



# Service innovation and internationalization in SMEs: antecedents and profitability outcomes

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## Abstract

Both innovating and internationalizing can hold the key to survival and growth among small- and medium-sized enterprises (SMEs). Service innovation in particular is highly relevant in the increasingly digitalized and high-technology global trade. However, there have been until now few studies on service innovation in international entrepreneurship. Thus, in an effort to illuminate its role in entrepreneurial internationalization, the present study examines the profitability impact of service innovation in SME internationalization, while also outlining the differing impacts of entrepreneurial orientation and human capital as the antecedents of both. The empirical data were collected via an online survey of Finnish SMEs in the information and communications technology (ICT) industrial sector, the final sample comprising 104 companies. The data were analyzed through structural equation modeling. The results indicate, first, that entrepreneurial orientation underlies both degree of internationalization and service innovation, yet different dimensions of entrepreneurial orientation have distinct impacts on the two outcomes. Second, we find that the level human capital also determines the level of service innovation in as an antecedent and third, international expansion, but not service innovation, has a negative impact on profitability. We discuss the implications of these results, which imply that SMEs may face an internationalization-innovation paradox in that engaging in both activities may not be a feasible strategic option for them, and that prioritizing internationalizing in favor of innovating may incur costs and result in lower profitability.

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## Resume

La investigación académica ha mostrado como la innovación y la internacionalización son impulsos importantes de la sostenibilidad y el crecimiento entre las pequeñas y medianas empresas (PYMES). En este contexto, la innovación orientada a los servicios es particularmente relevante, sobre todo en un contexto de desarrollo tecnológico y digitalización en los mercados globales. No obstante, no existe mucha investigación sobre innovación en servicios en el marco del emprendimiento internacional. En este artículo, los autores tienen como objetivo estudiar el papel de la innovación en servicios en el marco del emprendimiento internacional, analizando aquellas empresas emprendedoras que aspiran a los mercados internacionales. El artículo analiza la rentabilidad de la innovación en servicios en la internacionalización de las PYMES, a la vez que estudia diferentes impactos de la orientación empresarial y el capital humano como antecedentes de ambos, innovación en servicios y internacionalización. El estudio analiza datos empíricos recogidos a través de una encuesta online distribuida a PYMES finlandesas en el sector de la información y la comunicación. La muestra final comprende 104 empresas. Los datos se analizan con modelos de ecuaciones estructurales. Los resultados indican diferentes aspectos importantes para avanzar el conocimiento. Primero, que la orientación emprendedora impulsa tanto el grado de internacionalización, como la innovación en servicios, de forma que las diferentes dimensiones de la orientación emprendedora tienen diferentes impactos en los dos. Segundo, el nivel de capital humano influye también el nivel de innovación en servicios como antecedente. Tercero, la expansión internacional, sin la innovación en servicios, tiene un impacto negativo en la rentabilidad. En la discusión se presentan las implicaciones de estos resultados, que implican que la PYMES pueden padecer un paradoja entre la internacionalización y la innovación cuando intentan unificar el desarrollo de las dos actividades. Estos resultados informan sobre el hecho que las dos actividades conjuntas pueden resultar una no adecuada opción estratégica. Además, cabe destacar que priorizar la internacionalización puede resultar en costes y menor rentabilidad.

**Keywords** Internationalization of SMEs · Innovation in SMEs · Service innovation · Entrepreneurial orientation · Human capital · Profitability

## Summary highlights

*Contributions:* The study contributes to the international entrepreneurship literature by examining entrepreneurial internationalization and service innovation, more specifically their drivers and performance implications. Literature is still mixed about the relationship between entrepreneurial internationalization and innovation, and their relationship has been suggested to be innovation type specific. However, the prior research has mostly overlooked service innovation, which is important in knowledge-intensive industry sectors in particular. The study sheds further light on the role of entrepreneurial orientation (EO) and human capital as drivers of entrepreneurial internationalization in the context of service innovation.

*Purpose:* This study explores the relationship between entrepreneurial internationalizing and service innovation by analyzing jointly the effects that the extent of service innovation and degree of internationalization (DOI) have on the profitability of

internationalizing SMEs, as well as the effects that entrepreneurial orientation (EO) and human capital have on both innovation and internationalization.

*Data:* The data were collected via an online survey of Finnish SMEs operating in the ICT industrial sector. The structured survey consisted of measurement scales adopted from the prior literature. A total of 104 Finnish ICT SMEs comprised the sample utilized in this study.

*Findings/Results:* On the impact of entrepreneurial orientation dimensions, the results show that innovativeness has a negative effect on DOI but a positive effect on service innovation. Proactiveness is not connected to service innovation or internationalization, while risk-taking has a positive effect on DOI but not on service innovation. The skills and know-how element of human capital is positively connected to higher extent of service innovation. The results also highlight that international expansion may hinder a firm's financial performance, since DOI had a negative effect on profitability. Taken together, the results imply that firms may have to make trade-offs when choosing between international expansion and service innovation, and that the dimensions of entrepreneurial orientation underlie internationalization and service innovation differently.

*Theoretical implications and recommendations:* The study indicates that service innovation focus in internationalizing SMEs may generate benefits; however, accumulating these benefits may be complex and directed by the firm's strategic goals. Additionally, the results suggest that, depending on their strategic goals, SMEs seeking internationalization may need to compromise on being innovative with their services. Thus, by examining DOI and service innovation and their drivers simultaneously, the study adds to the discussions on entrepreneurial internationalization and innovation.

*Practical implications and recommendations:* The study highlights the necessity of strategic focus for internationalizing SMEs by suggesting that dual strategy on innovation and internationalization is not always beneficial, especially if the aim of the internationalizing SME is to maintain profitability. Additionally, the study highlights the importance of top management skills and knowledge in enhancing both innovation and internationalization. The results suggest that internationalizing SMEs that also engage in service innovation in particular need to invest in training to improve the skills and knowledge of top management.

*Limitations and future research:* The study is limited to a single country, a single industry and a cross-sectional nature of data, and thus the findings of the study may have limited generalizability across different contexts. Future research could include cross-country data across other knowledge-intensive industries. Further insights on the DOI-profitability relationship could be generated longitudinally via panel data. Another avenue for future research is extending the unit of analysis from the organization level to that of the individual.

## Introduction

The development of small- and medium-sized enterprises (SMEs) is essentially influenced by the extent of their success in innovation and internationalization (Louart and

Martin 2012; Hagen et al. 2014), and innovative SMEs are more likely to export than non-innovative SMEs (Saridakis et al. 2019). Innovative organizational culture is linked to rapid entry into foreign markets (Knight and Cavusgil 2004; Jones and Coviello 2005; Chetty and Stangl 2010; Onetti et al. 2012). McDougall and Oviatt (2000, p.903) already incorporated innovation and internationalization into the very definition of international entrepreneurship (IE), i.e., “a combination of innovative, proactive and risk-seeking behavior that crosses national borders and is intended to create value in organizations”. This definition brings an international dimension to the concept of entrepreneurial orientation (Covin and Slevin 1989, 1991; Lumpkin and Dess 1996; Miller 2011), and later studies have indeed identified positive linkages between higher levels of entrepreneurial orientation (EO) and internationalization decisions, activities, and performance in SMEs (Jantunen et al. 2005; Kuivalainen et al. 2007; Ripollès-Melià et al. 2007). However, extant studies have also left several aspects of entrepreneurial internationalization and innovation relatively unexamined.

One such area relates to clarifying the relationship between entrepreneurial internationalization and innovation further. The two have been found to be intertwined (Onetti et al. 2012; Denicolai et al. 2015), but whether innovation is a driver of internationalization (Golovko and Valentini 2011; Veglio and Zucchella 2015; Calvo and Villarreal 2019; Weerawardena et al. 2019) or rather, if the opposite is the case (Kafourous et al. 2008; Zahra et al. 2009; Genc et al. 2019; Vrontis and Christofi 2019) and under which conditions, could do with further study as the extant literature has found both types of relationships, and the linking literature overall is of recent origin (Hagen et al. 2014). As Veglio and Zucchella (2015, p. 139) note, there are studies on the dynamics of innovation and internationalization, but mostly from the context of large companies (see Cano-Kollmann et al. 2016). Recently, Saridakis et al. (2019) have found that the link between innovation and internationalization is also dependent on the type of innovations, and Weerawardena et al. (2019) posit that learning capabilities can underlie the development of innovation in born globals. Bello et al. (2016) also recently examined how innovativeness of service offerings relates to financial performance, but that study did not account for internationalization, which we in this study aim to do.

Specifically, the antecedents and outcomes of internationalization- and innovation-related activities in SMEs should be clarified further in order to establish what types of trade-offs do SMEs have to consider in their internationalization and innovation efforts: Although both internationalization and innovation activities may reside in the organizational culture (Dimitratos and Plakoyiannaki 2003), in practice, a SME may not have the resources necessary to engage seriously in both simultaneously. Indeed, innovativeness may, in some cases, hinder internationalization efforts (Dai et al. 2013). Such a situation presents SMEs with the necessity of trade-offs.

Second, extant studies examining innovation in the context of SME internationalization tend to examine different types of innovativeness, namely product innovation (e.g., Zahra et al. 2009), design innovation (Veglio and Zucchella 2015), and business model innovation (Rask 2014). However, the role of service innovation in the context has received very little attention so far (Weerawardena et al. 2019). This is despite the fact that service innovation as concept that has performance implications (Bello et al. 2016), is distinct scientifically, and offers promise for cross-disciplinary research in particular (Karniouchina et al. 2006). Instead, research on entrepreneurship and innovations in general has tended to be mostly limited on examining product innovations

instead (Oly Ndubisi 2014). As internationalization can be related to the type of innovation in question (Denicolai et al. 2015; Saridakis et al. 2019), examining the role of service innovation in international entrepreneurship can bring forth added knowledge to complement and extend the extant studies concentrating on different types of innovations (Rask 2014; Veglio and Zucchella 2015).

Indeed, a large portion of entrepreneurial internationalization occurs in high-technology fields where service innovation is a core element in corporate decision-making (Van Riel et al. 2004). This is particularly the case with born globals (Rennie 1993; Madsen and Servais 1997), which tend to be knowledge-intensive in nature (Kuivalainen et al. 2012) and to operate in service-oriented industrial sectors such as software (Bell 1995). There is thus a clear need to examine the role of service innovation in international entrepreneurship.

This study aims to respond to these omissions in literature, by illustrating the relationships between service innovation and internationalization on successful entrepreneurial internationalization. As most existing studies have not assessed both the antecedents and the related outcomes of internationalization and innovation in general, we also explore the antecedents of both the service innovation (SI) and international expansion in SMEs, and link the two to performance outcomes, namely to profitability. This is due to earlier literature examining the impact of international expansion on business performance having reported contradictory and ambiguous results (see, e.g., Capar and Kotabe 2003; Lu and Beamish 2004; Thomas and Eden 2004), and most of the studies in question having been conducted in manufacturing contexts (Capar and Kotabe 2003). Only a few studies in IE assess the profitability aspect of internationalizing SMEs, and those that do give conflicting results (Lu and Beamish 2001, 2006; Qian and Li 2003; Zhou et al. 2007). Thus, there is also a need for further clarification on the relevant question of how internationalization affects the profitability of SMEs. Given that engaging in both internationalization and innovation may stretch the financial and other resources of SMEs, which by nature are resource-constrained to begin with (Madsen and Servais 1997), maximizing profitability may be of the essence for an innovating SME aiming for both foreign-market entry and long-term survival.

The extant literature identifies two concepts in particular that may, in part, underlie and determine the extent of both service innovation and internationalization: human capital (Becker 1964; Youndt and Snell 2004) and entrepreneurial orientation (Miller 1983; Covin and Slevin 1989). Genc et al. (2019) have recently posited that entrepreneurial orientation can mediate a relationship between internationalization and innovation performance, while the study by Bello et al. (2016) finds that entrepreneurial orientation and human capital predict the innovativeness of service offering in Indian professional service firms. While the latter study did not account for internationalization in their empirical model, it does provide the basis for postulating on these antecedents of service innovation also in international entrepreneurship. In general, both human resources of SMEs and their entrepreneurial orientation have been found to drive business performance (Grimmer et al. 2013). However, there is only limited amount of research examining causal relationships between entrepreneurial orientation and the multitude of outcomes, e.g., firm profitability, international scope, and product development performance, to which it has been connected (Wales et al. 2013).

Therefore, this study examines the impact of human capital (HC) and entrepreneurial orientation (EO) on internationalization and service innovation of SMEs, and the

subsequent impact of the latter two on the profitability of internationally operating SMEs. We continue as follows: Sect. 2 gives a more in-depth literature review of the relevant research, examining the theoretical foundations underlying the proposed relationships between the antecedents of DOI and SI and their profitability outcomes; Sect. 3 introduces the research methodology and describes the data collection procedure and the measures we developed; Sect. 4 gives the empirical results, and we conclude in Sect. 5 with a discussion of their implications and limitations, also identifying potential future research avenues.

## Hypothesis development

### Entrepreneurial orientation as an antecedent in SME internationalization and service innovation

Innovativeness is part of entrepreneurial orientation, and the relationship of the latter with internationalization has also been under literary focus for some time and is particularly relevant for performance implications in IE (see Etemad 2015). SME internationalization has been interpreted specifically as an act of EO, in other words an expansion strategy to enter new markets by seeking growth opportunities (Lumpkin and Dess 1996; Zahra et al. 1999; Ripollès-Melià et al. 2007). Furthermore, small companies facing resources constraints and dynamic operational environment overcome their deficiencies through EO and innovation (Cavusgil and Knight 2015).

Entrepreneurial orientation has been conceptualized as a set of managerial behaviors or attitudes, or a combination of both (Miller 2011). Miller suggests examining EO as a multidimensional construct (i.e., comprising risk-taking, proactiveness and innovativeness), as each of the dimensions may vary in their impact on innovation- and internationalization-related activities (Kuivalainen et al. 2007; Frishammar and Andersson 2009; Harms et al. 2010). Other studies have previously also supported the idea that EO is a multidimensional construct (e.g., Covin and Slevin 1990; Miller 1983; Wiklund 1999). EO includes the decision-making operations, processes, and practices that result in expansion in markets, products, or services, or in all three (Lumpkin and Dess 1996). It is also described as a strategic orientation that reflects specific entrepreneurial facets of company-level outcomes, decision-making styles, methods, and practices, as well as managerial behavior, beliefs, and preferences (Covin et al. 2006; Lumpkin and Dess 1996). EO reflects the degree of top management's willingness to take business risks and pursue change and innovation to respond actively to competition and sustain competitive advantage (Covin and Slevin 1990). The entrepreneurial propensity for proactiveness, risk-taking, and innovativeness is also a medium through which EO can be examined (Runyan et al. 2008).

Innovativeness and proactiveness are prerequisites for expansion into international markets (Fletcher 2004; Knight and Cavusgil 2004). Moreover, the combination of a willingness to take risks and innovativeness is an essential feature of successful operations in global markets (McDougall and Oviatt 2000). These features are considered part of EO, the implication being that international operations are entrepreneurial (Fletcher 2004). The ability to identify and utilize opportunities in foreign markets is more marked in companies with an innovative culture and capabilities (Jantunen et al. 2005; Lazonick 2005). EO both tends to strengthen the intent of a company to

internationalize (De Clercq et al. 2005) and further serve as an antecedent of innovation activities in SMEs. Some studies report a positive relationship between the level of EO and innovations (Rhee et al. 2010; Pérez-Luno et al. 2011; Asemokha et al. 2019), and Hult et al. (2004) specifically argue that the key driver of innovativeness and performance in companies is the extent of their EO. Recently, innovativeness has been positively connected to speed of innovation, while risk-taking has a negative effect on speed of innovation (Shan et al. 2016). Additionally, increases in proactiveness increase the speed of innovation to a certain point, beyond which it actually decreases the speed.

There is evidence of a relationship between EO and foreign market expansion in SMEs from both emerging (Javalgi and Todd 2011) and developed economies (Ripollès-Melià et al. 2007; D'Angelo and Presutti 2019). EO has been found to be positively associated with degree of internationalization (DOI), the number of foreign countries a company has entered (Javalgi and Todd 2011), international sales growth (D'Angelo and Presutti 2019), and foreign entry success (Baker et al. 2019). Wiklund et al. (2009) note a positive effect of EO on growth in small businesses, whereas Frishammar and Andersson (2009) found that proactiveness had an impact on the international performance of Swedish SMEs. Entrepreneurially oriented activities and internationalization are dual processes that companies integrate in practice when aiming to conduct business internationally (Fletcher 2004).

The majority of extant studies indicate that EO strengthens a company's intent to internationalize, and that the likelihood of further internationalization is higher among companies with high EO. Risk-taking and innovative thinking or proactive expansion to new markets may to some degree determine a company's international success and the extent of its presence in foreign markets (De Clercq et al. 2005). Moreover, the early development of an entrepreneurial culture enhances the ability and willingness to pursue international opportunities (Autio et al. 2000; Zucchella et al. 2007). In accordance with these notions, we first posit that

- H1: Higher levels of entrepreneurial orientation among international SMEs are positively related to their degree of internationalization.

H1a: Higher levels of innovativeness among international SMEs are positively related to their degree of internationalization.

H1b: Higher levels of proactiveness among international SMEs are positively related to their degree of internationalization.

H1c: Higher levels of risk-taking among international SMEs are positively related to their degree of internationalization.

Several definitions of service innovation (SI) are to be found in the literature (Gadrey et al. 1995; Gallouj and Weinstein 1997; Avlonitis et al. 2001; Alam 2006; Paswan et al. 2009). It is seen as an evolutionary process of dynamically combining and recombining diverse elements to meet customer needs (Chae 2011), and as a completely new or significantly renewed service that generates benefits to its developer and can be replicated with numerous customers (Toivonen and Tuominen 2009). Damanpour (1991) distinguishes service innovation as one of the main innovation types in addition to product and process innovation types, among others.

Entrepreneurial orientation may be linked to SI in various ways. It drives the innovativeness and innovative activities that an individual or an organization can generate on the company level (Naman and Slevin 1993; Lumpkin and Dess 1996; Hult et al. 2004). Engagement in creating innovations that are new to the market and a willingness to undertake ventures that carry considerable risk are also characteristics of an entrepreneurial company (Miller 1983). Such companies are also active in seeking opportunities to develop new technologies, products, and services and to engage in both innovation generation and adaptation (Damanpour and Wischnevsky 2006). Bello et al. (2016) find evidence for entrepreneurial orientation underlying innovativeness of Indian professional service firms in general.

There is also empirical evidence of a positive relationship between EO and innovations in general. Zhou et al. (2005) found a positive association with both technology- and market-based innovations, and a positive relationship has also been identified in German companies (Harms et al. 2010). Hult et al. (2003), in turn, found that the role of EO in the tendency to innovate was significant among old service- and product-oriented companies regardless of their size. EO also influences product innovativeness through the acquisition of new information in the process of developing new products (Brockman and Morgan 2003).

The focus on innovation is a fundamental aspect of EO, although proactiveness and risk-taking are also important (Harms et al. 2010). There is some evidence of how each dimension influences innovations. For instance, proactiveness and risk-taking have a positive impact on innovation generation, and strongly drive companies to prefer generation to adaptation (Pérez-Luño et al. 2011). A company's willingness to abandon current practices and technologies and to go beyond existing standards is also reflected in innovativeness (Kimberly 1981). Furthermore, some scholars suggest that each of the EO dimensions may affect innovation and internationalization differently (Kuivalainen et al. 2007; Frishammar and Andersson 2009; Harms et al. 2010). We posit that these notions hold in service innovation among SMEs as well:

- H2: Higher levels of entrepreneurial orientation among international SMEs are positively related to their level of service innovation.
  - H2a: Higher levels of innovativeness among international SMEs are positively related to their level of service innovation.
  - H2b: Higher levels of proactiveness among international SMEs are positively related to their level of service innovation.
  - H2c: Higher levels of risk-taking among international SMEs are positively related to their level of service innovation.

## Human capital as an antecedent in SME internationalization and service innovation

Human capital comprises the knowledge individuals possess and take with them when they go home from work. It constitutes skills, experiences, abilities, and know-how, including innovation capacity, creativity, formal training, and education (Marr et al. 2004) and, according to Barney (1991), company resources in the form of management-worker relationships, intelligence, judgment, and insight. Firm-specific,



industry-specific, and general levels of human capital have been described (Neal 1995; Huang 2003), and a two-dimensional structure based on employee skills and expertise on the one hand and their creativity and new ideas on the other have been recognized (Youndt et al. 2004).

On the individual level, human capital is the combination of a person's genetic inheritance, education, experience, and attitudes to life and business (Hudson 1993). It could be considered an essential enabler of internationalization in general, and of the extent of international operations in particular: studies have repeatedly identified a positive link between the two (e.g., Bloodgood et al. 1996; Reuber and Fischer 1997; Ruzzier et al. 2007; Javalgi and Todd 2011). This further attests to the importance of human resources for SMEs: human capital compensates for the lack of other resources (Westhead et al. 2001; Radulovich 2008). Conversely, a lack of human capital may constitute a further barrier to internationalization (Dichtl et al. 1990). The human-capital resources of entrepreneurial companies, including the entrepreneurs themselves, positively affect their propensity to export (Westhead et al. 2001).

Similarly, human capital has been positively associated with the ability of companies to innovate (Martin and Horne 1995; de Brentani 2001; Oke 2007), and there is evidence of a significant impact on innovation in high-technology SMEs (e.g., Acs 1999; Qian and Li 2003; Thornhill 2006; Wu et al. 2008) and on professional service firms in particular (Bello et al. 2016). Thus, even though no studies examining the two have been conducted to our knowledge, extant literature does provide some grounds to posit that human capital could well be a determinant of both DOI and SI.

Managerial skills and environmental perceptions are the most important dimensions of human capital (Manolova et al. 2002). Onkelinx et al. (2016b) find a positive curvilinear relationship between human capital and SME internationalization, yet their analysis concentrates on export performance only. Investments in human capital may be necessary for born globals and other rapidly internationalizing enterprises in particular (Onkelinx et al. 2016a). In a recent study, Silva et al. (2017) also noted human resources as an important factor in export performance of internationally operating firms. Moreover, previous international experience and positive foreign-market perceptions of the owner/founder increases the likelihood of internationalization and further foreign expansion, given the high odds that owners and/or founders have to rely on their international experience, competences, and skills when internationalizing (Manolova et al. 2002; Ruzzier et al. 2007). Thus, we suggest that human capital may be positively associated with international expansion among SMEs:

- H3: Higher levels of human capital among internationally operating SMEs are positively related to their degree of internationalization.

A company's employees play a crucial role in the innovation process, being the generators of ideas for new or improved services that turn into successful innovations (Van de Ven 1986). Frontline employees tend to be the ones who recognize innovation opportunities and are aware of unsatisfied customer needs; thus, their inclusion in the process may increase the likelihood of success in implementing service innovations (de Brentani 2001). Innovative service companies seeking a solution to an existing innovation challenge need the knowledge, skills, and other similar resources that, in combination, constitute the capabilities of the service innovator (Kuusisto et al.

2013). Successful companies use highly skilled and trained personnel in both frontline and production activities in the process of creating and delivering new services (de Brentani 2001).

Human resources, which comprise interpersonal and business skills, are positively related to the innovation strategy in small firms (Edelman et al. 2005). Veglio and Zucchella (2015) note that small firms can develop certain innovations without necessarily making large other types of resource commitments if they leverage the creativity of the employees and entrepreneurs. Long-term customer interaction, creative employees, and solid technical and marketing skills are required from companies with an innovation strategy (Chandler and Hanks 1994), and those with successful service innovations seem to encourage higher overall internal participation in the process (Martin and Horne 1995). Professional knowledge possessed by employees and based on education and experience positively correlates with a firm's innovations (Damanpour 1991). There is also evidence that investing in human capital has an impact on innovations: in-service training appears to have a positive effect (Ballot et al. 2001; Gallie and Legros 2012).

Human capital is also positively related to the creation of sustained competitive advantage (Ordeñez de Pablos 2004). This is achieved in international companies through the integration of knowledge-based resources from different units, which in turn describe the organization's capacity to innovate (Ordeñez de Pablos 2006). The role of industry-specific knowledge is especially important when innovation ideas are generated through combining collaboration with network partners and tacit knowledge of existing technology (Dakhli and De Clercq 2004).

Employees in high-tech SMEs in particular tend to be more innovative than those in large companies on account of the clearer property rights (Acs and Yeung 1999; Qian and Li 2003). Furthermore, the resources of high-tech SMEs, including specialized expertise and previous experience, positively affect their competitiveness, including innovation speed (Wu et al. 2008). Given that the knowledge possessed by people in an organization is the key to creating innovations, human capital may have an impact on SI (Bello et al. 2016). We therefore suggest, based on the literature discussed above, that this influence also extends to internationalizing SMEs.

- H4: Higher levels of human capital among international SMEs are positively related to their level of service innovation.

### **The impact of internationalization and service innovation on the profitability of SMEs**

A major prerequisite for successful internationalization among SMEs is the ability to develop new products and services (Bell et al. 2004). There are two main reasons why a positive relationship between service innovation and profitability could be expected in internationally operating SMEs: first-mover advantage and performance gap (Ettlie 1983; Lieberman and Montgomery 1988; Roberts and Amit 2003; Damanpour et al. 2009). First-mover advantage is achieved through innovations and thus may enhance business performance (Roberts and Amit 2003), whereas a performance gap results from a change in the environment to which the company is able to adapt by innovating (Ettlie 1983).

Moreover, radical innovations enhance financial performance in dynamic environments such as international markets (Saridakis et al. 2019), whereas incremental innovations have the same effect in competitive environments (Jensen et al. 2006). Companies that absorb novel knowledge are more conscious about the most recent developments, and in achieving first-mover position through innovation activities are more likely to exploit the benefits thus generated in the long term (Cohen and Levinthal 1990; Roberts and Amit 2003). Earlier research points towards a positive relationship between innovations and overall company performance (Cainelli et al. 2004, 2006; Freel and Robson 2004; Damanpour et al. 2009).

Forthcoming research has linked R&D innovation to international expansion (Vrontis and Christofi 2019) and highlighted the importance of service innovation for born globals in particular (Calvo and Villarreal 2019; Weerawardena et al. 2019). The capacity to pursue innovation has a positive impact on profitability, sales growth, market share, and general performance in general (Hult et al. 2004). Moreover, performance is influenced by innovations in global markets (Hitt et al. 1998). Innovator position may have a positive influence on profitability among SMEs in particular (Qian and Li 2003). It has also been found that technology-focused service sectors, including software, technical consultancy, R&D, engineering, and post and telecommunication are more innovative than other service sectors (Cainelli et al. 2004, 2006). Therefore, we posit the following:

- H5: The level of service innovation in international SMEs is positively related to their profitability.

Empirical findings on the relationship between DOI and overall business performance are inconsistent and conflicting (Annavarjula and Beldona 2000; Lu and Beamish 2004). In theory, a positive relationship between DOI and profitability could be expected in an SME, in that exploration and exploitation benefits through geographical expansion may allow advantage to be taken of learning, and of economies of scale and scope (Kogut 1985; Lu and Beamish 2004). Moreover, companies can benefit from cost differences through internationalization, as well as minimize their costs by using local expertise (Kogut 1985; Ghoshal 1987; Thomas and Eden 2004).

However, it may well be that the rising costs of internationalization exceed the initial benefits: costs attributable to managerial and resource constraints arise because the need for coordination and communication increases as DOI increases (Qian 2002). Although it is suggested that SMEs could benefit more from increased DOI than large companies (Loth and Parks 2002), there is some evidence of a negative effect of foreign-market expansion on SME profitability (Lu and Beamish 2001, 2006), although other scholars have found a positive relationship (Qian and Li 2003; Zhou et al. 2007; Kuivalainen et al. 2007; Schwens et al. 2017). Finally, Zahra et al. (2000) suggest that the nature of this relationship may depend on the characteristics of the company. One such influence may be the original location of the firm, as SMEs from small open economies tend to be faced with small domestic markets, which further pushes them to internationalize (Madsen and Servais 1997). Inherent in internationalization in this context is the need to incur additional risks, to aggressively commit resources in order to grow foreign operations, and to balance that risk with internal

innovation activities in the company, such as service innovation. Given their prevalence in the research on international entrepreneurship, we have chosen such SMEs as our empirical context, and thus posit that:

- H6: The level of DOI in internationally operating SMEs is negatively related to their profitability.

## Research methodology

### Data collection

We collected our data via an online survey of Finnish SMEs operating in the ICT industrial sector. Our choice of this specific context was based on theoretical, managerial, and societal considerations. First, the role of human capital is recognized as important in both SMEs in general and in ICT companies in particular (Bloodgood et al. 1996; Manolova et al. 2002; Delgado-Gomez et al. 2004; Reuber and Fischer 1997; Ruzzier et al. 2007; Javalgi and Todd 2011). The majority of Finnish ICT companies are small- and medium-sized, and the industry has been characterized as innovative on a global scale: between 2004 and 2009, the percentage of ICT-related patents among the national total was the second highest in the world (OECD 2012). The ICT industry has been characterized as global, and global standards in telecommunications, for example, are emerging, which pushes companies to internationalize early on in order to avoid falling behind their competitors (Bell 1995; Coviello and Munro 1997; Saarenketo et al. 2004). Additionally, innovating in a high-tech sector is necessary to increase the probability of survival (Cefis and Marsili 2006). Thus, specialization, high up-front R&D costs, and the need to exploit opportunities to the full push companies towards internationalization in order to grow (Saarenketo et al. 2004).

Second, ICT is one of the most innovative sectors in the EU, and the main way for companies to grow is through internationalization (Moen et al. 2004; Saarenketo et al. 2004; Wiig Aslesen 2008). Finland is among the leading countries globally in terms of ICT activities (Dutta and Bilbao-Osorio 2012, 12), and the industry has been the locomotive driving economic development in the country. Given the significant and broad impact of these trends, the attention paid to service innovation has been small compared with that given to technological innovation. Third, within the EU, SMEs comprise 99.8% of non-financial enterprises and provide 67.4% of jobs within the non-financial business economy (Ecorys 2012, p. 9). For all these reasons, ICT and the SME perspective combined constitute a relevant research context.

We used the European Commission classification of SMEs and ICT firms to identify companies to contact that would be suitable for the purpose of the research. Identified through the Amadeus database, the firms were subsequently sent a cover letter via e-mail with a link to the survey. The questionnaire was pretested on two managers in different fields, and some alterations to the wording of the questions were made based on their suggestions. It was sent to companies in two parts, and the non-respondents were contacted by means of three reminder emails. The questionnaire was sent to 1050 companies representing ICT service, trade, and manufacturing sectors. Four companies

were excluded from the sample because they did not have international operations. Moreover, 34 companies had blocked the online service that was used to send the survey invitation, and sent e-mails bounced back from eight companies. In all, responses were received from 1004 firms, the three reminder e-mails being sent subsequently to non-respondents. During the 2 months of data collection, 104 filled questionnaires were received, thus resulting in a response rate of 10%. The relatively low response rate could relate to the questions regarding profitability, in which SMEs tend to consider sensitive information (Autio et al. 2000). However, as Rutherford et al. (2017) have pointed out, lower response rates in general do not bias empirical results in entrepreneurship research.

The majority of companies (87.2%) involved in the research were small-sized, employing less than 50 people (see Table 1). Of these, 63.2% were micro enterprises with less than 10 employees. The turnover of 79.7% of the companies was less than five million Euros, the average age was 13 years, and the firms had begun their internationalization activities, on average, in 2005. The majority of the respondents (76.6%) were CEOs, with half of them having 8 or more years of international experience, and 34.6% with more than 15 years. Finally, 42% of the respondents had been with their current employer for 2 to 4 years, and 24% for 11 or more years.

We used Likert-scaled items to measure EO, human capital, and SI. The EO measure consisted of nine items, adopted from Jantunen et al. (2005) and based on the original scale of Miller (1983), and Covin and Slevin (1989). This scale and its variations have been commonly used in EO studies, and it has been suggested that the variance in results is not attributable to the use of a certain EO scale (Rauch et al. 2009). We used the nine-item scale because it allows the formation of three dimensions of EO, the usage of which is recommended in the literature (Naman and Slevin 1993; Lumpkin and Dess 1996; Miller 2011; Cadogan 2012). The innovativeness, proactiveness, and risk-taking dimensions were each measured on a set of three items (as seen in Appendix).

Several constructs are used in the literature to describe DOI. Ramaswamy et al. (1996), as well as Sullivan (1994), suggest using multidimensional measures because

**Table 1** Respondent demographics. *M* manufacturing, *W* wholesale, *S* service, Internationalization = Year of internationalization, Industry exp. = Industry experience, and Intern.exp. = International experience

		Small	Medium	Missing
Amount		68	10	22
	M	11	0	
Industry	W	3	0	
	S	55	9	
Turnover (M€)		0.5–0.99	10–24.9	22
Size		1.5	4.8	23
Age		13	18	24
Internationalization		2005	2003	36
Industry exp. (years)		11–15	11–15	23
Intern. exp. (years)		8–10	11/15	24

single-item measures may not fully capture the concept (Li 2007). We followed this suggestion. Service innovation was measured on six items adapted from Cooper and Kleinschmidt (1987), which have also been used in service contexts (e.g., Atuahene-Gima and Ko 2001; Radulovich 2008). We used a subjective scale to measure profitability, asking the respondents to assess the profitability of their company over the past 3 years relative to their competitors on a seven-point Likert scale (again, as seen in Appendix).

The survey also inquired into company size (total sales and the number of full-time employees). We included questions about the primary sector of operations in order to differentiate between manufacturing and service SMEs, and asked about the age and the international and industry experience of the companies so as to assess the potential impact on internationalization and innovation (Andersson 2000; Manolova et al. 2002; Reuber and Fischer 1997; Ruzzier et al. 2007).

## Measures

We applied factor analysis to determine the reliability and validity of our scales, as it is an appropriate method when partial correlations are small. Partial correlations comprise the basis of Kaiser's measure of sampling adequacy (MSA), which should have a value above 0.5 to be adequate (Hair et al. 1998, p. 99). Varimax rotation is a common rotation method aimed at simplifying the data structure and creating uncorrelated factors: the item communalities can be considered high if they are all 0.8 or greater, and low if they are less than 0.4 (Costello and Osborne 2005). As Table 2 shows, all the resulting factor analyses were reliable, with Cronbach's alpha values of above 0.7, as Hair et al. (1998) recommend.

As predicted, the rotated factor pattern for EO depicted in Table 2 yielded a three-dimensional construct, consisting of innovativeness, risk-taking, and proactiveness. As Table 2 also shows, the overall MSA values were adequate, indicating that the items were appropriate for factor analysis. Moreover, all the communality values were sufficient, indicating that the three suggested EO factors explained the variance in each item. These three factors explained 59% of the variance in total, and together with the Cronbach's alpha values being above the suggested cutoff value of 0.7, the factor analysis indicated reliability with sufficiently valid factors.

We used the measure of human capital developed by Youndt et al. (2004) to evaluate employees' general levels of knowledge and skills. The questions focus on two main areas related to (1) the skills and expertise of the employees and (2) their creativity and level of new ideas (see Appendix). Our factor analysis supported this suggested structure and resulted in two dimensions (see Table 2). The MSA measures were sufficient ( $>0.8$ ), indicating that the items were appropriate for factor analysis. The two factors together explained 71.7% of the total variance, and the communalities were again at an acceptable level, suggesting that the two-factored human-capital construct explained the variance in each item sufficiently. The Cronbach's alpha values for both factors further indicated sufficient reliability and validity, as evidenced by the intra-factor correlations.

We combined the four SI items to form a single SI factor, explaining 65.6% of the total variance. The second, third, and fourth items were dropped due to a poor fit to the factor. The second factor had a communality of 0.48, which suggests that SI did not

**Table 2** Rotated factor patterns for the applied measures

	Entrepreneurial orientation				
	Innovativeness	Risk-taking	Proactiveness	Comm.	MSA
EO1	0.568			0.560	0.88
EO4	0.843			0.764	0.85
EO7	0.562			0.595	0.90
EO2		0.682		0.591	0.83
EO8		0.654		0.503	0.87
EO9		0.526		0.512	0.88
EO3			0.640	0.700	0.88
EO5			0.605	0.511	0.91
Var exp.	0.222	0.195	0.174		
Cum. var.	0.222	0.418	0.592		
Cron. alpha	0.796	0.753	0.708		
H0 for 3 factors is sufficient		0.564			
	Human capital				
	Skills and know-how	Creativity	Comm.		MSA
HC1	0.790		0.762		0.85
HC2	0.687		0.574		0.89
HC4	0.696		0.665		0.87
HC3		0.914	0.995		0.81
HC5		0.625	0.591		0.82
Var exp.	0.388	0.329			
Cum. var.	0.388	0.717			
Cron. alpha	0.839	0.848			
H0 for 2 factors is sufficient		0.362			
Degree of internationalization (DOI)					
DOI1		0.957	0.916		0.67
DOI2		0.806	0.649		0.88
DOI3		0.933	0.870		0.69
Var exp.		0.812			
Cum. var.		0.812			
Cron. alpha		0.924			
Service innovation					
SI1		0.875	0.765		0.68
SI5		0.795	0.632		0.73
SI6		0.756	0.571		0.76
Var exp.		0.656			
Cum. var.		0.656			
Cron. alpha		0.846			
Profitability					
			Comm.		MSA
P1		0.916	0.838		0.79
P2		0.980	0.961		0.68
P3		0.917	0.840		0.79
Var exp.		0.880			
Cum. var.		0.880			
Cron. alpha		0.956			

explain the variance in the item. Thus, the item was removed, resulting in sufficient MSA and communality values and, by extension, reliability and validity for the SI factor (see Appendix for the individual items).

DOI is described in the literature through several constructs, including international diversity, export intensity, geographical diversity, multi-nationality, the scale and scope of internationalization, international business intensity, and degree of internationalization (Cavusgil and Zou 1994; Sullivan 1994; Zahra and Garvis 2000; Zahra et al. 2000; Lu and Beamish 2001, 2004; Saarenketo et al. 2004; George et al. 2005; Pla-Barber and Escriba-Esteve 2006; Li 2007), but in general, it is considered to be the extent of a company's operations outside the home country (Ietto-Gillies 2009). The three DOI items in the survey formed a single factor. The communalities were at an appropriate level, and the factor explained 81.2% of the variance. The results of the factor analysis, shown in Table 2, support Sullivan's (1994) suggestion to operationalize the DOI measure through a multiple-item measure. A single-factor solution explained 81% of the total variance, with a Cronbach's alpha value of 0.92 and sufficient communality values, containing four items (see Appendix). Finally, a single-factor solution was also obtained for profitability, with similarly sufficient MSA and Cronbach's alpha values (see Table 2), thus making all of the respective measures suitable for use in the analysis.

Finally, we included several control variables into the survey, and subsequently to our analyses. Traditionally, the main factors that may impact internationalization of companies are related to their industrial sector and to their size (Pla-Barber and Escriba-Esteve 2006). Therefore, inquired upon the industrial sector of the respondents in order to distinguish between primarily manufacturing, retail, and service companies, and subsequently re-coded the three groups into a control variable. We also controlled for the age of companies, as extant research has indicated it tends to impact performance and international sales of smaller, younger firms in particular (Reuber and Fischer 1997; Zahra 2003). We further controlled for international experience and industry experience of the respondents, due to their potential impact on both internationalization and innovation (Andersson 2000; Manolova et al. 2002; Reuber and Fischer 1997; Ruzzier et al. 2007).

The responses on the different item scales ranged as follows: EO from 4.3 to 5.2, human capital from 5.0 to 6.2, and DOI between 1.6 and 2.5. In addition, the SI items ranged from 4.2 to 5.5. The levels of DOI and SI in particular indicate that the companies in the sample seemed to prioritize innovating over further internationalization. Table 3 shows the inter-correlations between the variables used in our analysis and the standardized factor averages.

## Results

We tested the hypotheses by means of structural equation modeling (SEM). The most common estimation procedure within SEM is maximum likelihood, which is used for small sample sizes of 50 and has generated valid results, although the appropriate sample size is usually between 100 and 200. The significance level should be dropped to 0.025 or 0.01 with smaller sample sizes due to certain statistical characteristics of maximum likelihood estimation (Hair et al. 1998, p. 605; p. 613). The path model of profitability was based on the regression analysis results. We used the *lavaan.survey* R



**Table 3** The descriptives and inter-correlations of the variables used in the analysis

	Mean	Std.	EO1	EO2	EO3	HC1	HC2	DOI	SI	P1	P2	P3	Size	Sector	Industry experience	International experience	Age
EO1	0.03	0.86	1.00														
EO2	-0.02	0.77	0.10	1.00													
EO3	-0.21	0.86	0.30*	0.17*	1.00												
HC1	0.02	0.96	0.18	0.22	0.39***	1.00											
HC2	0.10	0.88	0.21	0.08	0.24***	0.10	1.00										
DOI	0.01	1.03	-0.17	0.42**	0.15	0.01	0.11	1.00									
SI	0.00	0.94	0.48**	0.21*	0.44***	0.42***	0.32***	-0.04	1.00								
P1	-0.13	0.94	0.16	-0.10	0.13	0.01	0.02	-0.30**	-0.05	1.00							
P2	-0.05	1.04	0.28**	0.33**	0.34**	0.18	0.26	0.54**	0.33**	-0.12	1.00						
P3	-0.05	1.07	0.22	0.05	0.29	-0.00	0.10	-0.04	0.07	0.41**	0.23	1.00					
Size	0.09	0.29	-0.10	-0.12	-0.10	-0.19*	0.19	0.14	0.02	0.02	0.13	-0.05	1.00				
Sector	2.55	0.86	0.11	-0.18	0.06	0.10	0.30**	-0.23*	0.25*	0.18*	-0.12	0.05	0.17	1.00			
Industry experience	5.55	0.80	0.17	-0.05	-0.03	0.19	0.18	-0.05	0.27	0.03	0.03	0.07	0.06	-0.02	1.00		
International experience	4.27	1.72	0.07	0.28*	0.05	0.03	0.19	0.48**	0.13	-0.08	0.29**	0.06	0.25	-0.22	0.40*	1.00	
Age	15.82	10.22	-0.06	0.13	-0.24*	-0.02	-0.29*	-0.04	-0.28*	0.01	-0.08	-0.18	0.17	-0.48**	-0.18	0.13	1.00

package for the SEM analyses. Three goodness-of-fit measures are used to evaluate the model fit in SEM: absolute fit, incremental fit, and parsimonious fit (Hair et al. 1998, p. 611; Hooper et al. 2008). The maximum likelihood method with robust standard errors was used for the model estimation. All the variables were standardized during the estimation due to the impact of normality, skewness, and kurtosis on the results, and the covariance matrix was generated via the software. Although the one-step model in which both confirmatory factor analysis and regression analysis is performed simultaneously is preferred, the two-step model has been widely used (Hair et al. 1998, p. 600).

Chi-square test statistics, and the ratio between chi-square ( $\chi^2$ ) and degrees of freedom (df) were used to evaluate the overall model fit. The value of the latter in the model with the profitability outcome was 0.835 (15.022/18), suggesting no significant correlations between the matrices of the hypothesized model and the sampled data in the models of international performance and growth. The RMSEA value was 0.00 and thus below the suggested 0.08 threshold, indicating that errors in the fit of the covariance matrix were reasonable, although a good error of approximation was indicated in the profitability model. The SRMR value (0.04) was also below the recommended level of 0.08, indicating that the model was not misspecified. All in all, the fit measures (CFI 1.000, TLI 1.027, RMSEA 0.000, and SRMR 0.040) in the profitability model indicated an adequate fit to the data (see Table 4). Both the CFI and TLI values were above 0.95, suggesting a sufficient fit between the model and the sample data. This indicates that there was little possibility of measurement error because the difference between the null model and the sampled model was small. In addition, because all the measures in the model were at an adequate level, we checked that the SRMR values were between 0.06 and 0.03, which lowers the likelihood of error.

Figure 1 depicts the overall model. The results give partial support to H1. Namely, the risk-taking dimension of EO (H1c) did have a positive and significant (0.29, sig. < 0.01) impact on DOI. We did not consider this a surprising result given that entering foreign markets tends to require SMEs to focus their resources on internationalization, thus assuming a risk-taking strategic posture. The impact of innovativeness on DOI, although statistically significant, was nevertheless negative ( $-0.19$ , sig. < 0.05). Thus, more innovation-oriented SMEs tended to exhibit lower levels of DOI, and H1a was not supported. The proactiveness dimension of EO was not associated with higher levels of DOI in the SEM model; thus, H1b was not supported either. In sum, the impact of EO on DOI was complex in that increased risk-taking led to higher levels of DOI, whereas a more innovative posture had the opposite effect.

Our second main hypothesis (H2) postulated a positive impact of EO on SI. As Fig. 1 indicates, the results were similarly dependent on the EO dimension in question: the innovativeness dimension had a significantly positive impact (0.35, sig. < 0.01). Although this was not a surprising result in itself, we note that the impact was the opposite to that of DOI, suggesting that in assuming an innovative posture the SMEs were, in fact, prioritizing service innovation at the cost of expanding their international activities. Additionally, the risk-taking dimension of EO was not associated with SI, and the relationship of the proactiveness dimension, although positive, was non-significant (0.22, sig. < 0.05). Thus, H2 was partially supported through the support for H2a.

**Table 4** The results of the structural equation modeling with robust standard errors

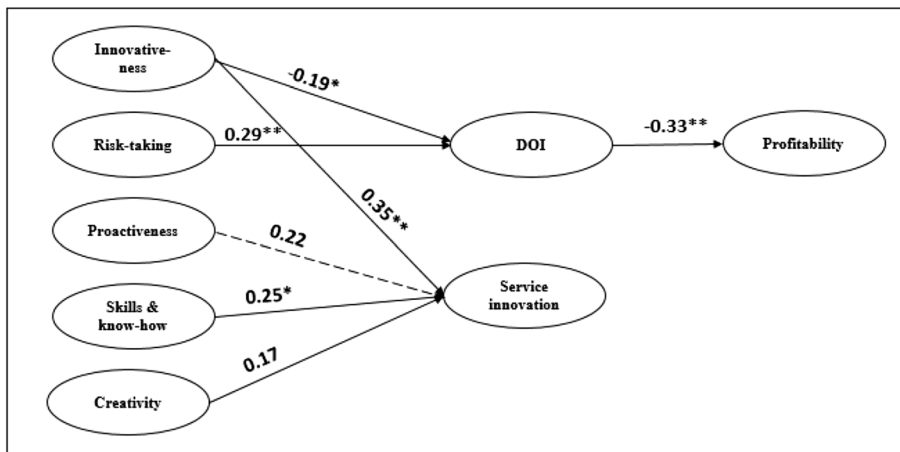
	<b>Profitability</b>
<b>DOI</b>	
EO1	− 0.188* (0.092)
EO2	0.289** (0.093)
Sector	− 0.145 (0.090)
Industry exp.	− 0.262** (0.095)
International exp.	0.532** (0.096)
Age	− 0.245* (0.101)
<b>SI</b>	
EO1	0.351** (0.130)
EO2	0.064 (0.103)
EO3	0.219 (0.128)
HC1	0.248* (0.125)
HC2	0.170 (0.140)
<b>Performance</b>	
DOI	− 0.330** (0.124)
SI	
<b>Diagnostics</b>	
Min .func .test static	15.885
Comparative Fit Index	1.000
Tucker-Lewis Index	1.027
RMSEA	0.000
SRMR	0.040

Standard errors are in brackets

*RMSEA* root mean square error of approximation, *SRMR* standardized root mean square residual

Statistical significance: \*0.05 and \*\*0.01

The third hypothesis postulated a positive relationship between HC and DOI. As Fig. 1 indicates, higher levels of HC led to higher levels of SI rather than more extensive foreign operations. Thus, H3 was not supported. Conversely however, H4 was partially supported in that the skills and know-how dimension of HC was positively and significantly (0.25, sig. < 0.05) associated with higher levels of SI. The creativity dimension was positive (0.17) but not statistically significant in our model.



Note: \*  $P < 0.05$ , \*\*  $P < 0.01$

Fig. 1 The SEM path model

Finally, hypotheses H5 and H6 postulated a positive impact of SI and a negative impact of DOI (respectively) on the profitability of the international SMEs. As Fig. 1 shows, H6 was supported ( $-0.33$ , sig.  $< 0.01$ ). In other words, higher levels of DOI among the companies led to decreased profitability, whereas SI was not associated to profitability in our model.

In sum, we conclude that the profitability model suggested a sufficient fit to the sample data, and thus indicated the following: the risk-taking dimension of entrepreneurial orientation positively and significantly affected DOI, and the innovativeness and proactiveness dimensions significantly and positively affected SI. Furthermore, according to the model, DOI was significantly negatively associated with profitability. Overall, the SEM results show that EO and HC may be antecedents of internationalization and service innovation among SMEs, but their respective impacts are largely contrary. The implication is that the aptitude of SMEs to engage in either service innovation or internationalization may preclude them from achieving the other. The findings also indicate that SMEs may have to make a choice between innovating and internationalizing, and if they were to choose the latter, they may have to be prepared for a negative impact on their profitability. One reason for this may be that increasing DOI requires a risk-taking entrepreneurial attitude, which may result in an increased likelihood of market failure.

## Discussion and conclusion

While entrepreneurial internationalization and innovation have been linked together in international entrepreneurship for a long time (e.g., Knight and Cavusgil 2004), studying the two jointly has recently started to gain steam in the IE field (e.g., Veglio and Zucchella 2015; Denicolai et al. 2015; Weerawardena et al. 2019). However, the role of service innovation in the international entrepreneurship domain overall has received little attention, and thus, the aim of this study was to seek empirical

clarification concerning the antecedents and outcomes related to service innovation in the context of SME internationalization. The results of this study indicate, first, that entrepreneurial orientation underlies both internationalization and service innovation in SMEs, but that the impact depends partly on the EO dimension, as the innovativeness dimension of EO has significant but opposite effects on DOI and SI, suggesting a trade-off between innovation and internationalization when it comes to the entrepreneurial culture in SMEs. This is an interesting result when contrasted to those of Genc et al. (2019), who found EO to mediate between internationalization and innovation outcomes. Contrary to that study, we did not find EO to have a mutually beneficial and enriching role in linking innovation and internationalization outcomes, rather that the individual components of EO predict (service) innovation and internationalization separately. This difference may be due to the fact that Genc et al. measured innovation performance through the number of patents owned, thus their study context was not service innovation specifically. In addition, while Saridakis et al. (2019) found more innovative firms to also export more, the results of the present study contradict that result, by finding that the innovativeness dimension of EO has positive effect only on the extent of service innovation, but a negative one on the degree of internationalization. We suggest that these results may be due to the fact that the relationship between innovation and internationalization can depend on the type of innovation in question (Saridakis et al. 2019). The present study suggests that with service innovation, there may be a trade-off between engaging in innovation and international expansion.

Human capital would be an antecedent to SI, but not to the degree of internationalization among the SMEs and, although increasing the scale and scope of internationalization resulted in lower profitability among the SMEs, engaging in service innovation did not incur profitability costs for them. Consequently, our findings also imply that accumulated human capital may have neither a direct nor an indirect association with the profitability of an internationalizing SME. Our analyses did not yield evidence of a relationship between SI and profitability, but we did find a negative relationship between DOI and profitability. In this, our results are in conflict with Qian and Li's (2003) finding of a positive impact of DOI on SME profitability, while confirming those reported by Lu and Beamish (2006) indicating that exporting has a positive impact on growth, but a negative one on profitability. This may imply that, as Zahra et al. (2000) suggest, the relationship depends on the characteristics of the firm.

The main contribution of this study is multi-faceted. First, in examining both service innovation and internationalization jointly in the SME context, we have highlighted their potential antecedents of entrepreneurial orientation and human capital, while at the same time as investigating an under-researched internationalization outcome in profitability. Thus, the study adds to the knowledge and arising discussion on the role of innovation in internationalizing SMEs (Genc et al. 2019; Saridakis et al. 2019; Vrontis and Christofi 2019; Weerawardena et al. 2019), while also extending the study by Bello et al. (2016) to account also for internationalization outcomes. Second, the findings contribute to the literature on the determinants of firm performance, and on the successful internationalization of high-technology SMEs (Bell 1995; Coviello and Munro 1997; Moen et al. 2004; Saarenketo et al. 2004; Vadana et al. 2019)—a context relevant in IE. In particular, our results enhance knowledge of service innovation in the context of internationally operating SMEs (cf. Weerawardena et al. 2019): SMEs

concentrating on service innovation are able to gain certain benefits by operating internationally but accruing these benefits may be complex and depend on the strategic goals of the firm. A further contribution is to add to the body of knowledge on the determinants and outcomes of DOI, the findings thus far having been mainly inconclusive and conflicting. Given that DOI had a negative relationship with the profitability of internationally operating SMEs while SI did not, the main implication of our analysis is that, at least in the short run, SMEs may remain more profitable through innovation-rather than internationalization-related activities.

Our finding that different dimensions of EO act as antecedents of both DOI and SI provides further empirical support for the suggestion in the literature that EO should be conceptualized as a multidimensional construct (Naman and Slevin 1993; Frishammar and Andersson 2009; Miller 2011; Cadogan 2012; Lomberg et al. 2017). On the other hand and in conflict with some of the extant literature on the topic (e.g., Fletcher 2004; Knight and Cavusgil 2004; Genc et al. 2019; Saridakis et al. 2019), we found that different dimensions of EO had varying impacts on internationalization and service innovation, namely that innovativeness had a positive impact on SI, and a negative relationship with DOI. Our results suggest that innovativeness among top management may in fact decrease DOI, which could imply that innovative managers tend to focus on developing and commercializing innovations and therefore allocate more resources to the process of innovating. Consequently, a trade-off may present itself due to the limited resources SMEs possess, forcing them to spend less on engaging in internationalization.

Moreover, we distinguished a positive relationship between the proactiveness dimension of EO and SI, and between the risk-taking dimension and DOI. Surprisingly and contrary to what de Jong et al. (2003) and den Hertog (2010) suggest, in our analyses, risk-taking had no influence on SI. We believe this may be attributable to the fact that service innovations are carefully planned and researched, and that management risk-taking does not play a role. On the other hand, the lack of a significant relationship between proactiveness and DOI implies that international expansion in these companies may be more an act of risk-taking than a carefully considered strategic choice, which may further imply that in some cases, SMEs follow effectuation logic (Sarasvathy 2001) rather than strategic causality.

We also found a relationship between human capital (HC) and SI, but not between HC and DOI. Instead, international experience was positively related and industry experience negatively related with DOI. This suggests that top management's international experience may play a more crucial role in internationalization in these types of companies than employees' skills and capabilities. The role of international experience is acknowledged in the literature (e.g., Reuber and Fischer 1997; Manolova et al. 2002; Ruzzier et al. 2007), but in contrast to the results reported by Shane (2000), Westhead et al. (2001) and D'Angelo and Presutti (2019), our findings imply that industry experience may have a negative impact on DOI. In addition, overall educational level did not have a significant effect on SI or DOI, which contradicts Wang and Chang's (2005) suggestion that educational background could be a dimension of human capital. Although there may be several explanations for the contrasting result in the present study, it could have had something to do with the nature of the industry: many software SMEs are startups founded by students, university graduates, or serial entrepreneurs who may vary in educational background.

In combination, the results regarding the effects of the EO dimensions and human capital on SI indicate that innovativeness among top management has a bigger impact than employee creativity in that the innovativeness dimension had a highly significant and positive relationship with SI, whereas in the case of creativity, the impact was only partially significant and positive. This could also imply that service innovations in SMEs tend to be created and developed from the top down, meaning that members of top management come up with new ideas that are then developed and commercialized together with employees. Furthermore, our findings also imply that SMEs may not be taking advantage of the potential of employees when assessing the role of skills and know-how in SI, or they may not see their creativity as beneficial. Notably, this could also imply that employees do not share their ideas sufficiently within the organization.

We also believe that our findings have relevant managerial implications. First, one could argue that the role of human capital in the development and commercialization of innovations is important. The human capital of both top managers and employees matters, although the creativity of employees matters less than their skills and know-how. The implication here is that companies should perhaps focus more on applicants' skills and know-how rather than their creativity and innovativeness in the hiring process. Furthermore, the importance of international experience as well as skills and know-how in DOI and SI highlights the role of training and the opportunity to undertake international assignments. Second, as opposed to what is suggested in the literature, our findings do not support the adoption of a dual strategy combining innovation and internationalization, not at least if the internationalizing SME aims to maintain profitability. SMEs should therefore focus first either on innovation or on internationalization.

The main limitations of this study include its single-country and single-industry focus, which limits the generalizability of the results (cf. Bryman and Bell 2003 p. 105). The proposed model should subsequently be applied across industries, and a cross-country study could reveal more about the potential generalizability of the results obtained. For example, Lomberg et al. (2017) have shown that in the case of low- and high-tech firms, the degree to which each dimension of EO explains the variance in performance differs. Our findings may be valid in the context of high-technology SMEs in the Scandinavian countries and in other small economies that are similar to Finland. They may also be relevant to knowledge-intensive SMEs aiming at international expansion as well as to start-ups, which tend to be innovative and eager to internationalize by nature. The use of panel data would also allow more detailed examination of the DOI-profitability relationship.

Second, the sample mainly comprised small service companies in the ICT industry. Another limitation and, consequently, a potential avenue for future research is that we did not account for the radicalness of service innovations. This could also require applying den Hertog's (2010) six-dimensional model of SI, given that we used the four-dimensional model on account of its fit to our specific empirical context (i.e., technology, which plays a central role in ICT companies, is at the center of the four-dimensional model). This study was conducted in a specific cultural environment, and EO in particular has been found to be influenced by culture (Lee et al. 2011). Expanding the empirical view to cultures other than Finland might provide us with more information on the dynamics of EO with SME innovation and internationalization. There is some evidence that in emerging markets, the role of institutions and

institutional development may impact the dynamics of internationalization and innovation (e.g., Wu et al. 2016). In order to make further comparison, future research could thus assess the role of the institutional environment from the developed economies point of view. We also note that the 10% response rate in the empirical sample was not particularly high. Thus, we considered the possibility of biases arising from the response rate and, as Rutherford et al. (2017) recently found in their review, low response rates are not expected to bias results in the entrepreneurship domain.

For the future, the significance of international experience and the non-significance of human capital in the human-capital-DOI relationship imply that, if structured differently, human capital could yield more evidence about the association. The structure suggested by Huang (2003) and Neal (1995) could give further insight into these dynamics. Furthermore, including tacit and explicit technological knowledge in the measures instead of educational level could provide different evidence about the effect of human capital on DOI and SI.

Another potential future research avenue could be taking the unit of analysis to the individual level, as human capital has been found to lead to accumulating entrepreneurial and managerial competencies (Kungwansupaphan and Siengthai 2012), as well as to overall venture success (Hormiga et al. 2011; De Cleyn et al. 2014). Examining the mindset of SME managers on the innovation-internationalization behavior activities among SMEs, as both global mindset and global orientation may affect the behavior related to internationalization (Felicio et al. 2013). Moreover, gender may also have an influence in the entrepreneurial intentions of individuals (Díaz-García and Jiménez-Moreno 2010) and thus by extension, on their individual entrepreneurial orientation (Goktan and Gupta 2013). While our study did not approach the examined phenomena from the point of view of the individuality or the gender of the respondents, extant studies do thus indicate that accounting for the gender of the entrepreneur might yield additional insight into constructs such as EO in this context. In addition, social capital could also be considered an antecedent of DOI and SI, given the recognition of the important role of relationships in contemporary literature on internationalization and innovation (e.g., Chesbrough 2011, p. 35; Johanson and Vahlne 2011). Moreover, service innovations tend to require collaboration between the service provider and the customer or other external parties (Alam and Perry 2002; Magnusson 2003; Kristensson et al. 2008; Kuusisto and Rieppula 2011).

The dynamics of internationalization and innovation have recently gained attention in research on international entrepreneurship (e.g., Hagen et al. 2014; Onetti et al. 2012; Veglio and Zucchella 2015; Saridakis et al. 2019; Weerawardena et al. 2019). However, most of the extant research incorporating innovation and internationalization is still from the context of large companies (Cano-Kollmann et al. 2016). It is important to distinguish between different types of innovations in the context of internationalization (Denicolai et al. 2015; Saridakis et al. 2019). Thus, this study has sought to add to the knowledge on a type of innovation that extant research in IE has mostly neglected, service innovation, and to highlight the common antecedents and performance implications underlying service innovation and successful internationalization of SMEs in a joint setting.

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## Appendix. Selected survey items

Entrepreneurial orientation (adapted from Jantunen et al. 2005):

- We are among the first ones to implement progressive and innovative production processes and practices.
- The management of our company supports the projects that are associated with risks and expectations for returns higher than average.
- We actively observe and adopt the best practices in our sector.
- We actively observe the new practices developed in other sectors and exploit them in our own business.
- We recognize early on such technological changes that may have an effect on our business.
- We are unable to take on unexpected opportunities.
- We search for new practices all the time.
- In uncertain decision-making situations, we prefer bold actions as to make sure that possibilities are exploited.
- We allocate our resources continuously to new promising operation areas.

Human capital (Youndt et al. 2004):

- Our employees are highly skilled.
- Our employees are widely considered the best in our industry.
- Our employees are creative and bright.
- Our employees are experts in their particular jobs and functions.
- Our employees develop new ideas and knowledge

Degree of internationalization:

- Please estimate the percentage of your company's total sales which are attributable to foreign sales.
- Please estimate the percentage of your company's profits which are attributable to foreign profits.
- Please estimate the percentage of your company's customers who are considered foreign customers.
- Please estimate the percentage of your employees that are located outside of the company's home country.

Service innovation (Cooper and Kleinschmidt 1987):

- Our service(s) offer unique benefits to the customer, not offered by competitors.
- Our service(s) rely on technology, which has never been used in the industry before.
- Our service(s) are not radically different from competitor services.
- Our service(s) provide higher quality than the competitors.
- Our service(s) are highly innovative, replacing a vastly inferior alternative.
- Our service(s) offers solutions that are not possible to achieve with existing products.

### Profitability:

The following statements pertain to the performance of your firm during the past 3 years relative to companies in the same industry. Please compare your firm over the past 3 years relative to the companies in the same industry on the following criteria:

- 1 = Our performance is much worse than the companies in the same industry.
- 7 = Our performance is much better than the companies in the same industry.
- 4 = Our performance is equal to the companies in the same industry.

- Return on equity (ROE).
- Return on assets (ROA).
- Return on sales (ROS).

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