and Hypotheses

International Entrepreneurship

Over time, researchers have incorporated multiple theoretical perspectives to explain the internationalization of firms. Although research initially focused mainly on large firms, many authors have explored the pattern and pace of

internationalization of new ventures since the 1990s (Coviello & McAuley, 1999; Gankema et al., 2000; Lu & Beamish, 2001; Zahra & George, 2002; Rialp et al., 2005; Ruzzier et al., 2006; McAuley, 2010). The implications of this research resonate with the increasing amount of evidence compiled regarding entrepreneurial firms aiming at rapid internationalization, which are small, resource-poor, and in some cases at an early stage in their development. So far, conventional theories from international business have argued that smaller and younger firms were limited in resources and inexperienced in dealing with global trade (Brouthers et al., 2015). Traditional frameworks were based mainly on linear and sequential processes of internationalization, assuming that knowledge should be acquired gradually over time (Johanson & Vahlne, 1977). The emphasis on these smaller firms gaining a competitive advantage in multiple countries from inception has brought the emergence of a new research stream (Knight & Liesch, 2016); International Entrepreneurship (IE), where international business and entrepreneurship theories intersect. The interest here is in drawing a theoretical base and perspectives on MSMEs and young firms that venture abroad (Oviatt & McDougall, 1994; McDougall & Oviatt, 2000; Zahra & George, 2002; Oviatt & McDougall, 2005; Rialp et al., 2005; Baldegger & Schueffel, 2009; Keupp & Gassmann, 2009; Jones et al., 2011; Autio, 2017).

IE and Entrepreneurial Orientation

At the outset, IE was first defined as *a combination of innovative, proactive, and risk seeking behavior that crosses national borders and is intended to create value in organizations* (McDougall & Oviatt, 2000). This definition of IE is closely linked with the concept of EO, which is *the propensity to use new behaviors for anticipating and acting on future changes in the external environment, and the willingness to undertake investments with uncertain results* (Lumpkin & Dess, 1996). Researchers have suggested that EO provides one of the key capabilities for building competitive advantage in markets (Lumpkin & Dess, 1996). In IE, the popular emergence of the role of entrepreneurial behavior has been broadly investigated and gave birth to International Entrepreneurial Orientation (IEO), which is a multi-dimensional concept that captures the propensity of entrepreneurs to be innovative and proactive, and to take risks in an international context (Knight, 2001; Covin & Miller, 2014). According to this concept, EO seems to provide the company with skills to make better use of its internal resources, to obtain and exploit resources from external sources more efficiently,

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and thus, to enhance its internationalization prospects (Jantunen et al., 2005; Brouthers et al., 2015).

Notwithstanding the EO perspective (see this edition Baldegger, Caon, Sadiku 2020), Oviatt and McDougall (2005) argued that the combination of innovative, proactive and risk taking behaviors was not the only entrepreneurial dimension related to IE. Thus, they proposed an alternative view, one that was more focused on recognising opportunities, thus defining IE as: *“the discovery, enactment, evaluation, and exploitation of opportunities – across national borders – to create future goods and services”* (Oviatt & McDougall, 2005). The inclusion of opportunity as a driver of internationalization has been recognized by prominent IE scholars but, as pointed out by Reuber and colleagues (2018), the meanings and roles of those opportunities remain underdeveloped.

Nowadays, with the burgeoning digital economy and global business ecosystems, factors enabling the discovery and pursuit of new opportunities have become more persuasive (Autio et al., 2018). These nascent factors are influencing the processes and strategies of internationalizing MSMEs by allowing them to rethink their business models thanks to the use of digital technologies (Andersson et al., 2014). In this context, several opportunities are emerging for defining new strategic orientations and new forms of internationalization (Coviello et al., 2017; Kriz & Welch, 2018) and, as mentioned by Knight and Liesch (2016), it is currently fundamental to study the role of digitalization in recognizing and exploiting those future opportunities for international trade. Thus, a wide body of literature has recently emerged that focuses on jointly addressing IE and digitalization (Kollmann & Christofor, 2014; Ziyae et al., 2014; Autio & Zander, 2016; Coviello et al., 2017; Etemad, 2017; Hagsten & Kotnik, 2017; Strange & Zucchella, 2017; Brouthers et al., 2018; Hannibal & Knight, 2018; Kriz & Welch, 2018; Neubert, 2018; Ojala et al., 2018; Stallkamp & Schotter, 2018; Watson et al., 2018; Wittkop et al., 2018; Chen et al., 2019; Enjolras, Camargo, Schmitt, 2019; Banalieva & Dhanaraj, 2019; Monaghan et al., 2019;). However, studies have mainly tested the internationalization patterns of technological firms and little research relies on empirical data for measuring how digital technologies affect the activities of established internationalizing MSMEs. Furthermore, as an investigation focusing on new digital opportunities with regard to the strategic position is overdue, we aim to address this gap in the

literature by empirically testing how the degree of digitalization affects the orientation of firms, as well as how this orientation affects the intensity of internationalization. We propose a new look at traditional theories on internationalization by conceptually studying the process of relations between digitalization, EO, and internationalization of MSMEs.

Digital Entrepreneurship

Digital entrepreneurship (DE) emerged a decade ago at the intersection of digitalization and entrepreneurship. Principally based on a theoretical foundation of entrepreneurship, which involves recognizing, seizing and transforming opportunities into marketable goods or services to create new value, DE is of growing interest to more and more scholars (Hull et al., 2007; Davidson & Vaast, 2010; Giones & Brem, 2017; Nambisan, 2017; Le Dinh et al., 2018; Hsieh & Wu, 2019; Kraus et al., 2019). The origin of this research stream emerged following the rapid technological advances that have transformed the very nature of entrepreneurial activities and made it possible to overcome the uncertainty inherent in the processes and results of entrepreneurship (Nambisan, 2017). DE can be defined as a subcategory of entrepreneurship, *“the pursuit of opportunities based on the use of digital media and other information and communication technologies”* (Davidson & Vaast, 2010). Because digital technologies create more fluidity and nonlinearity across time and space into entrepreneurial processes, DE aims to define how these nascent technologies and their unique characteristics can be used to shape entrepreneurial activities and orientation (Nambisan, 2017). Research on DE is therefore growing at the heart of the digitalization phenomenon, which is often faced with terminological confusion. By linking research work to information technology and DE, we provided a theoretical approach to these notions.

First, we drew a distinction between the two closely related concepts “digitization” and “digitalization”. According to Tilson and colleagues (2010), the first term digitization is a “technical process” that renders technologies digital. It means converting and representing something analog or physical into a digital format that can be used by a computing system. Thanks to digitization, information can be standardized into the same format and be processed by the same technologies. Digitalization, on the other hand, is *“a sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural”* (Tilson et al., 2010). In other words, it is the combination and application of digital technologies

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within an organization, economy, and society, in order to create and share value. Nowadays, many societies are experiencing a new wave of digitalization (Legner et al., 2017), characterized by the emergence and converging of many innovative technologies in the domains of robotics, artificial intelligence, the internet of things, mobile applications, augmented and virtual reality, big data, cloud, 3D printers, blockchain, nanotechnology, biotechnology, and quantum computing. The application and overlap of these digital technologies are impacting many segments of companies by drastically transforming and dematerializing temporal and spatial dimensions of businesses, as well as expanding global access.

DE and the role of entrepreneurs

To truly understand digitalization and the resulting creation and enactment of entrepreneurial opportunities, we address DE in a more applied context, thanks to expanding knowledge in the literature. The digital environment provides a competitive landscape in which taking an entrepreneurial strategic posture may be particularly beneficial to MSMEs. Because firms might be expected to preserve a market advantage by demonstrating innovative, proactive, and risk-taking efforts (Covin & Slevin, 1989), the use of digital technologies offers new opportunities to enhance current entrepreneurial orientation by optimizing processes, managerial, and strategic decisions (market entry, customer targeting, partnership, pricing decisions), and customization (Lumpkin & Dess, 2004; Watson et al., 2018; Kraus et al., 2019; Aagaard et al., 2019). Digital technologies create more variability in entrepreneurial activities and allow MSMEs to rapidly and easily enhance their capabilities and performance to create value (Lumpkin & Dess, 2004; Nambisan, 2017).

However, the widespread adoption of digital technologies has also changed the role of founders. Indeed, governance becomes less centralized and thus more distributed between groups of actors that share value creation (Nambisan, 2017). Although research on entrepreneurship has so far focused mainly on the entrepreneur as an individual who leads operations from the idea inception to its realization, the use of digital technologies is extending this role by allowing a broader set of actors, with different goals, to participate in entrepreneurial initiatives. As Nambisan (2017) highlighted, these new stakeholders, either individuals or ventures, are directly involved in opportunity recognition and processes by, for instance, the use of

digital platforms, social media, or even crowdsourcing and crowdfunding systems. This creates a global network with a plethora of new possibilities and opportunities for innovative collaboration, strategic alliances, co-creation, open innovation, networking, and creativity (Bell & Loane, 2010). However, the implementation of digital technologies has triggered a change in firms' functions. Entrepreneurs are then faced with transformation across internal and external dimensions of their business (Bharadwaj et al., 2013; Pagani, 2013; Gray & Rumpe, 2015; Matt et al., 2015; Porter & Heppelmann, 2015; Schallmo et al. 2017; Autio et al., 2018; Aagaard et al., 2019; Kraus et al., 2019). These dimensions can be categorized, as suggested by research carried out by Greif and colleagues (2017), through four main pillars of transformation, including at an internal level, **processes and infrastructure (operations)** as well as **people and culture (training)** and, at an external level, **digital sales (experience)** as well as **customer involvement (relationship)**.

By combining current capabilities with capabilities enabled by digital technologies, firms can shape a new value proposition and orientation supported by decision-makers (Westerman et al., 2011; Bharadwaj et al., 2013; Pagani, 2013; Kane et al., 2015; Matt et al., 2015; Ross et al., 2016; Sebastian et al., 2017). Therefore, as the literature assumes a relationship between digitalization and managerial decisions, we developed our baseline hypothesis to examine the effect of the degree of digitalization on the EO of MSMEs.

Hypothesis 1: *A high degree of digitalization contributes positively to an increase in the degree of EO in MSMEs.*

We were interested in investigating the extent to which the use of digital technologies could be a source of opportunities for internationalizing MSMEs. Thus, as we assumed that the implementation of such techniques supports their EO, we then intended to observe how EO is related to the internationalization intensity of the MSMEs surveyed. To evaluate and identify the internationalization intensity of firms, the literature suggests different measures and determining factors (Oviatt & McDougall, 1994; Jones & Coviello, 2005; Ruzzier et al., 2006). The most frequently used measures underpinning internationalization intensity consist of four main indicators, including the **scale** (share of turnover from foreign markets), the **scope** (geographical market involved), the **speed** (rate at which revenues are generated), and the **mode** (market entry for cross-border activities) (Oviatt & McDougall, 1994; Zahra & George,

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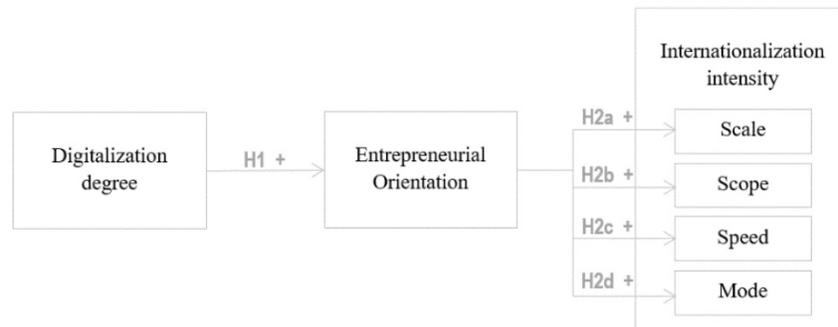


Figure 1. Research framework

2002; Jones & Coviello, 2005; Ruzzier et al., 2006; Kuivalainen et al., 2007; Brouthers & Hennart, 2007; Andersson et al., 2014). As reflected in the relevant literature, an entrepreneur's experience and their global mindset are prerequisites for successful internationalization in terms of increased intensity. Therefore, our next hypothesis indicates that we expected greater EO to be associated with internationalization intensity among MSMEs.

Hypothesis 2: *A high degree of EO contributes positively to an increase in a) the scale, b) the scope, c) the speed, and d) and the mode of internationalizing MSMEs.*

The proposed research framework and the formulated hypotheses are highlighted in Figure 1. This representation shows a conceptual process in which the degree of digitalization supports EO, and in turn, affects the internationalization intensity of MSMEs.

Methodology

Sample and data collection

To gather empirical evidence, our study relied on a quantitative research design. Based on the key determinants of DE, EO, and IE compiled from literature, the quantitative approach took stock of the Swiss context. Highly involved on the international stage and given its cultural and language diversity, Switzerland is a good representative of internationalizing firms. Approximately 99% of companies are MSMEs, which account for more than two thirds (67.6%) of total business employment (FSO, 2019). This high proportion demonstrates the major role MSMEs play in the Swiss economy. Approximately 9% of the 586,2147 companies registered in Switzerland export goods every year (FCA, 2019),

representing around 40,000 MSMEs. These firms make a significant contribution to the total export of Swiss goods, with an overall share amounting to 45% (FSO, 2019). Although Switzerland is resource poor, it is nonetheless highly competent in basic and innovative technologies (GDS, 2018), thus comprising an interesting setting with respect to digitalization. We tested our hypotheses using a secondary database from Swiss internationalizing MSMEs (Baldegger et al., 2019). Maintaining the relative weight of each category, 8,000 firms were randomly selected and surveyed; hence including almost 20% of the total exporting Swiss MSMEs. To ensure homogeneity in our sample and because we were interested in MSMEs, we excluded firms with more than 250 employees. Moreover, we only took into consideration firms that generate more than 5% of their annual sales revenue in foreign markets. Our final sample comprised 190 MSMEs that met our inclusion criteria. On average, respondents have been selling and trading in foreign markets for more than 30 years and generate around 55% of their total revenue abroad. The selected MSMEs taken into consideration have on average 60 employees and come mainly from manufacturing and professional services.

Measures

Within our database, we focused on specific measurements that were validated in existing literature, and thus relied on three key variables in the empirical analysis: degree of digitalization, entrepreneurial orientation and internationalization intensity.

Degree of digitalization

The variable degree of digitalization consists of a four-item scale related to various strategic pillars of companies (Greif et al., 2017). Based on a self-evaluation, companies were asked to assess the level of

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digitalization of each item using a score range of 1 to 4. The four items are divided into two internal pillars — **processes and infrastructure**, as well as **people and culture**, and two external pillars — **digital sales** and **customer involvement**. To measure each dimension as comprehensively as possible, respondents were asked to scale their degree of digitalization on the basis of four statements that helped firms to position themselves on a score ranging from 1 to 4. The higher the score of the selected statements, the higher the degree of digitalization.

Entrepreneurial orientation

To measure the EO of our sample, we used the questionnaire developed by Colvin and Slevin (1989). It consists of nine items consolidated under three unidimensional strategic orientations: innovativeness, proactiveness, and risk-taking. Managers for our survey were asked to indicate the extent to which each item reflects their strategic posture on a seven-point Likert scale that divided pairs of opposite statements. The higher its overall score, the more entrepreneurial the company's strategic posture (Covin & Slevin, 1989; Lumpkin & Dess; 1996).

Internationalization intensity

To articulate the intensity of internationalization, we focused on four factors: the scale, scope, speed and mode of internationalization. Firstly, we measured the scale indicator with the percentage of sales derived from foreign market activities to total firm sales revenue (Oviatt & McDougall; 1994; Zahra & George, 2002; Knight & Cavusgil, 2004; Kuivalainen et al., 2007). Secondly, we explored the market scope in line with the literature, and measured it according to the number of geographical markets with which MSMEs are involved and have generated revenue (Zahra & George, 2002; Jones & Coviello, 2005; Kuivalainen et al., 2007; Andersson et al., 2014). Thirdly, we considered the speed of internationalization. Because there is no established conceptualization or measurement tradition for this variable, we refer it to the current ratio of foreign sales to total sales in relation to the number of years involved abroad (Jones & Coviello, 2005; Oviatt & McDougall, 2005; Kuivalainen et al., 2007; Andersson et al., 2014; Ziyae et al., 2014). Finally, the mode of internationalization was considered according to the particular combination of entry strategies applied by the MSMEs surveyed. Several alternatives of entry mode have been addressed in the literature and we have selected the main ones, including direct exports, indirect exports, e-commerce, licensing and

franchising, joint venture, and subsidiaries (Datta et al., 2002; Malhotra et al., 2003; Jones & Coviello, 2005; Brouthers & Hennart, 2007; Hashai et al., 2010; Andersson et al., 2014).

Results

In this study, special care was taken to ensure the validity and reliability of our measurements. Thus, to determine the adequacy of our measurement model we first investigated the internal consistency of the measured constructs through a reliability analysis. Results show a variable degree of digitalization and EO Cronbach Alpha values of more than 0.7, which is higher than expected by Hair and colleagues (2006). However, the variable of internationalization intensity has a Cronbach Alpha value of 0.401. Thus, instead of constructing a composite variable, as was the case for digitalization and EO, we did not create a mean score for internationalization intensity, but rather used single items of measurement. Finally, in our research, we also created composite variables consolidating the 9 items of EO under the three unidimensional constructs; innovativeness, proactiveness, and risk-taking (Covin & Miller, 2014). Table 1 introduces a description of the constructs and displays the results of the reliability analysis involving key variables.

In order to test our hypotheses and evaluate the relations between variables, we statistically relied on a regression analysis. On the one hand, we investigated the relationships that may exist between degree of digitalization and degree of EO for MSMEs, while, on the other, the relationships between decomposed EO factors and the internationalization intensity of MSMEs.

Hypothesis 1: Degree of Digitalization and EO

As a first step, a regression was calculated to predict the degree of EO based on the degree of MSMEs' digitalization. The regression results revealed that a company's degree of digitalization is positively and significantly related to its degree of EO ($\beta=.402$; $p<0.001$). This allowed us to validate our first hypothesis (H1). Since we were not interested solely in the general hypothesis that considers the average degree of digitalization, we operationalized based on four specific hypotheses to detail the results. In short, we considered it more significant to decompose EO factors in detail, and thus aimed to further deconstruct the process proposed in our research model by analyzing how the degree of digitalization of each pillar affects each EO

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Table 1. Descriptive statistics.

	Mean	Median	Minimum - Maximum	Standard deviation	Number items	Alpha value
Degree of Digitalization	2.15	2.00	1.00 – 4.00	0.723	4	.719
• Process and infrastructures	2.35	2.00	1.00 – 4.00	0.940	1	-
• People and culture	2.43	2.00	1.00 – 4.00	0.855	1	-
• Digital sales	1.64	1.00	1.00 – 4.00	0.863	1	-
• Customer involvement	1.92	1.00	1.00 – 4.00	1.072	1	-
Degree of EO	4.33	4.55	1.00 – 7.00	1.093	9	.828
• Innovativeness	4.27	4.33	1.00 – 7.00	1.353	3	.678
• Proactiveness	4.51	4.66	1.00 – 7.00	1.258	3	.664
• Risk-taking	4.28	4.33	1.00 – 7.00	1.229	3	.845
Internationalization intensity	• Scale	55.47	5.00 – 100.00	34.822	1	.401
	• Scope	19.90	0 – 193	25.526	1	
	• Speed	3.68	0.18 – 30.00	5.022	1	
	• Mode	1.95	1.00 – 6.00	1.082	1	

component. In order to test these contributions, we subdivided three separate regression models. The first was calculated to predict EO innovativeness based on the degree of digitalization of each pillar. Results show that EO components are mainly affected by the degree of digitalization of the internal pillars. The relationship between digitalization of the firm's pillars and innovativeness highlights a positive effect of process and infrastructure ($\beta=.344$; $p=0.000$) as well as people and culture ($\beta=.308$; $p=0.001$). The second model investigated the construct of proactiveness. A similar pattern of results was found with the pillar process and infrastructure ($\beta=.318$; $p=0.003$) as well as people and culture ($\beta=.311$; $p=0.002$). We then calculated the last model with the risk-taking factor and found a tendential positive result with the pillar process and infrastructure ($\beta=.183$; $p=0.091$), as well as a positive relationship with people and culture ($\beta=.306$; $p=0.004$).

Hypothesis 2: *EO and the intensity of internationalization*

Regarding our second hypothesis, we also decided to use decomposed EO factors in order to provide a more relevant analysis, as well as to observe in more detail how innovativeness, proactiveness, and risk-taking affect the propensity of MSMEs' internationalization. The regression results highlighted that not all components of EO are significant predictors of MSMEs' internationalization, and revealed that none of the EO factors are a driver of scale and mode. Notwithstanding these first observations, the regression analysis for scope indicated a positive and significant relationship with proactiveness ($\beta=.270$; $p=0.010$) (H2b is supported). Finally, regarding the regression analysis for speed, we noticed a positive and significant relationship with risk-taking ($\beta=.270$; $p=0.039$) (H2c is supported).

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Discussion

This study was conducted with the objective of shedding light on relationships that link the dimensions of digitalization, EO, and internationalization of MSMEs. Although our results support the well-founded views from existing theoretical frameworks, the investigation of these dimensions within one process extend beyond conventional views that have only examined them separately. The central contribution of our study includes the introduction of a conceptual process that demonstrates how digitalization affects EO which, in turn, is a crucial determinant for increasing the internationalization propensity of MSMEs. As predicted, we found that the more MSMEs have digitalized some of their operations, the more they favor entrepreneurial behavior when leading their strategic decisions. Furthermore, in line with scholarly research, we verified that the more entrepreneurial behavior a company adopts in its foreign operations, the more it increases its internationalization intensity. More specifically, we observed that the number of geographical markets expands through proactive behavior and the speed of generating revenue in those markets accelerates through taking risky actions. Contrary to expectations, we found no relationship between EO components and the scale and mode of MSMEs' internationalization.

By elaborating on the results of our hypothesis testing, we first noticed that firms prioritize a digital transformation into their internal processes and infrastructure, as well as in building their employees' digital skills and digital-oriented culture. Nevertheless, MSMEs demonstrated fewer digitalization efforts in terms of the experience they provide through sales and customer involvement. Indeed, in line with previous research, the use of purely digital technologies in external features leads to defining a new value proposition, and in some cases, requires redesigning the company's business model (Bharadwaj et al., 2013; Pagani, 2013; Gray & Rumpe, 2015; Kane et al., 2015; Porter & Heppelmann, 2015; Ross et al., 2016; Schallmo et al., 2017; Sebastian et al., 2017; Autio et al., 2018; Aagaard et al., 2019; Kraus et al., 2019). Established MSMEs may require more time and resources to achieve such digital transformation, and may consequently focus on digitalizing internal features for operation optimization, cost reduction, quality improvement, and greater reliability (Ross et al., 2016). At the same time, whether at internal or external levels,

we observed in our results that the degree of digitalization has a significant impact on a company's EO, which, in turn, affects the internationalization intensity of MSMEs. The approach used in our research allows us to discuss the model of discovery and exploitation of opportunities through the use of purely digital technologies, particularly dedicated to established MSMEs.

Considering that we decided it was more relevant to observe the three unidimensional strategic orientations in our research separately, we propose organizing our discussion through each EO component. We first noticed a positive and significant relationship between the degree of digitalization and innovation behavior. Thus, from the perspective of innovativeness, we found that the digital context enables firms to strongly encourage collaboration, sharing of ideas, and new value creation. As emerging technologies have the ability to connect people to each other, connect people with machines, and connect machines to each other, broad business networks and communities are created around the world. And since digital technologies are interactive technologies, a flow of hyperconnectivity allows firms to improve their innovativeness by integrating new actors — customers, staff, partners, and even competitors — into their creative processes and experimentations. For instance, as the dimensions of space and time are changing, customers have become directly reachable through digital platforms, regardless of distance and time zones. People can therefore be integrated remotely into the process of designing, sharing ideas and experimenting.

Even if we did not find a significant relationship between innovative behavior and internationalization items, we are convinced about the benefits of digitalization to better enhance company innovativeness. New forms of collaboration involving innovation, co-creation, and strategic alliances will provide companies with additional resources and competences to develop international trade activities, and better adapt offers to foreign markets' expectations. To achieve this, technologies such as digital platforms, mobile applications, augmented reality, and 3D printers present innovative ways to personalize offers, build unique experiences with end-users, and even start activating nearby customers.

To build and fuel the wide range of digital technologies, the central point is the data (Witten et al., 2016). From a perspective of proactiveness, data is also a precious

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source of information for firms to improve their competitive position. In our research, we found a positive relationship between the degree of digitalization and the proactiveness of firms. We are convinced that data exists as a crucial resource for decision making. By collecting abundant data and processing it through predictive algorithms, firms can assess their current conditions, as well as future market attractiveness, and thereby improve their competitive position (Neubert, 2018). Available data can also be employed for the development of user-centric and knowledge-driven products and services. This is also a way to increase customization. Nowadays, while collecting data is a method for overcoming a lack of business knowledge, monitoring it is essential for shaping a company's environment, and adapting its strategic behaviour. With technological advances such as big data, internet of things, and machine learning, firms are improving their abilities to gather market knowledge, and taking a more proactive in their decision-making process. Better informed companies are more inclined to take dynamic actions to extend their product or service scope in foreign markets, and to engage in new niche markets. For example, they can experiment using several test versions directly with customers, who are able to give their opinions and feedback, or to share data on preferences and habits.

We are convinced that using digital technologies is a relevant method of overcoming international barriers as a way to pursue new market commitments, even without the certainty of success. Risk taking is thus the last entrepreneurial orientation that we found positively affected by the use of digital technologies. We suggest that if companies are better informed, they should be more inclined to make decisions that involve taking calculated risks. Despite the fact that entrepreneurs are often afraid of cyber-attacks, data loss, and other security issues involved in digital technology usage, we are nevertheless confident that these tools will develop more secure solutions in the years to come. For example, companies can use blockchain technology to secure financial and other business transactions. An open, distributed ledger can record transactions between two parties efficiently, in a verifiable and permanent way (Iansiti & Lakhani, 2017). This makes blockchain part of a sharing process between actors who must collaborate, even while they do not naturally trust each other. Mechanisms based on cryptography make the registry tamper-proof and the transactions immutable. From our results, we also demonstrated a positive relationship between risk taking and the speed of MSMEs'

internationalization. In our argument, we suggested that, by implying more direct and greater integration of data between actors, digital technologies increase immediacy, moderate the need for intermediaries, and consequently, speed up the pace of exchanges. In some cases, disintermediation may also result in reducing companies' dependence on location-specific value chain assets and resources.

In the light of these notable findings, we finally suggest that entrepreneurs should combine digitalization, EO, and internationalization activities through defining their own digital entrepreneurial internationalization strategy. Shaped by combining current capabilities with capabilities enabled by digital technologies, a new business strategy will directly impact the current value proposition of companies in foreign markets, and thus significantly reinforce their competitive advantage. According to the change in governance involved in digital contexts, we emphasize the key role of founders and decision-makers. We are convinced that the faster they understand the benefits of using digital technologies with a specific vision in mind, the faster they will develop the right mindset to achieve their transformation and increase their internationalization.

Conclusion

In this study, we conjointly examined three research streams from the field of entrepreneurship. The central contributions of our research include the introduction of a conceptual process that illustrates the relationships between degree of digitalization, EO, and the internationalization intensity of MSMEs. It highlights how the degree of digital transformation affects companies' EO, and measures how each EO component is linked to MSMEs' internationalization intensity. We relied on a quantitative research design based on Swiss internationalizing MSMEs, and statistically demonstrated that as firms become digitalized, this positively affects their EO degree which, in turn, positively contributes to increasing the scope and speed of their internationalization. Furthermore, to reinforce the results of our study, we discussed propositions that highlight how digital technologies could improve companies' EO, and thus enhance internationalization. In our argument, we considered that the digital context provides a wide range of opportunities for firms to become more innovative, aggressive and risk-taking in order to conquer new foreign markets. Indeed, by shaping spatial and temporal boundaries of entrepreneurial activities, digital technologies reduce

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many constraints for reaching the global marketplace. By consolidating EO capabilities with the use of nascent technologies, we suggested that firms have numerous opportunities to further activate their ecosystem, deepen market knowledge, develop stronger skills, optimize internal resources and better exploit external ones, improve operations, and shape new value propositions with greater flexibility and responsiveness. All of these elements, if dynamically explored, will lead companies to expand their competitive advantage in foreign markets.

Implications, limitations and further research

Although DE, EO, and IE have been widely addressed in scientific research, the value added from our research is in considering these dimensions as part of the same process. By testing a set of hypotheses, the study contributes to empirically confirming the relationship between digitalization and EO, as well as between EO and MSMEs' internationalization. We also made an important contribution to knowledge by outlining empirical evidence measuring the degree of companies' digitalization, and by emphasizing how founders can benefit from the decentralization of governance to exploit new opportunities. However, even though we have suggested that digitalization in internal dimensions involves less financial risk and effort in the short term, it would be relevant to examine in more detail how firms can transform their external dimensions and redesign their value proposition in light of digitalization. Because our empirical results were collected via Swiss MSMEs, this may raise concerns about the possibility of generalizing the results to other nations. To develop the conceptual process, we encourage further research to collect empirical evidence in other countries. Furthermore, in our research, no composite variable could be created based on the internationalization items. It would therefore be interesting, in a future study, to create a multidimensional construct of internationalization, and observe how it is related to EO.

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About the Authors

Annaële Hervé is a PhD candidate at the Université de Lorraine. Her thesis addresses the research streams of digitalization and internationalization of MSMEs. She holds a Bachelor's degree in Management as well as a Master degree in Entrepreneurship. She is also working part time at the research department of the School of Management Fribourg in Switzerland. Her main research interests are digital transformation of firms, digital business model as well as international entrepreneurship.

Prof. Christophe Schmitt is a Professor in Entrepreneurship at the Université de Lorraine (IAE de Metz and CEREFIGE), he holds the research Chair "Entreprendre", and he is responsible for PeeL (the Lorraine Student Entrepreneurship Pole). He is also an Associate Professor at the Louvain School of Management in Belgium and at the School of Management Fribourg in Switzerland. His articles and books mostly concern the notion of value design and knowledge building for action as well as the development of entrepreneurial practices.

Prof. Rico Baldegger is Director and Professor of Strategy, Innovation and Entrepreneurship at the School of Management Fribourg (HEG-FR), Switzerland. He has studied at the Universities of St. Gallen and Fribourg, Switzerland. His research activities concentrate on innovative start-ups, the entrepreneurial behavior of individuals and organizations, as well as the phenomenon of rapid-growth companies. He has published several books and articles and, since the beginning of the 1990s, he has been the manager of a business for company development. Moreover, he is a business angel and serial entrepreneur, as is demonstrated by the many companies he has created.

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