



**EDITORIAL**

**DIGITAL TRANSFORMATION AND INTERNATIONALISATION OF  
SMEs: EMERGING CHALLENGES, OPPORTUNITIES AND THREATS**

*Guest Editors:*

*Valerio Veglio*

*Free University of Bozen-Bolzano, Italy,  
valerio.veglia@unibz.it*

*Michael Nippa*

*Free University of Bozen-Bolzano, Italy,  
michael.nippa@unibz.it*

*Marjaana Gunkel*

*Free University of Bozen-Bolzano, Italy,  
marjaana.gunkel@unibz.it*

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**Abstract**

*A better understanding of the influence of the ongoing digitalisation of SMEs on their internationalisation strategies and processes is of fundamental importance for both, scholars and practitioners. This Special Issue comprises a series of empirical and conceptual studies that address important issues and particularly emerging challenges, opportunities and threats at the interface between digital transformation and internationalisation processes of SMEs. The selected contributions draw from different frameworks and methodological approaches as the authors have expertise in various disciplines (e.g., international business, international entrepreneurship and family business). They provide new insights in the field of international business issues of SMEs with a special focus on the following topics: internationalisation process of digital firms, international growth process of international new ventures operating in the Big Data & Analytics sector, influence of Industry 4.0 investments on internationalisation strategies and international joint ventures choices in a digitised world.*

The current wave of digital transformation triggered off by technological advances that are related to terms such as big data analytics, 5G, internet-of-things or artificial intelligence holds opportunities and threats regarding the competitive positioning of firms of all sizes. For reasons of limited financial and human resources as well as highly specialised business models these challenges are of particular interest for small and medium-sized enterprises (SMEs) acting within international contexts (Hervé, Schmitt, and Baldegger, 2020; Kleindienst and Ramsauer, 2016). The latter need to rethink the way they create, capture and deliver value to their customers in order to survive and/or to grow in the international marketplace (Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013; Loebbecke and Picot, 2015).

As the rapid development and increasing pervasiveness of new internet-based technologies results in highly dynamic and competitive business environments, the digitalisation is putting firms under an enormous pressure to identify opportunities and threats and to efficiently change their products, services, Structures and processes (Bouwman, Nikou, and de Reuver, 2019; Lerch and Gotsch, 2015; Rachinger, Rauter, Müller, Vorraber, and Schirgi, 2019; Turber, vom Brocke, and Gassmann, 2015). Technologies behind concepts such as internet of things, big data and analytics, robotics, and additive manufacturing are transforming the conditions under which and how firms create and deliver value-based transactions within local and foreign markets (e.g., Ojala, Evers, and Rialp, 2018).

In the course of these technological advancements and applications such as virtual reality or augmented reality innovative newcomer firms which are able to anticipate the opportunities of combining digital and analogous products and to develop new business model as well as new sophisticated configurations of value chains emerge (Dasi, Elter, Gooderham, and Pedersen, 2017; Porter and Heppelmann, 2014; 2015; 2017). As one important consequence –among others– these developments allow for previously rather unknown modes of internationalisation (Coviello, Kano, and Liesch, 2017) or lead to disruptive changes of established structures and processes of cross-border transactions and collaborations of which many bear new opportunities for newcomers and start-ups conceptualised as international new ventures (INVs) or Born Globals (e.g., Cannone and Ughetto, 2014; Cavusgil and Knight, 2015; Oviatt and McDougall, 1994; Zahra, 2005; Zander, McDougall-Covin, and Rose, 2015). Specifically, these new firms are changing the way of how economic value is created, captured and delivered by replacing the traditional firm-centric with a network-centric view (Chan, 2015). Among others, they are developing innovative value creation processes based on new layers such as object sensing and information gathering, information delivering, information processing, application and smart services (Chen, 2013; Chan 2015), which have not been considered before, but have become key drivers of future business growth.

Previous studies have shown that the continuous development of digital technologies frequently has a disruptive effect on traditional business models – based on a product dominant logic – towards a service-oriented approach, removing established incumbents, and enforcing the reconfiguration of organisational structures (e.g., Dasi, Elter, Gooderham, and Pedersen, 2017; Brouthers, Geisser, and Rothlauf, 2016; Tripsas, 2009; Yoo, 2010; Yoo, Boland, Lyytinen, and Majchrzak, 2012). In addition, other scholars have analysed how digital transformation is forcing and enabling firms to redesign the business functions of the value chain (Caylar, Noterdaeme, and Naik, 2016; Porter and Heppelmann, 2015). In the context of cross-border business activities Strange and Zucchella (2017) have highlighted potential changes in existing configurations of the global value chain especially with regard to location and ownership. Another stream of research emphasises the influence of digitalisation on the internationalisation process of multinational enterprises (Coviello, et al., 2017), international new ventures (Autio, 2017; Autio and Zander, 2016) and iBusiness firms (Brouthers, et al., 2016) as well as the relevance of location decisions in explaining the business growth of new technology-based firms (Onetti, Zucchella, Jones, and McDougall-Covin, 2012).

However, as many of the exemplarily cited literatures have highlighted in their future research sections, there is ample evidence that many issues regarding the internationalisation of SMEs in the digital age are yet to be systematically investigated. In fact, although the more disruptive wave of digitally enabled business models started already in the mid-2000s, with the exception of authors cited above, international business scholars have only recently started to address this phenomenon. This comes as a surprise in the light of increasing anecdotal evidence that the digitalisation is directly challenging and even undermining the current business models of SMEs with a clear impact on both (global) value chains and internationalisation processes, which are becoming increasingly complex, sophisticated, and uncertain.

To fill at least a fraction of this research gap, our Special Issue in *Piccola Impresa/Small Business* seeks to address both conceptual and empirical implications on how new digital technologies are changing the internationalisation process of SMEs, highlighting opportunities, threats and challenges. The Special Issue starts with a literature review on born digital firms and their internationalisation processes (see Piqueras). Of the manifold research questions we exemplarily mentioned in our call for papers in February 2019 the papers which finally made it into this Special Issue address –among others– the following research ones:

What are the determinants characterising the international growth process of International New Ventures that provide Big Data and Analytics services? (see Veglio and Romanello);

Is there a difference in I4.0 adoption paths between small and larger international firms? Is there any difference in terms of adoption between internationalised small and small firms operating only domestically (see Bettiol, Capestro, De Marchi, and Di Maria);

What opportunities and risks do the use of ICTs create for international SMEs in their fight against corruption? (see Bauer and Schembera);

How do board interlocks affect the firm's choice to engage in a domestic or in an international joint venture? (see Debellis and Pinelli).

Moreover, as the authors have expertise in different disciplines such as international business, international entrepreneurship, and family business the selected contributions draw on diverse frameworks and methodological approaches. As such, we think that the collection of studies published in the Special Issue provide national and international readers with a special interest at the crossroads of digitalisation, digital transformation, business model innovation and internationalisation of SMEs with an interesting spectrum of insights as well as ideas for future research.

The review article by Silvia Piqueras "Born digital firms and their internationalisation process: a systematic literature review and future research agenda" illustrates the diversity of topics and research in the context of innovative high-tech start-ups that rely on advanced information and communication technology. The author systematically summarises the research at the intersection of entrepreneurship and international business. Piqueras speaks of "born digital firms" in reference to the aforementioned concept of Born Globals (esp. Knight and Cavusgil, 2004; Cavusgil and Knight 2015), which are characterised by the fact that shortly after their inception they already generate a large part of their turnover outside their home countries. Piqueras' work highlights that both conceptualisations have large overlaps, because start-ups whose business model is based on the development, creation and distribution of digital products and services ('born digitals') are able to market them on different global markets with little adaptation due to lower logistics and transaction costs ('born globals'). It aims at providing a better understanding of how born digital firms internationalise. For this purpose, Piqueras conducts a systematic literature review focusing on what she labels 'central academic papers', i.e. relevant studies published in high impact journals between 2000 and 2018. Her staged review process finally identifies and embraces 42 review, conceptual and empirical articles of which many have been published in leading international business (IB) and entrepreneurship journals. Given the specific research interest of internationalisation of born digitals the majority of contributions can be ascribed to the IB field. Not surprisingly though, the number of articles published in recent years (2016-2018) grew significantly. With regard to studies that develop concepts and theories, Piqueras proposes to distinguish different research streams such as stud-

ies (a) addressing internalisation theory, (b) investigating into variations of internationalisation process theories and particularly on speed and entry modes, or (c) applications of resource based view. Her thematic analysis of the 22 empirical studies (of which 13 were qualitative and 9 quantitative) revealed four major themes addressed by previous research, i.e. those studies that investigate in antecedents and factors that determine (a) speed, sequence and location choices or (b) entry modes (e.g. export versus FDI) as well as a group that addresses (c) the global diffusion of digital innovations or (d) the development and implementation of digital business models. Of much value for the interested readers are ideas for future research avenues and topics to be addressed.

Based upon Piqueras' results and discussion we learn that there is –despite an attempt of UNCTAD to provide a commonly accepted terminology – an ongoing need to better define what we understand and subsume under a 'digital firm' or a 'born digital firm'. The same holds with regard to internationalisation process theories and their adaptation to digital firms especially as young and therefore –as a rule– small firms internationalisation patterns may differ significantly from those of established and large firms. On the other hand, the author concludes that well-established internationalisation process theories such as the Uppsala model are still of value for born digitals although they need to be implemented carefully and need to be adapted in certain details. In sum, Piqueras' review offers a good starting point for both, scholars and practitioners interested in internationalised digital firms' phenomenon. The first may address research gaps or advance existing internationalisation theory of SMEs the latter may derive valuable insights supporting them to better crafting and manage their own internationalisation.

Valerio Veglio and Rubina Romanello, in their article "International new ventures in the digital age: the case of a big data and analytics provider", examine the determinants characterising the international growth process of international new ventures with a special focus on companies in the area of big data and analytics services. The authors adopt a case study approach to investigate the internationalisation process of a digital international new venture. Veglio and Romanello review the literature on the internationalisation process of international new ventures and discuss the specific case of big data analytics, and thereby, industry 4.0. They note that though there has been a general research interest on big data analysis in the area of management, the aspect of internationalisation has remained rather unexplored, providing a research gap for the authors.

Veglio and Romanello present the results of two in-depth interviews with a founder of an Italian international new venture offering big data analytics services. In addition, archival data was collected for triangulation purposes. The authors analysed the most influential variables (individual,

environmental, and firm) during each phase of the internationalisation process demonstrating that the influential variables change depending on the stage on internationalisation. The study is one of the first studies examining international new ventures In the field of industry 4.0. Veglio and Romanello show that the internationalisation process in industry 4.0 is similar to those of manufacturing and high tech INVs. However, there is a strong influence of individual, environmental and firm level variables on the internationalisation process in the industry 4.0. By the way, the relevance of the influence of each level changes withing the internationalisation process. Individual and environmental factors are both highly relevant during the initial phase of growth of the INVs, while already during the turning point stage firm's factor become more necessary for survival. The qualitative approach selected by Veglio and Romanello provides an excellent starting point for future quantitative studies in the area. Future studies may focus on researching the influence of the individual, environmental and firm level influences utilizing a larger sample, and thereby, providing more generalizable results. Examining a broader context, potentially even involving country comparisons will provide avenues for future research in the area.

Marco Bettiol, Mauro Capestro, Valentina De Marchi, and Eleonora Di Maria in their study entitled "Industry 4.0 investments and internationalisation: does size matter?" explore how firms adopt I4.0 technologies and its influence on internationalisation strategies. The authors review the literature on I4.0 adoption between small and larger firms and Industry 4.0 and internationalisation, focusing on the difference adoption pattern between small and large firms and on the relationship between internationalisation of small firms and I4.0 technologies. Based on a dataset of more than 1, 200 Italian manufacturing firms located in the North of Italy operating in different industries, the authors - through a three-step analysis - provide empirical evidences on how firms of different sizes and with different internationalisation strategies, pertaining to both upstream and downstream activities, adopt I4.0 technologies. Their main findings highlight: (a) medium-large firms compared to small ones are more likely to adopt specific technologies such as robotics and big data / cloud, and to adopt more technologies than one at once; (b) large firms tend to invest more in production and data management technologies than small firms because large firms face more complex activities when doing business on a global scale; (c) the size of the firm, but particularly the internationalisation strategies are important factors in influencing the adoption path of I4.0 and (d) domestic-sourcing small firms have a significantly higher adoption rate for robotics compared to medium-large firms. These outcomes provide innovative and original implications. First, the authors contribute to the literature at the intersection between internationalisation and digitalisation, showing that

firm size, particularly international firm strategy, shape the relationship between I4.0 and international firms. In particular, the authors contribute to the limited knowledge on whether small firms differ from large firms in their adoption of I4.0 technologies, considering for their international competitiveness and their strategical purposes. Second, managers need to consider I4.0 as a part of the firm's strategy in terms of international positioning. Third, policy makers should guarantee a continuous alignment between I4.0 and the international strategy of the firms in order to foster experimentation and the learning curve of firms as well as to increase the internal competences of the firms in terms of I4.0 technologies.

In conclusion, the quantitative approach used by Bettiol, Capestro, De Marchi, and Di Maria is a strong starting point for future research on this field that – despite its strategic importance – is unexplored yet. Future studies might analyse the influence of different groups of technologies (operations vs. data management) on the firm's international activities and strategies.

The paper entitled “Technology as perceived benefit or burden in the fight against corruption at international SMEs? The role of trust and reduced human interaction” by Emily Bauer and Stefan Schembera examines the role of information and communication technologies (ICT) in international SMEs' fight against corruption. By utilising interview and documentary data, the authors examine if ICT can be considered as a help in fighting corruption due to increased transparency or whether, on the contrary, it promotes cyber-crime. The article discusses organisations corruption and relates it to the challenges especially SMEs face in their fight against corruption. The authors discuss why corruption may be considered more acceptable among employees of SMEs than within large organisations and SMEs are more often confronted with corruption-related problems. Anti-corruption ICT has become more common in organizations and may help in improving transparency and reducing corruption.

Bauer and Schembera present a qualitative study, based on a sample of five SMEs in Switzerland and Germany, which is supported by public and corporate documents. The results of the analyses reveal that the implementation of anti-corruption ICT enables transparency and may be a preventative measure against corruption. But ICT may also provide opportunities for misusing disclosed data. Nevertheless, ICT may be considered as a signal for corruption intolerance in the international marketplace, which may be regarded as an opportunity for international SMEs. Bauer and Schembera present a theoretical model that resulted from the analysis of the interview data depicting the relationship between the use of ICT and the perceived opportunities and risks in the fight against corruption.

With their study, Bauer and Schembera contribute to the literature examining the influence of technology in reducing corruption in international SMEs. They also open several new avenues for future research, such as ex-

amining the role of ICT in the fight against corruption in specific industries or in different country contexts. Future quantitative studies may provide a more nuanced picture of the opportunities and risks of anti-corruption ICT.

Finally, the paper "Board interlocks in SMEs and the formation of international joint ventures" authored by Francesco Debellis and Michele Pinelli addresses an interesting issue of an important organisational mode of market entry and cross-border market development called for, i.e. "whether small, often founder- and family-driven firms, exhibit differences and whether the individuals that run such organizations have a unique impact on IJV formation, governance, and management" (Nippa and Reuer, 2019: 582). While one might think that SMEs, due to their limited resources, would be more interested in joining forces with other companies to operate jointly in a foreign market, this is often not the case, as the contribution of Debellis and Pinelli highlights, too. Unlike large companies, which often form several IJVs or use other organisational modes of market entry simultaneously because they are able to do so based on their resources and risk diversification, many SMEs are likely to perceive the risk as too high. IJVs need financial and even more important top management resources to be successful, and reports of failed IJVs fill articles and books. As such, SMEs in particular decide on it at the highest management level. Hence, it is obvious to investigate to what extent the composition of the board of directors and the ownership structure of SMEs have an influence on the decision to form an IJV. Building explicitly on Agency Theory and the Resource Dependency Theory Debellis and Pinelli's paper "aims to investigate the effect of board interlocks on SMEs likelihood to undertake ..." not only domestic, but international JVs. Subsequently, they further investigate into ownership concentration which has been found to positively affect these risky investments (Reuer, Klijn, and Lioukas, 2014). It is of particular interest for Piccola Impresa that the sample the authors use for testing their hypotheses (#1: Parent firms with more board interlocks are more likely to form IJVs; #2: The effect of board interlocks on the likelihood of forming an IJV is stronger, if they can have a majority ownership of the JV) is based on Italian SMEs. According to their statistical operations and calculations the authors are able to confirm both, the main Hypothesis 1 as well as the moderating effect hypothesised in H2. With other words, one can assume that the additional information and knowledge provided by board members that have more than one mandate and, hence, have most likely experienced the pros and cons of IJV decisions has a positive impact on forming an international collaboration and relying on FDI rather than export only. Overall, the paper by Debellis and Pinelli included in this Special Issue offers new insights in a previously rather neglected research area and at the same time many ideas for future research. While this may include for example: (a) using samples from other countries as to test whether there are



country-specific factors or whether the results hold for other institutional contexts, too, (b) including multipartite configurations or (c) extending the sample period to include more recent developments, the latter idea might also be useful to test whether the development of advance internet-based technologies affects the likelihood of SMEs decision to forming an IJV. Moreover, it would be interesting whether high-tech SMEs or SMEs that are forerunners in digital transformation differ with regard to forming IJVs compared to their low-tech or late-mover peers.

Summing up, there are plenty more research avenues that are linked to the cross-road of digitalisation and internationalisation of SMEs.

However, we hope that this Special Issue is a good starting point and helpful to trigger-off and guide innovative and challenging future research as well as offering down to earth insights for practitioners, too.

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## References

- Autio, E. (2017). Strategic entrepreneurial internationalization: A normative framework. *Strategic Entrepreneurship Journal*, 11(3), 211-227.
- Autio, E., & Zander, I. (2016). Lean internationalization. In *Academy of Management Proceedings* (Vol. 2016, No. 1, p. 17420). Briarcliff Manor, NY 10510: Academy of Management.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: toward a next generation of insights. *MIS Quarterly*, 37(2), 471-482.
- Bouwman, H., Nikou, S., & de Reuver, M. (2019). Digitalisation, business models, and SMEs: How do business model innovation practices improve performance of digitalizing SMEs? *Telecommunications Policy*, 43(9), 101828.
- Brothers, K. D., Geisser, K. D., & Rothlauf, F. (2016). Explaining the internationalization of ibusiness firms. *Journal of International Business Studies*, 47(5), 513-534.
- Cannone, G., & Ughetto, E. (2014). Born globals: A cross-country survey on high-tech start-ups. *International Business Review*, 23(1), 272-283.
- Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. *Journal of International Business Studies*, 46(1), 3-16.
- Caylar, P. L., Noterdaeme, O., & Naik, K. (2016). Digital in industry: From buzzword to value creation. *McKinsey&Company. Digital McKinsey*, 2
- Chan, H. C. (2015). Internet of things business models. *Journal of Service Science and Management*, 8(04), 552.
- Chen, M. (2013). Towards Smart City: M2M Communications with Software Agent Intelligence. *Multimedia Tools and Applications*, 67, 167-178.
- Coviello, N., Kano, L., & Liesch, P. W. (2017). Adapting the Uppsala model to a modern world: Macro-context and microfoundations. *Journal of International Business Studies*, 48(9), 1151-1164.
- Dasi, A., Elter, F., Gooderham, P. N., & Pedersen, T. (2017). New business models in-the-making in extant MNCs: Digital transformation in a Telco. In *Breaking up the Global Value Chain*. Emerald Publishing Limited.
- Hervé, A., Schmitt, C., & Baldegger, R. (2020). Internationalization and Digitalisation: Applying digital technologies to the internationalization process of small and medium-sized enterprises. *Technology Innovation Management Review*, 10(7), 28-40.
- Kleindienst, M., & Ramsauer, C. (2016). SMEs and Industry 4.0—Introducing a KPI based Procedure Model to identify Focus Areas in Manufacturing Industry. *Athens journal of business & economics*, 2(2), 109-122.
- Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. *Journal of International Business Studies*, 35(2), 124-141.
- Lerch, C., & Gotsch, M. (2015). Digitalized product-service systems in manufacturing firms: A case study analysis. *Research Technology Management*, 58(5), 45-52.
- Loebbecke, C. & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, 24(3), 149-157.
- Nippa, M., & Reuer, J. J. (2019). On the future of international joint venture research. *Journal of International Business Studies*, 50(4), 555-597.
- Onetti, A., Zucchella, A., Jones, M. V., & McDougall-Covin, P. P. (2012). Internationalization, innovation and entrepreneurship: business models for new technology-based firms. *Journal of Management and Governance*, 16(3), 337-368.
- Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. *Journal of International Business Studies*, 25(1), 45-64.
- Ojala, A., Evers, N., & Rialp, A. (2018). Extending the international new venture phenomenon to digital platform providers: A longitudinal case study. *Journal of World Business*, 53(5), 725-739.

- Porter, M.E., & Heppelmann, J.E. (2014) How smart, connected products are transforming competition. *Harvard Business Review*, 92(11): 64-88.
- Porter, M.E., & Heppelmann, J.E. (2015). How Smart Connected Products are Transforming Companies. *Harvard Business Review*, 93(10), 96-114.
- Porter, M.E., & Heppelmann, J.E. (2017) Why every organization needs an augmented reality strategy. *Harvard Business Review*, 95(6): 46-57.
- Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2019). Digitalisation and its influence on business model innovation. *Journal of Manufacturing Technology Management*, 30(8), 1143-1160.
- Reuer, J. J., Klijn, E., & Lioukas, C. S. (2014). Board involvement in international joint ventures. *Strategic Management Journal*, 35(11), 1626-1644.
- Strange, R., & Zucchella, A. (2017). Industry 4.0, global value chains and international business. *Multinational Business Review*.
- Tripsas, M. (2009). Technology, identity, and inertia through the lens of “The Digital Photography Company”. *Organization science*, 20(2), 441-460.
- Turber, S., Brocke vom, J., & Gassmann, O. (2015). Designing Business Models in the age of Pervasive Digitization. In *Academy of Management Proceedings* (Vol. 2015, No. 1, p. 11600). Briarcliff Manor, NY 10510: Academy of Management.
- Yoo, Y. (2010). Computing in everyday life: A call for research on experimental computing. *MIS Quarterly*, 34(2), 213-231.
- Yoo, Y., Boland Jr., R.J., Lyytinen, K., & Majchrzak, A. (2012) Organizing for innovation in the digitized world. *Organization Science*, 23(5), 1398:1408.
- Zahra, S. A. (2005). A theory of international new ventures: a decade of research. *Journal of International Business Studies*, 36(1), 20-28.
- Zander, I., McDougall-Covin, P., & Rose, E. L. (2015). Born globals and international business: Evolution of a field of research. *Journal of International Business Studies*, 46(1), 27-35.