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Internationalisation through digitalization: The impact of e-commerce usage on internationalisation in small and medium-sized firms

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Abstract

This paper contributes to the ongoing debate about how digitalization affect internationalisation of small and medium-sized firms (SMEs). By applying the Uppsala internationalisation process model, this paper examines the impact of e-commerce on internationalisation of SMEs. The study uses a unique dataset, including 14,513 SMEs across several sectors in 34 countries. The results show that firms using the Internet as a means to provide information about the firm exhibit a higher degree of internationalisation, while using the Internet to facilitate transactions was found to have a positive impact on the ratio of foreign sales to total sales, but that this foreign sales is likely to be concentrated in less regions/markets. Furthermore, perceived export barriers was found to be a significant moderator of the effects of e-commerce on both international intensity and international diversification. This suggests that e-commerce does not automatically facilitate internationalisation of SMEs.

Keywords: Internationalisation; international diversification, small and medium-sized firms, e-commerce, perceived export barriers

Internationalisation through digitalization: The impact of e-commerce usage on internationalisation in small and medium-sized firms

Small and medium-sized enterprises (SMEs) in many parts of the world are now seeking growth by engaging in internationalisation – the increasing involvement in foreign markets. In recent years, new types of firms have started to emerge, such as born globals (Knight, 2015), international new ventures (Oviatt & McDougall, 2004) and micro-multinationals (Dimitratos, Johnson, Slow, & Young, 2003). Common to these firms is that they all engage in internationalisation while being small and often right from or shortly after inception. This has resulted in an increasing number of empirical studies focusing on the antecedents and outcomes of SMEs international involvement. Although several studies have looked at the antecedents and the process of internationalisation among SMEs, little effort have been made to understand the potential influence of the Internet and the development of e-commerce on SME internationalisation (Etemad, Wilkinson, & Dana, 2010; Hagsten & Kotnik, 2017; Sinkovics, Sinkovics, & Jean, 2013).

The Internet has been hailed as "the most important innovation in recent years for SME exporters" (Mostafa, Wheeler, & Jones, 2005, p. 292) and the emergence of born globals, international new ventures, and micro-multinationals are often closely linked to advances in information and communication technology and the emergence of e-commerce (Cavusgil & Knight, 2015; Oviatt & McDougall, 2005). SMEs are generally considered to be restricted by their size when seeking to expand their business abroad (Buckley, 1989; Kahiya, 2013; Leonidou, 2004). However, it is often suggested that the Internet and more specifically e-commerce open up new trading opportunities for SMEs and enable them to (at least partially) overcome many of the traditional internationalisation barriers (Sinkovics et al., 2013). As a consequence, WTO (2016) argues "the development of e-commerce promises to expand export opportunities for SMEs and give them a global presence that was once reserved for large multinational firms" (p. 6). Similarly, Oviatt and McDougall (1999) argued "the Internet may greatly increase the level of internationalisation of even the smallest businesses of the 21st century" (p. 8). Thus, it is commonly assumed that the Internet is an enabling technology, making internationalisation a viable growth strategy for even the smallest firm.

This assumption has not, however, been sufficiently examined and tested under close scholarly scrutiny. To date, surprisingly few studies have empirically examined the impacts of e-commerce on SME internationalisation (Hagsten & Kotnik, 2017). As a consequence, extant literature offers only a limited understanding of how the use of the Internet to conduct business activities, including buying, selling and marketing products and services, influence SMEs ability to expand their business operations internationally. Furthermore, we have limited insight into the potential factors constraining SMEs ability to use the Internet as a means to conduct or support international business activities. Thus, many questions about the impact of e-commerce on SME internationalisation remain unanswered. Consequently, there has been a call for more systematic research focusing on incorporating the role of the Internet in mainstream internationalisation literature by specifically examining how the Internet influences the internationalisation of SMEs (Coviello, Kano, & Liesch, 2017; Etemad et al., 2010; Tseng & Johnsen, 2011).

To address this gap, this study draws upon the Uppsala Internationalisation Process model (Johanson & Vahlne, 1977) to examine the impact of e-commerce on the internationalisation of SMEs in terms of international intensity and the geographical dispersion of their business activities. The study puts two arguments forward. First, it is suggested that e-commerce is positively associated with SME internationalisation as it increases their exposure to international opportunities while at the same time reduces the market commitments necessary for exploiting these opportunities. Second, it is proposed that this relationship is strengthened for firms that perceive export barrier to be low. The reason for this is that perceived export barriers can prevent SMEs from exploiting international opportunities by increasing doubts about the feasibility and desirability of capturing international opportunities. These ideas are tested on a representative sample of 14,513 European SMEs across several sectors in 34 different countries.

The study contributes to a better understanding of the impact of e-commerce on the internationalisation of SMEs. First, rather than looking at how e-commerce influences the international intensity of SMEs as done elsewhere (Hagsten & Kotnik, 2017), this study acknowledges the multidimensional nature of internationalisation and also examines how e-commerce influences the international diversification of SMEs. Thus, the study not only look at the impact of e-commerce on SMEs dependence on foreign sales, but also the potential impact on the dispersion of the firm's international sales. Second, this study moves beyond looking at the direct relationship between e-commerce and internationalisation, by examining the moderating impact of perceived export barriers. Previous results regarding the relationship between e-commerce and internationalisation remain inconclusive, with some studies suggesting a positive relationship (Berry & Brock, 2004; Hamill & Gregory, 1997; Loane, 2006; Tiessen, Wright, & Turner, 2001), while other studies demonstrate little or no impact upon internationalisation (Bianchi & Mathews, 2016; Hagsten & Kotnik, 2017; Moen, Madsen, & Aspelund, 2008). Thus, previous studies suggests that a direct relationship between e-commerce and internationalisation is incapable of explaining the relationship, why including moderated relationships can potentially increase our understanding of the complex relationship. This knowledge is important for SMEs seeking to expand their business abroad, as understanding whether and how e-commerce can influence firm internationalisation as it can help managers, who have to design and implement internationalisation strategies, reach a balanced assessment of the opportunities afforded by the Internet for increasing firms' involvement in foreign markets.

The paper proceeds as follows. The first section reviews prior literature on market commitment, market knowledge and internationalisation of SMEs, which serves as the basis for developing the hypotheses. The following section describes the methodology used in answering the research question, including the data sources and techniques used in testing the hypotheses. Next, the results are presented and discussed, before the final section concludes.

Theory and hypothesis development

Market commitment, market knowledge, and internationalisation of SMEs

For the purpose of this study, the Uppsala Internationalisation Process Model (IP model) is applied. The IP model has developed into a 'workhorse' theory for studying the process of firm internationalisation (Coviello et al., 2017) and is highlighted as being suitable for examining the impact of the Internet on the international involvement of firms (Berry & Brock, 2004; Nieto & Fernández, 2005; Petersen, Welch, & Liesch, 2002). Furthermore, while this model was first developed based on the internationalisation process of large multinationals, it has also proven appropriate for studying and explaining the internationalisation process of SMEs (Paul, Parthasarathy, & Gupta, 2017).

The IP model identifies basic mechanisms of firm internationalisation and argues that firms international involvement is contingent upon market knowledge and market commitment (Johanson & Vahlne, 1977). The basic argument of this model is that market commitment and market knowledge affect both perceived opportunities and risks, which in turn influences internationalisation decisions. The underlying assumption is that firms are able to acquire market knowledge from their activities in foreign markets which, over time, reduces the level of uncertainty and allows them to increase their commitment in foreign markets (Figueira-de-Lemos, Johanson, & Vahlne, 2011). Thus, the international involvement of firms is essentially explained by their experience and ability to learn about foreign markets. The model therefore also implies that firms typically make additional market commitments in small incremental steps, as they strive to keep risk-taking at a low level, unless the firm have large resources, operate in stable and homogeneous market conditions, or possess considerable experience from similar markets (Johanson & Vahlne, 1990; Welch, Nummela, & Liesch, 2016).

Market commitment

Market commitment is related to both the amount of resources committed (i.e. size of the investment in the market) as well as the degree of commitment (i.e. the transferability of resources committed) (Pedersen & Petersen, 1998). Large investments in resources does not necessarily suggest strong commitment, as it depends on how specialized the resources are to the specific market (Freeman, Giroud, Kalfadellis, & Ghauri, 2012). Market commitments therefore refer to all those assets that a firm accumulates in a particular foreign market, which can constrain its freedom of actions and can best be described as "the product size of the investments times its degree of inflexibility" (Johanson & Vahlne, 2009, p. 1412). These market commitments includes both tangible market commitments (production plants, subsidiaries' offices, transportation, etc.) and intangible market commitments (personnel education, advertisement actions, managers' meetings etc.) (Hadjikhani, 1997).

As SMEs are typically considered to be resource constrained, market commitment is often considered a constraining factor in the internationalisation process (Leonidou, 2004). Furthermore, increasing market commitments is associated with an increase in risk due to an increase in significance and severity of potential loss (Figueira-de-Lemos et al., 2011). As a consequence, in order to minimize the risks and uncertainty of operating abroad, firms will pursue a step-wise or gradual internationalisation process or rely on entry modes that require low resource commitments, such as exporting, licensing or joint ventures (Oviatt, Shrader, & McDougall, 2004; Sasi & Arenius, 2012).

While the original IP model expected firms to increase market commitments when uncertainty is reduced or the tolerable risk level increases (e.g. due to an increase in the total resources of the firm), firms are also likely to increase market commitments when the amount of resources required for making such investments is reduced. For example, the reduction in transportation and communication costs has allowed smaller firms to increase foreign market commitments and operate internationally (Mathews & Zander, 2007). This is because a decrease in the amount of resources required for operating internationally, allows the firm to use this latitude to increase their involvement in existing foreign markets or expand to new foreign markets.

Market knowledge

The IP model is based on the assumption that knowledge about foreign markets and operations is an important barrier constraining firms ability to initiate and develop international operations (Welch et al., 2016). Expanding into foreign markets requires knowledge, as firms are venturing into ‘strange new lands’ (Maitland & Sammartino, 2014). As a consequence, firms may experience a significant gap between existing knowledge and the knowledge needed to successfully expand into a foreign market (Petersen, Pedersen, & Lyles, 2008). These knowledge gaps, in turn, have been found to be critical in explaining SMEs commitment decisions and a significant barrier constraining their ability to initiate, sustain and develop foreign market operations (Leonidou, 2004). While the original IP model emphasised the importance of experiential learning in acquiring the necessary knowledge for internationalisation, that is learning through the firm’s own, ongoing operations, others have since encouraged research to look beyond learning by experience and focus on alternative learning processes (Pellegrino & McNaughton, 2017). In addition to experiential learning, firms have also been found to acquire knowledge via indirect experience (Schwens & Kabst, 2009), external search (Åkerman, 2015) and internal information (Petersen, Pedersen, & Sharma, 2003). It is typical to distinguish between two broad forms of knowledge required for internationalisation: (1) internationalisation knowledge, and (2) market knowledge (Pellegrino & McNaughton, 2017). Market knowledge refers to objective or explicit information about specific foreign markets, while internationalisation knowledge concerns how to develop and execute internationalisation strategies (Fletcher & Harris, 2012; Mejri & Umemoto, 2010). While both types of knowledge is found to be important when seeking to expand abroad, knowledge of *opportunities* is often highlighted as being of utmost importance. Knowledge of opportunities are seen as the main driver of internationalisation, why the importance of opportunity development in the internationalisation process has been emphasised (Johanson & Vahlne, 2006, 2009). Opportunity development is seen as an iterative process of recognition and exploitation (Johanson & Vahlne, 2009). Thus, in order to internationalise, an individual must first become aware of an international opportunity. This can be achieved either through deliberate search or accidental discovery (Muzychenko & Liesch, 2015). Thus, both deliberate intentionality as well as serendipitous discovery can a considered a catalyst for internationalisation (Chandra, Styles, & Wilkinson, 2009; Kontinen & Ojala, 2011).

The influence of e-commerce usage on SME internationalisation.

There has been ongoing discussion about the potential impact of the Internet – or firms' use of the Internet for commercial purposes - on the international expansion of SMEs. Scholars are discussing whether and to what extent the Internet and e-commerce use can facilitate internationalisation in SMEs. Many argue that the Internet offer promising potential for SMEs wanting to increase their involvement in foreign markets, as the Internet has reduced the relevancy of distance (Servais, Madsen, & Rasmussen, 2006) and removed or reduced many of the traditional barriers hindering their ability to initiate, develop and sustain operations in foreign markets (Nguyen & Barrett, 2006; Sasi & Arenius, 2012). E-commerce refer to the using the Internet to buy, sell, or market products and services (Bharadwaj & Soni, 2007; Kraemer, Gibbs, & Dedrick, 2005). The Internet is a global and decentralized technological structure consisting of networked computer networks, allowing its users to obtain and exchange information, without being constrained by physical barriers or geographical spaces. The Internet provide unprecedented opportunities for firms seeking to expand their business abroad, by allowing them to engage with firms from all parts of the globe (Coviello et al., 2017). Today, firms can use the Internet to market their products and services, find and communicate with customers and complete transactions. What makes the Internet such an interesting innovation to SME exporters is its ability to reduce or even eliminate many of the barriers and frictions constraining SMEs from increasing their involvement in foreign markets. The main benefit of the Internet as an internationalisation facilitator is its ability to reduce search costs (Petersen et al., 2002). Using the Internet as a tool for promoting the company and its products and/or services can potentially reduce search costs related to obtaining knowledge of foreign market opportunities. SMEs can now achieve global exposure for their brand, products, and services by building an online presence (Bianchi & Mathews, 2016). The Internet is a worldwide computer network connecting computers in more than 100 countries, allowing its users to obtain and exchange information, without being constrained by physical barriers or geographical spaces. Websites are therefore globally accessible more or less instantaneously in practically any time, why the Internet is inherently global in reach. Thus, in theory, firms are able to gain immediate access to international customers simply by being present on the Internet (Kotha, Rindova, & Rothaermel, 2001; Oviatt & McDougall, 1999). Due to the inherently global reach of the Internet, being present on the Internet is likely to expand SMEs opportunity horizon and increase the extent to which SMEs comes into contact with international knowledge (Berry & Brock, 2004). This may be achieved either by using the Internet as an intended vehicle for internationalisation or as a consequence of an increasing number of unsolicited orders from abroad (Prashantham, 2005; Yamin & Sinkovics, 2006). As a consequence, firms are increasingly pulled into foreign markets, because of their greater visibility to international customers, who are using the Internet to search for products and services (Petersen & Welch, 2003). In other words, using the Internet as a platform for marketing is likely to increase firms' international exposure and may directly result in international growth. Furthermore, the Internet can reduce the costs related to searching for and gathering information as well as the costs associated with the coordination and monitoring of information (Mostafa, Wheeler, & Dimitratos, 2004). For example, using the Internet as a promotional tool to present, publicise and promote the firm is typically less costly than using traditional marketing (Houghton & Winklhofer, 2004). In addition, SMEs are able to reduce search costs associated with locating international customers due to the increased exposure made possible through the Internet (Petersen et al., 2002). Thus, the Internet can significantly lower the costs and risk associated with international expansion and provide a low-cost gateway into foreign markets (Angelides, 1997; Hamill, 1997). Based on the above, it can be argued that e-commerce presents a significant opportunity for SMEs seeking to expand abroad to identify opportunities in foreign markets and lower the costs and risks associated with international expansion. Thus, the following hypothesis is proposed:

Hypothesis 1: Using the Internet for information dissemination purposes will be positively associated with internationalisation.

In addition, the Internet can be used as a transaction medium, that is, as a sales channel (Gabrielsson & Gabrielsson, 2011). This includes both using the Internet as a platform for ordering procedures as well as payment. The introduction of the Internet has led to the emergence of a completely new marketspace and created the possibility for SMEs to serve international markets in new ways, e.g. by using virtual export channels or e-intermediaries (Cho & Tansuhaj, 2013; Morgan-Thomas & Bridgewater, 2004). The Internet has therefore been recognised as a new mode of entry into international markets, exhibiting significant differences with respect to traditional ones (Plakoyiannaki, Kampouri, Stavraki, & Kotzaivazoglou, 2014). It is generally assumed, that SMEs using the Internet as an entry mode are subject to fewer barriers when seeking to expand abroad compared to firms with expensive physical presence in foreign markets (Luo, Zhao, & Du, 2005). One reason for this is because the Internet provide SMEs with a resource-conserving international entry mode (Arenius, Sasi, & Gabrielsson, 2005). Using the Internet to facilitate customer transactions can improve SMEs reduce the costs of internationalisation, by improving the efficiency in terms of receiving customer orders and handing inquiries (Sheth & Sharma, 2005). Another reason is that the Internet "can potentially create an instant global and near-frictionless exchange environment, with customers worldwide minimising end-users' transaction costs and establishing direct rather than indirect channel structures" (Andersen, 2005). Consequently, using the Internet as a sales channel instead of relying on traditional export channels has arguably made it easier for SMEs to become active in global markets, by providing a low-cost gateway into foreign markets. According to the IP model, the degree of resource commitment with respect to internationalisation influences the propensity to internationalise, that is, if a firm can internationalise while making a lower resource commitment, then the propensity to internationalise will increase, leading to a higher degree of international involvement. Thus, the following hypothesis is proposed:

Hypothesis 2. Using the Internet to facilitate customer transactions (e.g. ordering and payment) will be positively associated with internationalisation.

The moderating role of perceived export barriers

Knowledge about international opportunities occupies a vital position in our understanding of the internationalisation of SMEs, where it has been found that the ability of SMEs to recognize and exploit international opportunities influences the internationalisation of the firm (Mainela, Puhakka, & Servais, 2014). As argued above, one of the main benefits of the Internet for SME seeking to expand abroad is that it provide these firms with significant opportunities to identify and exploit opportunities for international growth. However, an international opportunity is only a prospect to conduct exchange with new partners in new foreign markets (Hilmersson & Papaioannou, 2015). For opportunities to be exploited managers "must first escape ignorance that an opportunity for someone exists within the environment and then overcome doubt about the feasibility and desirability of action" (Shepherd, McMullen, & Jennings, 2007, p. 78). This suggests that even when an international opportunity is identified, managerial doubt may inhibit action and cause managers to leave international opportunities unexploited. Thus, for international opportunities to be exploited, managers must believe they can successfully enact the opportunity, should they commit to its pursuit. As a consequence, the decision to exploit international opportunities may be strongly influenced by managerial interpretations (Barreto, 2012).

An important factor, which has been found to significantly prevent SMEs from exploiting international opportunities is managerial perceptions of barriers to internationalisation (Baum, Schwens, & Kabst, 2013). Perceived internationalisation barriers is found to be one factor preventing firms' from internationalising (Pinho & Martins, 2010) as well as a significant predictor of internationalisation patterns (Kahiya, 2013). According to Leonidou (2004), barriers to internationalisation are all those attitudinal, structural, operational, and other constraints that hinder SMEs ability to exploit international opportunities. Such barriers, whether actual or perceptual in nature, are critical to understanding SME internationalisation, as they have an important impact on managers evaluation of international opportunities in terms of the desirability and profitability associated with exploiting international opportunities (Crick, 2007). For example, if managers consider the barriers as significant, the opportunity is less likely to be considered worth exploiting. Thus, managerial perceptions of barriers to internationalisation is likely to have a moderating effect, changing the impact of e-commerce on internationalisation in SMEs.

Based on the above, the following hypotheses are proposed:

Hypothesis 3a. Perceived internationalisation barriers (negatively) moderate the relationship between using the Internet for information dissemination and internationalisation

Hypothesis 3b. Perceived internationalisation barriers (negatively) moderate the relationship between using the Internet to facilitate customer transactions and internationalisation

In sum, it is argued that using the Internet to present, publicize, and promote the firm as well as using the Internet to facilitate customer transactions is positively related to internationalisation, but that this relationship is moderated by perceived internationalisation barriers (see Figure 1).

---------- Insert figure 1 around here ----------

Methodology

Sample and data sources

To answer the research question and examine the impact of e-commerce use on the internationalisation of SMEs, the Flash Eurobarometer survey on "Internationalisation of Small and Medium-sized Enterprises" was used. The survey was conducted by TNS Political & Social Network on behalf of the European Commission with the purpose of exploring SMEs involvement in international business activities, their experiences and perceptions of internationalisation barriers, as well as their use of e-commerce.

Data was collected in 34 countries taking part in the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME)[1], using structured telephone interviewing. In total, 14,513 SMEs participated in the survey. At least 500 interviews were conducted in each country, except for some of the smaller Member States (Cyprus, Malta, and Luxembourg) and most of the non-EU countries surveyed (Albania, Iceland, FYROM, Montenegro, and Moldova).

Following prior studies, SMEs were defined as firms employing less than 250 employees (Hilmersson, 2014; Moen, Heggeseth, & Lome, 2016). To ensure that the sample would most accurately reflect the target population, stratified random sampling was used by applying country specific quotas on both company size (using four different range: 1-9

[1] COSME participants include the 28 EU countries as well as Albania, Former Yugoslav Republic of Macedonia, Iceland, Moldova, Montenegro, and Turkey.

employees, 10-49 employees, and 50-249 employees) and sectors (manufacturing, services, and industry). Whenever a company was eligible, the selected respondent had to be a general manager, a financial director or a significant owner.

Missing data is a common issue in empirical research, which is both natural and unavoidable. However, if managed improperly missing data may lead to both bias and error. The number of missing values were calculated for all variables. The results of the missing value analysis showed that only one variable contained missing values, where the missing data was less than 3 pct. To deal with this missing data, multiple imputation was used. Multiple imputation is a statistically sound and disciplined approach for dealing with missing data, where missing data are simulated by generating multiple imputations for a given missing data point (Fichman & Cummings, 2003). It then takes advantage of the variation between the different imputations to create a more conservative standard error estimate leading to more robust hypothesis tests (Shinkle & Kriauciunas, 2009).

Measures

Dependent variables

Internationalisation. Internationalisation is a multidimensional construct (Sullivan, 1994). In line with previous studies, internationalisation was measured using two distinct indicators: international intensity and international diversification (Nielsen, 2010; Raymond & St-Pierre, 2011). International intensity was measured using the common ratio of foreign sales to total sales (Reuber & Fischer, 1997), while international diversification was measured using an entropy approach using data on the percentage of the firm's international revenues earned from different geographic regions (Hitt, Hoskisson, & Kim, 1997). The entropy measure was calculated with the formula:

$$INTDIV = \sum_{i=1,3}^{n} \frac{P_i \times \ln \frac{1}{P_i}}{\ln(3)}$$

Where P_i is the proportion of sales attributed to region$_i$ (1: national market, 2: EU markets, 3: rest-of-world) by the managers of each firm and ln(1/P_i) reflects the weight given to each market region. The entropy measure will equal zero for firms that have all their sales concentrated in one country, and reach a maximum value of 1 for firms with exactly the same share of sales in each of the regions. Thus, maximum values indicate more dispersed external growth strategies in a larger number of regions, while near zero values reveals a market concentration strategy (Majocchi & Strange, 2012).

Independent variables

E-commerce use. E-commerce is defined broadly as use of the Internet to buy, sell, or market products and services (Bharadwaj & Soni, 2007; Kraemer et al., 2005). E-commerce use was measured in terms of the extent of e-commerce use for different activities (Gibbs & Kraemer, 2004; Raymond, Bergeron, & Blili, 2005). Respondents were asked to indicate the business activities for which the Internet are used in their organization. The activities include: (1) advertising and marketing, (2) online ordering, and (3) online payment. Following prior studies, these activities are grouped into two groups: information and transactional activities (Mostafa et al., 2004). Thus, two dummy variables were calculated to indicate whether the firm is using the Internet for informational and/or transactional activities.

Control variables

Other factors is also likely to influence the international involvement of SMEs. For example, previous studies have identified important variables at three different levels (1) environment-level variables, (2) firm-level variables, and (3) individual-level variables

(Martineau & Pastoriza, 2016). To remove the effect of other relevant factors when explaining SMEs internationalisation, I controlled for several variables.

Various studies (Hitt, Bierman, Uhlenbruck, & Shimizu, 2006; Majocchi, Bacchiocchi, & Mayrhofer, 2005) has demonstrated the importance of both size and age in explaining internationalisation. Firm size is often used as a proxy for financial and managerial resources and empirical evidence suggests that a critical size is necessary for SMEs to engage in international business (Dhanaraj & Beamish, 2003; Martineau & Pastoriza, 2016). Furthermore, firm age is also likely to influence the international involvement of SMEs, as export activity often develops as a consequence of an SME's success in its domestic market (Johanson & Vahlne, 1977). Consequently, to control for firm size and age, firm age was measured as the number of years the company has existed, while firm size was measured as the logarithm of the total number of employees.

Five industry dummies based on NACE categories were also included to control for industry, as internationalisation strategies are likely to be influenced by the competitive nature of the industry within which firms operate (Dasí, Iborra, & Safón, 2015; Majocchi & Strange, 2012). The nature of the industry can have a significant impact on the firm's internationalisation, as the industry comprises the environment in which the firm operates. For example, the nature of the industry can influence both the choice of foreign market and geographical scope (Andersson, Evers, & Kuivalainen, 2014). Thus, the nature of the industry has been highlighted as an important factor in understanding firm internationalisation. To allow the estimated coefficients to be interpreted as the dependent variable's difference, one industry (retail) were omitted from the regression analysis (Li, Qian, & Qian, 2012).

At the individual level, several studies highlight the manager's socio-cognitive characteristics as an influential antecedent of international involvement (Martineau &

Pastoriza, 2016). In particular, manager's attitudinal barrier (e.g. perceived export barriers) is one of the most significant internal barriers to SME's international expansion (Suárez-Ortega, 2003). Following Silva and Rocha (2001), respondents were presented a list of 12 export barriers and asked to indicate their perception of the importance of each barrier. This scale ranged from 1 to 4, with higher scores indicating higher levels of perceived importance.

Finally, I controlled for country-specific factors, as previous studies have emphasized the importance of a firms domestic environment on firm's internationalisation (Baum et al., 2013). Firms face different incentives and opportunities to internationalize depending on the size of their home markets. Insufficient size of the domestic market is likely to constrain firm growth and push firms into considering internationalisation (Crick & Spence, 2005). Thus, firms from small economies are therefore likely to exhibit higher degrees of internationalisation, compared to firms from large economies. Thus, the degree of internationalisation is likely to depend on the domestic market size (Glaum & Oesterle, 2007). The economic size of the firm's home country was measured as the log transformation of its average real GDP in Euro over a three-year period (Blake & Moschieri, 2017). This data was obtained from Eurostat.

---------- Insert Table 1 around here ----------

Results

Table 2 presents a summary of the descriptive statistics, including the minimum, maximum, means and standard deviation of all variables included in the regression models and their bivariate correlations.

---------- Insert table 2 around here ----------

The bivariate correlations displayed in Table 2 showed no serious risk for multicollinearity, as all correlations are below the commonly used 0.8 cut-off (Mason & Perreault, 1991). In addition, variance inflation factors (VIF) were calculated for all variables to further check for multicollinearity. However, the VIFs also showed no sign of multicollinearity, as all VIFs are close to 1, ranging from 1.05 to 1.42 (Hair, Black, Babin, & Anderson, 2009)

---------- *Insert Table 3 around here* ----------

Table 4 displays the results of the regression analyses used to test the hypotheses. Following Cuervo-Cazurra *et al.* (2016), the analysis was performed by employing hierarchical regression analysis. First, only the control variables were included in the analysis (Model 1 and 4). Next, the direct effect of the two types of e-commerce usage on internationalisation was analysed (Model 2 and 5), before adding the moderation effect of perceived export barriers (Model 3 and 6).

Model 1 and Model 4 examines the effect of the control variables on the international intensity and international diversification respectively. All control variables performed largely as expected, except for firm age. Consistent with previous studies, firm size was found to be positively related to both international intensity and international diversification, reinforcing the argument that a critical size may be needed for SMEs to engage in international business (Dhanaraj & Beamish, 2003; Martineau & Pastoriza, 2016). Perceived internationalisation barriers was found to be negatively related to both international intensity and international diversification, suggesting that high levels of perceived internationalisation barriers are likely to constrain SMEs from committing to internationalisation. Moreover, home market size is negatively related to international intensity, suggesting that insufficient size of the domestic market is likely to constrain firm growth and push firms into considering internationalisation (Crick & Spence, 2005). However, contrary to expectations, no statistically significant association was found between firm age and international diversification. This may suggests that experiential learning is no longer a necessary condition for internationalisation as suggested earlier (Johanson & Vahlne, 1977) reinforcing the view that it is now possible for even new ventures to internationalize right from or shortly after inception (Oviatt & McDougall, 1999; Reuber & Fischer, 2011).

In Model 2 and 5, the direct effect of e-commerce usage on international intensity and international diversification was added. As predicted in Hypothesis 1, the results of the main effects models show a positive association between informational e-commerce usage and internationalisation in terms of both international intensity ($\beta = 0.062$, $p < .001$) and international diversification ($\beta = .129$, $p < .001$). This suggests that having an online presence, in the form of having a website, can facilitate SME internationalisation, by enabling firms to increase their global reach and expanding the extent to which they come into contact with knowledge about international opportunities.

Furthermore, the main effects models provide partial support for Hypothesis 2, which predicts that transactional e-commerce usage is positively associated with SME internationalisation. While the association between transactional e-commerce usage and internationalisation was positive and significant in terms of international intensity ($\beta = .058$, $p < .001$) it was significant but negative for international diversification ($\beta = .030$ $p < .001$). This suggests that using the Internet to facilitate transactions is likely to have a positive impact on SMEs dependence on foreign sales, but that this foreign sale is likely to be more concentrated in less regions/markets.

Hypothesis 3a and 3b posits that perceived internationalisation barriers moderate the impact of e-commerce usage on SME internationalisation. Thus, while the relationship between e-commerce usage and SME internationalisation is positive overall, it is to a lesser extent for SMEs where decision-makers perceive internationalisation barriers to be high. To test these hypotheses, the interaction between perceived internationalisation barriers and informational and transactional e-commerce usage was included as predictors of international intensity and international diversification in Model 3 and 6.

The results reveal that if perceived internationalisation barriers increases, the positive effect informational e-commerce usage on SME internationalisation fades for both international intensity ($\beta = -.079$, $p < .05$) and international diversification ($\beta = -.206$, $p < .001$). The plots in Figure 2 illustrates how informational e-commerce usage has a stronger impact on international intensity and diversification at low levels of perceived export barriers, whereas when perceived barriers are high, the effects become significantly weaker. This suggests that having an online presence has a smaller impact on firm internationalisation when managers consider internationalisation difficult. Thus, the results provide empirical support for Hypothesis 3a.

---------- Insert figure 2 around here ----------

In contrast, Hypothesis 3b, which stipulates that perceived internationalisation barriers negatively moderate the relationship between transactional e-commerce usage and internationalisation, was not supported. As tested in Model 3 and Model 6, the coefficients of the interaction terms are significant, but positive, for both international intensity ($\beta = .151$, $p < .001$) and international diversification ($\beta = .073$, $p < .001$). Thus, Hypothesis 3b cannot be accepted. The plots in Figure 3 illustrates how transactional e-commerce usage has almost no impact on the international intensity and international diversification at high levels of perceived internationalisation barriers. At low levels of perceived internationalisation barriers, transactional e-commerce usage is also found to have little or no impact on international diversification, whereas it is found to be negatively associated with international intensity. Thus, contrary to expectations, SMEs with low levels of perceived internationalisation barriers are found to be less international, when measured in terms of dependence on foreign sales.

---------- Insert figure 3 around here ----------

Discussion and conclusions

Although our knowledge of internationalisation of SMEs has expanded greatly over the past several decades, the true impact of the Internet is yet to be determined. The aim of this study was to contribute to the ongoing debate about how digitalization affect firm internationalisation, by analysing the impact of e-commerce usage on internationalisation among SMEs in terms of international intensity and diversification. More specifically, drawing upon the Uppsala internationalisation process model, I argue that e-commerce usage will facilitate SME internationalisation, but that the impact of e-commerce usage on the international intensity and diversification of SMEs is moderated by perceived export barriers.

Discussion of findings

Several interesting findings related to the impact of e-commerce usage on internationalisation among SMEs were generated from this research, which covered 14,513 SMEs across several sectors in 34 countries. First, the empirical findings demonstrate how informational e-commerce usage has the biggest impact on SME internationalisation in terms of both international intensity and international diversification. Thus, simply having an online presence in the form of a website is positively associated with both the amount of sales coming from abroad as well as the firm's level of international diversification as reflected by the number of different markets in which it operates and their importance to the firm. This suggests that using the Internet as a promotional tool for disseminating information about the firm is likely to increase the extent to which SMEs are exposed to international opportunities and reduces the uncertainties associated with internationalisation. These findings resonate with previous studies on SME internationalisation and the role of the Internet. For example, Hagsten and Kotnik (2017) find that the possession of a website is positively related to the exporting performance of SMEs in a number of countries. The Internet offers means for SMEs to reduce costs directly associated with spatial distance and reach a large potential customer based (Loane, 2006). This, in turn, enable firms to reduce the effects of resource scarcity, which has traditionally constrained SMEs from participating in international trade (Sasi & Arenius, 2012). The findings are also consistent with Freund and Weinhold (2004), who find that the Internet reduces the fixed costs associated with internationalisation, which is then likely to enhance export growth.

Second, contrary to expectations raised by the literature, there is no clear evidence of a positive relationship between transactional e-commerce usage and internationalisation in terms of either international intensity or diversity. Thus, while it has been suggested that using the Internet as a sales channel can increase both the international intensity and international diversification of SMEs, by reducing the effects of liability of foreignness and resource scarcity (e.g. Arenius et al., 2005; Plakoyiannaki et al., 2014), this is not reflected in the findings of this study. The results demonstrates how using the Internet has a small positive impact on the amount of sales coming from foreign markets, while having a negative impact on the number of different markets in which it operates and their importance to the firm. This finding was a little surprising, as they seem to contradict recent studies suggesting that the importance of geographical distance is greatly reduced in online trade, compared to offline trade (Gomez-Herrera, Martens, & Turlea, 2014; Lendle, Olarreaga, Schropp, & Vézina, 2016). However, these findings are partly supported by recent studies (Hagsten & Kotnik, 2017; Moen et al., 2008).

These findings do not, however, necessarily signify that using the Internet as a sales channel is not suitable for firms seeking to expand their business abroad. While using the Internet as a sales channel may provide a potential avenue for SMEs to internationalize, as cross-border e-commerce continues to expand, these findings may also indicate that there are still barriers deterring SMEs from taking full advantage of the opportunities provided by cross-border e-commerce. For example, barriers related to the logistics of shipping a good or delivering a service, security and data protection, and payments are all likely to constrain SMEs from seizing the opportunities provided by e-commerce for international expansion (WTO, 2016). Another possible reason could be that using the Internet as a sales channel involves using the Internet as an intended vehicle for conducting business in particular foreign markets (Yamin & Sinkovics, 2006). Thus, using the Internet to facilitate international transactions is an example of active online internationalisation, which is more likely to require proactive, deliberate search for an opportunity, while having an online presence is likely to lead to accidental discovery of international opportunities, as it may generate unsolicited orders from abroad.

Finally, the findings also suggest that the positive effect of having an online presence fades for both international intensity and international diversification as the perceived internationalisation barriers increase. This suggests that while having an online presence may lead to accidental discovery of international opportunities; these opportunities are more likely to be exploited if the manager believe they can successfully enact the international opportunity, should they commit to its pursuit. Thus, to fully capture the opportunities provided by e-commerce, managers must first overcome their anxiety about internationalisation.

Practical implications

The findings also have practical implications for managers of SMEs whose aim is to increase their involvement in foreign markets. First, investing in informational e-commerce usage, that is, investing in establishing an online presence is more effective than investing in e-commerce if the goal is to increase the firm's involvement in foreign markets. Thus, SMEs seeking to expand their business abroad should first invest in establishing an online presence. Establishing an online presence not only enable SMEs to get exposure to new foreign markets. Having an online presence in the form of a website also provide a means for SMEs to gain customer insights and find new contacts through different kinds of analytics. Thus, having a strong online presence must be considered as a crucial component of SMEs internationalisation strategy.

Another implication is that SMEs with an online presence may need to be careful not to expand into too many countries. Results show that having an online presence in the form of a website is positively associated with international diversification, in particular when internationalisation barriers are perceived to be low. Although internationalisation can potentially improve firm performance, previous studies on the internationalisation-performance relationship have cautioned against high degrees of internationalisation in SMEs. For example, Benito-Osorio et al (2016) provided evidence suggesting a linear and negative relationship between internationalisation and performance in the specific case of small firms, while other have found that performance decreases after a certain level of internationalisation (Chiao, Yang, & Yu, 2006). This is because too much international diversification requires a significant amount of financial and human resources, which SMEs typically lack (Cieślik, Kaciak, & Welsh, 2012). As a consequence, focusing on a limited number of key markets is more likely to be an appropriate to follow for SMEs seeking to increase their involvement in foreign markets (Brouthers, Nakos, Hadjimarcou, & Brouthers, 2009). Thus, while the empirical results show that informational e-commerce usage can be viewed as a way of accelerating internationalisation, it remains unclear if this is desirable. It can also be that using the Internet as a tool for promoting the company and its products and/or services entice SMEs to expand into a large number of foreign markets with ill-considered haste (Petersen et al., 2002). Thus, SMEs should be cautious not to be enticed to over-diversify in terms the number of foreign countries or markets in which they operate.

Third, SMEs seeking to increase their involvement abroad via transactional e-commerce should be attentive to potential impediments to online cross-border trade. This study show that while using the Internet as a sales channel provide opportunities for SMEs seeking to expand their business abroad, these opportunities does not automatically transformed into increased internationalisation. In fact, SMEs who have already invested in transactional e-commerce was found to be only a little more international measured in terms of their dependence on foreign sales, while being less international measured in terms of international diversification. One logical explanation for the disparity between potential and realized benefits is that certain barriers are still constraining SMEs from seizing the opportunities provided by e-commerce for international expansion (e.g. logistics of shipping goods or delivering services, security and data protection, legal differences, intensified competition). Thus, SMEs must be mindful that increasing involvement in foreign markets via transactional e-commerce is likely to require more than just investing in Internet-based sales channels.

Limitations and future research

Like other empirical studies research, this study has a number of limitations. First, there are certain limitations related to measurement. In this study, e-commerce was measured by asking respondents to indicate the business activities for which the Internet was used in their company. Thus, the study examines the impact of adoption vs non-adoption on SME internationalisation. While this measure has been successfully used in prior studies (e.g. Gibbs & Kraemer, 2004; Raymond et al., 2005), one problem with this measure is that it fails to take into consideration the *extent* to which the Internet is being used for a specific business activity and the *depth* of use for each activity (Zhu & Kraemer, 2005). Furthermore, such measure does not account for how *well* companies use the Internet to sell or market products and services. Thus, for example, it was not possible to differentiate between SMEs that use the Internet as a minor supplement to physical sales channels and SMEs that use it as their dominant sales channel in this study. In addition, the study fails to distinguish between SMEs that use their website as a brochure and SMEs who use the website as an integral part of doing business (Karjaluoto & Huhtamäki, 2010). For this reason, future research is encouraged to examine how post-adoption variations in usage influence the internationalisation of SMEs to see how the extent and depth of e-commerce usage influences the impact on internationalisation.

Furthermore, as participants were only asked whether their company used the Internet to sell their products, it was not possible to distinguish between SMEs selling their products via their own web shops and SMEs relying on e-intermediaries, also referred to as online platforms or electronic marketplaces. Using e-intermediaries may provide SMEs with several benefits relative to direct Internet-based exchange, which can be risky, time-consuming, and costly for SMEs seeking to expand their business abroad through e-commerce. For example, e-intermediaries can help SMEs address the problem of limited knowledge and experience with respect to foreign markets (Cho & Tansuhaj, 2013). Thus, e-intermediaries can help SMEs reduce information frictions associated with geographic distance, by facilitating the matching of buyers and sellers from all over the world and consolidate the entire market into one easily accessible platform (Lendle et al., 2016). Thus, future research is encouraged distinguish between transactional e-commerce via e-intermediaries and direct Internet-based exchange.

Second, due to the nature of the study it was not possible to establish causality. Thus, while it is argued that internationalisation is a consequence of e-commerce, it cannot be ruled out that the relationship between the two is reciprocal. While the Internet may enable SMEs to explore foreign markets, increasing internationalisation may also increase the need for SMEs to adopt e-commerce (Yu, De Koning, & Oviatt, 2005). Analysing the impact of e-commerce use on firm internationalisation, and ruling out reverse causality, can only be achieved by collecting and analysing longitudinal data, why future research is encouraged to gather longitudinal data to examine the causality between e-commerce usage and internationalization. For example, future research may apply the longitudinal case study method to examine in-depth the internationalization process of SMEs, including the causal linkages between e-commerce usage and internationalisation (Arenius et al., 2005).

Third, while the findings demonstrate how firms with an online presence are more likely to exhibit higher degrees of international diversification and are engaged in doing business in a larger number of regions, the findings do not tell if this is desirable, as data on firm performance was unavailable. Prior studies have cautioned that the Internet may cause rapid, diversified international expansion, but that this may have a negative impact on firm performance (Petersen et al., 2002). Wide diversification can, according to some studies, be risky due to the resource-constrained nature of SMEs and have a negative impact on export performance (Brouthers et al., 2009; Cieślik et al., 2012). Thus, more research is needed to examine more closely the relationship between e-commerce use, internationalisation and firm performance in order to determine if the Internet is helpful or harmful for SMEs. This can potentially improve our understanding of how using the Internet as an instrument to expand a firm's operations beyond national borders can influence its subsequent performance.

Finally, contrary to expectations, the results failed to demonstrate a strong positive association between transactional e-commerce and internationalisation among SMEs. This opens up important questions about transactional e-commerce usage and its impact on internationalisation among SMEs. For example, why do firms, who have already invested in e-commerce, not engage more actively in cross-border e-commerce? Is it because the opportunities afforded by transactional e-commerce are over inflated or is it because SMEs are constrained in their ability to seize the opportunities afforded by the increase in cross-border e-commerce? If so, what are the factors constraining SMEs from engaging in cross-border e-commerce? These, I believe, are all important questions that needs to be answered in order to understand the true impact of the Internet on internationalisation among SMEs, by clarifying the conditions under which the e-commerce usage is more likely to increase internationalisation. In addition, answering such questions can assist policy-makers in supporting SMEs in developing their ability to benefit from the opportunities afforded by the Internet for participating in international trade. To fully understand the impact of the Internet and e-commerce on SME internationalisation, much work therefore remains to be done.

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Tables

Table 1

Variables included in the analysis

Variables	Operationalisation	Author(s)
Dependent:		
International intensity	Proportion of a firm's revenue in foreign countries to its total revenue in a given year (FTST)	Fernandez & Nieto (2006)
International diversification	Entropy measure of international diversification	Raymond and St-Pierre (2011)
Independent		
Informational	Dummy variable=1 if firm has a website	Hagsten & Kotnik (2017)
Transactional	Dummy variable=1 if firm use Internet to facilitate customer transactions	Hagsten & Kotnik (2017)
Control		
Firm age	Logarithm of the number of years since firm was established	Shinkle & Kriauciunas (2009)
Firm size	Number of employees	Shinkle & Kriauciunas (2009); Banalieva & Eddleston (2011)
Export barriers	An index of perceived exporting barriers	Baum, Schwens & Kabst (2011)
Domestic market size	Logarithm of the average home country GDP over the previous 10 years	Ojala & Tyrväinen (2007); Banalieva & Eddleston (2011)
DMANU	Dummy variable=1 if firm is in the manufacturing industry	
DRETAIL	Dummy variable=1 if firm is in the retail industry	
DSERV	Dummy variable=1 if firm is in the service industry	
DINDUS	Dummy variable=1 if firm is in the industrial industry	

Table 2

Descriptive statistics and bivariate correlations

	1	2	3	4	5	6	7	8	9	10	11
1 International intensity	1										
2 International diversification	.71**	1									
3 Firm size	.17**	.17**	1								
4 Firm age	.02*	.08**	.20**	1							
5 Perceived barriers	-.25**	-.26**	-.07**	-.03**	1						
6 Domestic market size	-.07**	.01	-.01	.16**	.13**	1					
7 Manufacturing	.26**	.27**	.15**	.10**	-.09**	.01	1				
8 Service	-.10**	-.11**	.04**	-.04**	.03**	.06**	-.34**	1			
9 Industry	-.15**	-.17**	-.02*	-.05**	.09**	-.04**	-.25**	-.31**	1		
10 Informational e-commerce usage	.09**	.18**	.16**	.09**	-.10**	.09**	.06**	.04**	-.06**	1	
11 Transactional e-commerce usage	-.04**	.00	.03**	.01	.00	.00	-.04**	.06**	-.04**	.28**	1
Minimum	1	0	1	.09	1	3.53	0	0	0	0	0
Maximum	100	1	249	216	3	6.45	1	1	1	1	1
Mean	15.55	.17	31.74	24.34	1.76	5.21	.22	.3	.18	.76	.40
S.D.	28.46	.28	44.15	22.08	.53	.72	.41	.46	.39	.43	.49

** $p < ,01$
* $p < ,05$

Table 4

Results of regression

	Dependent variable: International intensity			Dependent variable: International diversification		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Control variables						
Firm size	.133**	.126**	,125	,126**	,108**	,108**
Firm age	-.037**	-.038**	-,038	,014 ns	,009 ns	,009ns
Perceived barriers	-.213**	-.207	-,206	-,221**	-,209**	-,135**
Domestic market size	-.030**	-.036**	-.037**	,040**	,028**	,027**
DMANU	.172**	.168**	,167	,164**	,159**	,160**
DSERV	-.070**	.-.070**	-,069	-,096**	-,099**	-,097**
DINDUS	-.107**	-.107**	-,107	-,130**	-,128**	-,127**
Independent variables						
Informational (H1)		.062**	.132**		0,129**	0,315**
Transactional (H2)		.058**	-.200**		-0,030**	-0,099**
Moderating variables						
Informational x perceived barriers (H3a)			-.079*			-0,206**
Transactional x perceived barriers (H3b)			.151**			0,073*
Constant						
Adjusted R^2	,144	,149	,151	,156	,171	,174
F		42,37**	14,22**		121.53**	23.30**

** p < ,01
* p < ,05

Figures

Figure 1

Theoretical model

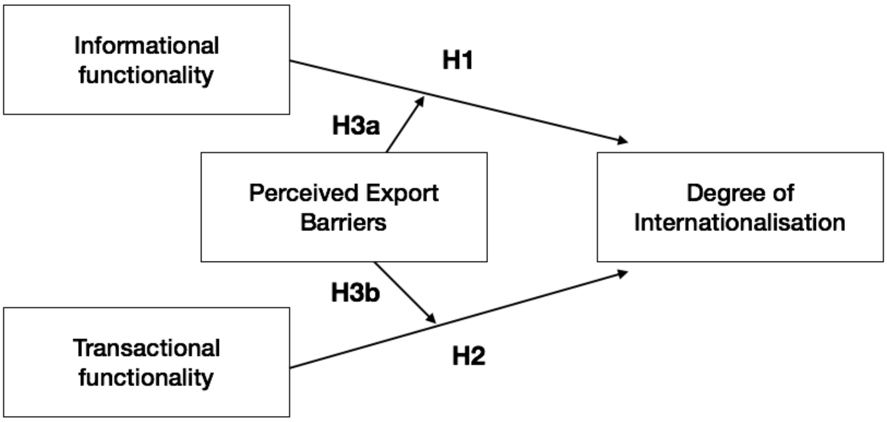
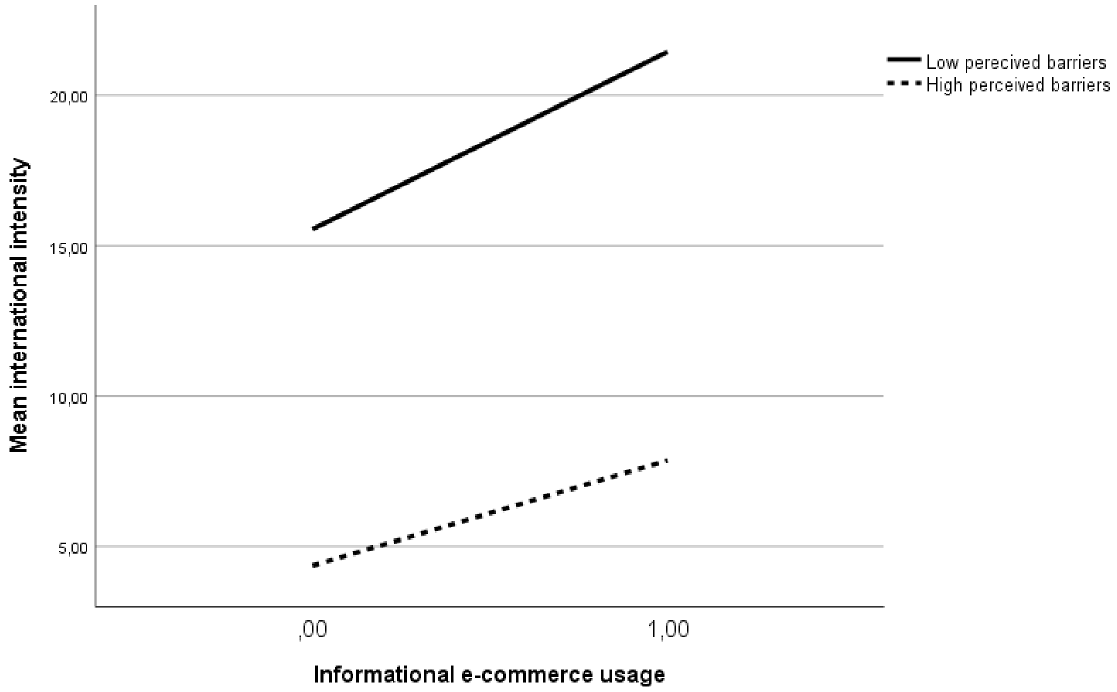


Figure 2

The moderating role of perceived barriers on the effects of informational e-commerce usage on international intensity and international diversification



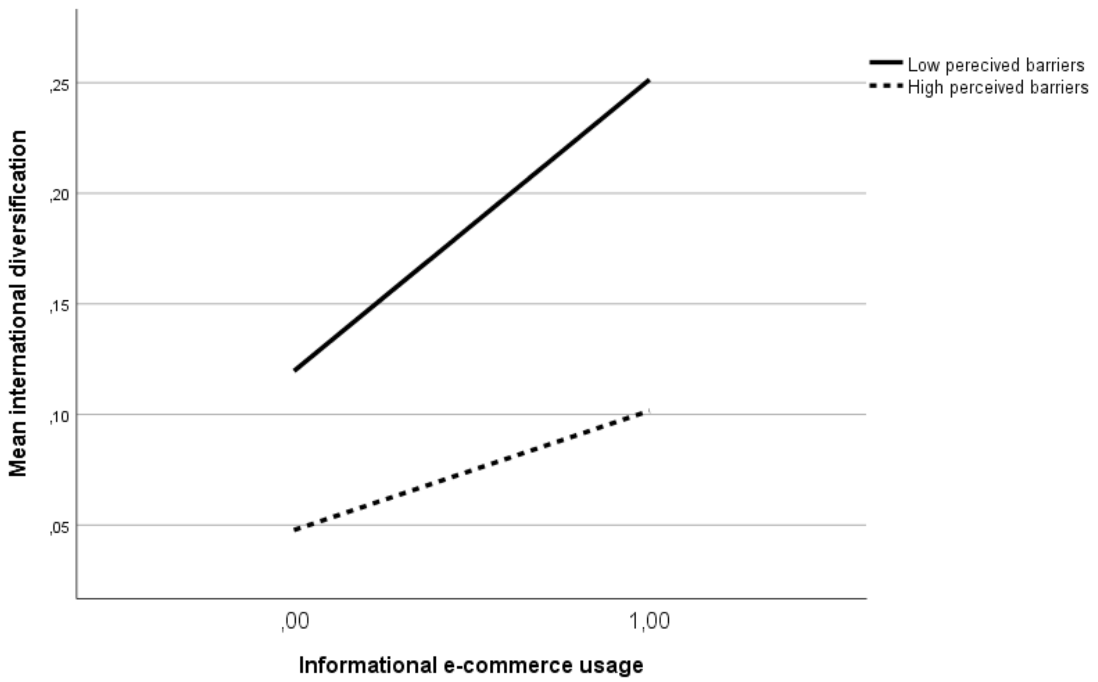


Figure 3

The moderating role of perceived barriers on the effects of transactional e-commerce usage on international intensity and international diversification