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Essays on SMEs' Internationalisation: An Empirical Analysis Using Large-Scale Survey Data

Bochra Idris

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For you Dad

For you Mum

May you always be proud.

Acknowledgments

"Surround yourself with the dreamers and the doers, the believers and thinkers, and most of all, surround yourself with those who see the greatness within you, even when you do not see it yourself"

Edmund Lee

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Abstract

This thesis uses new and large scale survey data, extracted from the United Kingdom (UK) Longitudinal Small Business Survey (UKLSBS, 2015, 2016) to carry out three empirical studies to investigate and shed more light on: first, the relationship between local interpersonal networks and internationalisation of small and medium-sized firms (SMEs); second, the relationship between training and performance for internationalised and non-internationalised SMEs; and third, the effect of outward internationalisation, inward internationalisation and both outward-inward internationalisation on different types of innovation undertaken by SMEs. The first study shows that there is a positive and significant relationship between local interpersonal networks and internationalisation. In particular, the results show that networking behaviour for internationalisation responds to the size of a firm. Specifically, the study finds that the role of formal interpersonal networks, such as accountants and banks, on internationalisation increases as the size of the firm increases, while the importance of informal interpersonal networks such as family and friends becomes weaker. The second study finds that employees' training (i.e., formal and/or informal) positively and significantly affects the actual and intended performance of SMEs, while the magnitude of the combined effect is stronger than the individual ones. The results show, however, that only the combined measure of owner-managers' training (i.e., formal and informal) positively and significantly affects the actual and intended performance of SMEs. When differentiating between SMEs according to their internationalisation activities (i.e., those who export and those who do not export), the results show that an employee's training (i.e., formal and/or informal) positively and significantly affects the actual and intended performance of SMEs in non-internationalised firms. For internationalised firms, however, the study finds that a positive association only exists between the combined measure of owner-managers' training (i.e., formal and informal) and intended performance. Finally, the results of the final empirical study show that all internationalisation operations are positively associated with innovation in SMEs, however the effect is found to be stronger for the combined outward-inward internationalisation operations compared to a single international operation. Nevertheless, when differentiating between firms according to their size-bands (i.e., micro, small and medium), the results show that although innovation responds to different internationalisation operations in micro and small firms, for medium-sized firms, only undertaking outward and inward internationalisation operations simultaneously increases the probability of undertaking innovation. Overall, the findings of the

three empirical chapters make a significant contribution to the SME, International Business (IB) and Innovation Management (IM) literatures, highlighting the importance of networking for internationalisation decisions, the differences in the nature of training that should be carried out within internationalised firms to boost performance, and how internationalisation activity can trigger innovation in SMEs. The results contribute to existing academic and policy debates, and provide new and more refined evidence for academics, policy makers, practitioners and other stakeholders.

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Chapter 1: Introduction

In 2018, small and medium-sized firms (SMEs) represented 99.9 per cent of all private sector businesses in the United Kingdom (UK), accounting for 60 per cent of their employment and 53 per cent of their turnover (BEIS, 2018). Similarly, SMEs play an important role in a country's employment growth and levels of innovation in all economies, and thus, in their economic growth and citizens' prosperity (Acs & Storey, 2004; Audretsch, Van der Horst, Kwaak, & Thurik, 2009; Hessels & Parker, 2013; Saridakis, Mendoza, Muñoz Torres, & Glover, 2016; Cowling, Liu, & Zhang, 2018). It is therefore important for governments to provide support and help to (existing and future) SMEs, so as to overcome socio-economic and demographic challenges, and potential entry barriers into local and foreign markets where opportunities can be exploited.

As it has been previously argued (see Storey, 1994) SMEs are different from larger firms in various ways. For example, SMEs have smaller and more limited resources than large firms, and therefore react differently to resource slack and economic downturns (see Lai, Saridakis, Blackburn, & Johnstone, 2016; Ferreira and Saridakis, 2017). SMEs also suffer from liabilities of smallness (Freeman, Carroll, & Hannan, 1983), which bring uncertainty and additional challenges, especially related to expansion strategies such as internationalisation. However, it is suggested that SMEs may be able to benefit from being involved in different forms of international exposure. It is well-documented in previous studies that exposure to international markets allow SMEs to gain more competitive advantages and improve their market position and power, introduce different types of innovation and in turn to sustain their growth and survival prospects (Wagner, 2013; Pattnayak & Thangavelu, 2014; Haddoud, Jones & Newbery, 2017). Due to the growing importance of SMEs in the global and increasingly interactive economy, more scholars have focused their research attention on the factors that enable the internationalisation of SMEs (e.g., Serra, Pointon & Abdou, 2012; Ge & Wang, 2013; Hånell & Ghauri, 2016; Stoian, Rialp, Rialp & Jarvis, 2016; Paul, Parthasarathy & Gupta, 2017; Saridakis, Idris, Hansen & Dana, 2019), and how internationalisation facilitates firm performance and employee productivity (e.g., Lu & Beamish, 2001; Zhou, Wu & Luo, 2007; Pangarkar, 2008; Patel & Cardon, 2010; Chinomona, 2013; Cowling et al., 2018).

Indeed, involvement in internationalisation, which can be defined as the process wherein firms increase their international involvement in incremental stages (Johanson &

Vahlne, 1977), is an important and a critical decision for SMEs. For example, SMEs usually have fewer financial resources, tend to focus on their domestic market and needs, and generally possess a limited geographical vision (Barringer & Greening, 1998; Lu & Beamis, 2006). From a micro-economic point of view, however, internationalised SMEs are able to obtain strategical advantages such as higher returns, and economies of scale and scope (Onkenlinx, Manolova & Edelman, 2016), and to obtain the valuable knowledge, information and skills needed for operating in foreign markets (Love & Ganotakis, 2013), thereby enhancing their capabilities for sustainability and resilience. From a macro-economic point of view, internationalised firms contribute to the economy by providing more competitive (and depending on the stage of development potentially more modern) jobs, enhancing creativity, working conditions and technological progress, and reducing national deficits (Giaoutzi, Nijkamp, & Storey, 2016; Onkelinx et al., 2016; OECD, 2017).

Due to the importance of internationalised SMEs at both micro-level and macro-level, research related to the factors that contribute to their international decision, operation and success is of a great interest for business owners, practitioners, academics and policy makers (Hilmersson, 2014; Love & Roper, 2015; Onkelinx et al., 2016). The aim of this thesis is therefore to empirically examine some key aspects that are still in their infancy, and where more work is needed to fill the existing literature gaps and provide answers to ongoing policy debates. Specifically, the aim of the thesis is threefold; first, to investigate the factors that enable the internationalisation of SMEs (first empirical paper, the findings of which have been published in the International Business Review); secondly, to examine the factors that enable internationalised firms to achieve better performance through training (second empirical paper); and thirdly, the association between internationalisation and innovation (third empirical paper).

1.1. SMEs' internationalisation

Given the importance of SMEs and their internationalisation activities, their internationalisation process has been well-documented in the literature (Zhang, Ma & Wang, 2012). A number of theories have been used when studying the internationalisation behaviour of firms, such as the internationalisation theory, the transaction cost approach and the eclectic paradigm (Ruzzier, Hisrich & Antoncic, 2006), however it can be argued that there are different models that can be applied to small firms when researching their internationalisation propensity. One of the most widely used models is the so-called Uppsala Internationalisation Model (U-Model) (Andersson & Wictor, 2003). The U-Model, developed by Johanson and

Vahlne (1977, 1990), views a firm's internationalisation as a gradual process of increasing international activities. According to this model, a firm increases its international involvement in gradual stages within the international market where it operates. Thereafter, the firm starts entering new and physically further international markets where languages and business practices are different from those markets where the firm currently operates (Ruzzier et al., 2006). The U-Model and other stage models (e.g., Innovation-related model), however, were criticised for being 'deterministic' and having restricted value (Andersson & Wictor, 2003).

Scholars therefore looked for other ways to analyse a firm's internationalisation process, and the network approach to internationalisation began to emerge (Ruzzier et al., 2006). The Social Network Theory (SNT) has been applied in previous research in order to study the internationalisation of firms (e.g., Coviello & Munro, 1997; Chetty & Blankenburg-Holm, 2000; Tang, 2011; Fernhaber & Li, 2012; Anderson, Evers & Griot, 2013; Eberhard & Craig, 2013). The SNT implies that networks play a critical role in transferring knowledge and information through different types of networks, such as interpersonal networks, and facilitate the exchange of valuable information and knowledge (Zhou et al., 2007). By integrating the network perspective with the U-Model, Johanson and Vahlne (1990) examined firms' internationalisation processes, and suggested that when firms invest in a set of networks and relationships that are new to them, they have the ability to internationalise due to their position in the established network (Ruzzier et al., 2006). Internationalisation from a network perspective can thus be defined as developing a set of relationships in the international market (Johanson & Vahlne, 1992; Coviello & Munro, 1997). The underlying premise of this perspective is that firms are in need of resources, which are held by other firms. By establishing a network position, firms can gain access to resources that can be beneficial to them, and increase competitive advantages over their rivals (Ghauri, Tasavori & Zaefarian, 2014).

Research into networks has gained significant attention, given the significant role played by networks in enabling SMEs to internationalise (Zhang et al., 2012; Stoian et al., 2016). For example, Boehe (2013) showed how participation in a network and collaborative ties among the participants affected SMEs export intensity. Musteen, Datta and Butts (2013) found that SMEs in the Czech Republic, which developed diverse and strong international relationships, had the ability to gain the knowledge needed for entering foreign markets, and thereby internationalise. It has been suggested, however, that previous studies examining the role of networks in the internationalisation process have viewed the concept as one (aggregate) dimension (Eberhard & Craig, 2013) and therefore, there is a an increasing call in the literature for new studies to analyse networks as a multi-concept (disaggregate) dimension (e.g., Inkpen

& Tsang, 2005). For example, previous studies have indicated that there is a need for more evidence of the relationship between specific types of networks, such as interpersonal networks, and the internationalisation of firms (Zhou et al., 2007). Although research into the association between networks and internationalisation has advanced our knowledge and advanced the field in a significant way, these studies generally focused on the role of foreign networks in the international market to which a firms is intending to expand. Very few studies have started to examine the role of networks located in the local market, where the firm operates, in giving access to international markets (e.g., Boehe, 2013). The aim of the first empirical study in this thesis is to fill these particular gaps that exist in previous literature.

Apart from the SNT, and based on the existing models of internationalisation, another stream of literature started to emerge which took the perspective of the Resource-Based View theory (RBV) of the firm (Ruzzier et al., 2006). The RBV theory of the firm emphasises the relationship between 'valuable, rare, and costly-to-imitate' firm resources and continuous competitive advantages (Onkenlinx et al., 2016, p. 352). The RBV implies that by creating value that is difficult to replicate, firms can gain competitive advantages (Barney, 1991; Teece, Pisano & Shuen 1997; De Saá-Pérez & García-Falcó, 2002). The RBV emphasises creating value through a firm's resources rather than its products, however, and therefore a firm should be perceived through the exceptional and intangible resources that can create its competitive advantages. It has been implied that one intangible form of resource is that entrenched within individuals, such as knowledge, skills and competencies gained through education, experience and training (Onkenlinx et al., 2016). Based on this perspective, researchers and scholars in the human resource management (HRM) field indicate that by applying human resource (HR) practices such as staffing and training, firms have the ability to generate a specific type of knowledge and competencies which will result in a better performance (Barney & Wright, 1998; Aragon & Valle, 2013; Chinomona, 2013; Saridakis & Cooper, 2013; Wiklund & Nason, 2018). The importance of HR can thus be related to Becker's (1994) human capital theory, with its emphasis on the role of individual abilities, skills and knowledge (Jones, Beynon, Pickernell & Packham, 2013). Policy makers and scholars are therefore interested in employee training and its effect in the market and economy (Storey, 2004).

Due to their size and their limited resources, SMEs have limited opportunities to sustain their growth and survive in the market, however it has been implied that by adopting HR practices, SMEs have the ability improve their performance and obtain competitive advantages (Williamson, Cable & Aldrich, 2002; Sheehan, 2014, Lai, Saridakis, & Johnstone, 2017). It is widely known that HRM practices in small firms are often characterised as being ad hoc and

informal (see Storey, Saridakis, Sen-Gupta, Edwards & Blackburn, 2010), and SMEs often face significant challenges in managing and training human talent (Kicthing, 2015). It has also been implied, however, that SMEs should train their employees because training may increase their human capital, which can lead to economic growth at the macro-level and great competitive advantages for firms at the micro-level (Wright & McMahan, 1992; Koch & McGrath, 1996; Acemoglu & Pischke, 1998; Barro, 2001; Carmeli & Schaubroeck, 2005; Bryan, 2006).

The significant role of training and its effect on a firm's performance has attracted significant attention from academics (e.g., Bartel, 1991, 1995; Bryan, 2006; Chi, Wu & Lin, 2008; Storey, 2012; Alassadi & Al Sabbagh, 2015). For instance, Jayawarna, Macpherson and Wilson (2007) found that a firm's performance was affected in a positive way by formal types of training. In contrast, Felstead, Fuller, Jewson and Unwin (2009) argued that informal types of training significantly increased a firm's performance. It has been suggested, however, that while some previous studies tend to agree that there is a positive relationship between training and performance, these effects may depend on the training provision (Aragon & Valle, 2013; Jones et al., 2013). It can also be argued that a review of the small business and HRM literature reveals contradictory and inconclusive results. Although some studies reported a positive relationship between training and performance (e.g., Eikebrokk & Olsen, 2009), other studies found either a weak association (e.g., Tharenou, Saks & Moore, 2007) or no association between training and performance (e.g., Foreman-Peck, Makepeace & Morgan, 2006). The aim of the second study of this thesis is thus to contribute to this debate by re-investigating the relationship between training and SME performance. More specifically, previous studies have tended not to pay attention to the different types of training that can take place within SMEs, and the potential effect on their performance. Importantly, this thesis emphasises the important distinction between internationalised and non-internationalised firms in training provision, and the form in which that training takes place to deal with different needs and challenges faced by the two types of organisations. The second empirical chapter thus also makes a large contribution to the International Business (IB) literature by examining the relationship between training and SME performance in those firms that are engaged in internationalisation activities and those that are not, and provides interesting findings and policy arguments that are currently absent in the existing literature.

Other models of internationalisation have also started to emerge, such as the Innovation-related model (I-Model). The I-Model (e.g., Bilkey & Tesar, 1977) investigates the process of internationalisation from the perspective of innovative actions and thereby examines

the application of new methods of conducting the business (Madsen & Servais, 1997). Innovation, which can be defined as 'the implementation of a new or significantly improved product (goods or service), or process, a new marketing method, or a new organisational method in business practice' (OECD, 2005, p. 47) is considered to make an important contribution to a firm's performance. It has been implied that innovation and internationalisation are two of the most important factors that can enhance a firm's growth and competitive advantages (Prashantham, 2008; Halilem, Amara & Landry 2014). For this reason, it is not surprising that academics and policy makers have also directed their attention to the potential association between innovation and internationalisation (e.g., Lachenmaier & Wößmann, 2006; Castaño, Méndez & Galindo, 2016; Dohse & Niebuhr, 2018; Saridakis et al., 2019) and specifically to the effect of internationalisation in introducing innovation (e.g., Bratti & Felice, 2012; Altomonte, Aquilante, BéKés & Ottaviano, 2014; Fritsch & Görg, 2015; Damijan, Kostevc & Rojec, 2017; Abubakar, Hand, Smallbone & Saridakis, 2019). It has been suggested, for example, that innovation and internationalisation activities are deliberate actions that are closely linked (Kyläheiko, Jantunen, Puumalainen, Saarenketo & Tuppura, 2011), and therefore it has been argued that innovation, by creating new and competitive products for example, enables firms to internationalise and enter foreign markets (e.g., Cassiman, Golovko & Martínez-Rose, 2010; Paul et al., 2017; Saridakis et al., 2019). It has been suggested, however, that exposure to foreign markets allows a firm to gain more information, knowledge and introduce new ideas leading to innovation, especially when knowledge is generated through exporting or importing activities (Hitt, Hoskisson & Kim, 1997; Kiriyama, 2012). Although scholars have started to research the effects of internationalisation on innovation (Kafouros, Buckley, Sharp & Wang 2008; Lecerf, 2012), a very limited number of studies has focused on SMEs (Abubakar et al., 2019).

It has been implied that because of their size, SMEs have the benefit of being flexible, able to make quick decisions and the ability to take risks; hence, SMEs that are involved in internationalisation activities are more likely to introduce innovation (Love & Roper, 2015). Although an enormous amount of research has found that there is a positive association between innovation and outward internationalisation (i.e., exports) (e.g., Higón & Driffield, 2010; Monreal-Pérez, Aragón-Sánchez & Sánchez-Marín, 2012; Saridakis et al., 2019), there is a very limited number of empirical studies suggesting that internationalisation affects innovation (e.g., Ganotakis & Love, 2011; Abubakar et al., 2019). Most of these studies have focused on exploring the effect of outward internationalisation in enabling firms to gain access to knowledge and information (Pangakar, 2008). Firms may also be involved in inward

international operations, such as importing and gaining external knowledge, which can boost their innovative activities (Welch, Benito & Petersen, 2007; Nieto & Rodríguez, 2011). Scholars have thus started examining the effect of importing on innovation (e.g., Liu & Qiu, 2016). Previous research has either focused on the effect of outward international operations (e.g., Love & Ganotakis, 2013; Fassio, 2018) or inward international operations (e.g., Grosse & Fonseca, 2012; Chen, Zhang & Zheng, 2017) on innovation individually, in order to explore how knowledge is being accumulated. There is thus still a gap in the literature related to the effects that outward and inward international operations can simultaneously have on innovation.

A review of recent literature reveals that in the context of SMEs empirical studies have mainly treated innovation as a general idea, measured as an aggregate construct of different types of innovation ignoring potential individual effects, which can be argued is probably 'too simplistic' (Azari, Madsen & Moen, 2017, p. 733). A gap therefore exists in the literature, as most previous studies have investigated only one type of innovation (e.g., Cassiman & Golovko, 2011, for product innovation; Golovko & Valentini, 2011, for process innovation) at a time. Studies that take into account different types innovation and a combination of innovations are very limited (e.g., Abubakar et al., 2019; Saridakis et al., 2019). Following the suggestion of Love and Roper (2015), among others, that the investigation of different types of innovation in SMEs is very limited, the aim of the third study is to fill this particular gap. More importantly, the third empirical study of this thesis makes a significant contribution to the literature by examining the association between outward-inward internationalisation and innovation by differentiating between SMEs according to their size-bands.

1.2. Research aims and focus

As mentioned earlier, the aim of this thesis is threefold. The first empirical study of this thesis examines the relationship between local interpersonal networks and SME's internationalisation. The focus of the first study is, in particular, on interpersonal networks at the individual level rather than inter-firm networks; it can be argued that opportunities are being exploited by individuals and not by firms (Singh, 2000; Shane, 2003). Building on, and expanding previous literature (e.g., Holmlund & Kock, 1998; Zhang, Ma, Wang, Li & Huo, 2016), the first study concentrates on interpersonal networks of SMEs and their role in firm exporting, which serves as a proxy for internationalisation. In contrast to existing work, the first study differentiates between the local interpersonal networks (such as accountants, banks, solicitors and consultants) generated in the local (domestic) market in which the firm operates

(in this case, the UK) and non-local networks (such as customers and suppliers) located in the international (foreign) market that the firm intends to enter (i.e., outside the UK). To do this, the first study builds on the work framed within the network perspective (Johanson & Mattsson, 1988) and social network theory, which enables the study to add to existing literature, and specifically to the social network theory of internationalisation (SNT). To do this, the first study adds to the literature by distinguishing between formal and informal interpersonal networks (see Fernhaber & Li, 2012), and discusses that this differentiation between types of networks, is an important one since it has been argued that knowledge obtained from networks is usually influenced by the formal setting as opposed to the informal setting within the network itself (Almeida, Dokko & Rosenkopf, 2003). The research questions of the first study can be expressed as follows. First, is there a positive and significant relationship between local interpersonal networks and SMEs internationalisation? Secondly, does this relationship differ according to different SME size-bands?

The second aim of this thesis is to examine the relationship between training and performance in SMEs by differentiating between firms that carry out internationalisation activities and firms that focus exclusively on the domestic market. The focus of the second study is on the specific effects of employees and owner-managers' training on the actual and intended performance of internationalised SMEs - a gap that exists in the international business and human resource management literature to date. In other words, the study differentiates between internationalised and non-internationalised SMEs (i.e., those who export and those who do not export) in order to examine how employees and owner-managers' training can affect those types of SMEs with an international look and those who focus on their local/domestic market. To do this, the second study builds on the RBV theory of the firm to empirically examine the effect of training on SMEs performance, and it contributes to the debate by re-examining the association between different types of training (i.e., formal and informal training) for both employees and employers, and the performance of internationalised and non-internationalised SMEs. The research questions of the second study can therefore be summarised as follows. First, is there a positive and significant relationship between local employee and owner-manager training and SME performance? Secondly, is this relationship different between internationalised and non-internationalised SMEs?

Finally, the aim of the third and final empirical study of this thesis is to examine the relationship between different internationalisation operations in SME innovation. More specifically, the third empirical study focuses on the effect of outward internationalisation, inward internationalisation, and outward-inward internationalisation on SMEs innovation.

Specifically, the focus of the third empirical study of this thesis is on the effect of different internationalisation operations on different types of innovation (i.e., product, process and a combination of product and process innovation). The third study thus makes significant contribution to the literature by addressing the existing following gaps in the literature. First, in line with a recent and growing number of studies (e.g., Abubakar et al., 2019; Saridakis et al., 2019), the third empirical study does not limit its analysis to one type of innovation, instead, the study distinguishes between different types of innovation (i.e., products and process innovation). Secondly, the study goes beyond this distinction and examines the effect of different internationalisation exposures on a combination of different types of innovation (i.e., product and process innovation). Finally, for the very first time, to the best of the author's knowledge, the third study of this thesis tests this association in different sized-SMEs (i.e., micro, small and medium). The research questions of the third study are thus formulated as follows. First, is there a positive and significant relationship between different internationalisation exposures and innovation? Secondly, does this relationship differ according to different sized-SMEs?

The remainder of the thesis is composed of five chapters, which are analytically described below.

Chapter 2 (Data and survey methodology for limited dependent variables) provides a brief but sufficient discussion of the survey data used in this thesis and the main survey econometric techniques used to answer the above questions for each of the three empirical studies. Detailed information is provided about the UK Longitudinal Small Business Survey (UKLSBS), including the sampling approach, sample size and response rates. Key models such as probit, ordered probit and multinomial logit regression, as well as the techniques (e.g., propensity score matching) used in order to deal with the possible endogeneity between variables, especially self-selection, are explained.

Chapter 3 (Local formal interpersonal networks and SMEs internationalisation: Empirical evidence from the UK)[1] empirically examines the relationship between local interpersonal networks (formal and informal) and SMEs internationalisation. A positive and significant association between local interpersonal networks and SMEs internationalisation is

[1] Chapter 3 has been published in the **International Business Review** (ABS 3*). Idris, B., & Saridakis, G. (2018). Local formal interpersonal networks and SMEs internationalisation: Empirical evidence from the UK. *International Business Review*, 27(3), 610–624.

found. The estimation results suggest that the role of formal types of interpersonal networks (e.g., accountants, banks) increases as the size of the firm increases, however the link between the informal type of interpersonal networks (e.g., family, friends) and internationalisation becomes weaker. The results show that micro and small firms tend to participate in one advice network, while medium-sized firms tend to participate in more than one network for their internationalisation purposes.

Chapter 4 (The relationship between training and performance in internationalised and non-internationalised SMEs: Is it different?)[2] empirically examines the relationship between employee's and owner-managers' training, and SMEs actual and intended performance by differentiating between internationalised and non-internationalised firms. The study differentiates between the different types of training (i.e., formal and informal) received by both the employees and owner-managers of SMEs. The results of the second study show that an employee's training significantly affects the actual and intended performance of SMEs, where the combined measure of training has a stronger effect than the individual measure. In contrast, the estimation results show that only the combined measure of owner-manager's training (i.e., formal and informal) is positive and significantly increases SMEs actual and intended performance. When differentiating between SMEs according to their internationalisation activities, the estimation results show that there is only a positive association between the combined measure of an owner-manager's training (i.e., formal and informal) and intended performance for internationalised SMEs.

Chapter 5 (The effect of outward and inward internationalisation on different types of innovation: is the relationship different in different sized-SMEs?)[3] empirically examines the effect of outward internationalisation, inward internationalisation and outward-inward internationalisation (i.e., exporting and importing) on different types of innovation undertaken by SMEs. The results show that all internationalisation operations are positively associated with introducing innovation in SMEs, however, the effect is found to be stronger for combined outward-inward internationalisation operations compared to an individual operation. The results are also found to be robust across the different types of innovation undertaken by SMEs (i.e., product, process and a combination of product and process innovation). When differentiating between SMEs according to their size-bands, the results show that innovation

[2] Chapter 4 is currently under review in ABS 3* journal.
[3] Chapter 5 is currently under review in ABS 4* journal.

responds to different internationalisation operations in micro and small firms, however for medium-sized firms, the results show that only undertaking outward and inward internationalisation operations simultaneously increases the probability of introducing innovation.

Chapter 6 (Conclusion) concludes the whole thesis. This final chapter synthesises the major findings from the three empirical studies and provides overall implications for policy makers, academics and practice. In summary, this thesis fills significant gaps in the literature by providing a rigorous empirical analysis of the factors that enable SMEs internationalisation, empirically examining the determinants that enable internationalised firms to achieve better performance, and exploring the factors that enable SMEs innovation via internationalisation. These three empirical studies make a significant contribution to our knowledge and theory of SMEs, and along with their academic impact, have significant implications for policy makers.

Each empirical chapter of the thesis undoubtedly offers various contributions that are analytically developed, explored and discussed. Nevertheless, to give the reader of this thesis a flavour of the contribution made before reading the individual chapters and the final chapter that summarises the findings and the implications, an overview of the contribution is briefly provided. First, looking at the academic impact, this thesis, for example, contributes to the international business field (e.g., Chetty & Blankenburg-Holm, 2000; Loane, Bell & McNaughton, 2007; Boehe, 2013; Eberhard & Craig, 2013; Evangelista & Mac, 2016; Onkelinx et al., 2016) and small business field (e.g., Larsson, Hedelin & Garling, 2003; Jayawarna et al., 2007; Ganotakis & Love, 2012; Chinomona, 2013; Hånell & Ghauri, 2016) by providing for the first time empirical evidence of the association between interpersonal networks and export propensity within different-sized SMEs. This thesis also contributes to human resource management literature by directly responding to the call for more empirical evidence of the relationship between different types of training and business outcomes (e.g., García, 2005; de Wiele, 2010; Patel & Cardon, 2010; Jones et al., 2013; Georgiadis & Pitelis, 2016); a topic that has long been ignored in the literature, and where an emphasis on internationalised and non-internationalised firms is virtually absent. Finally, this thesis contributes to the innovation management field (e.g., Rogers, 2004; Alegre & Chiva, 2008; Alegre, Pla-Barber, Chiva & Villar, 2012; Altomonte et al., 2014; Chiva et al., 2014; Abubakar et al., 2019) by empirically testing for the very first time the effect of outward-inward internationalisation operations and SME innovation by differentiating between SMEs according to their size-bands. Turning to policy implications, the thesis emphasises the

importance of networking, and especially that supporting and encouraging formal networking channels as a firm grows in size that can enable SMEs to expand their operations in foreign markets. Employer training also becomes essential in order for internationalised firms to overcome internationalisation barriers and the difficulties associated with implemented global HRM. Finally, policy should promote both inward and outward internationalisation operations not as individual entities, but as mutually reinforced activities, in order to optimize more innovative activities within SMEs.

Chapter 2: Data and survey methodology for limited dependent variables

2.1. Introduction

As previously mentioned, the thesis empirically examines: first, the relationship between local interpersonal networks and SMEs internationalisation by differentiating between firms according to their size-bands; secondly, the relationship between employees and owner-manager's training and SMEs performance by differentiating between internationalised and non-internationalised SMEs; and thirdly, the relationship between different internationalisation operations and SMEs innovation by differentiating between firms according to their size-bands. The UKLSBSs is used to do this. The first two empirical studies of the thesis use the first wave of the UKLSBS (2015)[4], and the third empirical study uses the recently published second wave of the UKLSBS (2016)[5]. This chapter provides a detailed explanation of the data and briefly discusses the key survey methodologies used in addressing the research questions outlined before. The latter can help readers to familiarise themselves with these methodologies and provide them with the reasoning behind choosing these models, based on the nature of the data and structure of the survey questions.

2.2. Survey data and some key data description

2.2.1. UKLSBS, first wave (2015)

The UKLSBS, first wave (2015) is a large-scale telephone survey of more than 15,000 owner-managers of small businesses in the UK. The first wave of the survey was commissioned by the Department for Business, Innovation and Skills (BIS, 2016), and is the latest in the series of the annual and biennial Small Business Surveys (SBS) which started in 2003. The first wave of the survey took place between July 2015 and January 2016 by BMG Research Ltd. It was based on a stratified sample within the four nations of the UK: England, Wales, Northern Ireland and Scotland; targets were set according to the size of the firm and within these targets, according to the SIC 2007 sector classification. The response rate was 58.1 per cent (BIS, 2016b), Table 2.1 describes these targets by employment size (with 249 employees or less). 54 per cent of the firms were micro-sized (including firms with zero employees), 26 per cent of

[4] When the first two chapters were written, the second wave was not available. Future research may use these two chapters to build a more dynamic theoretical and empirical framework, however, this work may be problematic as the sample size drops by almost half if both waves are used.

[5] The final empirical study uses the second wave and not the first wave due to the fact that in the first wave, the survey does not include information regarding a firm's importing activities.

the firms were small, and 20 per cent were medium-sized firms. The survey provides rich and detailed information about firm characteristics such as the region, the legal status, the age of the firm, the sector, the current and expected turnover, training opportunities, networking activities, internationalisation position, and the obstacles that firms face to achieve their business aims and objectives. A number of these characteristics are used in the empirical models to form the dependent, independent and control variables that are analytically discussed in each chapter separately, however more information about the sampling, survey instruments, survey questions and description can be found in the technical report (BIS, 2016b).

Table 2.1 Survey targets by employment size

Type of the firm	Percentage of interview	Type of company	Number of Obs.
No employees	12	Unregistered	4355
	11	Registered - companies	
	5	Registered - not companies	
Micro	10	Registered-companies (1-4 employees)	4102
	7	Registered - not companies (1-4 employees)	
	9	Registered - companies (5-9 employees)	
Small	26	Registered	4066
Medium	20	Registered	2979

Notes: Micro firms (1-9 employees), Small firms (10-49 employees), Medium firms (49-249 employees).
Source: Author's calculation based on UKLBS (BIS, 2016b) technical report.

As mentioned above, the UKLSBS (2015) first wave was used in the first empirical chapter (presented in **Chapter 3**) and the second empirical chapter (presented in **Chapter 4**) of this thesis. Specifically, the survey provides information for the first empirical study regarding firms' internationalisation activities in the form of exporting goods and/or services outside the UK, and their networking behaviour in the form of seeking advice/information from outside sources. Table 2.2 presents information on exporting and networking activities by firm size.[6] About 22 per cent of the firms were exporters, and export activity was found to increase with firm size. Similarly, networking was found to respond to firm size, with more than half of the medium-sized firms carrying out networking activities.

[6] In this thesis, the category 'Micro firms' include firms with zero to nine employees.

Table 2.2 Exporting and networking activities by firm size

	Exporters	Networks	Obs.
	Per cent	Per cent	
Micro	16.42	27.70	8386
Small	25.92	41.34	4011
Medium	30.69	53.36	2890
All Firms	21.61	36.13	15287

Notes: Micro firms (1-9 employees), Small firms (10-49 employees), Medium firms (49-249 employees). Estimates were based on the first wave of the UKLBS (BIS, 2016).[7]

The survey also provides useful information for the second empirical study of this thesis, about whether the firm provides training for employees and owner-managers, which was linked to a firm's current turnover and turnover expectation in the next year. Table 2.3 provides information regarding the training activities of employees and owner-managers. Informal training was found to be a more preferable training method for employees,[8] whereas formal training was more apparent for owner-manager training.[9] A combination of formal and informal training was greater for employees than owner-managers. When looking at training activity between internationalised and non-internationalised firms, the results indicated that informal training was a more preferable training method for employees in internationalised firms, while formal training is the more preferred method for owner-managers in internationalised firms.[10]

Table 2.3 Employees and owner-managers training by type of training

	All firms		Internationalised firms		Non-internationalised firms	
	Employees	Owner-managers	Employees	Owner-managers	Employees	Owner-managers
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Formal training	10.07	16.33	10.34	16.80	9.98	16.17
Informal training	15.86	14.45	15.43	14.36	15.99	14.48
Both training	48.64	41.68	52.47	37.67	47.40	43.07
No training	25.43	27.54	21.76	31.16	26.63	26.28
Obs.	10879	8112	2670	2089	8209	6023

Notes: Estimates were based on the first wave of the UKLBS (BIS, 2016).

[7] After considering missing values and cleaning the data (e.g., observations that reported 'do not know' for exporting and networking constructs were dropped), the sample size reduced to 15,287.

[8] The coefficient for formal employee training is statistically significantly different from the coefficient of informal employee training ($Z=-8.947$, $Pr(|Z|>|z|)= 0.001$).

[9] The coefficient for formal owner-manager training is statistically significantly different from the coefficient of informal owner-manager training ($Z=-3.328$, $Pr(|Z|>|z|)= 0.009$).

[10] The coefficient for formal employees training is statistically significantly different from the coefficient of informal employee training ($Z=-5.555$, $Pr(|Z|>|z|)= 0.001$) for internationalised firms. Similar results were obtained for the formal and informal training of owner-managers in internationalised firms.

2.2.2. UKLSBS, second wave (2016)

The second wave of UKLSBS (2016) follows from the first wave of UKLSBS (2015) which is also a large scale-telephone survey with 9,248 small businesses in the UK. The second wave was commissioned by the Department for Business, Energy and Industrial Strategy (BEIS, 2018). The survey again included the four UK nations and interviews were conducted between August 2016 and January 2017 by BMG Research Ltd. The response rate was 57.7 per cent (BEIS, 2018). Table 2.4 shows the number of observations in Year Two by employment size.

Table 2.4 Number of observations in UKLSBS Year Two by employment size

Type of firm	Number of Obs.	Type of company
Zero employees	1077	Zero – unregistered
	1247	Zero – registered
Micro	3047	Registered - company (1-9 employees)
Small	2487	Registered - company (10-49 employees)
Medium	1363	Registered - company (50-249 employees)

Source: Author's calculation based on UKLBS (BIS, 2017) technical report.

The survey provides information for the third empirical study of this thesis, regarding firms' internationalisation activities in the form of exporting goods and/or services outside the UK, and in the form of importing goods or services from outside the UK, which are then linked to a firm's innovative activities (i.e., product and process innovation). Table 2.5 shows the exporting, importing and overall innovation activities by firm size.[11] The results suggest that about 22 per cent of the firms were exporters, and exporting activity was found to increase with the size of the firm.[12] Similar results are obtained for importing and introducing innovation (23 per cent of firms were importers, and 42 per cent introduced innovation).[13]

[11] The number of observations has been reduced due to missing data, and because observations that reported 'do not know' were dropped from the analysis, leaving the number of observations at 8319.

[12] The coefficient for exporting micro firms is statistically significantly different from the coefficient of small exporting firms (Z=-10.508, Pr (|Z|>|z|)= 0.001) and from the coefficient of medium firms (Z=-10.296, Pr (|Z|>|z|)= 0.001). However, the coefficient of small exporting firms is not statistically significantly different from the coefficient of medium exporting firms (Z=1.378, Pr (|Z|>|z|)= 0.168).

[13] The coefficients for importing firms are all statistically significantly different from each other. Similar results were obtained for the coefficients for the innovation variable.

Table 2.5 Export, import and innovation by firm size

	Export	Import	Innovation
	Per cent	Per cent	Per cent
Micro	16.96	17.42	36.01
Small	27.79	28.58	48.29
Medium	30.00	34.26	53.58
All Firms	21.78	22.90	41.89
Obs.	8319	8285	8319

Notes: Estimates were based on the second wave of the UKLBS (BIS, 2018),

2.3. Survey methods for limited dependent variables

Apart from the basic statistical tools used to initially explore the properties of the data, such as descriptive summary statistics and correlation matrixes, the three empirical chapters employed a set of standard and advanced statistical survey techniques to examine the statistical relationship between each of the dependent variables (e.g., internationalisation) and the explanatory variables (e.g., networks), taking into consideration a wide range of controls. The survey techniques included mainly probit, ordered probit and multinomial logit models. All three studies applied propensity score matching techniques in order to deal with a potential endogeneity problem which arose from self-selection. These techniques are described below to assist non-technical readers of this thesis and provide them with a basis with which to follow the empirical modelling and discussions presented in the following chapters.

2.3.1. Survey models for limited dependent variables

Often the dependent variable is numerically measured, for example, on a ratio scale, however the dependent variable may also take the form of a nominal variable in the sense that the variable represents categories such as export or no export, import or no import and so on (Aldrich & Nelson, 1984). These regression models are often referred to as qualitative response regression models, and there are various models such as binary or dummy dependent variables. These models are estimated using specialised methods such as probit models when the outcome is binary, or ordered probit in the case of more than two outcomes that can be ordered. If ordering the outcomes is not possible, then a multinomial logistic regression can be used. This thesis applied a number of these models to estimate the empirical models, and they are briefly discussed below.

2.3.1.1. Probit regression model

The probit model is a binary choice model, which uses the cumulative standardised normal distribution (Dougherty, 2016), widely used when the dependent variable is coded 0/1; importantly it is considered an appropriate econometric technique for dealing with issues associated with the linear probability model (Gujarati, 1995).

Suppose that the dependent variable Y is a binary variable (e.g., exporting/not exporting), and it can be observed with the value of zero and one. There is a latent and unobserved continuous variable y* which will determine the value of Y. Therefore, Y* can be simply specified as follows:

$$Y_i^* = X_i\beta + u_i, \quad (1)$$

And that

$$Y_i = 1 \text{ if } Y_i^* > 0$$
$$Y_i = 0 \text{ Otherwise,}$$

Where X is a vector of random variables, and u is a random disturbance term. Now from equation (1):

$$P_i = prob\ (X_i\beta + u_i > 0) \quad (2)$$

Rearranging the terms,

$$P_i = prob\ (u_i > (-X_i\beta)) \quad (3)$$
$$= 1\text{-}\ F(-X_i\beta), \quad (4)$$

Where F is the cumulative density function of u. The marginal effects can be easily derived to interpret the probit coefficient. The marginal effect on P_i for a change in X_k is given by:

$$\frac{\partial P_i}{\partial(X_k)} = \frac{\partial\ [\ 1-F(-X_i\beta))]}{\partial(X_k)} = f(-\mathrm{X_i}\beta)\beta_\mathrm{k} \quad (5)$$

Therefore, the impact of changes in a variable X_k on the likelihood of a particular individual choosing option number 1 will depend not only on β_k (the coefficient of the variable) but also on the value of $\mathrm{X_i}\beta$, and more specifically on $f(-\mathrm{X_i}\beta)$. Since $\frac{\partial P_i}{\partial(X_k)}$ will depend upon the choice of F, the true F must be known in order to determine the true impact of changes in any independent variable upon different individuals. Or, the shape of the true $F(u)$ will depend

upon which individuals are most sensitive to changes in the independent variables (Nagler, 1994). A probit regression model, as described above, is used in the first empirical study (**Chapter 3**) and the third empirical study (**Chapter 5**) of this thesis, and more specific discussion can be found in the particular methodology sections of these chapters.

2.3.1.2. Ordered probit regression model

According to Jackman (2000) dependent variables will sometimes be of an ordered nature rather than continuous nature. Such models can therefore be estimated using an ordered response model, such as the ordered probit. The ordered probit model, like the probit model is estimated using the maximum likelihood method. Briefly, the idea is that there is a latent continuous measure underlying the ordinal responses observed by the researcher. Let's suppose that the dependent variable *Y* is a categorical variable (e.g., SMEs performance takes the value of 1 if performance increased, 2 if performance stayed the same, and 3 if performance decreased) that can be observed with limited and fixed possibilities (more than two outcomes). Y_i^*, which is the late continuous variable, is a linear combination of a number of predictors *x.* So the model can be represented as follows:

$$Y_i^* = \beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki} + \varepsilon_i \tag{6}$$

Where Y_i^* is the unobserved dependent variable and x is the vector of the explanatory variables that will affect *Y*. While β is the vector of regression coefficient estimators and ε is the disturbance term, which has a standard normal distribution (Jackman, 2000). Since we can observe Y_i^*, we can observe the categories of the response as follows:

$$Y_i = \begin{cases} 0 & \text{if } \gamma_{-1} < Y_i^* \leq \gamma_0 \\ 1 & \text{if } \gamma_0 < Y_i^* \leq \gamma_1 \\ & \cdots \\ N & \text{if } \gamma_{N-1} < Y_i^* \end{cases} \tag{7}$$

The ordered probit model uses the observations on *Y*, which is a form of censored data on Y_i^* in order to fit the β parameter vector. The ordered probit model is concerned with how changes in the explanatory variables translate into the probability of observing a particular ordinal outcome. The probability of each ordinal outcome will be:

$$\Pr[\ Y_i = 0\ ] = \Pr[\ \gamma_{-1} < Y_i^* \leq \gamma_0]$$
$$= \Pr[\ -\infty < Y_i^* \leq \gamma_0]$$
$$= \Pr[\ Y_i^* \leq \gamma_0]$$

Substituting from equation (6):

$$\Pr[\ Y_i = 0 \mid x_{1i} \ldots\ x_{ki}] = \Pr[\ \gamma_{-1} < \beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki} + \varepsilon_i \leq \gamma_0]$$
$$= \Pr[\ \varepsilon_i \leq \gamma_0 - (\beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki})]$$
$$= \Phi\ (\gamma_0 - x_i\ \beta)$$

$$\Pr[\ Y_i = 1\ ] = \Pr[\ \gamma_0 < Y_i^* \leq \gamma_1]$$
$$= \Pr[\ \gamma_0 < \beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki} + \varepsilon_i \leq \gamma_1)]$$
$$= \Pr[\ \gamma_0 - (\beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki}) < \varepsilon \leq \gamma_1 - \beta_0 + \beta_1 x_{1i} + \cdots + \beta_k x_{ki})]$$
$$= \Phi\ (\gamma_1 - x_i\ \beta) - \Phi\ (\gamma_0 - x_i\ \beta)$$

…

$$\Pr[\ Y_i = N\ ] = \Phi\ (\gamma_N - x_i\ \beta) - \Phi\ (\gamma_{N-1} - x_i\ \beta) \quad (8)$$

Since N is the highest category, the generic form is reduced to:

$$\Pr[\ Y_i = N\ ] = \Phi\ (\gamma_N - x_i\ \beta) - \Phi\ (\gamma_{N-1} - x_i\ \beta)$$
$$= 1 - \Phi\ (\gamma_{N-1} - x_i\ \beta) \quad (9)$$

Where Φ is the cumulative normal distribution function and the parameters β are estimated by using the maximum likelihood. The sign of the coefficients shows whether or not Y_i^* increases with the explanatory variables. In the ordinal regression model, the marginal change in y^* with respect to x_k is

$$\frac{\partial y^*}{\partial x_k} = \beta_k \quad (10)$$

Since y^* is latent, the marginal change cannot be interpreted without standardising by the estimated standard deviation of y^*

$$\widehat{\sigma_{y^*}^2} = \hat{\beta}' \widehat{Var}\ (\mathrm{x})\ \hat{\beta} + Var\ (\varepsilon) \quad (11)$$

Where $\widehat{Var}$ (x) is the covariate matrix for the observed x's, $\hat{\beta}$ contains maximum likelihood estimates, and Var (ε) = 1 for ordered probit. Thereafter, the y^* standardised coefficient for x_k will be

$$\beta_k^{Sy^*} = \frac{\beta_k}{\sigma_{y^*}} \tag{12}$$

Which can be interpreted as follows, for instance, for each unit increase in x_k, y^* is expected to increase by $\beta_k^{Sy^*}$ standard deviations, holding all other variables constant. The fully standardised coefficient is

$$\beta_k^{Sy^*} = \frac{\sigma_k \beta_k}{\sigma_{y^*}} = \sigma_k \beta_k^{Sy^*} \tag{13}$$

Which can be interpreted as follows: for a standard deviation increase in x_k, y^* is expected to increase by β_k^S standard deviations, holding all other variables constant (Long & Freese, 2001). In this thesis, the application of the ordered probit regression model can be found in the second empirical study (presented in **Chapter 4**).

2.3.1.3. Multinomial logistic model

The multinomial logistic model (MNLM) can be used in order to estimate the relationship between a set of explanatory variables and a multicategory (unordered) dependent variable (Long, 2015). Multinomial logistic regression, which is a generalisation of the binary outcome of standard logistic regression, involves comparing each category of the outcome variable to a reference category. Let the selection probabilities be given by:

$$P_{ij} = \frac{\exp(x_{ij}'\beta_j)}{\sum_{j=1}^{J} \exp(x_{ij}'\beta_j)} \tag{14}$$

Where the parameter vector is indexed by *j*, indicating that explanatory variables may have different effects depending on the alternative (Judge, Griffiths, Hill, Lütkerpohl & Lee, 1985). The odds of the *K*th alternative relative to the first are as follows:

$$P_{ij} = \frac{\exp(x_{ik}'\beta_k)}{\exp(x_{i1}'\beta_1)}$$

$$= \exp(x_{ik}'\beta_k - \exp(x_{i1}'\beta_1), \qquad K = 2, \ldots\ldots, J \tag{15}$$

If the vectors x_{ik} and x_{i1} contain variables that are constant across alternatives, then $x_{ik} = x_{i1} = x_i$ for all $K = 2, \ldots\ldots, J$ and equation (15) will be:

$$\frac{P_{ik}}{P_{i1}} = \exp[x_i'(\beta_k - \beta_1)] \quad (16)$$

A normalisation rule is required, and a convenient one is to assume that $\beta_1 = 0$. Hence, in this condition with (*J*-1), equation (15) will determine the selection probabilities and guarantees which sum to 1 for each *i*. Hence, the resulting selection probabilities are:

$$P_{i1} = \frac{1}{1+\sum_{j=2}^{J} \exp(x_i'\beta_i)}$$

$$P_{ij} = \frac{\exp(x_{ij}'\beta_j)}{1+\sum_{j=2}^{J} \exp(x_{ij}'\beta_j)} \quad , j = 2, \ldots\ldots, J \quad (17)$$

Finally, the marginal effects can be defined as

$$\frac{\partial \Pr(y=m|x)}{\partial x_k} = \Pr(y=m|x) \left[\beta_{k,m|j} - \sum_{j=1}^{J} \beta_{k,j|J} \Pr(y=j|x)\right] \quad (18)$$

Since equation (18) combines all of the $\beta_{k,j|J}$'s, the value of the marginal change depends on the levels of all variables in the model. Moreover, when the value of x_k changes, the sign of the marginal change can change as well (Long & Freese, 2001). The MNLM is used in the third empirical study (presented in **Chapter 5**). The study also uses specification tests associated with the MNLM such as the Independent of Irrelevant Alternatives (IIA) since the MNLM assumes that the odds of any pair of outcomes are determined without reference to the other outcomes which could be available (for a discussion see Freese & Long, 2000; Long & Freese, 2001).

2.3.1.4. Propensity score matching

In order to overcome the basic evaluation issues and address the possible occurrence of selection bias when analysing a micro-econometric study (Caliendo & Kopeinig, 2005), this thesis uses propensity score matching techniques (Rosenbaum & Burin, 1983; Cameron & Trivedi, 2005). Propensity score matching is a statistical technique which estimates the probability of one unit (e.g., firm) being assigned to a specific treatment conditional on observed baseline factors or given a set of observed covariates (Austin, 2011). Briefly, the treatment group (*I*=1) can be compared to a control group (*I*=0), with the latter group serving as counterfactual to the former group. The propensity score is the conditional predicted probability of receiving treatment given the pre-treatment characteristics X, where:

$$p(X) = \Pr(D = 1|X) = E(D|X) \tag{14}$$

Using a matched sample, the model can be re-estimated and the outcomes between the treated and control observations can be compared:

$$P = \begin{cases} P_0 & \text{if} \quad I = 1 \\ P_1 & \text{if} \quad I = 0 \end{cases} \tag{15}$$

The average treatment effect on the treated (ATT) using the nearest neighbour matching approach is used. In this thesis, propensity score matching techniques are applied in all the empirical studies (presented in **Chapters 3, 4, & 5**) in order to address the problem of endogeneity or self-selection bias.

Chapter 3: Local formal interpersonal networks and SMEs internationalisation: Empirical evidence from the UK[14]

Abstract

This article uses data from the UK Longitudinal Small Business Survey (2015) to empirically test the relationship between local (formal and informal) interpersonal networks and exporting. Our results suggest that local interpersonal networks increase the likelihood of exporting. More importantly, we find that the role of formal interpersonal networks (e.g. accountants) on internationalisation increases as firm size increases, while the link between informal interpersonal networks (e.g. family) and exporting becomes weaker. We argue that larger firms have more complex operations and diverse structures than smaller firms that require the engagement of formal interpersonal networks to help with the internationalisation process.

Keywords: interpersonal networks, formal networks, informal networks, SMEs, internationalisation, exporting

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3.1. Introduction

Research regarding the role of networks in the internationalisation process of small and medium-sized firms (SMEs) has been gaining significant attention during the past few years (Zhang, Ma & Wang, 2012; Boehe, 2013; Hånell & Ghauri, 2016; Stoian, Rialp, Rialp & Jarvis, 2016; Rosenbaum, 2017). However, previous studies dealt with the network concept as 'something uni-dimensional' (Eberhard & Craig, 2013, p. 386), failing to examine potential differences that can emerge from formal and informal networks. Hence, there is a growing call in the literature that research should move beyond 'one-size-fits-all analyses of networks' (e.g. Inkpen & Tsang, 2005, p. 161). Previous literature calls for more evidence on the specific types of networks, specifically the role of interpersonal networks[15], and their effect on firms' internationalisation (Ellis & Pecotich, 2001; Zhou, Wu & Luo, 2007; Eberhard & Craig, 2013), and this paper responds to this call.

A small, but growing literature on interpersonal networks reveals that entrepreneurs' international expansions and exporting decisions can be influenced by their interpersonal network relationships with others (Zhou et al., 2007; Narooz & Child, 2016; Zaefarian, Eng & Tasavori, 2016). Additionally, previous research emphasises the role of foreign networks and foreign relationships in assisting firms to internationalise (Ellis & Pecotich, 2001; Manolova, Manev & Gyoshev, 2010). Importantly, although a few studies stress the importance of the role of local networks in gaining access to international markets (e.g. Boehe, 2013), the empirical evidence remains scarce (Milanov & Fernhaber, 2014; Prashantham & Birkinshaw, 2015; Haddoud, Jones & Newbery, 2017). This is surprising since early research suggests that internationalisation is strongly associated with networks in the domestic market in which the firm operates (e.g. Johanson & Mattsson, 1988; Ellis, 2000). Porter (1998, p. 5), for example, argues that firms' competitive advantages often arise from local contacts such as 'institutions, rivals, and sophisticated customers in a particular region'.

In this paper, we focus on interpersonal networks at the individual level rather than inter-firm networks since opportunities are being exploited by individuals and not by firms (Singh, 2000; Shane, 2003). Building on and expanding previous literature (e.g. Holmlund & Kock, 1998; Zhang, Ma, Wang, Li & Huo, 2016), our interest is concentrated on interpersonal networks of SMEs and their role on firms' exporting, which serves as a proxy for internationalisation. In particular, we differentiate between local interpersonal networks (such as accountants, banks, solicitors and consultants) generated in the local (domestic) market in

[15] Interpersonal networks can be defined as networks that consist of all individuals with whom owner-managers have direct relationships and obtain advice, information and support from (Eberhard & Craig, 2013).

which the firm operates (in this case, the UK) and non-local networks (such as customers and suppliers) located in the international (foreign) market the firm intends to enter (i.e. outside the UK). To do this, we build on the work framed within the network perspective (Johanson & Mattsson, 1988) and social network theory (e.g. Mitchell, 1969), which enables us to add to existing literature, and specifically to the social network theory of internationalisation, however, we add to existing literature by distinguishing between formal and informal interpersonal networks (see Fernhaber & Li, 2012). We argue that this distinction is important since learning from networks generally depends on the formal versus the informal mechanism within the network (Almeida, Dokko & Rosenkopf, 2003). Formal networks can be defined as a 'formally specified set of relationships', while informal networks consist of more flexible relationships where the purpose of the interaction may not be related to work only, but could be social as well (Ibarra, 1993, p. 58).

The paper mainly draws on the Social Network Theory (SNT) of internationalisation and previous work in the field (Kingsley & Malecki, 2004; Coviello, 2006; Mort & Weerawardena, 2006; Zhang et al., 2016) and empirically examines the effect of both formal and informal local interpersonal networks on different-sized SMEs using data from the first wave of the UK Longitudinal Small Business Survey (UKLSBS) of 2015. This allows us to observe differences between larger-sized SMEs and smaller ones, which can be hidden when data is aggregated. Hence, this paper makes a substantial contribution to the IE (e.g. Ellis, 2011; Frenhaber & Li, 2012; Zhang et al., 2016), IB (e.g., Chetty & Blankenburg-Holm, 2000; Boehe, 2013; Eberhard & Craig, 2013) and small business literature (e.g., Larsson, Hedelin & Garling, 2003; Hånell & Ghauri, 2016) by providing for the first time empirical evidence on the association between interpersonal networks and exporting propensity within different-sized SMEs. Notably, our paper not only directly responds to the academic call for more research in this area (e.g. Ellis & Pecotich, 2001; Zhou et al., 2007), but also provides new policy avenues to help SMEs enter new markets and boost exporting activity through their networking strategy. Overall, the findings strongly suggest that local interpersonal networks increase the likelihood of SMEs exporting. In particular, as firm size increases, the role of formal interpersonal networks (e.g. accountants, banks) on firms' exporting becomes stronger. Additionally, our results show that micro firms are reluctant to network with outside sources. We therefore argue that analysing SMEs as one group of firms cannot unfold particular differences that lie within different size bands.

The chapter is organised as follows. Section 3.2 discusses the existing literature on the relationship between interpersonal networks and SME internationalisation, and offers the

derivation of the hypotheses to be tested. Section 3.3 discusses the data. Section 3.4 presents the model and discusses the results. The final section concludes the paper and provides directions for future research.

3.2. Background and derivation of hypotheses

3.2.1. Defining networks and the benefits of networking

Although most studies fail to provide an exact definition of networks (see review by Hohenthal, Johanson & Johanson, 2014), there are three commonly used approaches to define networks. The first approach views a network as a 'system of interrelated actors' (Hohenthal et al., 2014, p. 10) such as customers, suppliers, competitors, family members and friends (Zain & Ng, 2006; Evers & Knight, 2008). The second approach comes from the purpose of the relationship, such as business or social relationships (Evers & O'Gorman, 2011). The third approach is based on the structure of the network, suggesting that a network is a set of two or more connected relationships (Axelsson & Easton, 1992; Coviello & Munro, 1997; Chetty & Blankenburg-Holm, 2000).

Advice networks, for example, involve relationships where individuals share resources and obtain support and information (Sparrowe, Liden, Wayne & Karimer, 2001). Hoang and Antoncic (2003) suggest that pursuing advice/information is considered the main reason for networking. As discussed in Hoang and Antoncic (2003), most of the existing research on SMEs considers network relationships from this perspective, which is based on strong exchange of information and trust. In this paper, we follow their argument, which implies that seeking external advice/information is the primary reason for networking.

The SNT implies that in order for businesses to flourish, owner-managers should have the ability to gain access to resources that are controlled by other firms or individuals. Resources that exist externally can be obtained through networking (Jarillo, 1989; Florin, Lubatkin & Schulze, 2003). A study conducted by Donckels and Lambrecht (1995) shows that the growth of a firm is positively associated with developing and maintaining network relationships either nationally or internationally, while Larsson, Hedelin and Garling (2003) demonstrate that the lack of network relationships with outside advisors and experts is an obstacle for small businesses to expand and grow their firms further. Therefore, entrepreneurs' reliance on networks is not limited to the start-up stage. Network relationships provide entrepreneurs with business information and advice, and offer help to solve problems (Johannisson, Alexanderson, Nowicki & Senneseth, 1994).

Based on the empirical evidence, which favours the positive effect of networking, it is appropriate to expect that firms who succeed and survive are more likely to be more active in networks than other firms. However, Watson (2007) implies that the relationship between the level of networking undertaken by SMEs owner-managers and a firm's performance is an inverted U-shaped relationship. Although it is reasonable to assume that some level of networking is useful, it is also reasonable to propose, according to the law of diminishing returns, that a high level of networking is more likely to generate negative effects. Based on economists' argument that time is a scarce economic resource, and on the way individuals allocate their time (Uzzi, 1997), it may be unlikely that SMEs owners will have the time to network and run a sustainable business simultaneously. Therefore, the relationship between networking and small firms' performance will take the form of an inverted U-shape rather than being a linear relationship. It can be argued, however, that networks have positive effects on the success and expansion of SMEs and firms in general. Coleman (1988) demonstrates that information is important for owners to make strategic decisions. Hence, networking can develop owners' social capital because access to knowledge and information needed for firms' growth can be obtained through these relationships.

3.2.2. Networks and internationalisation

SNT is considered one of the dominant theories that explain firms' internationalisation. Previous studies combined different theories with the network approach to examine the internationalisation process of firms. Two of the most widely applied models are the Uppsala internationalisation Model and the Born Global Model. From an internationalisation perspective, Johanson and Vahlne (1992) find that network relationships influence firms to enter foreign markets in a gradual process. Firms are successful in expanding their businesses abroad because of their position in a network within their current markets (Johanson & Mattsson, 1988). However, in recent years more researchers have started paying attention to a special type of small firm, the born global firm. This type of firm has the ability to enter global markets rapidly from their inception. The Born-Global model has challenged incremental or gradual internationalisation theories by indicating that small firms can overcome their resource constraints through their network relationships (Mort & Weerawardena, 2006). Therefore, researchers adopting the Born-Global model have emphasised the role of networking in contributing to the success of these types of firms. Previous literature shows that network relationships help born global firms to acquire the required market knowledge and identify market opportunities (Coviello & Munro, 1995).

From a network perspective, internationalisation refers to the development and establishment of relationships in foreign networks. The foundation of this perspective is that a firm is dependent on resources that are controlled by other firms. Through participating in networks, access to resources can be obtained either by developing existing ties or by establishing new ones. Hence, it has been suggested that participation in a network relationship gives firms the benefits of insidership (Ghauri, Tasavori & Zaefarian, 2014). This applies to small firms since they face greater entry barriers than larger firms, so it is more difficult for them to obtain trust from prospective network partners (Zahra, 2005). Networks may assist firms in gaining access to a wide range of resources such as 'political influence, reputation and mutual trust' (Boehe, 2013, p. 168). The emphasis is on the gradual learning and the attainment of knowledge through interactions. Through this process, firms will internationalise by developing ongoing relationships and increase their resource commitments among networks (Johanson & Mattsson, 1988).

Sharma and Johanson (1987) suggest that when firms operate in a network consisting of relationships, these relationships will develop further to become channels to international markets. However, due to the criticisms of the Stage model and the Born-Global model, the SNT of internationalisation has emerged, which focuses more on individual-level relationships rather than on firm-level relationships. For instance, Ellis's (2000) study shows that interpersonal relationships and connections provide firms with foreign opportunities, while Zhou et al. (2007) suggest that social networks produce information and facilitate the relationship between internationalisation and firms' performance. Social networks are important for SMEs because firms can exchange information, which will lead them to duplicate each other and speed up the exporting process (Bonaccorsi, 1992; Robert & Antoncic, 2006; Ge & Wang, 2013). Moreover, being part of a network allows owner-managers to 'exchange and combine their resources through various activities for their mutual benefits' (Ghauri et al., 2014, p. 580). Social networks also offer advice and information (Hoang & Antoncic, 2003), which are crucial for firms' development. Owner-managers seek advice in order to obtain opinions and judgements regarding current strategies and alternative opportunities (McDonald & Westphal, 2003). Advice and information from external sources are usually sought from individuals who lack the appropriate knowledge to make decisions related to their firms (Menon & Pfeffer, 2003).[16] Therefore, networks enable owner-managers to gain access to

[16] In addition, the resource-based view theory of the firm (RBV) highlights the advantages of seeking external advice and information. Small and young firms can overcome their limited resources and skills by obtaining information and knowledge from their advice networks (Mole, North & Baldock, 2016). Importantly, social ties can be a source of a firm's competitive advantage (Lavie, 2006).

different kinds of resources (Boehe, 2013) where owner-managers will have the ability to learn and gain knowledge in a gradual way. Through this process, firms can internationalise by developing ongoing relationships and increase their resource commitments among their network relationships (Johanson & Mattsson, 1988).

Previous literature emphasises the role of networks in the internationalisation process of SMEs. For instance, Bonaccorsi (1992) argues that small firms use network relationships in order to obtain information, knowledge and trade, which in turn enhance their exporting activities. In addition, Zain and Ng (2006) find that small software companies use their network relationships in their internationalisation process. Moreover, recently Eberhard and Craig (2013) found a positive relationship between SMEs' internationalisation (proxied by export activities) and networks, which is measured in the form of seeking advice/information from outside sources. Given the above literature, we hypothesise that:

> ***H1:*** *SMEs that receive external advice/information have a higher likelihood of internationalisation.*

3.2.3. Interpersonal networks and internationalisation

Interpersonal networks include all connections in which an individual has a direct relationship. In the context of firms, an interpersonal network can be defined as a group that consists of people from whom an owner-manager obtains advice, information and support (Dubini & Aldrich, 1991). Therefore, interpersonal contacts are networks among people who are not only interlinked through social connections, but in which business and information exchange can also occur (Björkman & Kock, 1995). Previous studies refer to interpersonal networks as social networks (Komulainen, Mainela & Tahtinen, 2006; Zhou et al., 2007), social ties (Ellis, 2011), and informal and formal networks (Coviello & Munro, 1997). These studies viewed interpersonal networks from the wider perspective, which integrates personal connections with businesses, government officials, and family and friends.

SNT suggests that the exchange of information occurs through interpersonal networks (Zhou et al., 2007). Previous empirical research confirms the role that is played by interpersonal networks in firms' internationalisation. Some studies show that interpersonal networks have a positive association with foreign market opportunities that promotes firms' internationalisation (Ellis, 2000; Ellis & Pecotich, 2001; Zain & Ng, 2006; Chandra, Styles & Wilkinson, 2009). Other studies note the negative role of interpersonal networks, such as the cost that is involved in participating in networks that might outweigh the benefits obtained from these networks

(Mort & Weerawardena, 2006). Moreover, it has been noted that when an individual has a high local network and fails to increase and expand their vision, they will be constrained in reaching the foreign information needed for internationalisation. Therefore, owners will be trapped 'in their local area preventing the search process outside the firm's own region' (Masciarelli, Laursen & Principe, 2009, p. 19).

However, it can be argued that since SMEs lack internal managerial resources (Penrose, 1959), such as coordination and communication (Williamson, 1985), by developing networks and connections with international clients (Boehe, 2013) and clients in the home country, owner-managers will more likely gain significant information and the exchange of knowledge and resources will occur. Kingsley and Malecki (2004) argue that it is generally assumed that new and small firms are more likely to form and rely on local contacts based in their home markets rather than on foreign contacts. This is to be expected because it is the frequent face-to-face communications and relations that mean the most to small firms (Sweeney, 1987). As Nebus (2006, p. 616) puts it, 'despite recent advances in technology, people continue to prefer to converse with other people as the primary means of obtaining important information'.

Yiu, Lau and Bruton (2007) find that when local knowledge and information are exchanged with trade organisations and professional companies, a firm's internationalisation occurs, whereas Zhou et al. (2007) argue that home-based social networks act as the mediator that links firms' performance and internationalisation. Moreover, Zhang et al. (2016) point out that home-based network relationships reduce the risk associated with SMEs' international expansion. The principal idea behind this argument is that social network ties located in the home country are crucial for firms to explore foreign market opportunities and to expand their connections with international parties (Ellis & Pecotich, 2001). In addition, a study by Mackinnon, Chapman and Cumbers (2004) regarding SMEs in the Aberdeen oil complex shows that 'extra-local' networks are an important source for exchanging knowledge and information. More specifically, one of their respondents stressed the role of these local networks in developing a presence in foreign markets. Interpersonal networks are based on trust and referrals (Oviatt & McDougall, 2005) and these two factors represent key drivers that enable firms to respond to international market demands.

According to Brunetto and Farr-Wharton (2007), trust is a key moderator in the way owner-managers perceives the benefits from networks. For SMEs, it is a necessity to place trust in their relationships with others in order for them to trust the obtained information and knowledge (Kingsley & Malecki, 2004). Trust and referral are higher when connections are based in the home market rather than international markets, because interactions will be face-

to-face. As Boehe (2013) points out, through membership in trade association networks, local firms might obtain referrals to foreign buyers via these trade associations.

The existing literature mainly focuses on the role of foreign relationships in internationalisation. Although the literature advanced our knowledge regarding their role and importance in the internationalisation process of SMEs, it is surprising that the role of local interpersonal networks is not emphasised since early research suggested that internationalisation is strongly affected by relationships in the domestic markets (e.g. Johanson & Mattsson, 1988; Ellis, 2000). According to Prashantham and Birkinshaw (2015), although a great deal is known regarding the important role of foreign country (i.e. non-local networks) networks and relationships in the internationalisation process, we still know little regarding the role of home market (local networks) networks that can either help or hinder SMEs' internationalisation (Fernhaber, Gilbert & McDougall, 2008). Some research suggests that local networks are positively related to firms' international growth (e.g. Boehe, 2013) while others find that local relationships may hinder firms' expansion (e.g. Milanov & Fernhaber, 2014) or they have no significant effects (Yu, Gilbert & Oviatt, 2011). However, it can be argued that building and maintaining local networks and relationships with connections in the home market is beneficial for firms expanding across borders as input and output (Liesch, Wlech, Welch, McGaughey, Peterson & Lamb, 2002). As an input, the information received from social and interpersonal networks may influence firms' internationalisation strategies (McAuley, 1993; Liesch & Knight, 1999). From the outcome perspective, it is vital for firms seeking to internationalise to participate in networks and use their local interpersonal networks[17] in order to obtain valuable information. Based on the above argument, we hypothesise that:

> ***H2:*** *Using local interpersonal networks increases the likelihood of SME internationalisation.*

3.2.4. Formal and informal networks

Interpersonal networks can further be differentiated according to the distinct source from which they are derived: formal and informal (Birley, 1985; Johannisson, 1987; Coviello & Munro, 1997; Das & Teng, 1997). Formal interpersonal networks consist of a set of 'formally specified relationships' among a group of differentiated individuals who must connect with each other

[17] Here we consider as local interpersonal networks the relationships formed within the firms' domestic market.

in order to achieve a specific objective (Ibarra, 1993, p. 58). Kingsley and Malecki (2004, p. 72), in their study on the use of formal and informal networks by small manufacturers in the rural and urban counties of northern Florida, defined formal networks as 'intentionally formed group of small to medium-sized profit-oriented companies'. They argue that these types of connections share the same objectives, while Birley (1985) suggests that formal networks include connections with companies and individuals such as banks, lawyers, accountants, Chambers of Commerce and those involved in small business administration. Das and Teng (1997) suggest that formal networks include relationships with banks, accountants, lawyers, creditors, venture capitalists and trade associations. Formal networks are 'not usually in the business of diagnosing needs, but rather satisfying them by responding to a specific request' (Birley, 1985, p. 109).

Informal networks, on the other hand, consist of more flexible relationships and connections where the purpose of the interaction may not be related to work only, but could also be social or a combination of both (Ibarra, 1993). Kingsley and Malecki (2004, p. 72) suggest that informal networks are 'not bound by an explicit agreement' but rather by mutually supporting self-interests. Hence, informal networks include individuals such as family, friends, work colleagues, employers and business contacts (Birley, 1985; Das & Teng, 1997). These contacts are more likely to listen to entrepreneurs than formal networks, and to offer guidance and advice on business issues even though they are less informed about the available opportunities in the marketplace.

Informal networks are considered an important source of information for SMEs because relationships with family and friends are inexpensive, regular and flexible (Kingsley & Malecki, 2004). Hence, SMEs may function in a network of informal connections but turn to formal networks when the business complexity increases and owners' objectives are not being satisfied through information from friends. Previous studies suggest that entrepreneurs start by using their informal networks, and when their firms start to grow, they turn to formal networks (see Birley, 1985). Firms form relationships to control for uncertain situations in the environment surrounding them, to reduce the cost associated with searching for potential connections, and to obtain the resources and knowledge (Gulati & Gargiulo, 1999) required for success and growth. Networks, which are beneficial during the start-up stage, may become limited in providing access to knowledge; this might affect the firm in a negative way (Lechner & Dowling, 2003).

Therefore, owner-managers may change their network relationship types, which are based on unreflective decisions, to relationships based more on rational and logical behaviour

in order to gain economic returns (Huggins, 2010). Hence, owner-managers may seek to form ties with other individuals or firms such as 'trade associations and research and development ventures' (Gulati & Gargiulo, 1999, p. 1445) that have the capabilities and resources that can help them to adapt to the external constraints. These ties and relationships are characterised by a high level of trust and information exchange (Powell, 1990; Gulati & Gargiulo, 1999). In time, these 'embedded' relationships (Granovetter, 1983) form a type of formal network that becomes a source for exchanging knowledge and resources.

Coviello and Munro (1997) find that both formal and informal interpersonal network relationships affect the internationalisation process in different aspects. However, their research does not differentiate between local and foreign networks. Hence, it is not clear which type of network is the driver for foreign market entry. Duchesneau and Gartner (1990), on the other hand, indicate that firms seeking professional advice are more likely to be successful than other firms. Moreover, Potts' (1997) results suggest that firms that use information provided by their external accountants are more successful in reaching their objectives. Watson's (2007) research finds that both formal networks, such as accountants and banks, and informal networks, such as family and friends, are related to a firm's survival. However, only formal networks are related to the firm's growth. Ojala's (2009) study shows that formal networks, such as suppliers operating in foreign markets, are the reason for firms entering foreign markets. However, firms with no direct relationships in the foreign markets use mediated networks, such as family and friends, to expand their businesses abroad.

Boter and Lundström's (2005) findings show that 50 per cent of the SMEs in their sample are in frequent contact with their banks, auditors and legal advisors. Moreover, they find that about one company in ten is in contact with the 'Swedish Trade Council' regarding exporting matters and 27 per cent receive benefits and achieve their objectives. Their results also show that the size of the company is related to seeking external advice/information. However, they argue that these results do not apply to the smallest micro firms. Larger SMEs, such as small and medium-sized firms, are likely to be more complex than micro firms and require different support and advice (Gino, Brooks & Schweitzer, 2012; Mole et al., 2016) specifically related to internationalisation.

The Small Business Survey, conducted by the Department for Business, Innovation and Skills (2012–2013), shows that 45 per cent of all SMEs employers sought external advice or information on matters related to their businesses. Their results indicate that medium-sized firms, 68 per cent, and small firms, 59 per cent, are more likely to use formal networking than micro firms. According to the survey's results, the most widely used sources of advice or

networking were accountants, banks, lawyers and trade associations. It has been suggested that in order to adapt to the increasing and fast-changing global business environment, owner-managers are required to seek advice and information from experts and specialists to make changes and take advantage of new opportunities (Fincham, 1999). Based on previous evidence and empirical results, we argue that formal interpersonal networks are more important in the internationalisation process of SMEs than informal networks. We also argue that formal networks are positively and significantly related to exporting in larger-sized SMEs rather than in smaller-sized ones. Hence, we hypothesise that:

H3: *Using formal (informal) interpersonal networks increases the likelihood of larger (smaller)-sized SMEs' internationalisation.*

3.3. Data

This paper uses data from the first wave of the UKLSBS (2015). This is the last in a series of annual and biennial small business surveys (SBS) dating back to 2003. The first wave of UKLSBS was commissioned by the Department of Business Innovation and Skills supported by a number of other department agencies. The survey is a large-scale telephone survey of 15,502 owners and managers of firms (those with up to 249 employees) in the UK, which allows us to provide new and more refined findings (BIS, 2016). The survey is based on a stratified sample within four nations: England, Wales, Scotland and Northern Ireland. Briefly, targets were set according to firm size, and within these groups, according to the sector (SIC, 2007). Moreover, for registered businesses with employees, between zero and four, an additional strata was set based on the legal status of the company. For registered firms, the Inter-Departmental Business Register (IDBR) source was employed. Finally, the Dun and Bradstreet database was used for unregistered companies with zero employees. Detailed information about the survey method and instruments can be found in the SBS report (BIS, 2016).

Overall, the UKLSBS (2015) is a typical wide-range survey that provides a large quantity of information related to firms' characteristics, such as region, industry, the legal status of the firm, sector, the age of the firm and the perceived barriers to fulfilling business objectives. With regard to the key variables - exporting and networking - for this study, the data provide information on whether a firm exports goods and/or services outside the UK and whether owner-managers seek external advice/information on matters affecting their

businesses. Therefore, the survey provides a relatively large sample size and rich information about internationalisation and networking activities and involvement.

3.3.1. Measuring internationalisation through export propensity

There are many different ways to operationalise internationalisation in the literature; some authors, for example, proxy this through foreign sales (e.g. Fernhaber & Li 2012; Fernández-Olmos, Gargallo-Castel & Giner-Bagües, 2016) or established foreign operations (e.g. Musteen, Francis & Datta, 2010). In this paper, however, we follow the majority of the literature on firm internationalisation and use export propensity as a proxy of internationalisation (e.g. Chetty & Blankenburg-Holm, 2000; Cassiman & Golovko, 2011; Eberhard & Craig, 2013; Graves & Shane, 2014). We follow Serra, Pointon and Abdou (2012, p. 216) who define export propensity 'as whether a firm exports to foreign markets', and we follow previous studies in measuring internationalisation by export propensity (Westhead et al., 2004; Cassiman & Golovko, 2011; Boehe, 2013). The data provide information on whether a firm exports goods and/or services outside the UK. Specifically, the survey asks: *'In the past 12 months, did your business export any goods and/or services outside the UK?'* The outcome variable is a binary variable taking the value of one if the firm sells outside the UK (i.e. export) and zero if not. Table 3.1 presents exporting activity by different firm size: micro firms (0–9 employees), small firms (10–49 employees) and medium-sized firms (50–249 employees).[18] We find that about 22 per cent of UK SMEs are engaged in exporting their products and/or services. This figure is close to the one reported by Higón and Driffield (2010) who, using the small business survey (SBS) conducted in 2004, find that 23 per cent of SMEs in the UK are exporters. Comparing our results with more recent evidence, however, we find that our estimate is higher than the one reported in the 2014 SBS for SMEs, in which it is found that 19 per cent of all SME employers export goods, services or licensed products outside the UK.

Table 3.1 Exporting activity by firm size

Firm Size	%	Obs.
Micro	16.42	8386
Small	25.92	4011
Medium	30.69	2890
SMEs	21.61	15287

[18] Due to missing values, the total number of observations included in the present study is reduced. Also, observations that reported 'don't know' for exporting and networking constructs were dropped, thereby leaving the sample size at 15,287.

3.3.2. Measuring external advice

The survey also asks owner-managers whether they sought external advice/information. The fundamental question in the survey is: *'In the last 12 months, have you sought external advice or information on matters affecting your business?'* The explanatory variable is also a binary variable taking the value of one if the owner-manager sought external advice/information, and zero if not. Table 3.2 presents seeking advice/information activity for each SME size band. Overall, we find that 36 per cent of all SMEs (including firms with zero employees) sought external advice/information on matters affecting their businesses. In particular, we find that 53 per cent of medium-sized firms sought external advice/information, followed by 41 per cent for small firms. The results imply that larger-sized SMEs are more likely to seek external advice/information than smaller-sized SMEs.

Table 3.2 Seeking external advice by firm size

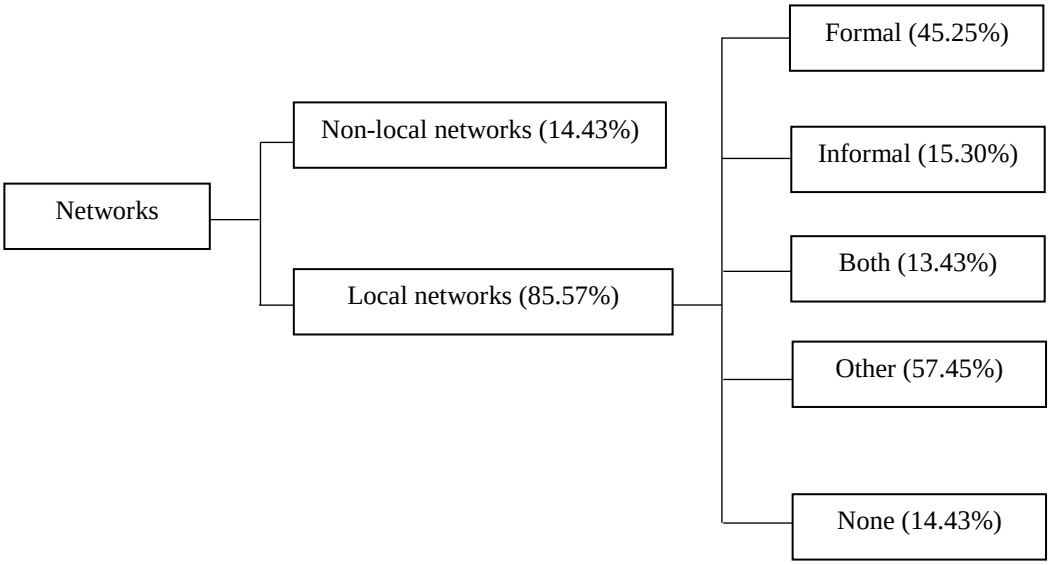
Firm size	%	Obs.
Micro	27.70	8386
Small	41.34	4011
Medium	53.36	2890
All Firms	36.13	15287

3.3.3. Measuring interpersonal networks

Our construct of local interpersonal networks is measured as an index variable. The survey provides information regarding the source of advice/information. Owner-managers can choose at least one individual/organisation they have approached to gain external advice/information. We create our local interpersonal networks measurement as a binary variable taking the value of one if the owner-manager approached any individual/firm, and zero if they have not approached anyone. Finally, following Birley (1985) and Das and Teng (1997), we classify networks, according to their formality, into formal networks (i.e. accountants, banks, Chambers of Commerce, trade associations and solicitors) and informal networks (i.e. family, friends, business networks and work colleagues). Hence, a related measure is created to capture whether owner-managers approached both formal and informal networks, one of them or neither of them. In addition, the measure captures whether owner-managers approached other types of networks (such as consultants, financial advisors and local enterprise partnerships).[19] Figure 3.1 describes the undertaken network activity that is observed in the survey.

[19] The question on the types of local interpersonal networks allows for multiple responses per respondent. Hence, percentages do not add up to 100 due to multiple response.

Figure 3.1 Network activity.



3.3.4. Control variables

In our model, we consider several control variables that influence SMEs' internationalisation, as previous empirical research shows. Specifically, we control for the 'size of the firm' measured by the natural logarithm of the number of employees. Previous research finds a positive but non-linear relationship between export and firm size (Roper & Love, 2002). We also control for the 'age of the firm' measured by the number of years the business has been trading. Previous evidence provided conflicting results with respect to the effect of firms' age on exporting. From the theory point of view, it is expected that there exists a positive relationship between exporting and firms' age given that learning by doing may be the result of accumulated years of experience (Baldwin & Rafiquzzaman, 1998). However, the opposite is also expected for younger firms that might be more active and aggressive. Some studies report that the age of the firm influences exporting in a positive way (e.g. Welch & Weidersheim-Paul, 1980), while other studies report a negative influence (e.g. Das, 1994).

The study also controls for the 'legal status of the firm'. Empirical studies suggest that the legal status of the firm affects business decisions (Higón & Driffield, 2010), especially in an international setting where exporting may be considered a risky decision. In addition, we control for the 'number of sites'. Roper and Love (2002) suggest, for example, that in the UK,

firms that belong to a business group are more likely to export since multiple numbers of sites allow the firm to overcome its resource constraints as required for exporting.

Finally, we control for the surrounding business environment, which is captured by the 'competition in the home market'. According to Miesenbock (1988), export behaviour may be affected by the domestic market conditions. Rammer and Schmiele (2009) find that competition in the home market is an obstacle to firms internationalising. Our models also include sectoral and regional dummies.[20] Table 3.3 presents the variable definitions used in this study (for descriptive statistics, see Table 3.7 in the Appendix). Finally, in Table 3.4, we present the correlation between the key explanatory variables and dependent variable (export).

Table 3.3 Variable definitions used in the models

Variable	Definition
Export	Whether the firm sells goods and/or services outside the UK (coded 1) or not (coded 0).
External advice/information	Whether the owner-manager has sought external advice/information (coded 1) or not (coded 0).
Local interpersonal networks	Dummy variable = 1 if the owner-manager approached at least one source of advice from the list available in the survey.
Formal networks	Dummy variable = 1 if the owner-manager sought external advice from accountants, banks, Chambers of Commerce, trade associations or solicitors.
Informal networks	Dummy variable = 1 if the owner-manager sought external advice from family/friends, business networks or work colleagues.
Both networks	Dummy variable = 1 if the owner-manager sought both formal and informal networks.
Other networks	Dummy Variable = 1 if the owner-manager sought other types of networks (e.g. consultants, financial advisors and local enterprise partnerships).
No networks	Dummy variable = 1 if the owner-manager did not seek any advice/information.
Network location	Dummy variable = 1 if the owner-manager sought advice from a local network (i.e. accountants, banks, friends, family etc.). Dummy variable = 1 if the owner-manager sought advice from a non-local network (i.e. not from the list available in the survey).
Network source	Dummy variable = 1 if the owner-manager sought non-local networks. Dummy variable = 1 if the owner-manager sought local formal networks. Dummy variable = 1 if the owner-manager sought local informal networks. Dummy variable = 1 if the owner-manager sought both types (i.e. formal and informal) of local networks. Dummy variable = 1 if the owner-manager sought other types of local networks. Dummy variable = 1 if the owner-manager sought formal and other types of networks from a local source. Dummy variable = 1 if the owner-manager sought informal and other types of local networks. Dummy variable = 1 if the owner-manager sought both types (i.e. formal and informal) of advice and other types of local networks.
Size of the firm	Ln (1 + number of employees).
Age of the firm	Broken down into age bands (0–5years = 1, 6–10 years = 2, 11–20 years = 3, > 20 years = 4). Dummy variables are created for each category.

[20] The survey does not provide any financial information about firm performance. However, it does provide self-reported information about the last year's turnover performance of a firm. We have included this variable in the model, and although in some cases the number of observations drops significantly, this does not alter the main conclusions of the paper (results are available upon request).

Legal status	Legal status of the business (sole proprietorship = 1, company = 2, partnership = 3). Dummy variables are created for each category.
Sites	Number of sites the business has (1 site = 1, 2 sites = 2, 3 sites = 3, 4–10 sites = 4, 11+ sites = 5). Dummy variables are created for each category.
Competition	Dummy variable = 1 if the major obstacle for the business is competition in the local market.
Regions	Location of the business (England = 1, Scotland = 2, Wales = 3, Northern Ireland = 4). Dummy variables are created for each category.
Sectors	SIG 2007 (1-digit) classification. Dummy variables are created for each category.

Table 3.4 Correlation between key explanatory variables and dependent variable (export) by firm size.

Variable	All Firms (*n*=15287)	Micro (*n*=8386)	Small (*n*=4011)	Medium (*n*=2890)
Advice/information	0.121*	0.104*	0.111*	0.052*
Local interpersonal networks^	0.027*	0.033	0.022	0.007
Formal networks^	0.028*	0.018	0.028	0.047
Informal networks^	-0.004	-0.009	-0.009	0.026
Both networks^	-0.005	-0.016	-0.009	0.026
Other networks^	0.018	0.012	-0.004	0.016
Local networks	0.116*	0.105*	0.104*	0.049*
Non-local networks	0.020*	0.017	0.020	0.006
Formal local networks	0.053*	0.056*	0.060*	0.012
Informal local networks	0.007	0.010	0.003	0.000
Both local networks	0.016*	0.017	0.016	-0.001
Other local networks	0.059*	0.055*	0.052*	-0.002
Formal & other local networks	0.054*	0.037*	0.037*	0.049*
Informal & other local networks	0.014	0.022	0.012	0.011
Both & other local networks	0.032*	0.017	0.021	0.046*

^n_{SMEs} = 5523; n_{micro} = 2323; n_{small} =1658; n_{medium} = 1542
* $p < 0.05$

3.4. Empirical findings

Since the variable we want to explain takes only two possible values (1 if the firm exports and 0 otherwise) we use probit regression in order to examine the potential relationships between exporting, external advice/information and local networks. In other words, probit is a binary choice model since it explains (0/1) dependent variable, and is an appropriate econometric technique that deals with problems associated with the linear probability model (for discussion see Gujarati 1995, pp. 552–570).[21]

[21] To check whether the results are robust to a different modelling approach, we also use a logit model, which is another model commonly used whenever the dependent variable is binary. Specifically, logit uses the cumulative standard logistic distribution whereas probit uses the cumulative standard distribution. However, the results from the logit model are similar to those reported from the probit model, and thus are not reported here.

Firstly, a latent variable that represents the propensity of a firm to export goods and services is defined (E_j^*). We cannot observe (E_j^*), but we can observe whether a firm *j* exports through the following measurement equation:

$$E_j = \begin{cases} 0 & \text{if} \quad E_j^* \leq 0 \\ 1 & \text{if} \quad E_j^* > 0 \end{cases} \tag{1}$$

$$E_j^* = X_j b_j + A_j \vartheta + N_j \delta + e_j \ , \ e \sim N(0, \sigma^2) \tag{2}$$

where *A* and *N* are the indicator variables for whether the firm has sought external advice/information and a network, respectively. *X* is the vector of firm characteristics for firm j. b, ϑ and δ are the parameters to be estimated. The model is estimated by maximum likelihood techniques (Stock & Watson, 2012).

3.4.1. Full sample analysis

Table 3.5 presents the marginal effects of the probit estimations. We find that seeking external advice/information increases the likelihood of SMEs exporting outside their home country (this is found to increase the probability by 6.7 percentage points).[22] The results also show that local interpersonal networks are positively associated with firms' exporting activities (with the marginal effect being 0.034). Hence, the overall sample results provide strong support for both *H1* and *H2*.

When the model includes detailed information about the types of local interpersonal network formality, the results show that formal networks are positively and directly related to SMEs' exporting. This implies that seeking advice/information from formal sources, such as accountants and banks, increases the likelihood of firms exporting by nearly 3 percentage points. Moreover, we find that other types of networks, such as financial advisers, are positively associated with internationalisation.[23]

[22] We also estimate the average treatment effect on the treated using the nearest neighbour estimator. The results suggest that for firms that have received external advice/information, the external advice/information has caused the probability of exporting to be 6.7 percentage points higher than it would have been otherwise.

[23] We test to see whether formal networks and other types of networks are statistically different from each other. The results report that $x^2(1) = 0.30$ and Prob. = 0.58; hence, formal networks and other types of networks are not significantly different from one another.

The results in Table 3.5 show that local and non-local networks increase the likelihood of firms exporting. In particular, the effect of the former source is found to be nearly twice the magnitude of the latter's effect ($x^2\ (1) = 3.33$ and Prob. = 0.06).

We also test the association between network source and exporting. The results in Table 5 suggest that seeking advice/information from all local networks, with the exception of informal networks, increases the likelihood of firms exporting. We test whether these variables are statistically significantly different from each other. The results imply that non-local networks are statistically different from local formal networks ($x^2(1) = 3.00$, Prob.$= 0.079$).

The results also show that a non-local network is statistically different from local formal & other networks ($x^2(1) = 4.05$, Prob.$= 0.044$) and that a non-local network is statistically different from local informal & other networks ($x^2(1) = 3.14$, Prob.$= 0.076$).

Table 3.5 The association between networks and SME exporting (full sample estimates)

Sample			**All Firms**		
Probit Regression	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Advice/information	0.067***				
	0.006				
Local interpersonal networks		0.034**			
		0.016			
Network Formality					
Formal networks			0.031**		
			0.014		
Informal networks			0.055		
			0.049		
Both networks			-0.060		
			0.043		
Other networks			0.022*		
			0.012		
Network Location (Base category: No network)					
Local networks				0.072***	
				0.007	
Non-local networks				0.046***	
				0.015	
Network Source (Base category: No network)					
Non-local networks					0.046***
					0.015
Formal local networks					0.081***
					0.014
Informal local networks					0.070
					0.059
Both local networks					0.064***
					0.021
Other local networks					0.066***
					0.010
Formal & other local networks					0.092***
					0.017
Informal & other local networks					0.177***
					0.079
Both & other local networks					0.093***
					0.026
Controls	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-6325.998	-2617.347	-2615.875	-6324.321	-6322.142
Chi 2 (degrees of freedom)	3306.64 (32)	1340.52 (32)	1343.46 (35)	3310.00 (33)	3314.36 (39)
Obs.	15287	5523	5523	15287	15287

Notes:
All models control for variables mentioned before (results are available upon request).
For robustness check, we also estimate the model using a logit model, but the results are similar (results are available upon request).
Values in *italics* are standard errors.
***p < 0.01, **p < 0.05, *p < 0.1

3.4.2. Subsample analysis

In Table 3.6, we present the results for different SME groups (i.e. micro, small, and medium). The results show that seeking advice/information increases the likelihood of all sizes of firms exporting. However, the results imply that local interpersonal networks are not significant in micro, small and medium-sized firms. When differentiating between different types of networks, our third hypothesis proposes a positive and significant relationship between formal networks and exporting in larger SMEs. In contrast, it also proposes that informal networks can play an important role for smaller SMEs. The results suggest that formal networks are positive and significant in small and medium-sized firms but not in micro firms. However, we find no association between informal networks and exporting for both smaller and larger SMEs. Overall, these results provide partial empirical support for *H3*. Moreover, the effects of other types of networks are positive and statistically significant in medium-sized firms. We found the magnitude of the effect to be similar to the one reported for formal networks ($x^2(1) = 0.00$, Prob. $= 0.98$). The results also show that local and non-local networks increase the likelihood of micro and small firms exporting. However, only local networks are significant and positive in medium-sized firms. Therefore, for medium-sized firms, seeking local interpersonal networks increases the likelihood of these types of firms exporting and internationalising. We test whether the effects of local and non-local networks are statistically different from one another in micro and small firms. The results show that for micro and small firms, local and non-local networks are not statistically different ($x^2(1) = 1.27$, Prob. $= 0.259$ and $x^2(1) = 2.30$, Prob. $= 0.129$, respectively).

Table 3.6 The association between networks and SME exporting by firm size (subsample estimates)

Sample	Micro					Small					Medium				
Probit Regression	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Advice/information	0.059***					0.089***					0.044***				
	0.008					*0.013*					*0.017*				
Local interpersonal networks		0.027					0.048					0.051			
		0.073					*0.030*					*0.039*			
Network Formality															
Formal networks			0.019					0.054**					0.061**		
			0.050					*0.028*					*0.030*		
Informal networks			0.054					-0.035					0.026		
			0.138					*0.118*					*0.111*		
Both networks			-0.067					0.007					-0.015		
			0.189					*0.132*					*0.113*		
Other networks			0.013					0.015					0.059**		
			0.036					*0.024*					*0.028*		
Network Location															
(Base category: No network)															
Local networks				0.064***					0.098***					0.048***	
				0.009					*0.015*					*0.017*	
Non-local networks				0.043**					0.057**					0.008	
				0.020					*0.030*					*0.038*	
Network Source															
(Base category: No network)															
Non-local networks					0.043**					0.057**					0.008
					0.020					*0.030*					*0.038*
Formal local networks					0.072***					0.134***					0.034
					0.018					*0.032*					*0.030*
Informal local networks					0.082					0.019					-0.003
					0.075					*0.119*					*0.122*
Both local networks					0.055**					0.118***					0.004
					0.027					*0.046*					*0.050*
Other local networks					0.066***					0.087***					0.035
					0.014					*0.020*					*0.233*
Formal & other local networks					0.063***					0.130***					0.095***
					0.025					*0.037*					*0.035*
Informal & other local networks					0.148**					0.189					0.446
					0.084					*0.355*					*0.152*
Both & other local networks					0.059**					0.096**					0.156***
					0.034					*0.049*					*0.066*
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-3215.811	-1092.482	-1092.109	-3215.170	-3214.423	-1771.976	-788.737	-787.898	-1170.815	-1769.441	-1220.795	-664.840	-661.984	-1220.228	-1216.76
Chi 2 (degress of freedom)	1058.30 (32)	300.31 (32)	301.06 (35)	1059.58 (33)	1061.07 (39)	1047.12 (31)	483.55 (29)	485.23 (32)	1049.44 (32)	1052.19 (38)	1122.44 (32)	545.08 (29)	550.79 (32)	1123.57 (33)	1130.51 (39)
Obs.	8386	2323	2323	8386	8386	4011	1644	1644	4011	4011	2890	1446	1446	2890	2890

Notes:
All models control for variables mentioned before (results are available upon request). Values in *italics* are standard errors. For robustness check, we also estimate the model using a logit model, but the results are similar (result are available upon request).
***p < 0.01, **p < 0.05, *p < 0.1

Furthermore, the results in Table 3.6 show that for micro firms, seeking local external advice/information from all local networks, with the exception of informal networks, increases the likelihood of micro firms' internationalisation and exporting their products and services. The results also suggest that seeking external advice/information from non-local networks increases the likelihood of micro firms exporting. We test whether these types of advice sources are statistically different from each other. The results imply that for micro firms these variables are not statistically different from one another ($x^2(6) = 2.74$, Prob. = 0.841). By testing the association between the source of local networks and small firms' exporting, the results suggest that seeking external advice from all local networks, with the exception of informal networks and the combination of informal & other types of networks, is significant and positive in small firms' internationalisation. The results also imply that for small firms, seeking non-local networks increases the likelihood of exporting. We test whether these variables are statistically different. The results show that non-local networks and local formal networks are statistically different from each other. The results also report that $x^2(1) = 3.42$ and Prob.$= 0.064$, hence we accept the null hypothesis and conclude that for small firms, seeking external advice/information from a local formal network is different from seeking external advice/information from a non-local network. For medium-sized firms the results are different from other SME groups. The results show that only a combination of networks (i.e. formal & other, both & other) is significant and positive in medium-sized firms' internationalisation. We test whether these two sources are statistically significantly different from each other. The results show that $x^2(1) = 0.73$ and Prob. = 0.393. Hence, we conclude that these two sources are not statistically significantly different. Moreover, the results show that non-local networks are not significant and are not related to medium-sized firms. This suggests that medium-sized firms rely on local networks for their internationalisation rather than on foreign networks located in the international market.

3.5. Discussion

3.5.1. Seeking advice/information

This paper has empirically examined the relationship between networks and SMEs' internationalisation. First, we examined the direct relationship between networks in the form of seeking external advice/information and SMEs' internationalisation in the form of exporting. The estimation results have shown that seeking external advice/information is positively and significantly related to SMEs' internationalisation in the overall SME sample, as well as in split

samples of firms (i.e. micro, small and medium-sized firms). This is consistent with previous empirical research in IB and small business fields that found that networks are important in the internationalisation process of firms (Zhou et al., 2007; Ge & Wang, 2013; Oparaocha, 2015; Hånell & Ghauri, 2016; Stoian et al., 2016; Rosenbaum, 2017). Hence, by establishing a network position, SMEs gain significant advantages, such as 'learning and developing trust and commitment', necessary for internationalisation (Ghauri et al., 2014, p. 580). This is to be expected since SMEs are encouraged by the government to seek external advice/information and support from outside sources (Mole et al., 2016). External advice and information from outsiders increases firms' strategic knowledge and competitive advantage (Bennett & Robson, 2003).

When the overall SME sample is split between micro, small and medium-sized firms, the analysis reveals that networks are positively and directly related to firms' internationalisation in all SME groups. Although previous empirical studies did not differentiate between SME groups, we argue alongside Mole et al. (2016) that external advice/information, particularly in the smallest and youngest firms, is significant because firms can overcome information and knowledge gaps. Our results are consistent with the RBV theory of the firm, which implies that external advice is sought by firms in the search for new markets through exporting and innovation (Bennett & Robson, 2003). Johnson et al. (2007, p. 1995) argue that firms that have plans to grow, in terms of 'expansion into new geographical markets, are significantly more likely' to use networks. Since SMEs face different types of internal and external export barriers (Leonidou, 2004), it is more beneficial for owner-managers to engage in networks and seek external advice/information on matters related to their businesses in order for them to grow and internationalise.

3.5.2. Local interpersonal networks

We also examined whether local interpersonal network relationships are associated with SMEs' exporting. The results show that there is a positive and direct association between owner-managers' local interpersonal networks and exporting. Our results are consistent with previous empirical research indicating that local interpersonal networks have a positive effect on firms' internationalisation (Manolova et al., 2010; Eberhard & Craig, 2013; Zhang et al., 2016). Specifically, building on the social network theory of internationalisation, we provide new evidence regarding the role of local interpersonal networks and SMEs internationalisation. Contrary to previous studies (e.g. Ellis & Pecotich, 2001; Ojala, 2009; Francioni, Vissak & Musso, 2017), which found that foreign networks are significant, our results suggest that local

networks are more effective for SMEs' internationalisation. Perhaps this is partly because small firms value the frequent face-to-face interaction more, hence their network connections are home-based (Kingsley & Malecki, 2004). Local relationships developed in the home market can help owner-managers to understand the international market through other firms' international experiences (Zhang et al., 2016). Since owner-managers place great importance on meeting and communicating with other individuals, which will result in 'business know-who' and 'business know-how' (Peterson & Rondstadt, 1986), our results show that participation in local networks will affect SMEs' internationalisation in a positive way (Masciarelli et al., 2009). In addition, we argue that local interpersonal network relationships are based on trust, referrals, mutual experience (McGrath, Vance & Gray, 2003) and credibility.

Trust and referrals can act as facilitators for firms to increase their capabilities and respond to market demands (Oviatt & McDougall, 2005). By developing relationships in the home market, and working with other individuals in the same network, credibility and trust will be developed in a gradual way (Larson, 1992; Zhang et al., 2016). Therefore, it seems rational for entrepreneurs and small firms that are active internationally, or looking to expand their businesses abroad, to rely more on the 'readily available' local networks to gain information and benefits (Zhou et al., 2007). Credibility and trust can be developed through network relationships between members (Turnbull, Ford & Cunningham, 1996), especially in the home market. One may suggest, however, that local networks may not always offer firms great advantages related to their strategy and growth because local networks are embedded in local settings and may lack the appropriate international connections. However, we argue that knowledge exchange and information can be obtained from local sources such as trade associations and professional bodies, which will provide significant assistance for firms to internationalise (Yiu et al., 2007). At the local level, firms may obtain referrals through their memberships in local networks such as industry associations (Boehe, 2013). Hence, export opportunities, via interpersonal connections based in the home market, will develop. This will result in reducing export barriers through local reachability since local reachability increases international reachability (Leonidou, 2004).

When examining the effect of local interpersonal networks, and the effect of non-local interpersonal networks, on SMEs' exporting, the results imply that, compared to no networks at all, local and non-local interpersonal networks are positively and directly related to SMEs' internationalisation. Our results are in line with those of Anderson, Evers and Griot (2013), indicating that both local and non-local networks influence firms' internationalisation, but in different ways. We argue that local networks, especially those formed with banks and

consultants, have a greater effect on firms' internationalisation, which confirms our previous results. When the overall SME sample is split between micro, small and medium, the results imply that local and non-local networks are significant in micro and small firms' internationalisation only. However, for medium firms, local networks are important for their internationalisation. This is to be expected since owner-managers of smaller SMEs have specific requirements and they need a greater level of external advice and support (Robson & Bennett, 2000); therefore, they seek local and non-local advice.

3.5.3. Network formality

Third, we examined the effect of different types of network formality on SMEs' internationalisation. By following Birley (1985) and Das and Teng (1997), we classified networks into formal networks (i.e. accountants, banks, Chambers of Commerce, trade associations and solicitors) and informal networks (i.e. family, friends, business networks and work colleagues). Contrary to some previous studies (Coviello & Munro, 1995; Coviello, 2006; Westphal, Boivie & Chng, 2006; Ojala, 2009), we found that only formal networks are positive and significant in SMEs' exporting. Our results are consistent with Watson's (2007) study, which is based on a large longitudinal database and shows that there is a significant positive relationship between formal networks, such as accountants, and firms' growth and survival.

Firms' growth is associated with the owner's formal, rather than informal, networks. The distribution of information is more likely to come from weak ties rather than strong ones such as those with family and friends (Granovetter, 1983).[24] Formal connections provide less redundant information that has a greater market value for firms, especially those seeking to internationalise (Rosenbaum, 2017). Therefore, owner-managers use formal networks in order to obtain resources and advice and achieve their objectives, which would 'not be possible due to cost constraints and economies of scales if the enterprise operated in isolation' (Dean, Holmes & Smith, 1997, p. 78). Although most small firms use several different sources of advice networks, specialist professionals are the most valuable and important source of advice for small firms (Bennett & Robson, 1999). Hence, we argue, alongside Tang (2011) that not all types of networks necessarily enable internationalisation.

When the overall SME sample is split between micro, small and medium-sized firms, our results imply that formal networks are significant and positively related to firms' internationalisation in small and medium-sized firms only. Although previous research did not

[24] In this respect, our results show that formal types of networks are more significant in providing information than informal ones, supporting Granovetter's (1983) strength of weak ties theory.

empirically differentiate between SME groups to indicate which types of network formality are closely associated with internationalisation, our results are in line with those of Mole et al. (2016, p. 2), thereby implying that the tendency to use formal advice networks is at a 'threshold of around ten employees'. According to Boter and Lundström (2005), the argument that SMEs have limited and weak resources and are in need of external advice and networks does not apply to the smallest micro firms. Businesses with more than ten employees (i.e. small and medium firms) become more complex when they increase in size. However, they are still small enough to employ more staff in order to fill in the required skills and knowledge internally. According to Saridakis, Mole and Hay (2012), the size and age of the firm are positive and directly related to firms' growth. Firms' growth and complexity tend to increase more rapidly with size for older firms and with age for larger firms. Based on this argument, small and medium-sized firms are required to form relationships with different kinds of expertise in order to fulfil their objectives, grow and internationalise their business.

Our results imply that SMEs are more likely to be dependent on networks consisting of entrepreneurs' social networks. However, when the size of the firm starts to grow, owners-managers will change their networking behaviour and move to more calculative networks based on logical behaviour in order to obtain economic returns that will benefit their firms (Huggins, 2010) and their internationalisation.

Our results show that micro firms tend not to participate in any types of networks, which can be explained by the following reasons. First, owner-managers of micro firms suffer from imperfect information because of their size and limited resources, which affect their awareness of the available external networks (Bennett, 2008). Even when entrepreneurs are aware of these types of networks and their advantages, they might be reluctant to use them because of their reliability and value (Spence, 1973). Second, the costs associated with these types of networks might be another reason for owner-managers being reluctant to use them. It is also generally agreed that being a small firm means that it is more complex and difficult to gain the recognition and trust of a prospective network (Zahra, 2005).

Similarly, it has been pointed out that many small firms are independent and tend to operate in isolation (Curran, Jarvis, Blackburn & Black, 1993). Owner-managers of these types of firms view themselves as independent and do not trust the 'outside' (De Vries, 2000); hence, they are more likely not to seek external advice on matters related to their businesses. Finally, the legal status of firms affects their strategic decisions, such as those related to exporting and internationalisation, since these decisions are viewed as risky ones (Higón & Driffield, 2010). According to Saridakis et al. (2012), being a limited company has a significant effect on a

firm's performance. Therefore, being a limited company, sole trader or partnership will also affect how firms participate in networks for internationalisation purposes. Hence, these factors can discourage micro firms from networking and seeking advice/information on matters related to their businesses.

3.5.4. Network source

Finally, we tested for the effect of the source of the advice obtained locally. The results imply that seeking local advice from all types of networks, except for informal networks, is significant and has a positive and direct effect on all firms' internationalisation. This supports our previous results indicating that formal and other types of networks are significant for SMEs' internationalisation. Moreover, this confirms our previous results indicating that participating in networks will affect firms' internationalisation in a positive way because firms can overcome their limited resources and gain more knowledge and information through networks (Mole et al., 2016). Although our results imply that local informal networks are not significant and are not related to firms' internationalisation, our findings show that when informal and other types of networks are sought together, the likelihood of firms internationalising will increase. This is to be expected since informal networks are generally expected to be less informed about the available opportunities in the marketplace (Birley, 1985) and they generally provide redundant information (Rosenbaum, 2017). Hence, owner-managers tend to seek other types of networks, such as consultants and local enterprise partnerships, alongside informal networks.

When the overall SME sample is split between micro, small and medium-sized firms, the results imply that for micro firms, all types of advice networks, with the exception of informal networks, are significant and have a positive effect on internationalisation. However, the results show that when informal networks are used with other types of networks simultaneously, micro firms are more likely to export. For small firms, the results show that all types of networks, with the exception of informal networks and the combination of informal and other networks, are insignificant and have no relationship with small firms' internationalisation. On the other hand, for medium-sized firms, our results show that when one type of network is sought, the effect of networks on internationalisation is insignificant. However, when medium-sized firms seek all types of networks, the results are positive and affect internationalisation directly and in a positive way. Hence, medium-sized firms tend to seek all types of advice networks, such as accountants, consultants and colleagues, simultaneously. This is to be expected since medium-sized firms are more complex than small and micro firms, and they operate in a more competitive environment than the former.

Therefore, seeking advice from consultants, for instance, who provide firms with knowledge in more efficient ways because they are more informed about the surrounding industries and markets (Anand, Glick & Manz, 2002), along with consulting with work colleagues, who might have international experience, is more beneficial for medium-sized firms' internationalisation. The results imply that larger SMEs' networking behaviour for internationalisation purposes is different from that of smaller SMEs.

Moreover, the results show that firms' networking behaviour for internationalisation purposes changes with the size of the firm. Our results show that when the size of the firm increased from micro to small, the effect of the network increased. This is to be expected since previous studies have shown that firms with an objective to grow are more likely to seek formal advice/information for networking than firms with no plans to grow (Johnson et al., 2007; Mole et al., 2016). Our results also show that when the size of the firm increased from small to medium, the effect of most of the network sources diminished and disappeared. Our results are in line with Watson's (2007) argument implying that the relationship between networking and SMEs' growth is a non-linear one. The results imply that the relationship between networking and the size of the firm is an inverted relationship. Although it is beneficial to expect that a reasonable level of networking will affect firms in a positive way, it is also reasonable to expect that an extreme level of networking might produce inverse effects for firms. Therefore, our results suggest that micro and small firms tend to participate in one advice network for the purpose of internationalisation. However, medium-sized firms tend to participate in more than one network for their internationalisation purposes.

To sum up, our paper makes three important contributions to IE, IB and small business literature by focusing on SME internationalisation from IE, interpersonal networks from IB and exporting from small business perspectives. First, we contribute to the field by providing empirical evidence regarding the role of formal interpersonal networks – obtained from the local market where the firm operates – in the internationalisation process of SMEs. Second, given the large data set, we examine the link between networking behaviour and exporting within different-sized SMEs. This allows us to observe differences between larger-sized SMEs and smaller ones, which can be hidden when data is aggregated. Our results, for example, show that micro firms are reluctant to use networks in the form of seeking advice/information from outside sources such as accountants and trade associations. Finally, we directly respond to the call for more focused research on the link between interpersonal networks and the internationalisation process, especially for SMEs. By doing so, we add to the literature

regarding the role that owner-managers can play in forming networks through seeking advice/information and show how this in turn affects internationalisation.

3.6. Implications and limitations

Our findings have important implications for practice and research. For practice, and in contrast to previous studies, which have emphasised the role of foreign networks in the internationalisation process of small and medium-sized firms (e.g. Ojala, 2009; Francioni et al., 2017), we suggest that SMEs should focus on home market relationships and networks (Zhang et al., 2012; Eberhard & Craig, 2013). In addition, we suggest that focusing on gaining advice/information from professionals and experts in the home market will benefit SMEs a great deal (Mole et al., 2016), and will provide knowledge and information, especially on matters related to their internationalisation. Moreover, in contrast to previous studies that found that formal and informal networks are important in the internationalisation process of SMEs (e.g. Coviello, 2006; Ojala, 2009), we suggest that the focus should be on the formal types of networks such as accountants, banks, Chambers of Commerce and solicitors. Information and advice obtained from these types of networks will enable owner-managers to gain advantages in the form of economic returns. Our results suggest that when the size of firms increases from micro to small or medium, they tend to change their networking behaviour from social behaviour to a more calculative behaviour based on a logical rationale in order to obtain economic returns (Huggins, 2010). Our findings regarding the use of formal networks by only small and medium-sized firms reveal concerns for policymakers. Although the government in the UK is encouraging SMEs to seek advice/information and to participate in networks, micro firms and firms with no employees are still reluctant to use these services. This is partly because of the cost associated with participating in such networks, and partly because of trust and entrepreneurs' independence. Hence, the government should encourage greater use of these networks by making these SMEs aware of their availability. Our findings also suggest that the nature of medium-sized firms is different from that of micro and small firms since medium-sized firms operate in a more competitive environment; hence, medium-sized firms should focus their networking on the home market and seek out all types of networks in order to gain advantages and internationalise.

There are, of course, limitations to the analysis in this study that may merit further examination. Using a cross-sectional data set, our results suggest an association between formal interpersonal networks and SMEs' internationalisation. However, using panel data and longitudinal research to examine the effects of time on forming network relationships for

internationalisation purposes is strongly recommended. In addition, and due to the available data from the UKLSBS (2015), our measurement of internationalisation, measured by export activities, did not capture the full complexity of the concept, such as internationalisation destination, internationalisation speed, internationalisation exposure or the number of foreign markets entered. We leave these, however, to future research. Furthermore, future work should explore the potential role of firm performance in altering the relationship between networks and exporting. However, this may be better explored within a panel framework in which firm performance can be observed over time and linked to the subsequent internationalisation activities and decisions of the firm. Additionally, prolonged adverse macroeconomic conditions can also alter internationalisation decisions. Future studies should consider these factors. An additional avenue for future research can also be the distinction between family and non-family firms with a view to understanding how their networking behaviour for internationalisation purposes differs from each other.

To conclude, and reflecting on many of the previous studies of SMEs, our findings lend some prima facie support to the argument that there is a threshold of around ten employees with respect to the propensity for using formal interpersonal networks for internationalisation purposes. We argue that at around this size, firms start to become more complex and require different types of networks to gain knowledge, information and the support needed for internationalisation. This implies that firms below this threshold are not encouraged to seek advice/information or to network, and this should be a concern for policymakers. Finally, our results highlight the importance of formal networks, which in turn has important managerial implications for owner-managers seeking to expand their businesses across borders.

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Appendix

Table 3.7 Description of the main covariates by firm size (sample in %)

Variable	All Firms (*n*=15287)	Micro (*n*=8386)	Small (*n*=4011)	Medium (*n*=2890)
Export	21.613	16.42	25.928	30.692
External advice/information	36.128	27.7	41.336	53.356
Network Formality				
Local interpersonal networks^	85.569	83.857	84.559	89.234
Formal networks^	45.247	46.19	43.365	45.849
Informal networks^	15.299	17.003	15.138	12.905
Both networks^	13.434	14.377	14.173	11.219
Other networks^	57.45	52.044	59.288	63.618
Network Location (base cat. No networks)				
Local networks	30.915	23.229	34.953	47.612
Non-local networks	5.213	4.471	6.382	5.743
Network Source (base cat. No networks)				
Non-local networks	5.213	4.471	6.382	5.743
Formal local networks	6.96	5.998	6.831	9.93
Informal local networks	0.399	0.369	0.349	0.553
Both local networks	2.799	2.444	3.266	3.183
Other local networks	13.894	9.706	16.629	22.249
Formal & other local networks	4.533	2.814	5.235	8.546
Informal & other local networks	0.274	0.357	0.05	0.346
Both & other local networks	2.054	1.538	2.592	2.802

^n_{SMEs} = 5523; n_{micro} = 2323; n_{small} =1658; n_{medium} = 1542

Chapter 4: The relationship between training and performance in internationalised and non-internationalised SMEs: Is it different?[25]

Abstract

Using data from the Longitudinal Small Business Survey (2015) in the UK, the authors empirically examine the effect of training on actual and intended performance of small firms. Importantly, we distinguish between formal and informal training received by both employees and owner-managers. We also examine whether this relationship differs between internationalised and non-internationalised SMEs. Our results show that employee's training (i.e., formal and/or informal) significantly affects actual and intended performance in non-internationalised firms. However, for internationalised firms, we find that a positive association only exists between the combined measure of owner-managers' training (i.e., formal and informal) and intended performance. We argue that the heterogeneity and the complexity of the international markets requires owner-managers of SMEs to receive both types of training that allows them to respond to international challenges and uncertainty. Our results contribute to both small business and internationalisation literatures, and they have various managerial and policy implications.

Keywords: SMEs, formal training, informal training, actual performance, intended performance, internationalised SMEs, non-internationalised SMEs.

[25] This paper is currently under review in ABS 3* journal.

4.1. Introduction

Training plays a critical role in enhancing firm's human capital capabilities and organisational knowledge, two main sources of the firm's competitive advantage (e.g., Huber, 1991; Kim, 1993; Bartel, 1994; Wright, McMahan & McWilliams, 1994; MacDuffie & Kochan, 1995; Alavi & Leidner, 2001; Lang, 2001; Aragon & Valle, 2013). Training activity is also one of the most emphasised aspects of high commitment HRM (Wright & Gardener, 2003), and for Keep (1989) training is the litmus test against which other aspects of management practice should be assessed. In particular, the Resource Based View (RBV) theory of the firm suggests that the firm is a collection of resources and capabilities that, if combined, can develop and sustain competitive advantage culminating in enhanced firm performance (Kinsella et al., 1993; Wright, Dunford & Snell, 2001; Way, 2002; Hayton, 2003; Progoulaki & Theotokas, 2010; Aragon & Valle, 2013; Chinomona, 2013; Delery & Roumpi, 2017; Boon et al., 2018; Wiklund & Nason, 2018). Also, the Knowledge-Based View (KBV) theory of the firm proposes that the exploitation and the creation of new knowledge are key sources for a firm's competitive advantage (Grant, 1996).

To this end, 'training can and should, be a powerful agent of change, facilitating and enabling a company to grow, expand and develop its capabilities thus enhancing profitability' (Jennings & Banfield, 1993: 3). In other words, training may cause modifications in behaviour through increasing job knowledge, innovative practices and specific skills, and use of new and superior technologies, which, in turn, can enhance productivity at the firm level and contribute to economic performance (Armstrong, 1991; Bartel, 1994, 1995; Dostie, 2018). Thus, training is associated with a continuous learning culture that may allow both employees and owner-managers to understand the local and foreign markets, adapt to a fluctuating, changing and challenging environment and to manage international relations and the global workforce more effectively (Martocchio & Baldwin, 1997). Boxall (1996) views this as part of 'organisational process advantage' where organisations synergise the contributions of competent and talented staff. The significance of human resource (HR) can be further linked with Becker's (1964, 1994) theory of human capital, in its acknowledgment of individual's (general and specific) skills, capabilities and knowledge (Jones et al., 2013). It is therefore not surprising that both academics and policy makers are often interested in issues of employee training and its impact in labour markets and economy (for a review see Blundell et al., 1999 and Storey, 2004 among others).

Despite its importance, small and medium-sized enterprises (SMEs) face significant challenges in attracting, training and managing human talent (Atkinson, Mallett & Wapshott,

2014; Kitching, 2015), thereby, limiting their potential for survival and growth (e.g., Storey & Westhead, 1997; de kok, 2002; Patton & Marlow, 2002; Williamson, Cable & Aldrich, 2002; Jones, 2004; Bryan, 2006; Patel & Cardon, 2010). Specifically, existing literature suggests that Human Resource Management - HRM - is characterised as ad hoc, flexible and informal in small firms and HR formality, and hence formal training, increases with firm size (e.g., Black, Noel & Wang, 1999; Patton, Marlow & Hannon, 2000; Matlay, 2002; Corrado, Hulten & Sichel, 2006; Kotey & Folker, 2007; Storey et al., 2010). Evidence from the UK consistently reveals how training tends to be more extensive in larger workplaces, and where an HR specialist is employed (Kersley et al., 2006; van Wanrooy et al, 2013). Additionally, there are differences in market, customers and competition levels that a firm faces as it grows and penetrates distant markets, which can explain why larger firms invest more in training than smaller firms. Perhaps firms which provide more extensive training recognise the need for skilled workers to meet expectations of product or service quality. For example, due to lower productivity and higher death rates, smaller firms may compete by lowering prices rather than competing on quality when compared to large enterprises (Saridakis, Mole & Storey, 2008). Customers, however, who care about product quality, base their decisions not merely on the observed price but on the quality-adjusted price (see Baldwin & Harrigan, 2010) and customer satisfaction, which is a proxy of quality, and this is found to be associated with training (see Rogg et al., 2001). Moreover, increased competition may increase the demand for product quality, and affect the bargaining power of a recognized union at the workplace and, in turn, the features that are conducive to training (Böheim & Booth, 2004).

Although previous work finds that on balance training occurs less in small firms and exhibits low employee participation rate (Brown, Hamilton & Medoff, 1990; Curran et al., 1993; Townroe & Mallalieu, 1993; Kersley et al., 2006; van Wanrooy et al., 2013), according to Bryan (2006) SMEs should provide training for the following two reasons. First, at the macro-level, the increase of human capital can drive regional and national economic growth (see Acemoglu & Pischke, 1998; Barro, 2001). Second, at the micro-level, employees' human capital can contribute to a firms' competitive advantage that is difficult to imitate and, thus, outperform competition (see Koch & McGrath, 1996; Wright & McMahan, 1992; Carmeli & Schaubroeck, 2005). Additionally, job training can help workers and their employers to bond, potentially improving interpersonal relations and team working, thus, reducing employee turnover and redundancy (Becker, 1994; Blundell et al., 1999). Yet while existing research has tended to examine the time and effort organisations dedicate to training, less attention has been paid to understanding the association between training activity and organisational performance.

Although the existing evidence points to some positive association between training and firm performance, the estimates of the impact are, at best, tentative and depends on training provision (Kitching & Blackburn, 2002; Storey, 2002; De Winne & Sels, 2010; Aragon & Valle, 2013; Jones et al., 2013). For example, Jayawarna, Macpherson and Wilson (2007) find that formal training is more strongly related to firm performance when compared to informal training, while Felstead et al. (2009) show that informal training significantly enhances the performance of the firms. In addition, Kotey and Folker (2007) suggest that informal training is linked to the short-term strategic orientation of the firm. Earlier studies (e.g., Cambridge Small Business Research Centre, 1992; Wynarczyk et al., 1993) have also failed to find a significant association between training and SME performance. However existing studies tend to underemphasise the various types and forms of training which take place, yet it is important to understand the nature of the training taking place in greater detail. Hence, this paper contributes to this long-lasting debate by re-examining the association between different types of training (i.e., formal and informal training) and SME performance by using a large-scale dataset from the United Kingdom.

Our study addresses two major gaps in the literature. First, we distinguish between employee training and owner-managers training (see Storey, 1994; Jones et al., 2013), given that it is important to understand to what extent training efforts are spread across the workforce. The latter has received much less empirical support, and, as Storey (2004: 126) concludes '…despite substantial public spending in this area, there is currently no satisfactory assessment of the link between small firm, formal management training and firm performance.' This is also in line with Georgiadis and Pitelis (2016: 410), who suggest that 'the impact of owner-managers training on firms' profitability may be different from that of non-managerial employees'. Second, we distinguish between internationalised and non-internationalised SMEs. We argue that internationalisation requires valuable firm-specific assets to operate in a global market (Onkenlinx, Manolova & Edelman, 2016), thus, different forms of training may enhance the skills of managers and employees and lead to improved firm performance.

The chapter proceeds as follows; we first review the literature and derive the hypotheses. We then present and discuss the data used in this paper. In the following two sections, we present our results and discuss the findings, respectively. The final section concludes the paper and provides directions for further research.

4.2. Background and hypothesis derivation

The contribution of HRM practices to firm performance has attracted extensive research attention in recent decades, and a positive link between the two has been identified in many studies (see Guest, 2011). A central proposition of such studies is that to achieve high levels of performance small and large firms should train their workers and managers (e.g., Golhar & Deshpande, 1997; Hayton, 2003; Stavrou & Brewster, 2005; Wright et al., 2005; Zheng, Morrison & O'Neill, 2006; Aragon & Valle, 2013; Rosli & Mahmood, 2013). Theoretically, the RBV proposes that a firm's sustainable competitive advantage depends on its ability and capability to acquire and develop valuable, scarce and distinct resources, such as employees with valuable skills, which are not easy for rivals to imitate and substitute by other means of production. These attributes may be of even greater importance for small firms to remain competitive (Pfeffer, 1994). Similarly, the KBV theory of the firm views organisational knowledge as a critical resource for firm's competitive advantages and that human beings are the main element in the creation of knowledge within the organisation (Grant, 1996; Huber, 1991). To this end, training is the key to enhance employee's learning and competencies (Alavi & Leidner, 2001; Aragon & Valle, 2013), and can contribute to 'organisational process advantage' (Boxall, 1996). In other words, training provides individuals with additional skills and the up-to-date knowledge needed for their present job, and prepares them for future organisational and industrial developments as well as technological advances (e.g., Thang, Quang & Buyens, 2010).

Although small firms are much less likely than large firms to adopt formal HR strategies, as they start growing informal strategies towards managing people become increasingly insufficient and, as a result, they increase their formal procedures (Kaman et al., 2001; Kotey & Slade, 2005). Enhancing HR formality allows firms to deal with internal uncertainty and diversity among the workforce and, thus, improve their productivity, competitiveness and financial performance (see Storey & Sykes, 1996). Jayawarna, Macpherson and Wilson (2007: 234) defines informal training as 'ad-hoc, fragmented and flexible.' In contrast, formal training 'has a structured mode of delivery, where the aim is to impact new awareness or knowledge of a workplace process or activity' (Patton & Marlow, 2002: 261). In this line of argument, training in SMEs is commonly lower than in large firms, and when it is undertaken is provided within informal rather than formal settings (e.g., Brown, Hamilton & Medoff, 1990; Storey, 1994; Hill & Stewart, 2000). Perhaps this is because formal training is costly and has low short-term returns for small firms to justify investment

(Hankinson, 1994; Storey & Westhead, 1997; Fernald, Solomon, & Bradley, 1999; Pajo, Coetzer & Guenole, 2010).

While some empirical evidence on the extent of the impact of training on SME performance supports this argument (e.g., Jones et al., 2013), other commentators find that a positive association between training and SME performance exists (e.g., Cannon, 1997; Keep & Mayhew, 1997; Bryan, 2006; Eikebrokk & Olsen, 2009). It may sometimes be the case that owners and managers might not appreciate the potential benefits of greater investment in training for the workforce. Below, in the following subsections, we derive the expected theoretical relationship between training and SME performance and then discuss why this relationship may differ between internationalised and non-internationalised SMEs.

4.2.1. SME training and firm performance

As discussed by Onkenlinx, Manalova and Edelman (2016), existing work on human capital in SMEs mainly focuses on those at the top of the firm (i.e., owner-managers). Generally, the empirical results tend to provide weak evidence that educational attainment of owners improves firm performance (see Storey & Wynarczyk, 1996; Taylor, 1999; Saridakis, Mole & Storey, 2008; Saridakis, Muñoz Torres & Johnstone, 2013). However, since the knowledge, skills and abilities of employees provide the basis of the firm-level competencies (Love & Roper, 2015), the human capital of employees cannot be ignored. Importantly, existing research suggests that owner-managers training is more likely to have a different impact on the firm performance when compared to non-managers training (Bruhn, Karlan & Schoar, 2012; Georgiadis & Pitelis, 2016).

Also, we argue that the owner-managers training is more likely to be undertaken within a formal setting, as compared to employee training, which can be carried out informally and flexibly under the supervisory of senior and more experienced colleagues (Lyons & Mattare, 2011). To explore this further, informal learning usually occurs in settings that are not designed for learning purposes, often organised inside the organisational unit. Furthermore, engagement in informal learning heavily depends on personal characteristics such as self-efficacy and interest in the profession and professional development (Beckett & Hager, 2002; Lohman, 2005; Manuti et al., 2015). In contrast, formal training is planned in nature and has predetermined objectives (Manuti et al., 2015). However, Loewenstein and Spletzer (1994) find that individuals that receive formal training are also more likely to participate in informal training, and controlling for individual training the effect of formal training on wages falls substantially (between 15-20%). Hence, it is crucial to distinguish between employees and

owner-mangers training when seeking to explain its link to firm performance (see Jayawarna, Macpherson & Wilson, 2007, for formal training; Fuller et al., 2003 and Kotey & Folker, 2007, for informal training).

Due to the multiple task challenges and limited labour resources, owner-managers often have heavy job demands meaning they have limited time to dedicate to training and development issues for themselves or for the business more generally (Chadwick et al., 2013), and might instead 'take mental shortcuts and fall back on what they have tried and seen work in the past' (Hambrick, 2007: 336). This is important given that previous research shows that incompetent management is responsible for firms to exit the market (e.g., Baldwin et al., 1997; Bruno & Leidecker, 2001). Alassadi and Al Sabbagh (2015) propose two routes in which owner-managers can improve their managerial skills. The first route is consultancy, while the second route is training. Training may allow owner-managers to step back and dedicate time to improving their technical and entrepreneurial expertise, as well as enhancing their skills in key management areas including strategic management, finance, business development, marketing and HR (Devins & Gold, 2000; Walker et al., 2007; Nolan & Garavan, 2016). Managerial training may also act as a catalyst for further investment in training for the broader workforce (Rigg & Trehan, 2002), and this is important given existing research has suggested a limited appreciation of the potential value of formal training by owner managers in SMEs (Walker et al., 2007). A review by Storey and Westhead (1994) shows that owner-managers participation in training is positively related to the size of the firm, but similar to previous work (e.g., Marshall et al., 1995; Wong et al., 1997; Cosh, Hughes & Weeks, 2002; Kitching & Blackburn, 2002) they report a weak statistical association between management training and firm performance. Other studies find management development activity can have a positive impact on business growth and development (Clarke et al., 2006), improved performance and lower failure (Fuller-Love, 2006), growth and market exploitation (Gold & Thorpe, 2008), as well as managerial performance and the recruitment and retention of staff (Gray & Mabey, 2005).

In contrast to these findings, other empirical studies find that there is a positive link between the skill composition of the workforce and labour productivity, but that this does not always translate to increase firm performance (see Blundell et al., 1999). Specifically, for firms to provide their employees with up-to-date skills and specialised knowledge, as well as to sustain their competencies needed for their jobs, investment in employee training becomes an important strategic concern (Sahinidis & Bouris, 2008). Chapman and Tan (1990) and Bosworth and Wilson (1993), for example, find a positive link between training and adoption

of new technologies increasing firm competitiveness in the marketplace. In addition, Barrett and O'Connell (2001) suggest a positive association between training and productivity growth. For employees, training may increase the likelihood of promotion within the organisation and result in higher wages and thus, increasing employee engagement (Anitha, 2014), job satisfaction (Rowden & Conine Jr, 2005), job retention (Ranganathan, 2018) and organisational commitment and loyalty (Sieben, 2007; Newman & Sheikh, 2012; Kampkötter & Marggraf, 2015). Liu and Batt (2007), for example, find that informal training is positively associated with employee productivity, while more recent studies by Reid and Harris (2002) and Chinomona (2013) tend to agree that there is a positive relationship between employee training and SMEs performance.

Here, we propose that there exists a complementarity between these two types of training offered to owner-managers and employees, and when received simultaneously, the potential organisational outcomes can be amplified (see also Carter & Gribble, 1991; Sefton, Waterhouse & Deakin, 1994; Curtain, 1995; Kell, 1995; Harris, 1996). Perhaps for owner-managers used to an informal and ad hoc approach to training activities, when they undertake formal training which they themselves perceive to be beneficial, it increases the value they attach to training activity in their business more generally (Nolan & Garavan, 2016). Thus, it may be the case that it is not simply the content of the individual training which is important but also the potential for significant cultural changes in the value attached to training which is also significant. In turn, more training might be made available to employees, leading to better staff performance and more collaborative workplace relations as workers feel more valued and appreciated. Following the basic premise of high commitment management that more extensive training and development opportunities can lead to superior organisational results, literature we hypothesise that:

> **H1:** *Both employee and owner-managers training increase the likelihood of reporting increased turnover performance, although the magnitude of the combined impact will be greater than the individual ones.*

4.2.2. The role of internationalisation on the training-SME performance relationship

The current global economy offers SMEs more international and cross-border opportunities, which allow them to play an important role in international markets (Chi, Wu & Lin, 2008). Although internationalisation offers a great number of business opportunities, it also imposes threats and consequently SMEs are required to have the ability to cope and manage the

challenges and the risk associated with internationalisation. In general, SMEs budget relatively less financial resources to their international expansion, and rely more on capable international human resources for their international operations (Carrier, 1999; Carlson, Upton & Seaman 2006). To do this, SMEs develop their international skills and capabilities through effective training programmes (e.g., Storey, 2004; García, 2005) to overcome difficulties when dealing with foreign customers such as differences in culture and language, as well as other internationalisation challenges (Aaby & Slater, 1988; Axinn, 1988; Barkema, Bell & Pennings, 1996; Deng, Menguc & Benso, 2003).

In this paper, we argue that internationalisation occurring within an SME may increase the internal demand for training to reduce culture shock, adapt to an unfamiliar environment and understand foreign-market dynamics (see, e.g., Harris & Kumra 2000; Morris & Robie 2001). Reid and Harris (2002), for example, find that SMEs that operate in growing markets are more likely to compete on firm quality as well as price and thus, invest in training (Baldwin & Harrigan, 2010). Where workers are deemed to contribute directly to levels of product or service quality there may be greater recognition of the value of training as part of a high commitment approach to HRM with workers viewed as resources to be nurtured and developed. In contrast, in settings where this is not believed to be the case, and workers are viewed simply as a resource to be used and disposed of as necessary, expenditure on training might be viewed as having little impact on organisational performance and therefore a low priority. Moreover, Onkenlinx, Manolova and Edelman (2016) suggest that when firms expand their operation into foreign markets, the complexity of their international activities increase. Hence, internationalisation requires a higher level of skills and knowledge in order to manage these more complex operations. This may mean that the relationship between training and SME performance is different between internationalised and non-internationalised SMEs, and existing empirical work has failed to deal adequately with this possibility (see Onkenlinx, Manolova & Edelman, 2016).

To this end, it can be further argued that enhanced HR skills are an essential factor for the growth and the internationalisation of SMEs (Paul, Parthasarathy & Gupta, 2017), and the lack of management education and exposure to foreign culture creates challenges for SMEs during their international operations (Suárez-Ortega & Álamo-Vera, 2005). For example, operating in international markets involves a high level of risk arising from market uncertainty, a limited knowledge about the international environment, and a lack of experience in managing and operating globally. Therefore, firms entering international markets face liability of foreignness and exhibit a knowledge gap between the possessed knowledge and the required

knowledge needed for internationalisation (Pedersen, Pedersen & Lyles, 2008). However, this risk may be reduced by acquiring the appropriate managerial knowledge and information related to international markets through training. This is in line with previous studies (Johanson & Vahlne, 1977; 1990; Oviatt & McDougall, 1994) suggesting a link between learning and SME internationalisation.

Specifically, existing literature on SME internationalisation emphasises the role of the owner-managers in the internationalisation process. For example, Loane, Bell and McNaughton (2007) find that the management team significantly set up the skills and knowledge needed for rapid internationalisation. In addition, Hitt et al. (2006) argue that international expansion places significant requirements on managers. Moreover, some other commentators suggest that international experience, orientation and attitudes of the owner-managers (Baird, Lyles & Orris, 1994; Bijmolt & Zwart, 1994; Reuber & Fisher, 1997; De Clercq, Sapienza & Crijns, 2005) are associated with SMEs internationalisation process. For example, general human capital skills of the owner-manager, such as international business knowledge and foreign language skills (Manolova et al., 2002; Stoian, Rialp & Rialp, 2011; Love & Roper, 2015) can help the owner-manager to understand the institutional settings and geographical dynamics of the foreign market. As well as improving organisational processes (Boxall, 1996) and workforce performance, enhancing the knowledge base of SME owner-managers can stimulate the creation of novel ideas and increase the possibilities to exploit new market opportunities and internationalise (see Quintas, Lefrere & Jones, 1997; Sadler-Smith, Sargeant & Dawson 1998; Wentland, 2003; Chrisman & McMullan, 2004; De Winne & Sels, 2010). Chi, Wu and Lin (2008) argues, for example, that when SMEs owner-mangers choose to internationalise through foreign direct investments, they tend to participate in foreign direct investment training programmes.

Given that the international business literature emphasises the role of the owner-manager in the internationalisation process of firms (e.g., Kundu & Katz, 2001; Hitt et al., 2006; Sapienza et al., 2006; Loane, Bell & McNaughton, 2007; Filatotchev & Piesse, 2009) more than the role of employees, we argue that training for owner-managers in internationalised SMEs may allow the firm to better organise its internationalisation strategy and coordinate activities between home and host countries, which allow them to exploit internationalisation activities in more efficient ways. Based on the above literature, we hypothesise that:

H2: *Owner-managers training is more likely to increase SME performance than employee-training in internationalised SMEs.*

H3: *Employee training is more likely to increase SME performance than owner-managers training in non-internationalised SMEs.*

4.3. Data

In this paper, we use data from the first wave of the UKLSBS (Department for Business, Innovation and Skills (BIS) 2016a) which is the last in the series of the annual and biennial small business surveys (SBS) dating back to 2003. The survey is a large-scale telephone survey with more than 15,000 owner-managers of firms (those with up to 249 employees) in the UK, and it covers four nations; England, Wales, Scotland and Northern Ireland. The survey is based on a stratified sample, and targets were set according to the size of the firm and within these groups, according to the sector (SIC, 2007). Detailed information about the survey method and instruments can be found in UKLSBS technical report (BIS, 2016b).

The UKLSBS (2015) is typically a wide-range survey that provides a large amount of information related to firms' characteristics, such as the region, sector, age of the firm, number of employees and turnover of the firm. Regarding the key variables performance, training and export for this study, the data provide information on the company's turnover, whether the firm exports goods and/or services outside the UK, and whether the firm provides training for employees and owner-managers. Therefore, the survey provides a relatively large sample size and rich information (BIS, 2016a) about training, performance and internationalisation activities and involvement.

4.3.1. Measuring firms' performance

The growth of SMEs can be measured in different ways. Growth can be measured in terms of the increase number of employees. This measure has been the most relevant to government and policy makers because the growth of SMEs is considered as an important factor to reduce unemployment (e.g., Storey, 1994; Robson & Bennett, 2000). In addition, owner-managers of SMEs are usually concerned with their financial performance, which can be measured in terms of growth in sales and turnover growth (e.g., Bartlett, 1994; Robson & Bennett, 2000). In this paper, we follow pervious literature (e.g., Saridakis et al., 2018), and we use two measures of SMEs performance: actual and intended turnover performance.

Actual turnover performance: Owner-managers were asked, *'Compared with the previous 12 months, has your turnover in the past 12 months increased, decreased or stayed*

roughly the same?' The dependent variable is an ordered variable, taking the value of one if the turnover 'decreased', two if the turnover 'stayed the same' and three if the turnover 'increased'. The survey shows that 47 per cent of exporting firms experienced an actual turnover performance.[26] The survey also shows that, for firms that have an increase in actual performance, 51 per cent of exporting firms provide formal employee training while 47 per cent of non-exporting firms provide formal employee training. We test if there is a statistically significant difference in actual performance between exporters and non-exporters with formal employee training, and the results show that there is a statistically significant difference in actual performance (t=-8.947, Pr (|T|>|t|)= 0.001). Moreover, the survey shows that firms that have an increase in actual performance, 52 per cent of exporting firms provide informal employee training, while 46 per cent of non-exporting firms provide informal employee training. We also find that the actual performance is statistically different between exporters and non-exporters with informal employee training (t=-10.160, Pr (|T|>|t|)= 0.001).

Intended turnover performance: Owner-managers were asked: *'In the next 12 months do you expect your turnover to increase, decrease, or stay roughly the same?'* The second dependent variable is also an ordered variable taking the value of one if the turnover will 'decrease', two if the turnover will 'stay the same' and three if the turnover will 'increase'. The survey shows that 57 per cent of exporting firms are intending to increase their turnover in the next 12 months.[27] The survey also shows that, for firms with an intention to increase their performance, 60 per cent of exporting firms provide formal employee training while 51 per cent of non-exporting firms provide formal employee training - the difference is found to be statistically significant (t=-5.212, Pr(|T|>|t|)= 0.001). Moreover, the survey shows that firms with an intention to increase their performance, 62 per cent of exporting firms provide informal employee training, while 51 per cent of non-exporting firms provide informal employee training.[28]

4.3.2. Measuring training

In this paper, we differentiate between formal and informal training for both employees and owner-managers. We follow pervious literature (e.g., Sheehan, 2014) in referring to 'off-the-job training' as formal training and 'on-the-job training' as informal training.

[26] We test if actual turnover performance is statistically significantly different between exporting and non-exporting firms. The results show that it is statistically different between the two groups (t=-7.249, Pr (|T| > |t|)=0.001).
[27] We test if there is a statistically significant difference in intended performance between exporting and non-exporting firms. The results show that it is statistically different between the two groups (t=-11.976, Pr (|T| > |t|)=0.001).
[28] We also test if there is a statistical significant difference in intended performance between exporting and non-exporting firms with informal employee training. We find that it is statistically different between the two groups (t =-7.440, Pr (|T| > |t|)=0.001.

Formal employee training: The survey asks, *'Over the past 12 months, has your organisation arranged or funded any off-the-job training or development for employees?'* The explanatory variable is a binary variable taking the value of one if the firm provides formal employee training and zero otherwise. The survey shows that 26 per cent of exporting firms provide formal employee training, while 74 per cent of non-exporting firms provide formal employee training.[29]

Informal employee training: The survey asks, *'Has your organisation arranged or funded any on-the-job or informal training and development over the last 12 months?'* The explanatory variable is also a binary variable taking the value of one if the firm provides informal employee training and zero otherwise. The survey shows that 26 per cent of exporting firms provide their employee with informal training, and 74 per cent of non-exporting firms provide informal employee training.[30]

Employee training: In order to capture the full employee training, we then create an index variable in order to capture whether employees received formal training, informal training, both training (i.e., formal and informal) or no training at all. Table 4.1 shows that 26 per cent of employees received both types of training in exporting SMEs, while 74 per cent of employees received both types of training in non-exporting SMEs.[31]

Table 4.1 Employee training for exporting and non-exporting SMEs.

	Formal training	Informal training	Both training	No training
	Per cent (%)	Per cent (%)	Per cent (%)	Per cent (%)
Exporters	25.21	23.88	26.47	21.00
Non-exporters	74.79	76.12	73.53	79.00
Obs.	1095	1725	5292	2767

Owner-managers training: The survey asks, *'Did any of the managers in the business receive this off-the-job or informal on-the-job training or development during the last 12 months?'* We create a related measure to capture if owner-managers received formal training, informal training, both of them or no training at all. Table 4.2 shows that 23 per cent of owner-

[29] We test if there is a statistical significant difference in formal employee training between exporting and non-exporting SMEs, and the results show that is it statistically different between the two groups (z= -4.952, Pr (|Z| > |z|)= 0.001).
[30] We also test if there is a statistical significant difference in informal employee training between exporting and non-exporting firms, and the results show that it is statistically different (z=-4.229, Pr (|Z| > |z|)=0.001).
[31] We test if there is a statistical significant difference in either formal, informal, both or no employee training between exporting and non-exporting SMEs, and the results showed that only both and no employee training are statistically different between exporting and non-exporting SMEs (z=-4.555, Pr (|Z| > |z|)=0.001 and z=5.018, Pr (|Z| > |z|)=0.001, respectively).

managers in exporting SMEs received both types of training (i.e., formal and informal training), while 77 per cent of owner-managers in non-exporting SMEs received both training.[32]

Table 4.2 Owner-managers training for exporting and non-exporting SMEs**.**

	Formal training	Informal training	Both training	No training
	Per cent (%)	Per cent (%)	Per cent (%)	Per cent (%)
Exporters	26.49	25.60	23.28	29.14
Non-exporters	73.51	74.40	76.72	70.86
Obs.	1325	1172	3381	2234

4.3.3. Internationalised and non-internationalised SMEs

Although export is one of the several modes of internationalisation available to SMEs, it is still the most dominant mode of internationalisation (Calia & Ferrante, 2013; Raymond et al., 2014). Hence, in order to differentiate between internationalised and non-internationalised SMEs, we follow previous literature (e.g., Serra, Pointon & Abdou, 2012; Graves & Shane, 2014; Idris & Saridakis, 2018), and we use export propensity as a proxy of internationalisation. The survey asks the following question: *'In the past 12 months, did your business export any goods and/or services outside the UK?'* Therefore, the outcome variable is a binary variable takes the value of one if the firm exports and zero otherwise. The survey shows that 22 per cent of SMEs export goods and/or services outside the UK, and 78 per cent of SMEs do not export any goods and/or services outside the UK.

4.3.4. Control variables

We follow pervious literature in controlling for the following variables, which previous studies found that they affect the relationship between HRM and firm performance. First, we control for the size of the firm (i.e., measured as the natural logarithm of the number of employees) and for the age of the firm. According to Sheehan (2014), the size and the age of the firm are found to be important for the use of HRM in small and large firms. This reflects the possible effect of economies of scales and experience (Nguyen & Bryant, 2004). Second, we control for the sector and the regions. We also control for the number of sites and for the legal status of the firm. Table 4.3 presents the definitions of the variables used in this study. For the

[32] We test if formal, informal, both and no owner-managers training are statistically significantly different between exporting and non-exporting SMEs, and the results showed that only both and no owner-managers' training are different between exporting and non-exporting SMEs ($z= 4.309$, $Pr(|Z| > |z|)= 0.001$ and $z=-4.309$, $Pr(|Z| > |z|)=0.001$, respectively).

descriptive statistics and the correlation matrix, please refer to the Appendix (see Tables 4.6, 4.7 & 4.8).

Table 4.3 Variables definition used in this study

Variable	Definition
Actual performance	Dummy=1 if the turnover decreased. Dummy=2 if the turnover stayed the same. Dummy=3 if the turnover increased.
Intended performance	Dummy=1 if the turnover will decrease. Dummy=2 if the turnover will stay the same. Dummy=3 if the turnover will increase.
Formal employee training	Whether the firm provides formal employee training (codded 1) or not (codded 0).
Informal employee training	Whether the firm provides informal employee training (codded 1) or not (codded 0).
Employee training	Dummy =1 if the firm provides formal training for employees. Dummy =1 if the firm provides informal training for employees. Dummy =1 if the firm provides both (i.e. formal and informal) training for employees. Dummy =1 if the firm does not provide training for employees.
Owner-managers training	Dummy =1 if the firm provides formal training for owner-managers. Dummy =1 if the firm provides informal training for owner-managers. Dummy =1 if the firm provides both (i.e. formal and informal) training for owner-managers. Dummy =1 if the firm does not provide training for owner-managers.
Internationalisation (Export)	Whether the firm sells goods and/or services outside the UK (coded 1) or not (coded 0).
Size of the firm	ln(1 + number of employees).
Age of the firm	Broken down into age bands (0–5years = 1, 6–10 years = 2, 11–20 years = 3, > 20 years = 4). Dummy variables are created for each category.
Legal status	Legal status of the business (sole proprietorship = 1, company = 2, partnership = 3). Dummy variables are created for each category.
Sites	Number of sites the business has (1 site = 1, 2 sites = 2, 3 sites = 3, 4–10 sites = 4, 11+ sites = 5). Dummy variables are created for each category.
Regions	Location of the business (England = 1, Scotland = 2, Wales = 3, Northern Ireland = 4). Dummy variables are created for each category.
Sectors	SIC 2007 (1-digit) classification. Dummy variables are created for each category.

4.4. Empirical findings

We use an ordered probit analysis to examine the relationship between training and performance for internationalised and non-internationalised SMEs. Ordered probit regression is a statistical technique used where there are more than two outcomes of an ordinal observed variable. The model is estimated by using the maximum likelihood and regresses a function of the probability that a case falls into certain outcome category (Stock & Watson, 2007). [33] In order to alleviate concerns over potential endogeneity between formal employee training and firm performance, we use propensity score matching (PCM) techniques (for technical discussion, please see Cameron & Trivedi, 2005). A multinomial logistic regression is used for

[33] For the robustness check, we also use a different modelling approach: the ordered logit model. The results obtained are similar to the results reported from the ordered probit model and, therefore, are not reported here.

estimating propensity scores for nominal treatments. The propensity score analysis is performed within the marginal mean weighting through stratification (MMWS) approach (Huang et al. 2005; Hong, 2010; 2012; Linden, 2014).

4.4.1. Full sample analysis

4.4.1.1. Actual performance

In Table 4.4, we present the analysis of the relationship between training and performance for all SMEs. First, we test the relationship between training and SMEs actual performance (Models 1 - 6). We find that formal employee training (Model (1), Table 4.4) is positive and significantly related to SMEs actual performance (coeff.=0.120).[34] We also find that informal employee training (Model (2), Table 4.4) is positive and significantly related to SMEs actual performance (coeff.=0.135).[35]

In Model (3), Table 4.4, we test the effect of employee training on SMEs actual performance. The results show that, compared to no training at all, formal, informal and both types of training (i.e., formal and informal) are positive and statistically significantly related to SMEs actual performance (with the coefficients being 0.110, 0.122 and 0.193, respectively). In addition, we obtain the marginal effects and the results indicate that both types of employee training (i.e., formal and informal) increases the likelihood of being in the 'increasing' category of actual performance by 7.3 per cent. However, formal and informal employee training alter the probability of being in the 'increasing' category of actual performance by 4.2 per cent and 4.6 per cent, respectively. Using the Wald test (see Judge et al., 1985), we further test if the coefficients of different forms of training are statistically different from each other. The results show that formal and informal employee training are not statistically significantly different from each other (x^2 (1) = 0.07 and Prob. = 0.787). However, we find that formal and both employee training are different from each other (x^2 (1) = 4.37 and Prob. = 0.036), also, informal and both employee training are statistically significantly different from each other (x^2 (1) = 4.59 and Prob. = 0.032). In Model (4), we restrict the sample to those SMEs that offer employee training; the results show that, compared to informal type of training, only both

[34] We extract the marginal effects, and the results show that formal employee training is positive and statistically significant, suggesting that SMEs that provide formal employee training are 4.5 per cent more likely to be in the 'increasing' category of actual performance. However, the results show that formal employee training is associated with being 2.8 per cent less likely to be in the 'decreasing' category and 1.7 per cent less likely to be in the 'stayed the same' category of actual performance.

[35] We extract the marginal effects, and the results show that informal employee training is positive and statistically significant, suggesting that SMEs that provide informal employee training are 5.1 per cent more likely to be in the 'increasing' category of actual performance. Moreover, the results show that informal employee training is associated with being 3.17 per cent less likely to be in the 'decreasing' category and 2 per cent less likely to be in the 'stayed the same' category of actual performance.

types of employee training (i.e., formal and informal) is positive and significantly related to SMEs actual performance (coeff.=0.072).[36]

When testing for the effect of owner-managers training on actual performance (Model (5), Table 4.4), the results show that, compared to no training, both types of training (i.e., formal and informal training) is positive and statistically significantly related to SMEs actual performance. Hence, it can be implied that SMEs that provide owner-managers with both types of training are more likely to be in the 'increasing' category of actual performance (coeff.=0.080). The results show that when owner-managers receive a single type of training (i.e., either formal or informal), the actual performance of the firm is not affected. We obtain the marginal effect for both types of owner-managers training, and the results show that SMEs that provide both types training are 1.8 per cent less likely to be in the 'decreasing' category of actual performance, 1.3 per cent less likely to be in the 'stayed the same' category of actual performance and 3.1 per cent more likely to be in the 'increasing' category of actual performance. In Model (6), Table 4.4, we restrict the sample to those SMEs that offer owner-managers training. The results show that, compared to informal type of training, formal and both types of training (i.e., formal and informal) are not statistically significantly related to SMEs actual performance.

Overall, our results give support to our *H1* that training, for employees and owner-managers, increase SME performance, but their combined impact is greater than the impact generated individually.

4.4.1.2. Intended performance

Second, in Table 4.4, we test the relationship between training and SMEs intended performance (Models 1a - 6a). In Model (1a, Table 4.4), we test the association between formal employee training and SMEs intended performance, and the results show that the coefficient of formal employee training is positive and statistically significant (coeff.=0.094).[37] In addition, the results show that informal employee training (Model (2a), Table 4.4) is positive and statistically

[36] We also obtain the marginal effects, and the results show that the coefficient of both employee training is positive and statistically significant, suggesting that SMEs that provides both employee training are 2.8 per cent more likely to be in the 'increasing' category of actual performance. However, the results show that both employee training is associated with being 1.6 per cent less likely to be in the 'decreasing' category and 1.1 per cent less likely to be in the 'stayed the same' category of actual performance.

[37] We also extract the marginal effects, and the results show that formal employee training is positive and statistically significant; suggesting that SMEs that provides formal employee training are 3.6 per cent more likely to be in the 'will increase' category of intended performance. However, the results show that formal employee training is associated with being 1.3 per cent less likely to be in the 'will decrease' category of intended performance, and it is also associated with being 2.2 per cent less likely to be in the 'will stay the same' category of intended performance.

significant (i.e., SMEs that offer informal employee training are more likely to be in the highest category of intended performance, coeff.=0.146).[38]

In Model (3a) of Table 4.4, we test the association between employee training and SMEs intended performance. The results show that, compared to no training, only informal and both types of training are positive and statistically significantly related to SMEs intended performance (coeff.=0.131 and coeff.=0.180, respectively). However, the magnitude of the latter is higher than the former (x^2 (1) =2.12 and Prob. =0.145). We also obtain the marginal effects, and the results show that SMEs that offer informal and both types of employee training are 5 per cent and 6.9 per cent, respectively, more likely to be in the 'will increase' category of the intended performance. In Model (4a) of Table 4.4, we restrict the sample to those SMEs that offer employee training. The results show that compared to informal employee training, the coefficients of formal and both employees training are statistically insignificant. In Model (5a) of Table 4.4, we test the association between owner-managers training and SMEs intended performance. The results show that, compared to no training, both types of training (i.e., formal and informal) is statistically significant and positively related to SMEs' intended performance (coeff.=0.90).[39] However, when restricting the sample to only those SMEs that offer owner-managers training, the results in Model (6a) of Table 4.4 show that, compared to informal type of training, formal and both owner-managers training types are not statistically significant.

Again, the results from the intended perforce model provide further support for *H1*, highlighting the importance of training, especially the joint training for employees and owner-managers, on SME performance.

[38] We also extract the marginal effects, and the results show that informal employee training is positive and statistically significant; suggesting that SMEs that provides informal employees training are 5.6 per cent more likely to be in the 'will increase' category of intended performance. However, the results show that formal employee training is associated with being 2 per cent less likely to be in the 'will decrease' category of intended performance and it is also associated with being 3.5 per cent less likely to be in the 'will stay the same' category of intended performance.

[39] We also obtain the marginal effects and the results show that SMEs that provide both types of owner-managers training are 3.4 per cent more likely to be in the 'will increase' category of the intended performance, while they are 1.2 per cent less likely to be in the 'will decrease' category and 2.2 per cent less likely to be in the 'will stay the same' category of intended performance.

Table 4.4 The association between training and SMEs actual and intended performance (all firms)

All firms												
Sample	Actual performance						Intended performance					
ordered probit regression	(1)	(2)	(3)	(4)	(5)	(6)	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)
Formal employee training	0.120***						0.094***					
	0.024						*0.025*					
Informal employee training		0.135***						0.146***				
		0.026						*0.026*				
Employee training (Base category: no training)												
Formal training			0.110***						0.058			
			0.042						*0.043*			
Informal training			0.122***						0.131***			
			0.037						*0.038*			
Both training			0.193***						0.180***			
			0.031						*0.032*			
Employee training (Base category: informal training)												
Formal training				-0.008						-0.074		
				0.045						*0.046*		
Both training				0.072**						0.053		
				0.033						*0.034*		
Owner-Managers training (Base category: no training)												
Formal training					0.054						0.008	
					0.041						*0.041*	
Informal training					0.055						0.071	
					0.042						*0.043*	
Both training					0.080**						0.090***	
					0.033						*0.034*	

Owner-Managers training (Base category: informal training)												
Formal training						0.001						-0.057
						0.047						*0.048*
Both training						0.018						0.014
						0.040						*0.041*
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-10234.584	-10232.887	-10227.345	-7579.8791	-7580.5442	-5432.8025	-9225.9735	-9218.0118	-9216.0794	-6843.4124	-6844.3093	-4927.800
Chi 2(degrees of freedom)	513.26(28)	516.65(28)	527.74(30)	359.58(29)	358.25(30)	264.81(29)	575.81(28)	591.73(28)	595.60(30)	417.10(29)	415.30(30)	317.54(29)
Obs.	10294	10294	10294	7720	7720	5585	10474	10474	10474	7836	7836	5666

Notes: All models control for variables mentioned before (results are available upon request).
For robustness check, we also estimate the model using ordered logit model. The results are similar and available upon request. Values in *italics* are standard errors.
***p < 0.01, **p < 0.05, *p < 0.1

4.4.1.3. Propensity score matching estimates

In order to take into account for a potential endogeneity between formal employee training and actual firm performance, we use propensity score matching techniques and the nearest neighbour estimator. The results (see Table 4.9 in Appendix) suggest that, for firms that offer formal employee training (Model 1), the formal training has caused the probability of being in the highest category of actual performance to be 4.7 percentage points higher than it would have been otherwise. Moreover, we find that for firms that offer informal employee training (Model 2), the treatment has caused the probability of being in the highest category of the actual performance to be 9 percentage points higher than it would have been otherwise. Turning to intended performance model, the results suggest that, for firms that offer formal employee training (Model 1a), the formal training has caused the probability of being in the highest category of intended performance to be 3.2 percentage points higher than it would have been otherwise. We also find that for SMEs that offer informal employee training (Model 1b), the training has caused the probability of being in the highest category of the intended performance to be 9.2 percentage points higher.

Furthermore, we estimate a model that allows multiple nominal level treatments; the results are consistent with the results presented in Model (3) of Table 4.4.[40] We also apply propensity score matching techniques for Model (5) and find that the coefficients are to be higher in the magnitude, with informal and formal owner-managers training becoming statistically significant at the 5 per cent level, and that both types of owner-managers training to become statistically significant at the 10 per cent level. Finally, estimating a model that allows multiple nominal level treatments for Model 3a shows that the coefficients are to be smaller in the magnitude with informal employee training to become statistically insignificant. We also estimate a multiple nominal level treatment model for Model 5a, and we find that the coefficients are higher in the magnitude and informal owner-managers' training to become significant at the 1 per cent level.

4.4.2. Sub-sample analysis

4.4.2.1. Actual performance

In Table 4.5, we differentiate between internationalised and non-internationalised SMEs in order to test the association between training and performance in these types of SMEs. First, we test the relationship between training and actual performance for internationalised and non-

[40] However, the coefficients are found to be smaller in the magnitude, with formal employee training to become statistically insignificant.

internationalised SMEs (Models 1a - 6b). The results show that the coefficient of formal employee training is statistically significant and positively related to actual performance in non- internationalised SMEs (Model (1b) (coeff.=0.159)[41] but it is not statistically significant in internationalised SMEs (Model (1a), Table 4.5). However, the results show that informal employee training is statistically significant and positively related to actual performance in internationalised and non-internationalised SMEs (coeff.=0.096 and coeff.=0.149, respectively). We also obtain the marginal effects of the informal employee training in internationalised and non- internationalised SMEs and the results show that internationalised SMEs that provide informal employee training are 3.7 per cent more likely to be in the 'increasing' category of actual performance, and non-internationalised SMEs that provide informal employee training are 5.6 per cent more likely to be in the 'increasing' category of actual performance.

When testing the association between employee training and actual performance for internationalised SMEs (Model (3a), Table 4.5) and non-internationalised SMEs (Model (3b), Table 4.5), the results show that, compared to no training at all, formal, informal and both types of employee training are not statistically significantly related to actual performance in internationalised SMEs. However, the results show (Model (3b), Table 4.5) that, compared to no training, all types of employee training (i.e., formal, informal and both) are statistically significant and positively related to actual performance in non-internationalised firms (with the coefficients being 0.172, 0.135, and 0.233 respectively). The marginal effects indicate that non-internationalised SMEs that offer both types of employee training are 8.8 per cent more likely to be in the 'increasing' category of actual performance, 5.3 per cent less likely to be in the 'decreasing' category of actual performance and 3.4 per cent less likely to be in the 'stayed the same' category of actual performance. Using the Wald test, we test if these variables are statistically significantly different from each other; the results suggest that only informal and both employee training are significantly different from each other in non-internationalised firms ($x^2\ (1) = 6.54$ and Prob. = 0.010).

In Models (4a) and (4b) of Table 4.5, we restrict the sample to those SMEs that offer employee training. The results show that, compared to informal employee training, both types of employee training is statistically significant and positively related to actual performance in non-internationalised SMEs (Model (4b), Table 4.5) (coeff.=0.099). By obtaining the marginal

[41] We also obtain the marginal effects and the results show that non-internationalised SMEs that provide formal employees training are 6 per cent more likely to be in the 'increasing' category of the actual performance, while they are 3.6 per cent less likely to be in the 'decreasing' category and 2.3 per cent less likely to be in the 'stay the same' category of actual performance.

effects, the results show that non-internationalised SMEs that provide both types of employees training are 3.8 per cent more likely to be in the 'increasing' category of actual performance and 2.1 per cent and 1.6 per cent less likely to be in the 'decreasing' and 'stayed the same' categories of actual performance, respectively. Thereafter, we test the effect of owner-managers training and actual performance for internationalised and non-internationalised SMEs (Models (5a) and (5b), Table 4.5). The results in Model (5b) show that both types of training (i.e., formal and informal) is statistically significant and positively related to SMEs actual performance in non-internationalised SMEs (coeff.=0.074) with marginal effects of 2.8 per cent of being in the 'increasing' category of actual performance. In addition, the results show Model (5a) that any type of owner-managers' training is not statistically significantly related to actual performance in internationalised SMEs. In Models (6a) and (6b) of Table 4.5, we restrict the sample to those firms that provide training for owner-managers. The results show that, compared to informal training, formal and both types of owner-managers training are neither statistically significant in internationalised nor in non-internationalised SMEs.

4.4.2.2. Intended performance

Second, we test the association between training and intended performance by differentiating between internationalised and non-internationalised SMEs (Models (1c - 6d)) in Table 4.5. The results show that formal employee training is statistically significant and positively related to intended performance in non- internationalised SMEs (coeff.=0.126) (Model (1d), Table 4.5).[42] On the contrary, for internationalised SMEs, the results show (Model (1c), Table 5) that formal employee training is not statistically significant. When testing the relationship between informal employee training and intended performance (Models (2c) and (2d), Table 4.5), the results suggest that it is positively and significantly related to intended performance in both types of SMEs (coeff.=0.097 for internationalised SMEs and coeff.=0.156 for non-internationalised SMEs).[43]

We then test the association between different types of employee training and intended performance for internationalised and non-internationalised SMEs (Models (3c) and (3d), Table 4.5). The results show that, compared to no employee training, formal, informal and both

[42] We also obtain the marginal effects, and the results show that non-internationalised SMEs that provide formal employee training are 4.8 per cent more likely to be in the highest category of the 'will increase intended performance category, while they are 1.8 per cent less likely to be in the 'will decrease category and 2.9 per cent less likely to be in the 'will stay the same' category of intended performance.

[43] We also obtain the marginal effects, and the results show that internationalised SMEs that provide informal employee training are 3.6 per cent more likely to be in the 'increasing' category of intended performance. While non-internationalised SMEs that provide informal employee training are 6 per cent more likely to be in the 'will increase' category of intended performance.

types of employee training are positively and significantly related to non-internationalised SMEs intended performance (Model (3d), Table 4.5). The results show that SMEs that provide both types of training are more likely to be in the 'will increase' category of intended performance with the estimated coefficient of 0.212 and by 0.104 and 0.139 for formal and informal types of training, respectively We also obtain the marginal effects, and the results shows that non-internationalised SMEs that provide formal employee training are 4 per cent more likely to be in the 'will increase' category of intended performance, and SMEs that provide informal employee training are 5.3 per cent more likely to be in the 'will increase' category of intended performance. Moreover, the results show that SMEs that provide both types of training are 8.1 per cent more likely to be in the 'will increase' category of intended performance. In addition, we use the Wald test and test if these variables are statistically significantly different from each other, and the results suggest that formal and both types of training are statistically significantly different from each other (x^2 (1) =5.19 and Prob. =0.022). Also, informal training as well as both types of training are different from each other (x^2 (1) =3.48 and Prob. =0.062). However, the results show that none of the variables are statistically significant in internationalised SMEs (Model (3c), Table 4.5).

Next, we restrict the sample to those SMEs that offer employee training (Models (4c) and (4d), Table 4.5). The results show that, compared to informal employee training, both types of training is statistically significant and positively increase non-internationalised SMEs intended performance (Model (4d), Table 4.5) (coeff.=0.075 and 2.9 per cent more likely to be in the 'will increase' category). In addition, the results in Model (4c) of Table 4.5 show that, compared to informal types of training, internationalised SMEs that provides formal employee training are less likely to be in the 'will increase' category of intended performance in internationalised SMEs (coeff.=0.183). We obtained the marginal effects, and the results show that internationalised SMEs that provide formal employee's training are 6.7 per cent less likely to be in the 'will increase' category, 4.4 per cent more likely to be in the 'will stay the same' category and 2.3 per cent more likely to be in the 'will decrease' category of intended performance.

Thereafter, in Models (5c) and (5d) of Table 4.5, we test the association between owner-managers training and intended performance in internationalised and non-internationalised SMEs. The results show (Model (5d), Table 4.5) that both types of owner-managers training is statistically significant and positively related to non-internationalised SMEs intended performance (coeff.=0.082 and 3.2 per cent more likely to be in the increasing category). Moreover, the results in Model (5c) of Table 4.5 show that in internationalised SMEs, both

type of owner-managers training is significantly related to SMEs intended performance (coeff.=0.111 and 4.1 per cent more likely to be in the 'will increase' category). When restricting our sample to those owner-managers who are involved in training, the results (Models (6c) and (6d), Table 4.5) show that, compared to informal training, formal employee training as well as both training types are not statistically significant in both types of SMEs (i.e., internationalised and non-internationalised).

Overall, the results support our *H2*, suggesting that owner-managers training is more likely to increase SME performance than employee training in internationalised SMEs. Moreover, the results support our *H3*, indicating that employee's training is more likely to increase SMEs performance than owner-managers training in non-internationalised SMEs.

Table 4.5 The association between training and SMEs actual and intended performance (subsample)

	Actual turnover performance												Intended turnover performance											
Sample	Exporting firms						Non-Exporting Firms						Exporting firms						Non-Exporting Firms					
ordered probit regression	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)	(1b)	(2b)	(3b)	(4b)	(5b)	(6b)	(1c)	(2c)	(3c)	(4c)	(5c)	(6c)	(1d)	(2d)	(3d)	(4d)	(5d)	(6d)
Formal employee training	0.006						0.159***						-0.023						0.126***					
	0.051						*0.028*						*0.053*						*0.028*					
Informal employee training		0.096*						0.149***						0.097*						0.156***				
		0.053						*0.030*						*0.055*						*0.030*				
Employee training (Base category: no training)																								
Formal training			-0.081						0.172***						-0.107						0.104**			
			0.085						*0.048*						*0.089*						*0.049*			
Informal training			0.060						0.135***						0.079						0.139***			
			0.077						*0.042*						*0.081*						*0.043*			
Both training			0.068						0.233***						0.048						0.212***			
			0.065						*0.036*						*0.068*						*0.036*			
Employee training (Base category: informal training)																								
Formal training				-0.139						0.040						-0.183**						-0.037		
				0.090						*0.052*						*0.094*						*0.053*		
Both training				0.005						0.099***						-0.031						0.075**		
				0.067						*0.038*						*0.071*						*0.038*		
Owner-Managers training (Base category: no training)																								
Formal training					0.045						0.058						-0.006						0.012	
					0.077						*0.048*						*0.080*						*0.049*	
Informal training					0.061						0.048						0.033						0.081	
					0.082						*0.050*						*0.086*						*0.051*	
Both training					0.102						0.074*						0.111*						0.082**	
					0.064						*0.040*						*0.067*						*0.040*	
Owner-Managers training (Base category: informal training)																								
Formal training						-0.018						0.015						-0.049						-0.061
						0.093						*0.055*						*0.098*						*0.056*
Both training						0.029						0.020						0.070						-0.002
						0.081						*0.047*						*0.086*						*0.047*
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-2582.3035	-2580.654	-2580.1978	-2011.0012	-2011.5178	-1355.9022	-7601.8304	-7605.3316	-7596.0946	-5531.9766	-5533.7541	-4045.6894	-2172.0325	-2170.5725	-2169.7797	-1687.8024	-1688.2057	-1131.9405	-7006.7233	-7003.2063	-6999.3425	-5124.4842	-5125.4297	-3773.6322
Chi 2(degrees of freedom)	103.05(28)	106.35(28)	107.26(30)	84.18(29)	83.15(30)	75.45(29)	455.18(28)	448.18(28)	466.66(30)	312.17(29)	308.61(30)	214.76(29)	131.83(28)	134.75(28)	136.34(30)	110.59(29)	109.78(30)	90.37(29)	422.85(28)	429.89(28)	437.61(30)	297.86(29)	295.97(30)	216.76(29)
Obs.	2602	2602	2602	2042	2042	1403	7692	7692	7692	5678	5678	4182	2611	2611	2611	2047	2047	1407	7863	7863	7863	5789	5789	4259

Notes: All models control for variables mentioned before (results are available upon request).
For robustness check, we also estimate the model using ordered logit model. The results are similar and available upon request. Values in *italics* are standard errors.
***p < 0.01, **p < 0.05, *p < 0.1

4.5. Discussion

4.5.1. All firms

This paper has empirically examined the relationship between training and performance for internationalised and non-internationalised SMEs. First, we examined the direct relationship between employee training and performance for all SMEs. Our results have shown that formal and informal employee training are statistically significant and positively related to SMEs actual and intended performance in the full sample analysis. Our results are consistent with previous literature indicating that employee training positively affects firm performance (e.g., Litz & Stewart, 2000; de Wiele, 2010; Chinomona, 2013; Jones et al., 2013). Therefore, we argue alongside previous research that training for employees is a powerful mechanism, which enable firms to grow and develop its capabilities (Chandler & McEvoy, 2000). It can be argued, for example, that employee training is associated with a continuous learning mechanism, which allows and prepare employees to adapt to the surrounding changes (Bryan, 2006). In addition, lifelong learning can improve employee's career development, increase flexibility and make the competitive position of the firm stronger (de Wiele, 2010). Hence, training is important for SMEs to stimulate their growth and performance.

It is essential for SMEs to provide training opportunities for their employees because the accumulation of the human capital can drive economic growth (Lucas, 1993) at the macro-level, and employees can contribute to firm's competitive advantages at the micro level (Koch & McGrath, 1996). Our results regarding the effect of employee training on firms intended performance is consistent with previous literature (e.g., Bryan, 2006), indicating that employee training will enable firm growth, especially for firms with an intention to expand their firms and increase their performance (Johnson & Gubbins, 1992). Therefore, we argue alongside scholars, in the strategic human resource management field, that firms can create a specific form of aggregate knowledge, skills and abilities through their human resource practices, such as training (Onkelinx, Manolova, & Edelman 2016); which, in turn, can contribute to the firm-level performance (Ployhart, Weekley & Ramsey, 2009).

Second, we examined the effect of employee training on SMEs actual and intended performance by differentiating between different types of employee training, which are formal, informal and a combination of both types of training. Compared to an absence of training, our results have shown that when employees receive both types of training (i.e., formal and informal), training is strongly associated with SMEs performance. Previous literature compared the effect between formal and informal training on firm performance but did not consider the possible effect of a combination of both types of training. Our results are consistent

with previous empirical research, indicating that formal and informal types of training enhance business performance; for example, Jayawarna, Macpherson and Wilson (2007) for formal training, and Fuller et al. (2003) for informal training. However, our results showed that when employees receive both types of training (i.e., formal and informal) the effect on SMEs actual and intended performance is stronger. It has been indicated that SMEs are more likely to prefer informal types of training (Anderson, Boocock & Graham, 2001; Jayawarna, Macpherson & Wilson 2007; Jones et al., 2013). However, we argue that a combination of both types of employee training (i.e., formal and informal) may allow employees to gain advanced knowledge and skills appropriate to their roles in the company which ultimately can be linked to firm performance.

Moreover, it has been indicated that failure to provide employees with appropriate formal training might delay the development of competitive advantages for SMEs (Stewart & McGoldrick, 1996). Training, especially in small firms, has not enjoyed a reputation as a tool and instrument that helps firms to create values and competitive advantages. Rather, it has been seen as an induction process for the newly employed employees (Lyons & Mattare, 2011). However, it has been argued that, apart from obtaining benefits from informal training for employees, firms can improve their performance by providing an adequate training strategy that provides new and existing employees with the necessary skills and knowledge required for their job (Bryan, 2006). Moreover, our results have shown that, compared to informal types of training, both types of employee training affect SMEs actual performance in a positive way. Hence, we argue that a combination of formal and informal training may be a more effective strategy to boost SME performance than focusing on a single form of training.

Third, we examined the effect of owner-managers training on SMEs actual and intended performance. The results show that when owner-managers receive both types of training (i.e., formal and informal), SMEs actual and intended performance are more likely to be in the 'increasing performance' category. Hence, we argue that the acquisition of knowledge and skills can be obtained from informal and formal training (Westhead & Storey, 1996). Our results are consistent with previous literature, indicating that training 'can, and should, be a powerful agent of change facilitating and enabling a company to grow' (Jennings & Banfield, 1993: 3). Therefore, SMEs should focus and divert their resources to provide both types of training for owner-managers in order to achieve better performance outcomes.

In conclusion, our results showed that training in SMEs for employees could take the form of either informal and/or formal training; however, the effect of a combination of both on firm performance is stronger. On the other hand, training for owner-managers should be in the

form of a combination of both types of training (i.e., formal and informal) in order for firms to increase their performance. Our results lend some prima facie support to the argument that 'the impact of owner-managers training on firms' profitability may be different from that of non-managerial employees' (Georgiadis & Pitelis, 2016: 410).

4.5.2. Sub-sample

4.5.2.1. Non-internationalised SMEs

Next, we differentiated between internationalised and non-internationalised SMEs and examined the training-performance nexus for these types of firms. First, we examined the association between training and actual and intended performance for non-internationalised SMEs. Our results showed that formal and informal employee training are statistically significant and positively related to non-internationalised SMEs performance (i.e., actual and intended). Our results are consistent with previous literature on the impact of training and SMEs performance, indicating a positive relationship (e.g., Patton & Marlow, 2002; Nguyen & Bryant, 2004). Moreover, the results showed that, compared to an absence of training, both types of employee training is strongly associated with actual and intended performance. We argue that when employees in non-internationalised SMEs receive both types of training (i.e., formal and informal), SMEs can exhibit higher performance outcomes. We argue that these two types of training are complementary to each other, and, therefore, firms that focus on their domestic markets should provide formal and informal employee training. Non-internationalised firms are faced with higher levels of competition in their domestic markets; therefore, they may have the ability to create and sustain more competitive advantages by training their employees.

In addition, when testing the association between owner-managers training and performance for non-internationalised SMEs, our results show that when owner-managers receive both types of training, firm performance (i.e., actual and intended) increases. Our results are consistent with previous literature indicating that training for owner-managers is more likely to have a different impact on the firm from employee training (Bruhn, Karlan & Schoar, 2012; Georgiadis & Pitelis, 2016). Hence, we argue alongside previous literature that the human capital of the owner-managers will affect the firm performance by improving the productivity of the firm and other inputs (Penrose, 1959).

Although it has been indicated that employees are the center of any firm, regardless of the size of the firm, it can be implied that employees have different motives and behaviour from SMEs owner-managers (Rosli & Mahmood, 2013). Therefore, the role of the owner-

managers in any SME is critical. Moreover, during this globalised era, the ability of an SME to compete and obtain a larger share from the market depends, to a great extent, on its owner-managers' ideas and attitudes. The entrepreneur is regarded as a creative individual who has the ability to set visions and goals (Bygrave, 1994). Therefore, we argue that through training, owner-managers of small firms will realise the benefits of investing in training to increase performance (Petridou, Sarri, & Kyrgidou, 2009; Rosli & Mahmood, 2013).

4.5.2.2. Internationalised SMEs

Finally, we examined this relationship on SME performance for internationalised firms. The results showed that only informal employee training is positive and significantly affects SME performance (i.e., actual and intended) in internationalised firms. We argue that, in internationalised firms, training takes the form of informal, on-the-job training, with little or no provision for development (Loan-Clarke et al., 1999; Kotey & Folker, 2007). Our results are consistent with previous literature, implying that training in SMEs is mostly lower than larger firms, and when it is undertaken, it is usually provided informally (e.g., Hill & Stewart, 2000; Kitching & Blackburn, 2002). Therefore, we argue that, in SMEs that are engaged in international business, employee training is provided informally, usually supervised by managers or more experienced colleagues. According to Bai, Yuan and Pan (2017), previous studies show that the owner-managers of small firms tend to rely on informal types of training. These types of training may be implemented and delivered by owner-managers, occur on the job and do not lead to a qualification. Moreover, it has been implied that these types of training are well suited to the SME requirements and imposes few direct costs and can be combined with the daily operations of the firm (Patton, 2005).

Furthermore, we argue that owner-managers in internationalised SMEs may be reluctant to provide their employees with formal training opportunities, which may be attributed to several reasons and barriers. For instance, it has been argued that owner-managers tend to perceive training as an operating expense and question the benefits of training (Alassadi & Al Sabbagh, 2015). While Storey and Westhead (1997) argue that owner-managers of small firms are ignorant of the benefits of training. On the other hand, Padachi and Bhiwajee (2016) indicate that, if SMEs were to provide their employees with formal training and development, it means preparing them to get 'poached' by competitors. In addition, it should be noted that employees may leave the company and may not be trusted to keep the knowledge inside the firm (Delerue & Lejeune, 2010; Paul, Parthasarathy, & Gupta, 2017); therefore, owner-

managers may be reluctant to provide training opportunities for their employees (Saru, 2007). Moreover, some commentators also pointed out that owner-managers of SMEs tend to not invest in external training since it is generally assumed that training, especially a formal type of training, does not focus on firm-specific requirements (Johnson, 2002; Kitching & Blackburn, 2002). In addition, we argue that since SMEs that are engaged in international activities have limited resources (Lu & Beamish, 2001), they tend to focus their resources on their internationalisation activities. Therefore, the human capital should be allocated in a careful way in order to deal with the complex international activities (Brambilla, Lederman & Porto, 2012; Love & Roper, 2015; Onkelinx, Manolova & Edelman 2016).

When we examined the relationship between owner-managers training and firm performance for internationalised SMEs, the results show that the combined owner-managers training (i.e., formal and informal) is significantly related to SMEs intended performance in internationalised firms. Given the lack of pervious literature regarding the effect of owner-managers training on performance in internationalised SMEs, we argue that owner-managers of internationalised firms tend to be involved in both types of training for the following reasons. First, we argue that the heterogeneity and the complexity of the international markets require owner-managers to be involved in these operations and to receive appropriate training and development activities. Especially at the first stage of a firm's life cycle, the owner-manager is the central actor in implementing the company's strategy (De Winne & Sels, 2010). Therefore, her/his human capital is the key source of knowledge needed to be able to choose the most appropriate resources and use the firm's available capabilities in an effective way (Dutta et al., 2002).

Moreover, it has been indicated that, at the strategic level, what works in the domestic market will not work in the international market (Evangelista & Mac, 2016). The diverse nature of international markets, therefore, require clear articulation and codification approaches (Zollo & Winter, 2002), which makes the allocation process of resources a precondition for achieving collective solutions to the complicated problems. Moreover, it has been pointed out that managerial and entrepreneurial resources are important for the growth of the firm and they can only be efficient if employees carried out administrative and routine procedures (Penrose, 1959).

Second, it has been indicated that the lack of knowledge of international markets and the lack of employees with enough experience about international markets are among the key challenges that internationalised SMEs face (Baykal & Gunes, 2004; Paul, Parthasarathy & Gupta, 2017). However, we argue that the experience of owner-managers, obtained through

training, enables them to develop knowledge needed for internationalisation (Hitt et al., 2006) as well as the required knowledge to manage relationships and operations in the new markets (Manolova et al., 2002). Sapienza et al. (2006) suggested that managerial skills and competencies play a critical role in the internationalisation process of firms, whereas Loane, Bell and McNaughton (2007) pointed out the significant role played by the management team in the internationalisation process when acquiring the appropriate knowledge, skills and capabilities. Therefore, it has been indicated that the owner-managers competencies, skills and knowledge are an essential factor for the firm's performance in international markets (Kundu & Katz, 2001), which explains owner-managers' involvements in receiving both types of training in order to increase their knowledge base and capabilities.

Finally, we argue that focusing on the owner-managers is an important aspect of small firm internationalisation process (Ganotakis & Love, 2012). The owner-manager is the main decision-maker in a small firm; hence, the quality of the decisions made by the firm reflects its top management team (McDougall & Oviatt, 2000; Filatotchev & Piesse, 2009). It has been pointed out that the entrepreneurial team in a small firm is responsible for collecting information, identifying opportunities and choosing the best appropriate business strategies. This makes the entrepreneurial team responsible not only for their firm's exporting behaviour and strategies but also for the firm's subsequent export and performance (Ibeh, 2003; Zucchella, Palamara, & Denicolai, 2007). Hence, we argue that a higher level of appropriate knowledge and skills obtained from training allows owner-managers to discover and exploit internationalisation opportunities that, in turn, can affect firm performance.

To sum up, our study makes the following contribution to the IB, HRM and small business literature. Applying the RBV and the KBV theories, first, we directly respond to the call for more empirical evidence into the relationship between different types of training and business outcomes (Jones et al., 2013); a topic that has long been ignored in previous literature. By doing so, our study provides empirical evidence to suggest that providing employees and owner-managers with both types of training (i.e., formal and informal) can increase SMEs performance. We argued that formal and informal training provides the workforce with complementarities and specific skills that improve firm performance. Second, we contribute to previous literature by differentiating the impact between managerial and non-managerial training, separately, on firm performance, a gap that exists in the HRM literature (Georgiadis & Pitelis, 2016). Specifically, our study contributes to the previous literature by providing empirical evidence to support the argument that 'the impact of owner-managers training on firms' profitability may be different from that of non-managerial employees' (Georgiadis &

Pitelis, 2016: 410). Finally, we contribute to the IB literature on SMEs internationalisation by considering the effect of training on firm performance for internationalised firms, a research that has been absent in previous literature. Our paper provides empirical evidence that in internationalised SMEs, employee training takes the form of informal, on-the-job training, while owner-managers of internationalised firms tend to be involved in both types of training (i.e., formal and informal) in order to increase their skills, knowledge and competencies to deal with the complexity of the internationalisation process.

4.6. Implication and limitation

Our results have important implications for practice and research. For practice, and in contrast to previous studies which indicate that SMEs tend to prefer an informal type of employee training (e.g., Fuller et al., 2003; Kotey & Folker, 2007), we suggest that SMEs that provide their employees with both types of training (i.e., formal and informal) can achieve higher levels of firm performance, when compared to SMEs that focus on a single type of training. We suggest that complementarity exists between these types of training and that employees can acquire greater sets of skills and knowledge beneficial for their firms. In addition, we highlight the importance of owner-managers of small firms to be involved in training (both formal and informal) and its potential effect on firm performance. Moreover, for SMEs that are involved in internationalisation activities, such as exporting, we suggest that owner-managers should focus their resources in obtaining both types of training, which can enhance their internationalisation strategy and, ultimately, their intended performance.

We argued that the heterogeneity of the international markets and the complexity associated with internationalisation requires owner-managers to make decisions related to their expansion. In addition, based on our results, we suggest that owner-managers can benefit from training by obtaining significant competitive advantages in the future. Hence, we suggest that owner-managers of internationalised and non-internationalised SMEs may seek to invest in HRM by participating in 'formal and informal training' because, in the longer-run, investments in training can have significant and positive effects on the firm performance and sustainability.

There are, of course, limitations to the analysis in this study that may merit further examination. Using panel data or longitudinal research designs can capture volatility in firm performance and dynamics in the training and performance relationship. In addition, due to data limitations (UKLSBS, 2015) our classification of internationalised and non-internationalised firms was restricted to exporting activities. Future research should consider additional dependent variables (e.g., actual sales data) and investigate how training affects firm

performance between firms that are heavily involved in internationalisation (i.e., export intensity). Finally, using a qualitative research or mixed method approaches may provide significant insights into the reasons that prevent owner-managers in internationalised firms to provide their employees with formal, off-the-job training opportunities.

To conclude and reflecting on many of previous studies of HRM in SMEs, our findings provides more nuanced evidence regarding the relationship between training and SMEs performance. Our results lend support to the argument that the acquisition of knowledge and skills can be acquired through formal and informal training (Westhead & Storey, 1996). We argue that training in internationalised firms is most effective when it is acquired by owner-managers of SMEs due to the heterogeneity and complexity of the international markets, which require owner-managers to deal with the international activities and operations. Therefore, it has been suggested that, in internationalised SMEs, resources should be diverted to invest in training for owner-manager.

Appendix

Table 4.6 Description of the main variables (sample in percentage)

Variable	All firms	Exporting firms	Non-exporting firms
Actual turnover performance†			
Decreased	18.061	17.618	18.188
Stayed the same	42.777	35.455	44.865
Increased	39.161	46.928	36.947
Intended turnover performance†			
Decreased	9.730	8.200	10.160
Stayed the same	44.155	34.992	46.654
Increased	46.176	56.808	43.185
Formal employee training‡	58.709	26.256	73.743
Informal employee training‡	64.500	25.837	74.162
Employee training‡			
Formal employee training	10.065	25.205	74.795
Informal employee training	15.856	23.884	76.116
Both employee training	48.644	26.474	73.526
No employee training	25.434	20.997	79.003
Owner-managers training^			
Formal owner-managers training	16.333	73.509	26.491
Informal owner-managers training	14.447	74.403	25.597
Both owner-managers training	41.678	76.723	23.277
No owner-managers training	27.539	70.859	29.141
Export∗	21.615		

† n_{SMEs} =14379; $n_{exporting}$ =3190; $n_{non-exporting}$ =11189

‡ n_{SMEs} =14553; $n_{exporting}$ =3195; $n_{non-exporting}$ =11358

‡ n_{SMEs} =10879; $n_{exporting}$ =2670; $n_{non-exporting}$ =8209

^ n_{SMEs} =8112; $n_{exporting}$ =2089; $n_{non-exporting}$ =6023

∗ n_{SMEs} =15165; $n_{exporting}$ =3278; $n_{non-exporting}$ =11887

Table 4.7 Correlation between key explanatory variables and actual turnover performance

	Actual turnover performance		
Variable	All SMEs	Exporting SMEs	Non-exporting SMEs
Export¶	-0.060*		
Formal employee training¶	-0.087*	-0.028	-0.106*
Informal employee training¶	-0.099*	-0.065*	-0.109*
Employee training¶			
Formal employee training	-0.009	-0.040*	0.001
Informal employee training	0.004	0.012	0.001
Both employee training	0.092*	0.052*	0.104*
No employee training	-0.103*	-0.044*	-0.120*
Owner-managers training^			
Formal owner-managers training	-0.004	-0.011	-0.001
Informal owner-managers training	0.004	0.010	0.001
Both owner-managers training	0.034*	0.044*	0.031*
No owner-managers training	-0.037*	-0.045*	-0.035*

¶ n_{SMEs} =10294; $n_{exporting}$ =2602; $n_{non-exporting}$ =7692

^ n_{SMEs} =7720; $n_{exporting}$ =2042; $n_{non-exporting}$ =5678

* p < 0.05

Table 4.8 Correlation between key explanatory variables and intended turnover performance

	Intended turnover performance		
Variable	All firms	Exporting firms	Non-exporting firms
Export¶	-0.098*		
Formal employee training¶	-0.050*	-0.010	-0.058*
Informal employee training¶	-0.072*	-0.058*	-0.072*
Employee training¶			
Formal employee training	-0.015	-0.044*	-0.006
Informal employee training	0.013	0.024	0.011
Both employee training	0.059*	0.037	0.061*
No employee training	-0.069*	-0.033	-0.074*
Owner-managers training^			
Formal owner-managers training	-0.020	-0.024	-0.020
Informal owner-managers training	0.015	0.010	0.017
Both owner-managers training	0.017	0.048*	0.012
No owner-managers training	-0.014	-0.038	-0.011

¶ n_{SMEs} =10474; $n_{exporting}$ =2611; $n_{non-exporting}$ =7863

^ n_{SMEs} =7836; $n_{exporting}$ =2047; $n_{non-exporting}$ =5789

* p < 0.05

Table 4.9 Propensity Score Matching results

Approach	Nearest Neighbour Matching				MMWS approach		MMWS approach	
Model	Model 1 (employee)		Model 2 (employee)		Model 3 (employee)		Model 5 (owner-managers)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Formal training	0.047**	0.022			0.074	0.048	0.099**	0.043
Informal training			0.090**	0.028	0.099**	0.042	0.096**	0.044
Both training					0.187***	0.036	0.107***	0.035

***p < 0.01, **p < 0.05

Chapter 5: The effect of outward and inward internationalisation on different types of innovation: Is the relationship different in different sized-SMEs?[44]

Abstract

This paper empirically examines the effect of outward internationalisation, inward internationalisation and outward-inward internationalisation (i.e., exporting and importing) on different types of innovation undertaken by British SMEs. Specifically, we differentiate between product innovation and process innovation and examine the potential effect that they can generate individually and in combination. The results show that both inward and outward internationalisation support product and process innovation in SMEs. However, such an effect is found to be stronger for the combined outward-inward internationalisation operations than for the single mode undertaken by SMEs. The results are found to be robust across the different types of innovation. However, sub-sample analysis shows that, although innovation responds to different internationalisation operations in micro and small firms, for medium-sized firms, only the combination of outward and inward internationalisation operations increases the probability of undertaking both innovations. Using the organisational learning theory, we argue that engaging in both internationalisation operations simultaneously enables firms to acquire a more diverse and richer set of knowledge and key information, which is translated into increased levels of innovation. Hence, our results have important managerial, practical and policy implications and stimulate the existing debate in the area.

Keywords: SMEs, outward internationalisation, inward internationalisation, learning, innovation, product innovation, process innovation.

[44] This paper is currently under review in ABS 4* journal.

5.1. Introduction

There has been an increasing interest in understanding the role of internationalisation on firm's innovation. Existing research shows that both internationalisation and innovation contribute to firm's performance, productivity and growth (Prashantham, 2008; Halilem, Amara & Landry, 2014; Abubakar, Hand, Smallbone & Saridakis, 2019). Since internationalisation and innovation are interlinked, increasing attention is being directed to the specific channels through which international trade can affect firm innovation (Altomonte, Aquilante, BéKés & Ottaviano, 2014). To this end, the international business (IB) literature suggests that firms that are engaged in international activities are more likely to gain substantial competitive advantages through the interaction with their customers and suppliers and the competitive conditions of the foreign market in which they operate (Salomon & Shaver, 2005; Damijan & Kostevc, 2010). In addition, the organisational learning (OL) theory suggests that firms that are exposed to different economic environments and conditions can enhance their creativity and innovative activities to overcome the competition and strengthen their market share. It can be argued, therefore, that internationalisation in the form of imports and/or exports can serve as a learning opportunity for firms to gain more market and organisational operation knowledge, which in turn can trigger innovation (Kiriyama, 2012). Especially for smaller firms, since they face limitations in their internal resources compared with larger firms, innovative activities may be affected more by knowledge factors that are external to the firm (Acs, 2002; Abubakar & Mitra, 2009; Abubakar et al., 2019).

Therefore, exposure to international markets can allow firms to develop and expand their set of capabilities and thus increase their likelihood of growth and enhance their dominance in the marketplace (Lu & Beamish, 2006; Prashantham, 2008). For example, internationalised firms may be more likely to be exposed to new organisational ideas and methods of production, providing them with greater learning opportunities and knowledge tools to develop new skills and expand or improve existing organisational approaches that are not available in their domestic market (Hitt, Hoskisson & Kim, 1997). Although a great number of studies provide evidence regarding the positive effect of internationalisation on innovation (e.g., Kafouros, Buckley, Sharp & Wang, 2008; Lecerf, 2012), most of these studies concentrate on larger firms (e.g., Kafouros et al., 2008) rather than on SMEs (Abubakar et al., 2019). This is perhaps surprising, since previous research shows that SMEs that are involved in international activities are 'three times' more likely to introduce products or services that are new to their sector than those SMEs that focus entirely on their domestic market (European Commission, 2010; Love & Roper, 2015). Although the available literature stresses the link

between internationalisation and innovation, it still in its infant stage regarding the individual and combined roles of outward and inward internationalisation on innovation.

Specifically, most of the previous studies focus either on the link between outward internationalisation and innovation (e.g., Salomon & Shaver, 2005; Love & Ganotakis, 2013; Golovko & Valentini, 2014; Olabisi, 2017; Fassio, 2018) or on the effect of inward internationalisation on innovation (e.g., Goldberg, Khandelwal, Pavcnik & Topalova, 2010; Grosse & Fonseca, 2012; Kiriyama, 2012; Liu & Qiu, 2016; Chen, Zhang & Zheng, 2017) to determine how firms accumulate and implement knowledge (Hernández & Nieto, 2016). However, this literature ignores the potential effect on innovation that can be generated by combining the two forms of internationalisation operations. To fill this gap, this paper investigates whether a combination of outward and inward internationalisation operations along with their individual effects can help SMEs to develop product and process innovations and, if so, to what extent. Theoretically, we adopt the OL theory (Senge, 1990; Gerschewski, Lew, Khan & Park, 2018), and apply it to propose that the knowledge flow from international activities can stimulate SMEs' innovation (Zahra, Ucbasaran & Newey, 2009). In contrast to a large body of previous work, we do not treat innovation as an overall construct capturing different types of innovation together (Azari, Madsen & Moen, 2017). In addition, instead of focusing on a single type of innovation (e.g., Cassiman & Golovko, 2011; Alegre, Pla-Barber, Chiva & Villar, 2012; D'Angelo, Majocchi, Zucchella & Buck, 2013, for product innovation; and Golovko & Valentini, 2011; Monreal-Pérez, Aragón-Sánchez & Sánchez-Marín, 2012, for process innovation), we follow limited but growing recent research (e.g., Love & Roper, 2015; Abubakar et al., 2019; Saridakis, Idris, Hansen & Dana, 2019) and consider different types of innovation (i.e., product, process and a combination of product and process) and their potential association with inward and outward internationalisation. We utilise data from the second wave of the UK Longitudinal Small Business Survey LSBS (BEIS, 2017), conducted between August 2016 and January 2017 by BMG Research Ltd. The wave 2 is a large-scale telephone survey conducted with 9,248 small business owner-managers (those with up to 249 employees) in the United Kingdom.

By utilising such a large scale data, the aim is to provide a complete picture of the effect of different internationalisation operations on innovation for British SMEs (e.g., Seker, 2009; Hernández & Nieto, 2016). Moreover, the use of a large-scale data set allows us to examine the differences between larger-sized SMEs and smaller ones, which can be hidden when data is aggregated into a single size category (Idris & Saridakis, 2018).

Importantly, this work contributes to three distinctive streams of literature - the international business (IB) literature (e.g., Damijan & Kostevc, 2010; Nieto & Rodríguez, 2011; Grosse & Fonseca, 2012; Hernández & Nieto, 2016; Abubakar et al., 2019), the small business (SB) literature (e.g., Andersson & Lööf, 2009; Hernández & Nieto, 2016) and the innovation management (IM) literature (e.g., Rogers, 2004; Chiva, Ghauir & Alegre, 2014) in three important ways:

First, we add to the previous IB literature by empirically examining the effect of outward-inward internationalisation operations simultaneously on SMEs' innovation. In other words, our paper extends the extant studies that highlight the importance of taking into account the complementarities that may arise from different international activities (Bertrand, 2011; Hernández & Nieto, 2016). In this way, the paper extends the typical examination of the effect of outward international operations on innovation (e.g., Lileeva & Trefler, 2010; Ganotakis & Love, 2011; Bratti & Felice, 2012) or inward international operations on innovation (e.g., Anderson & Lööf, 2009; Filippetti, Frenz & Ietto-Gillies, 2012; Shahabadi & Havaj; 2012) individually since such studies are relatively rare which have integrated both inward and outward internationalisation and simultaneously examined their effect on product and process innovations. Second, we contribute to the SB literature by examining this relationship in different-sized SMEs, allowing us to extract disaggregated findings for research and policy purposes. Finally, we contribute to the OL theory by providing new empirical evidence to support the view that it is important for firms to acquire and share knowledge with international firms due to the demands of globalisation (Levitt & March, 1988; Argote & Miron-Spektor, 2011; Hernández & Nieto, 2016). Our results clearly suggest that undertaking both types of internationalisation operations may allow firms to increase their knowledge and access to information, thereby enhancing their absorptive capacity (Yao, Yang, Fisher, Ma, & Fang, 2013), which is ultimately related to firm's performance (George, Zahra, Wheatley, & Khan, 2001).

The chapter is organised as follows. Section 5.2 reviews the existing literature and derives the set of the hypotheses to be examined in this paper. Section 5.3 presents the data and the measurements used in the model. Section 5.4 contains the statistical methods and the results of the paper. Section 5.5 discusses the results, and the last section concludes the paper and offers directions for future research.

5.2. Background and hypotheses development

5.2.1. Internationalisation and innovation in SMEs

Internationalisation is defined as the process whereby a firm increases its international involvement in incremental stages (Johanson & Vahlne, 1977). In this paper, we follow Welch and Loustarinen's (1988) view on internationalisation from a wider perspective, which involves firm' inward and outward international operations. Therefore, internationalisation refers to 'the process of increasing involvement in international operations' (Welch & Loustarinen, 1988, p. 35). In contrast, the definition of innovation is less clear and more prone to several interpretations (Azari et al., 2017). Therefore, there is no clear agreement in the literature regarding how to define innovation and its different types and degrees. In this paper, however, we follow recent studies (e.g., Azari et al., 2017; Saridakis et al., 2019) and thus employ the definition from the *Oslo Manual* published in 2005, which implies that innovation is 'the implementation of a new or significantly improved product (goods or service), or process, a new marketing method, or a new organisational method in business practice' (OECD, 2005, p. 47).

Both internationalisation and innovation are considered as key factors that can lead to improved firm's performance and growth (Prashantham, 2008; Halilem et al., 2014). Due to the increased globalisation forces, small firms have started to recognise that they cannot operate in isolation from the opportunities and the risks associated with innovation and internationalisation. The IM literature indicates that innovative firms tend to enter international markets to increase their sales and reduce the costs associated with innovation (Rogers, 2004; Chiva et al., 2014). Previous studies provide evidence that innovation encourages firms' outward internationalisation (e.g., Roper & Love, 2002; Leonidou, Katsikeas, Palihawadana & Spyropoulou, 2007; Filipescu, Rialp & Rialp, 2009; Harris & Li, 2009; Pérez, Aragón-Sánchez & Sánchez-Marín, 2012; Saridakis et al., 2019). According to these studies, only efficient firms can endure the high cost of exporting and have the ability to innovate. In contrast, by engaging in outward internationalisation, such as exporting, firms may gain the ability to increase their innovative activities and enjoy higher returns (Chiva et al., 2014). Outward internationalisation may allow firms to access different and specific types of knowledge and innovative ideas from different markets (Hitt, Hoskisson & Ireland, 1994). This knowledge may be related, for example, to access to more advanced technology and technical skills (Kafouros et al., 2008), which are important for both product and process innovation (Pittiglio, Sica & Villa, 2009).

The roles of different international operations can stimulate firm innovation as follows. First, inward internationalisation, such as importing, may act as an important transmission

channel of international knowledge from the suppliers and trading partners to the firms, thus stimulating innovation (Damijan & Kostevc, 2010). Such a knowledge can be important for SMEs to develop innovation which lack resources and have weak investment in R&D activities. Second, outward internationalisation, in terms of exporting, can generate opportunities for learning-by-exporting to a new foreign market and thereby create opportunities for innovation (Higón & Driffield, 2007; Cassiman & Golovko, 2011). Previous studies, such as those by Almeida and Fernandes (2008) and Andersson and Lööf (2009), show that there is an association between innovation and firms' participation in exporting and importing activities. For example, Nieto and Santamaría (2010) find that exporting intensity is positively associated with innovation outcomes, while Goldberg et al. (2010) provide empirical evidence that importing increases new product innovation. However, other empirical studies find no significant effect of exporting (e.g., Schubert & Simar, 2010; Woerter & Roper, 2010) and importing (e.g., Shahabadi & Havaj, 2012) on innovation. Such contradictory findings raise doubts regarding the link between internationalisation and innovation and call for more research in this area (Damijan & Kostevc, 2010; Halilem et al., 2014). Below, we discuss the theoretical associations between outward internationalisation and innovation, inward internationalisation and innovation, and outward and inward internationalisation and innovation.

5.2.2. Outward internationalisation and innovation

Although different modes of internationalisation are available to SMEs, exporting is still often considered to be a firm's initial stage of internationalisation (Jones, 2001; Golovko & Valentini, 2011). Following recent empirical studies in this area (e.g., Idris & Saridakis, 2018; Abubakar et al., 2019; Saridakis et al., 2019), we use exporting as a proxy for outward internationalisation, defined as 'outward international trade in goods and/or services, conducted either directly or through a third party' (Love & Roper, 2015, p. 29). Previous studies generally support the argument that exporting firms are more productive than non-exporting firms. This assumption may be explained by either 'the self-selection hypothesis' or the 'learning-by-exporting hypothesis' (Fassio, 2018). The 'self-selection hypothesis' (Bernard & Jensen, 1999; Melitz, 2003) argues that, since the competition level in the export market is higher than that in the domestic market, only more productive firms will have the ability to export. Hence, a higher level of innovation enables firms to gain more access to export markets by increasing their productivity (Monreal-Pérez et al., 2012). Meanwhile, the 'learning-by-exporting hypothesis' suggests that exporting firms can become more productive because they

are exposed to international markets. Although a great number of studies conclude that firms that introduce innovation are more likely to export (e.g., Roper & Love, 2002; Cassiman, Golovko & Martínez-Ros, 2010; Saridakis et al., 2019), the evidence for learning-by-exporting is relatively limited (Bratti & Felice, 2012).

Previous work also finds that SMEs that are active in the international markets are more likely to introduce innovation than their counterparts (Love & Roper, 2015). Particularly, small firms, due to their managerial structure, are more flexible in taking rapid decisions, accept risks and respond to market opportunities. To this end, there are ample empirical studies suggesting that innovation positively affects exporting (e.g., Cassiman et al., 2010; Higón & Driffield, 2010; Cassiman & Golovko, 2011; Monreal-Pérez et al., 2012; Damijan & Kostevc, 2015; Saridakis et al., 2019). However, the number of studies examining whether embarking on exporting can stimulate innovation is relatively limited (e.g., Lileeva & Trefler, 2010; Ganotakis & Love, 2011; Bratti & Felice, 2012; Abubakar et al., 2019).

According to Golovko and Valentini (2014), firms' innovation, to a great extent, depends on external knowledge, which can be gained through the interaction with foreign markets. Some scholars suggest that acquiring new knowledge is the key to innovation, since innovation is considered as an individual and a collective learning process (e.g., Hitt et al., 1997; Pérez et al., 2012; Chang, Chen & McAleer, 2013). Additionally, since innovation depends on a firm's ability to learn and develop new knowledge, internationalisation may allow the firm not only to develop knowledge but also potentially to take advantage of new ideas and opportunities, which can stimulate creativity and facilitate the introduction of innovation (Hitt et al., 1997).

In other words, the effect of learning-by-exporting is found to hold (Chang et al., 2013), and few previous (empirical) studies provide supportive evidence for this view. For example, Alvarez and Robertson (2004) find a positive link between exporting and the probability of introducing innovation, while Wagner (2007) implies that internationalised firms tend to innovate more than their counterparts due to their access to a greater pool of knowledge and ideas from external networks and sources. Moreover, Salomon and Shaver (2005) find evidence for increased innovation through exporting for Spanish manufacturing firms. They argue that exporting firms have access to information that is not available in the domestic market. Meanwhile, Damijan et al. (2010) find that exporting may increase firms' probability of becoming a process innovator in a sample of medium-sized firms in Slovakia. In addition, Bratti and Felice (2012) show that firms' export status positively affects their probability of

introducing product innovation. Furthermore, Kotabe, Srinivasan and Aulakh (2002) suggest that internationalisation reduces the cost that is associated with innovation.

Based on the literature discussed above, we argue alongside previous studies (e.g., Liu & Buck, 2007; Abubakar et al., 2019) that firms will be encouraged to introduce innovation due to their participation in and the knowledge gained from foreign markets. Thus, based on the above discussion, we hypothesise that:

H1*: Outward internationalisation increases the likelihood of innovation in SMEs.*

However, innovation activities by exporting firms will differ according to their innovation strategy (Golovko & Valentini, 2014). The review of the previous literature reveals inconsistent results regarding the effect of exporting on different types of innovation, with most studies focusing exclusively on one type. For instance, some studies find a positive association between exporting and product innovation (e.g., Salomon & Shaver, 2005; Iacovone & Javorcik, 2012; Pérez et al., 2012; Olabisi 2017), but fail to account for process innovation. Some other studies, in contrast, suggest a positive effect of exporting on process innovation (cf. Damijan et al., 2010) without considering the potential effect on product innovation. These findings, although contributing significantly to our knowledge about the internationalisation-innovation nexus, provide an incomplete picture; we can argue, for example, that firms may undertake these two types of innovation simultaneously or that some firms may be more prone to engage in either product or process innovation based on the industry in which they operate. Since pursuing both innovation simultaneously can be a costly process, especially for SMEs which tend to lack resources and key-know how. The study by Lee, Lee and Choi (2014) considers both types of innovation and finds that internationalisation in Korean service firms is positively and significantly related to innovation but that the effect is greater on product innovation than on process innovation. A more recent study by Abubakar et al. (2019), using a sample of SMEs in developing countries, finds that there is no association between exporting and product innovation but that there is a negative association between exporting and process innovation. Pérez et al. (2012) show that exporting firms are more likely to develop more product innovation than non-exporting firms, while Cooper and Kleinschmidt (1985) show that product innovation enables younger and smaller firms to adapt to foreign market demands. In other words, internationalisation forces firms to update their products to adapt to different market demands and requirements (Silva, Africano & Afonso, 2010; Pérez et al., 2012). Following this line of argumentation, firms that are engaged in international activities have to

adjust their products and improve their quality after entering a foreign market (Alvarez, Faruq & Lopez, 2013), and the need for introducing product innovation in the international market is stronger for smaller firms than for larger firms (Golovko & Valentini, 2014). It can be argued, for example, that SMEs are more narrowly focused than larger firms and thus there is a need for them to invest in innovation to adapt their existing products or create new products so that they can compete successfully in the foreign market (Calantone, Cavusgil, Schmidt & Shin, 2004). In addition, product innovation is more important for small firms that are engaged in exporting activities, since it can assist them in mitigating the prices in the export market and overcome the liability of smallness. Bratti and Felice (2012) show that the export status of a firm can positively affect its likelihood of introducing product innovation. They imply that the interaction and communication with foreign buyers can provide the firm with information regarding customers' needs and market demands, which may be translated into product innovation.

The results between process innovation and internationalisation, however, are also revealing. Damijan et al. (2010), for example, find a positive relationship between firm exporting and process innovation. Some researchers, though, argue that SMEs tend to focus their efforts on product innovation rather than process innovation to increase their productivity (e.g., Wolff & Pett, 2006; Golovko & Valentini, 2014). Meanwhile, other scholars claim that process innovation, which is based on technological improvements and enhancement in developing production processes, can allow firms to introduce product innovation (Martínez-Ros & Labeaga, 2009). However, according to Bratti and Felice (2012), the probability of introducing process innovation increases for exporting firms only if they first introduce product innovation. Baldwin and Gu (2004) find that firms that start to export increase their product specialisation and hence their production run compared with firms that do not export. Importantly, Love and Ganotakis (2013) argue that the stronger competition in the international market puts pressure on exporting firms to improve both their product and their process innovation to operate internationally. Therefore, we argue that complementarity between product and process innovation potentially exists (e.g., Roper et al., 2008; Martínez-Ros & Labeaga, 2009; Van Beers & Zand, 2014; Lewandowska et al., 2016), and we propose that outward internationalisation can enable SMEs to gain valuable knowledge and skills related to production, marketing and R&D (Zahra et al., 2009) and capitalise on opportunities to adapt their products or create new products for foreign markets, as well as adopting new and more efficient methods of production. The preceding discussion lead to the following hypothesis:

***H2**: Outward internationalisation increases the likelihood of SMEs introducing a combination of product and process innovation.*

5.2.3. Inward internationalisation and innovation

As discussed earlier, firms can internationalise via two types of operations: outward and inward (Fletcher, 2001; Welch, Benito & Petersen, 2007; Hernández & Nieto, 2016). Most of the previous studies, however, tend to pay more attention to outward international operations in allowing firms to exploit the opportunity and obtain knowledge that can be used for their expansion and growth (Pangakar, 2008). However, firms may also internationalise through inward operations, such as importing or contractual collaborations (Welch et al., 2007). Hence, recent studies identify strategic reasons for inward operations, such as their ultimate role in boosting innovation (Nieto & Rodríguez, 2011). It is argued that, although imports are rarely viewed as an essential part of firms' internationalisation process, increasing competition demands firms to find ways to lower their costs and gain access to products and knowledge that are not available in their domestic market (Grosse & Fonseca, 2012).

Compared with the literature on the effect of learning via exporting, the literature on the effect of learning via importing is relatively small (Amodóvar, Saiz-Biones & Silverman, 2014). The extant theoretical work suggests that these two channels of international activities should lead to increased innovative learning, because each channel enables firms to exploit knowledge outside their environment. For instance, Keller (1999) shows that imports allow firms to establish networks and sustain channels of communication, which can generate the exchange of international knowledge and the learning of production methods. This can be attributed to the fact that imports can enhance firms' exposure to new products and processes since knowledge can be embodies in imported inputs and machinery (Filippetti et al., 2012). The current literature stresses the role of imports as an important transmission channel in gaining international knowledge (e.g., Madsen, 2007; Coe, Helpman & Hoffmaister, 2009). It is argued that imports are beneficial for firms' innovation because gains from importing can be achieved, as the imported inputs can be new, previously unavailable, inputs that can facilitate better production of the final output (Paunov, 2011). In line with this, Schneider (2005) finds that high-tech imports from developed economies are positively related to US patents. However, although previous studies examine the role of imports in the international technology and knowledge flow, most of these studies are macro-level studies rather than micro-level studies and have no clear focus on SMEs (see Abubakar et al., 2019 for a review).

The inward internationalisation of firms may assist them to acquire and absorb knowledge from their suppliers and ultimately become more innovative, especially in terms of their process innovation (Damijan & Kostevc, 2010). However, the empirical results are somehow mixed, although most of them tend to suggest a positive association between inward internationalisation and innovation. Anderson and Lööf (2009), for example, show that there is a positive association between engagement in imports and firms' innovative activities. Bertschek (1995) also finds that German imports have a positive effect on product and process innovation. In contrast, Shahabadi and Havaj (2012) find a statistically insignificant effect of imports on innovation. A more recent study by Abubakar et al. (2019) shows that there is a significant relationship between importing and product innovation but no association between importing and process innovation. Similarly, Goldberg et al. (2010) find that domestic Indian firms increase their product scope because of their ability to gain access to previously unavailable new inputs. Similarly, Liu and Buck (2007) find that importing more technology increases Chinese firms' innovation activities. In addition, a recent study by Chen et al. (2017) finds that importing goods and inputs increases firms' innovation activities in terms of R&D. Their results imply that importing from a high-income source has a stronger impact on innovation.

Hence, importing intermediate inputs allows domestic firms to gain access to knowledge and foreign technology, which may serve as the basis for product and/or process innovation (Kiriyama, 2012). In addition, trade in tangible goods, such as importing, may expose firms to different inputs that are not available in the domestic market, which can facilitate the exchange of new creative ideas and insights with the providers of machinery and inputs to develop innovation. Therefore, many of the previous studies linking international trade to innovation focus on imports and the knowledge embodied in importing intermediate goods (e.g., Rivera-Batiz & Romer, 1991). It can therefore be argued that firms that operate in their domestic markets will gain the ability to exploit knowledge by importing intermediate products (Anderson & Lööf, 2009). Based on the above literature, we hypothesise that:

H3*: Inward internationalisation increases the likelihood of innovation in SMEs.*

According to Damijan and Kostevc (2015), firms that have a great number of importing links are more likely to introduce new product or process innovation which subsequently enhance their productivity and growth. A study by Paunov (2011) shows that firms in Ecuador that are engaged in importing activities are able to influence their product innovation.

Meanwhile, Narayanan and Bhat (2009) suggest that a relationship exists between importing technology and firms' R&D. Additionally, Goldberg et al. (2010) find that firms that focus on their domestic markets have the ability to increase their product scope due to the fact that these firms gain access to valuable inputs, which result in the introduction of new products.

Reviewing the existing literature, we argue that SMEs that are engaged in importing are likely to introduce both product and process innovation. To put it differently, importing exposes firms to new processes, since new knowledge tends to be embedded in new machinery (Filippetti et al., 2012; Abubakar et al., 2019). In addition, firms that are engaged in importing intermediate goods and inputs may have to adjust and advance their production processes. As with the literature on the complementarity between product and process innovation (e.g., Roper et al., 2008; Lewandowska et al., 2016; Saridakis et al., 2019), we suggest that inward internationalisation may enable firms to obtain more knowledge from their suppliers, for instance, and therefore have the ability to introduce a combination of product and process innovation. Hence, we hypothesise that:

> ***H4****: Inward internationalisation increases the likelihood of SMEs introducing a combination of product and process innovation.*

5.2.4. Outward-inward internationalisation and innovation

Exposure to foreign markets enables firms to develop capabilities that can enhance their future growth (Lu & Beamish, 2006; Hernández & Nieto, 2016). Internationalisation via outward operations or inward operations exposes firms to new and diverse ideas, learning opportunities and specialised knowledge that enables them to enhance their ability to develop new skills and introduce innovation (Cheng & Bolon, 1993; Hitt et al., 1997; Chiva et al., 2014). Although the existing work finds that outward and inward internationalisation allow firms to exploit knowledge, gain more advantages and introduce innovation, a gap still exists in the literature regarding the potential impact that can be generated on innovation by implementing both forms of internationalisation operation (i.e., outward and inward) simultaneously (Hernández & Nieto, 2016).

The existing literature suggests that it is critical for firms to gain access to knowledge (Levitt & March, 1998), since firms, especially those that are involved in international activities, need to transfer knowledge due to globalisation demands. Hence, outward and inward international operations allow firms to gain access to different and varied types of knowledge and information from a variety of sources. According to Hernández and Nieto

(2016, p. 297), undertaking both internationalisation activities simultaneously allows firms to increase their 'diversity, relatedness and complementarity of their experiential knowledge' and thereby increase their absorptive capacity (Yao et al., 2013). Much of the previous research considers that internationalisation provides firms with different experiences that enable them to develop and learn new knowledge (Forsgren, 2002). According to Chiva et al. (2014), most of these studies argue that internationalisation creates new knowledge that encourages firms to innovate (e.g., Pittiglio, Sica & Villa, 2009). The literature on OL is generally linked to innovation (Dodgson, 1993). Gomes and Wojahn (2017) argue that firms are able to obtain better competitive advantages and a larger market share when they direct their efforts to innovation. Especially for SMEs, innovation is the key factor that enables them to increase their market share and power (Gunday, Ulusoy, Kilic & Alpkan, 2011). Therefore, it can be argued that SMEs that have the ability to learn through internationalisation can be in a better position to detect trends and events in the marketplace and utilise the market opportunities that may emerge. Internationalisation therefore exposes SMEs to various types of knowledge, ideas and learning methods, exposing to a richer and wider flow of knowledge and information and thus enabling them to innovate. Therefore, we propose that undertaking both internationalisation operations will have a stronger effect on SMEs' innovation. Hence, we hypothesise that:

> ***H5****: Outward-inward internationalisation will have a stronger effect on the likelihood of SMEs innovating than a single internationalisation operation.*

New knowledge is the foundation of innovation (e.g., Hitt et al., 1997; Alegre & Chiva, 2008); it allows firms to capture new ideas from different sources, exploit opportunities and reduce the costs associated with introducing new products and methods of production (Hitt et al., 1997; Kotabe et al., 2002; Kafouros et al., 2008; Pérez et al., 2012). The process of acquiring knowledge and its impact on firms can be approached from an OL perspective. Previous studies in this field recognise that firms need to adapt their processes and their organisational structure during the internationalisation process. However, their absorptive capacity may limit their ability to do so and to adapt their strategies (Vermeulen & Barkema, 2002). A great number of studies examine how firms can develop their absorptive capacity to sustain and create competitive advantages. These studies argue that the flow of new information can increase the knowledge stocks of firms and hence their absorptive capacity (Al-Laham, Tzabbar & Amburgey, 2011; Erden, Klang, Sydler & von Krogh, 2014).

Studies that examine inward-outward internationalisation focus on investigating how knowledge obtained from inward internationalisation can be used to perform outward internationalisation or vice versa (Hernández & Nieto, 2016). When firms engage in both internationalisation operations at the same time, they may have the ability to develop connections that can create various advantages. For example, it is argued that firms can improve their absorptive capacity due to the greater exposure to the diversity and complementarity of the accumulated knowledge, hence allowing them to exploit opportunities and discover solutions to their problems and ultimately to achieve and obtain better organisational outputs (Zahra & George, 2002; Kostopoulos, Papalexandris, Papachroni & Ioannou 2011; Yao et al., 2013).

In addition, the IB literature argues that firms engaging in importing or exporting activities are more likely to gain from the interaction with their suppliers and their customers and from the increased competition in the market (Damijan & Kostevc, 2010). Additionally, it is asserted that firms develop their capabilities and strategies based on learning; thus, the role of OL is considered as an important factor in developing new capabilities and competitive advantages (Gerschewski et al., 2018). Gomes and Wojahn (2017) argue that the main reason for introducing innovation is firms' desire to achieve better performance and increase their competitive advantages. Firms can increase their ability to gain more competitive advantages and a larger market share depending on the level of importance given to innovation (see Gunday et al., 2011). SMEs that are exposed to new learning are expected to have a better ability to recognise market opportunities and trends in the marketplace. Therefore, these firms are generally more flexible and have a quicker response to new challenges than their competitors (Jiménez-Jiménez & Sanz-Valle, 2011). Given the lack of previous studies that examine the effect of outward and inward internationalisation on different types of innovation, we argue, like the previous literature on the complementarity between product and process innovation, that undertaking both internationalisation operations may allow SMEs to receive a diverse set of knowledge and information, permitting them to introduce a combination of innovation forms. In addition, by applying the OL theory, that knowledge achieved by undertaking both operations can allow the firm to acquire richer knowledge and hence introduce both types of innovation. Therefore, we hypothesise that:

> ***H6**: Outward-inward internationalisation will have a stronger effect on introducing a combination of product and process innovation than a single internationalisation operation.*

5.3. Data and measurements

5.3.1. Data

This paper uses data from the second wave of the UK Longitudinal Small Business Survey LSBS (BEIS, 2017) conducted between August 2016 and January 2017 by BMG Research Ltd. The LSBS (wave 2) is a large-scale telephone survey of 9,248 small business owner-managers (those with up to 249 employees) in the UK, covering firms operating in England, Wales, Scotland and Northern Ireland. Therefore, it can be argued that the survey provides rich information from a large representative sample of UK firms (BEIS, 2017). Detailed information about the survey method, sampling and instruments can be found in the LSBS technical report (BEIS, 2017). Regarding the key variables in this study - exporting, importing and innovation - the survey provides data on (i) whether a firm exports goods and/or services outside the UK, (ii) whether a firm imports goods and/or services from outside the UK and (iii) whether a firm has introduced a significantly new or improved product or process innovation. These measures are discussed analytically below. The survey also provides information related to firms' characteristics, such as the region, sector, age of the firm, number of employees and turnover of the firm. The latter variables are used as controls in our modelling approach.

5.3.2. Measurements

5.3.2.1. Dependent variables

We follow previous and most recent empirical studies and measure innovation as the introduction of new products (goods or services) and processes as a proxy for firms' innovative activities (Nguyen, Pham, Nguyen & Nguyen, 2008; Higón & Driffield, 2010; Higón, 2011; Golovko & Valentini, 2014; Van Beers & Zand, 2014; Fassio, 2018; Abubakar et al., 2019; Saridakis et al., 2019). The survey asks owner-managers the following two questions regarding product and process innovation, respectively:

- 'Has your business introduced any new or significantly improved goods or services in the last three years?'
- 'Has your business introduced any new or significantly improved processes in the last three years?'

Thereafter, we create the following two dependent variables:

Overall innovation is measured through the above two dichotomous scale questions, taking the value of one if the firm introduced product or process innovation and zero otherwise. The survey shows that 42 per cent of SMEs introduced innovation, mostly product innovation

followed by product and process innovation together, while 58 per cent did not introduce innovation at all in the last three years. Table 5.1 shows the distribution of innovation by firm size, suggesting that, as the firm size increases, the scale of innovation increases along with the tendency to carry out process innovation individually or in combination with product innovation. We test whether there are statistical significant differences in the proportions between non-innovative micro, small and medium-sized firms and find that there are statistical significant differences between micro and small, between micro and medium-sized and between small and medium-sized firms at the 1 per cent level. For the product innovation, process innovation and product and process innovation categories, we also find statistically significant differences, with the sole exception being between small and medium-sized firms (for product innovation prob. = 0.248; for process innovation prob. = 0.181; and for the combination of product and process innovation prob. = -0.106).

Table 5.1 Innovation types by firm size

	All firms	Micro firms	Small firms	Medium firms
	Percentage (%)	Percentage (%)	Percentage (%)	Percentage (%)
No innovation	58.11	63.99	51.71	46.42
Product innovation	20.03	18.68	21.31	23.01
Process innovation	6.46	5.45	7.42	8.70
Product and process innovation	15.41	11.88	19.56	21.87
Obs.	8,319	4,865	2,224	1,230

Note: Percentages may not add up to 100 due to rounding.

5.3.2.2. Independent variables

Outward internationalisation (i.e., exporting)

Similarly, following the previous literature, we use exports as a proxy for internationalisation (e.g., Salomon & Shaver, 2005; Higón & Driffield, 2010; Ganotakis & Love 2011; Serra, Pointon & Abdou, 2012; Boehe, 2013; Golovko & Valentini, 2014; Idris & Saridakis, 2018; Abubakar et al., 2019; Saridakis et al., 2019). The survey asks owner-managers the following question:

- 'In the past 12 months did your business export any goods and/or services outside the UK?'

This construct takes the value of one if the firm exports goods and/or services outside the UK and zero otherwise. The survey shows that 22 per cent of SMEs in the UK exported goods and/or services outside the UK. Also, 60 per cent of the exporting SMEs introduced innovation in the last three years. In addition, 26 per cent of micro firms that exports introduced a

combination of product and process innovation, 30 per cent of exporting small firms and 30 per cent of exporting medium-sized firms introduced a combination of product and process innovation.

Inward internationalisation (i.e., importing)

Based on the previous literature (e.g., Hernández & Nieto, 2016; Abubakar et al., 2019), we use imports as a proxy for inward internationalisation. The survey asks the participants to respond to the following question:

- 'In the past 12 months have you directly imported any goods or services from outside the UK?'[45]

We constructed a variable taking the value of one if the firm imported goods or services from outside the UK and zero otherwise. The survey shows that 23 per cent of SMEs imported goods or services from outside the UK. Moreover, 59 per cent of the importing firms introduced innovation in the last three years and 23 per cent of the importing micro firms introduced a combination of product and process innovation (followed by 28 per cent of the importing medium-sized firms and 26 per cent of the importing small firms).

Outward and inward internationalisation (i.e., exporting and importing)

To capture the different internationalisation operations of firms, we follow recent work (e.g., Seker, 2009; Hernández & Nieto, 2016) and distinguish between firms according to their internationalisation operations. In particular, we create an index to distinguish between firms that are (i) only involved in outward internationalisation (i.e., exporting), (ii) only involved in inward internationalisation (i.e., importing), (iii) involved in both international operations (i.e., exporting and importing) simultaneously and (iv) not involved in any international operations (reference category). Table 5.2 shows that about 20 per cent of medium-sized firms are engaged in exporting and importing activities, followed by 18 per cent of small firms and 8 per cent of micro firms. We also test whether there are statistically significant differences in the proportions between different-sized bands with different internationalisation operations. The results show that there is no statistically significant difference between micro and small firms that export only (prob. = 0.390), between micro and medium-sized firms that export only (prob. = 0.540) and between small and medium-sized firms that export only (prob. = 0.944) for

[45] The survey asks owner-managers whether the imports were from the EU and/or outside the EU; however, this is beyond the scope of this paper. Hence, we group them into one category.

exporting firms. Moreover, we find that the difference between micro and small firms that import only is statistically insignificant (prob. = 0.242). As for importing and exporting firms, the results show that micro, small and medium-sized firms are statistically significantly different from each other.

Table 5.2 Innovation types by firms' internationalisation operations

	All firms	Micro firms	Small firms	Medium firms
	Percentage (%)	Percentage (%)	Percentage (%)	Percentage (%)
No international operations	67.87	73.60	61.81	56.20
Outward operations only	9.23	8.98	9.62	9.54
Inward operations only	10.40	9.54	10.43	13.78
Outward-inward operations	12.49	7.89	18.15	20.47
Obs.	8285	4844	2215	1226

Note: Percentages may not add up to 100 due to rounding.

5.3.2.3. Control variables

In our specification, we control for several variables, such as the age of the firm (e.g., Hansen, 1992; Abubakar et al., 2019), measured as the number of years since the firm started operating, the firm's turnover, the size of the firm (Higón, 2011), the number of sites the firm has (e.g., Roper & Love, 2002) and the legal status of the firm (Higón & Driffield, 2010). Following previous work (e.g., Andersson & Lööf, 2009; Abubakar et al., 2019), we also control for the firm's external environmental factors, specifically the ability of the firm to obtain financial resources, the market competition and the networking linkages (for the latter, see Kingsley & Malecki, 2004; Rogers, 2004; Saridakis et al., 2019). It is argued, for example, that access to finance is often a major obstacle for small firms to carry out innovative activities. Finally, a general argument in the neo-Schumpeterian literature is that the characteristics of a particular sector or industry may influence its innovative activities (Andersson & Lööf, 2012); hence, we control for the sector effects along with the regions. Table 5.7 in the Appendix presents the definitions of the variables used in this paper. In addition, in the Appendix, we present the summary statistics of the key variables (Table 5.8) and the correlation matrices (Tables 5.9-5.10).

5.4. Empirical results

To test the association between internationalisation and innovation, we use two statistical approaches. (1) Since overall innovation takes only two possible values (1 if the firm introduced innovation and 0 otherwise), we use a probit regression (for a discussion, see

Gujarati 1995: 552-570) to examine the association between internationalisation operations (i.e. exporting, importing, and exporting and importing) and innovation.[46] Our model can be written as follows:

$$I_j = \begin{cases} 0 & \text{if} \quad I_j^* \leq 0 \\ 1 & \text{if} \quad I_j^* > 0 \end{cases} \tag{1}$$

$$I_j^* = X_j b_j + EX_j \vartheta + IM_j \delta + EXIM_j \gamma + e_j \tag{2}$$

where I_j^* denotes the latent variable and *EX*, *IM* and *EXIM* are the indicator variables for whether the firm has exported, imported and both (i.e. exported and imported), respectively. *X* is the vector of firm characteristics for firm *j*. b, ϑ, δ and γ are the parameters to be estimated. In addition, following the previous literature (e.g., Wagner, 2002; Yasar & Rejesus, 2005; Saridakis et al., 2019), we apply propensity score matching techniques (Rosenbaum & Rubin, 1983) to reduce the potential biases and allow stronger causal inferences between the internationalisation operations and innovation.

When the innovation variable is disaggregated to capture a single (i.e., either product innovation or process innovation) or the combined type of innovation (i.e., both product and process innovation), the above model is re-estimated using a multinomial logit model (the base category is no innovation), which is a generalisation of the binary logit model (Brooks, 2008). We test for the independence of irrelevant alternatives (IIA) using both the Hausman and the Small–Hsiao test. Both tests suggests that the IIA has not been violated. Our dependent variable in this case is a categorical and unordered variable, $j = 4$, and can be written as follows:

$$I_j = \begin{cases} 0 & \text{if} \quad I \neq j \\ 1 & \text{if} \quad I = j \end{cases} \tag{3}$$

For both models, we present the marginal effects to assist with the interpretation of the results and estimate the particular effects for each category (in the case of the multinomial logit model).

[46] We also use a logit model; however, the results are similar and thus are not reported here.

5.4.1. Full-sample analysis

5.4.1.1. The relationship between internationalisation operations and innovation

We start examining our hypotheses by first investigating the relationship between internationalisation operations and innovation and different types of innovation for all SMEs. In Table 5.3, we present the marginal effect of the probit analysis of the relationship between internationalisation operations and innovation for all SMEs. The results presented in Model 1 of Table 5.3 show that exporting increases the likelihood of introducing innovation by 15.5 per cent compared with non-exporting firms. To examine the robustness of this finding, we also use propensity score matching techniques (see Cameron & Trivedi, 2005, for a technical discussion) that account for potential endogeneity between exporting and innovation. More specifically, we apply the nearest-neighbour estimator techniques and find that, for firms that are engaged in exporting, exporting has caused the probability of introducing innovation to be 17.1 percentage points higher than it would have been otherwise (see Model 1, Table 5.11 in the Appendix). Moreover, the results of Model 2 in Table 5.3 show that importing increases the likelihood of introducing innovation by 18.8 per cent compared with no importing. Estimating the effect using propensity score matching techniques, we find that, for firms that are engaged in importing, importing has caused the probability to introduce innovation to be 16.8 percentage points higher than it would have been otherwise (see Model 2, Table 5.11 in the Appendix).

When differentiating between firms according to their international exposure, the results (Model 3, Table 5.3) show that, compared with no trading, exporting only increases the probability of introducing innovation by 13.5 per cent, while importing only increases the probability of introducing innovation by 17.9 per cent. In addition, the results show that carrying out both exporting and importing activities increases the likelihood of introducing innovation by 25 per cent. Using a model that allows multiple nominal-level treatments, the results are found to be consistent with those reported in Table 5.3 and thus are not discussed here (see Model 3, Table 5.11 in the Appendix). Using the Wald test (see Judge, Griffiths, Hill, Lutkepohl & Lee, 1985), we determine whether these coefficients are statistically different from each other. The results show that the coefficient of exporting is statistically significantly different from the coefficient of importing ($x^2(1) = 2.97$ and prob. = 0.084) and the one reported for the combination of exporting and importing ($x^2(1) = 21.32$ and prob. = 0.001). Moreover, the results show that the coefficient of importing is statistically significantly different from the coefficient of the combination of exporting and importing ($x^2(1) = 8.95$ and

prob. = 0.002). Hereafter, we restrict the sample to those SMEs that import. The results in Model 5 of Table 5.3 show that, compared with importing, exporting increases the likelihood of innovation by 13 per cent. In addition, we find that the combination of exporting and importing increases SMEs' innovation by 24.3 per cent compared with importing. Finally, the results show that the coefficients of exporting and exporting and importing together are statistically significantly different from each other ($x^2(1) = 19.79$ and prob. = 0.001).

5.4.1.2. The relationship between internationalisation operations and different types of innovation

Table 5.4 presents the marginal effect of the multinomial logit analysis of the relationship between internationalisation operations and different types of innovation for all SMEs (we exclude the marginal effect of the base category, which is no innovation). The results show that firms that are engaged in exporting increase the probability of introducing product innovation only (Model 1a, Table 5.4) by 7.6 per cent and the combination of product and process innovation (Model 1c, Table 5.4) by 5.9 per cent. However, the results show that exporting is not statistically significantly associated with introducing process innovation (Model 1b, Table 5.4). Moreover, we find that importing increases the probability of introducing product innovation and a combination of product and process innovation by 7.9 per cent and 7.6 per cent, respectively (Model 2a, 2c, Table 5.4).

When differentiating between firms according to their international operations, the results suggest that the probabilities of introducing product innovation only and a combination of product and process innovation are both associated with engaging in different international operations. More specifically, the results (Models 3a, 3c, Table 5.4) show, compared with no trading at all, that the combination of exporting and importing increases the probability of introducing product innovation only and a combination of product and process innovation by 11.6 per cent and 9.8 per cent, respectively. Importing, on the other hand, only increases the probability by 6.1 per cent for product innovation and 8.1 per cent for a combination of product and process innovation. Meanwhile, exporting is found to increase the probability of introducing product innovation by 5.6 per cent and the probability of a combination of product and process innovation by 5.8 per cent.

We test whether the above coefficients are statistically significantly different from each other. The results show that, for the coefficients associated with product innovation (Model 3a, Table 5.4), both exporting and importing are statistically significantly different from the

combination of exporting and importing ($x^2(1) = 17.59$ and prob. = 0.001; and $x^2(1) = 11.47$ and prob. = 0.001, respectively), while, for the coefficients associated with product and process innovation (Model 3c, Table 5.4), the results show that all the coefficients are statistically significantly different from each other.

When restricting the sample to those SMEs that import only, the results support the previous findings. The results (Model 4a, 4c, Table 5.4) show that exporting only increases the probability of introducing product innovation by 5.2 per cent, and by 5.5 per cent for introducing a combination of product and process innovation. In addition, the results show that the combination of exporting and importing increases the probability of introducing product innovation by 11 per cent and the probability of introducing product and process innovation by 9.1 per cent. We test whether these coefficients are statistically significantly different from each other, and the results suggest that they are indeed ($x^2(1) = 16.10$ and prob. = 0.001 for Model 4a, $x^2(1) = 6.01$ and prob. = 0.014 for Model 4c).

Table 5.3 The association between internationalisation operations and innovation (all SMEs)

Sample	**Innovation**			
probit regression	(1)	(2)	(3)	(4)
Exports	0.155*** *0.015*			
Imports		0.188*** *0.014*		
International operations (base category: no trade)				
Exports only			0.135*** *0.020*	
Imports only			0.179*** *0.019*	
Exports and imports			0.250*** *0.019*	
International operations (base category: imports)				
Exports only				0.130*** *0.020*
Exports and imports				0.243*** *0.020*
Controls	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-5143.6187	-5092.5226	-5067.7585	-4492.9963
Chi 2(degrees of freedom)	1025.62(42)	1079.11(42)	1128.64(44)	1034.62(43)
Obs.	8319	8285	8285	7423

Notes: All the models include control variables (full results are available on request).
As a robustness check, we also estimate a logit model, and the results are found to be similar to those reported here.
Values in *italics* are standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1

Table 5.4 The association between internationalisation operations and different types of innovation (all SMEs)

Sample	Product innovation				Process innovation				Product and process innovation			
mlogit regression	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)	(1c)	(2c)	(3c)	(4c)
Exports	0.076***				0.001				0.059***			
	0.011				*0.006*				*0.009*			
Imports		0.079***				0.009				0.076***		
		0.010				*0.006*				*0.009*		
International operations **(base category: no trade)**												
Exports only			0.056***				0.002				0.058***	
			0.015				*0.009*				*0.012*	
Imports only			0.061***				0.013				0.081***	
			0.014				*0.008*				*0.011*	
Exports and imports			0.116***				0.003				0.098***	
			0.014				*0.008*				*0.011*	
International operations **(base category: imports)**												
Exports only				0.052***				0.002				0.055***
				0.015				*0.009*				*0.012*
Exports and imports				0.110***				0.006				0.091***
				0.014				*0.008*				*0.011*
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-8518.1357	-8450.4436	-8421.1041	-7403.0259	-8518.1357	-8450.4436	-8421.1041	-7403.0259	-8518.1357	-8450.4436	-8421.1041	-7403.0259
Chi 2(degrees of freedom)	1308.49(126)	1360.40(126)	1419.08(132)	1277.06(129)	1308.49(126)	1360.40(126)	1419.08(132)	1277.06(129)	1308.49(126)	1360.40(126)	1419.08(132)	1277.06(129)
Obs.	8319	8285	8285	7423	8319	8285	8285	7423	8319	8285	8285	7423

Notes: All the models include control variables (full results are available on request).
Values in *italics* are standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1.

5.4.2. Subsample analysis

5.4.2.1. The relationship between internationalisation operations and innovation by firm size

We now turn to examining the association between internationalisation operations and innovation by differentiating between SMEs according to their size bands. Table 5 reports the marginal effect of the probit analysis for the internationalisation-innovation nexus for micro, small and medium-sized firms, respectively. The results show that exporting increases the probability of introducing innovation in micro firms (Model 1a, Table 5.5) by 14.7 per cent, while it increases it by 18.8 per cent in small firms (Model 1b, Table 5.5). However, for medium-sized firms, the effect drops substantially with exporting to increase the likelihood of innovation by only 6.8 per cent (Model 1c, Table 5.5). In addition, the results suggest that importing increases the probability of introducing innovation by 20.7 per cent in micro firms (Model 2a, Table 5.5), by 18 per cent in small firms (Model 2b, Table 5.5) and by 11.4 per cent in medium-sized firms (Model 2c, Table 5.5).

When differentiating between firms according to their various forms of internationalisation operations (i.e. exporting or importing or both internationalisation operations), the results are also interesting. For example, we find that, for micro firms (Model 3a, Table 5), different types of international operations increase the probability of introducing innovation. More specifically, the results show that, compared with no trading, exporting only in micro firms increases the probability of introducing innovation by 11.1 per cent and importing only increases the probability of innovation by 19.5 per cent. However, the results show that exporting and importing have a stronger effect on the probability of introducing innovation in micro firms (27 per cent). We find that the estimated coefficients are statistically significantly different from each other.[47] Similar results are obtained for small firms (Model 3b, Table 5.5), that is, 19.5 per cent for exporting only, 17.7 for importing only and 25 per cent for exporting and importing.[48] However, for medium-sized firms (Model 3c, Table 5.5), the results show that, isolating the exporting activity, exporting only is not associated with innovation. In contrast, operating an importing activity only is shown to increase the probability of introducing innovation by 10.7 per cent. However, when both exporting and importing

[47] The results show that exporting only is statistically significantly different from importing ($x^2(1) = 5.98$ and prob. = 0.014) and from exporting and importing ($x^2(1) = 18.78$ and prob. = 0.001). In addition, importing is statistically significantly different from exporting and importing ($x^2(1) = 4.35$ and prob. = 0.037).

[48] We also test whether these coefficients are statistically significantly different from each other, and the results suggest that only importing is statistically significantly different from exporting and importing in small firms ($x^2(1) = 3.08$ and prob. = 0.079).

activities are performed together, they are found to increase the probability of innovation by 14.4 per cent. We test whether these two coefficients are statistically significantly different from each other, and the results show that they are not ($x^2(1) = 0.45$ and prob. = 0.502).

Thereafter, we restrict the sample to those firms that undertake any internationalisation activity. The results show that, in micro firms (Model 4a, Table 5.5), both exporting only (10.6 per cent) and exporting and importing together (26.3 per cent) increase the probability of these firms introducing innovation compared with micro firms that undertake an importing activity only (base category).[49] Similar results are obtained for small firms (Model 4b, Table 5.5) (19.1 per cent for exporting and 23.9 per cent for exporting and importing).[50] As for medium-sized firms, the results (Model 4c, Table 5.5) show that, compared with importing only, exporting and importing increase the probability of introducing innovation by 14 per cent, whereas exporting only is found not to have an effect on innovation. Hence, it appears that exporting is a more important factor of innovation for smaller SMEs than importing, but the effect becomes larger when both internationalisation operations are performed at the same time.

5.4.2.2. The relationship between internationalisation operations and innovation by firm size

Finally, we examine the association between internationalisation operations and different types of innovation in different-sized SMEs. Tables 5.6a, 5.6b and 5.6c present the marginal effects of the multinomial logit analysis for the internationalisation-innovation nexus in micro, small and medium-sized firms, respectively (we do not report the results for the base category, no innovation, but we focus the discussion on types of innovation). The results (Model 1a, Table 5.6a) show that, in micro firms, exporting increases the probability of introducing product innovation only by 7.1 per cent and a combination of product and process innovation (Model 1c, Table 5.6a) by 4.7 per cent. However, the results show that exporting is not statistically significantly related to process innovation in micro firms. Similar results are obtained regarding importing in micro firms (8.5 per cent for product innovation and 8 per cent for product and process innovation, respectively).

When differentiating between different forms of international exposure within micro firms, the results show that all types of international exposure are associated with the

[49] We also test whether these two coefficients are statistically significantly different from each other. The results suggest that they are ($x^2(1) = 17.94$ and prob. = 0.001).

[50] We also test whether these two coefficients are statistically significantly different from each other. The results suggest that they are not different from each other ($x^2(1) = 1.14$ and prob. = 0.285).

probability of introducing product innovation only or a combination of product and process innovation. In more detail, the results suggest that exporting only in micro firms increases the probability of introducing product innovation by 4.7 per cent and process innovation by 4.3 per cent. Importing only, however, increases the probability of introducing product innovation by 6.9 per cent and process innovation by 8.8 per cent.

In addition, the results show that the combined internationalisation operation (exporting and importing) has a stronger effect on introducing product innovation (by 12 per cent) and a combination of product and process innovation (by 9 per cent). Using the Wald test, we determine whether these coefficients are statistically significantly different from each other. The results show that, in the product innovation equation, exporting is statistically significantly different from both exporting and importing activities ($x^2(1) = 13.66$ and prob. = 0.001) and that importing is also different from both exporting and importing activities ($x^2(1) = 5.21$ and prob. = 0.022).

Table 5.5 The association between internationalisation operations and innovation by firm size

Sample	Innovation in micro firms				Innovation in small firms				Innovation in medium-sized firms			
probit regression	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)	(1c)	(2c)	(3c)	(4c)
Exports	0.147***				0.188***				0.068*			
	0.020				*0.028*				*0.039*			
Imports		0.207***				0.180***				0.114***		
		0.020				*0.027*				*0.037*		
International operations **(base category: no trade)**												
Exports only			0.111***				0.195***				0.051	
			0.026				*0.039*				*0.054*	
Imports only			0.195***				0.177***				0.107**	
			0.026				*0.037*				*0.046*	
Exports and imports			0.270***				0.250***				0.144***	
			0.029				*0.032*				*0.048*	
International operations **(base category: imports)**												
Exports only				0.106***				0.191***				0.046
				0.026				*0.040*				*0.055*
Exports and imports				0.263***				0.239***				0.140***
				0.029				*0.034*				*0.051*
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-2908.8069	-2867.3427	-2856.4599	-2546.6364	-1399.37	-1393.1532	-1380.8635	-1231.5486	-790.79071	-784.55074	-783.94689	-672.6496
Chi 2(degrees of freedom)	540.84(42)	593.51(42)	615.28(44)	541.99(43)	281.78(42)	281.80(42)	306.38(44)	282.27(43)	117.26(42)	124.74(42)	125.94(44)	116.01(43)
Obs.	4865	4844	4844	4382	2224	2215	2215	1984	1230	1226	1226	1057

Notes: All the models include the control variables discussed earlier in the text (full results are available on request).
As a robustness check, we also use a logit model. The results, however, are similar to the ones presented here.
Values in *italics* are standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1.

Furthermore, the results show that, in the product and process equation, the exporting coefficient is statistically significantly different from the importing coefficient ($x^2(1) = 8.54$ and prob. = 0.003) and from the combined exporting and importing coefficient ($x^2(1) = 12.61$ and prob. = 0.001). We also test whether these coefficients are statistically significantly different across these two equations (i.e., product innovation and product and process innovation). The results show that only the importing coefficient is statistically significantly different across the two equations ($x^2(1) = 7.49$ and prob. = 0.006). When restricting the sample to those micro firms that carry out an importing activity only, the results are consistent with the previous estimations. More specifically, the results suggest that exporting and exporting and importing together increase the likelihood of introducing product innovation and product and process innovation together (5.2 per cent for product innovation when exporting only and 11 per cent when exporting and importing; 5.5 per cent for product and process innovation when exporting only and 9.1 per cent when exporting and importing together).[51]

Table 5.6b presents the marginal effects for small firms. The results show that exporting increases the probability of introducing product innovation by 9.8 per cent and a combination of product and process innovation by 8.5 per cent. However, the results show that exporting is not statistically significantly related to process innovation in small firms. Similar results are obtained regarding importing in small firms (for product innovation by 7.5 per cent and for product and process innovation by 6.8 per cent). When differentiating between different types of international exposure in small firms, the results show that all the types are associated with the probability of introducing product innovation and a combination of product and process innovation. In more detail, the results suggest that exporting only in small firms increases the probability of introducing product innovation by 10.3 per cent and product and process innovation by 8.5 per cent.

Importing only, however, increases the probability of introducing product innovation by 6.7 per cent and product and process innovation by 5.5 per cent. However, the results show that exporting and importing together have a stronger effect on introducing product innovation (increasing the probability by 12 per cent) and a combination of product and process innovation (increasing the probability by 10.9 per cent). In contrast to micro firms, the results show that importing only increases the probability of small firms introducing process innovation (by 3.5 per cent). Using the Wald test, we investigate whether these coefficients are statistically

[51] We test whether these coefficients are statistically significantly different from each other. The results show that the exporting coefficient is statistically significantly different from the exporting and importing coefficient in the two equations ($x^2(1) =$ 13.49 and prob. = 0.001, $x^2(1) =$5.67 and prob. = 0.017, respectively).

significantly different from each other. The results show that, in the product innovation equation, the importing coefficient is statistically significantly different from the coefficient for exporting and importing together ($x^2(1) = 3.86$ and prob. = 0.049). Moreover, the results show that, in the product and process innovation equation, the importing coefficient is statistically significantly different from the exporting and importing one ($x^2(1) = 4.22$ and prob. = 0.039).

We also determine whether these coefficients are statistically significantly different across these two equations (i.e., product innovation and product and process innovation). The results show that these coefficients are not statistically significantly different across the two equations. When restricting the sample to small firms that import only, the results are consistent with the previous findings. More specifically, the results suggest that exporting and exporting and importing together increase the likelihood of introducing product innovation and product and process innovation (for product innovation by 9.9 per cent when exporting only and by 11.2 per cent when exporting and importing together; for product and process innovation by 8.2 per cent when exporting only and by 10.6 per cent when exporting and importing).[52]

[52] We test whether these coefficients are statistically significantly different from each other. The results show that the coefficient of exporting is not statistically significantly different from that of exporting and importing in the two equations ($x^2(1) = 0.57$ and prob. = 0.451, $x^2(1) = 0.47$ and prob. = 0.492, respectively).

Table 5.6a The association between internationalisation operations and different types of innovation (micro firms)

Sample	**Product innovation**				**Process innovation**				**Product and process innovation**			
mlogit regression	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)	(1c)	(2c)	(3c)	(4c)
Exports	0.071***				0.008				0.047***			
	0.014				*0.008*				*0.010*			
Imports		0.085***				0.010				0.080***		
		0.013				*0.008*				*0.010*		
International operations (base category: no trade)												
Exports only			0.047**				0.004				0.043***	
			0.018				*0.010*				*0.014*	
Imports only			0.069***				0.005				0.088***	
			0.017				*0.011*				*0.012*	
Exports and imports			0.120***				0.016				0.090***	
			0.019				*0.011*				*0.014*	
International operations (base category: imports)												
Exports only				0.045**				0.004				0.040***
				0.018				*0.010*				*0.013*
Exports and imports				0.118***				0.017				0.081***
				0.018				*0.011*				*0.013*
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
log Likelihood	-4562.6672	-4506.8966	-4494.5241	-3965.3468	-4562.6672	-4506.8966	-4494.5241	-3965.3468	-4562.6672	-4506.8966	-4494.5241	-3965.3468
Chi 2(degrees of freedom)	709.02(126)	770.44(126)	795.18(132)	686.51(129)	709.02(126)	770.44(126)	795.18(132)	686.51(129)	709.02(126)	770.44(126)	795.18(132)	686.51(129)
Obs.	4865	4844	4844	4382	4865	4844	4844	4382	4865	4844	4844	4382

Notes: All the models include the control variables mentioned and discussed earlier in the text (full results are available on request).
Values in *italics* are standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1.

Finally, in Table 5.6c we present the marginal effect for medium-sized firms. The results show that exporting is not statistically significantly associated with introducing any type of innovation in medium-sized firms. On the contrary, the results suggest that the coefficient of importing is statistically significant implying an increase in the probability of introducing product innovation by 6.6 per cent and a combination of product and process innovation by 6.1 per cent in medium-sized firms. When differentiating between different international exposures, we find that exporting and importing together significantly increase the probability of introducing product innovation by 8.1 per cent and product and process innovation activities by 8.4 per cent. However, the results show that importing only is positive and statistically significantly related to the probability of introducing a combination of product and process innovation (increasing the probability by 6.9 per cent). We test whether the exporting and importing coefficients are statistically significantly different across the two equations (i.e., product innovation and product and process innovation), and the results show that they are not ($x^2(1) = 0.04$ and prob. = 0.849). When restricting the sample to importing firms only, the results show that, compared with importing only, exporting and importing together are statistically significant and increase the probability of introducing product and process innovation by 9.4 per cent. However, the results show that exporting and importing together are not statistically significantly related to the probability of introducing product innovation compared with importing only.

Table 5.6b The association between internationalisation operations and different types of innovation (small firms)

Sample	**Product innovation**				**Process innovation**				**Product and process innovation**			
mlogit regression	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)	(1c)	(2c)	(3c)	(4c)
Exports	0.098***				-0.014				0.085***			
	0.021				*0.014*				*0.019*			
Imports		0.075***				0.019				0.068***		
		0.021				*0.013*				*0.019*		
International operations (base category: no trade)												
Exports only			0.103***				-0.014				0.085***	
			0.029				*0.021*				*0.027*	
Imports only			0.067**				0.035**				0.055**	
			0.029				*0.017*				*0.028*	
Exports and imports			0.120***				-0.001				0.109***	
			0.026				*0.017*				*0.024*	
International operations (base category: imports)												
Exports only				0.099***				-0.011				0.082***
				0.030				*0.020*				*0.027*
Exports and imports				0.112***				-0.002				0.106***
				0.026				*0.016*				*0.024*
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-2416.0678	-2412.6227	-2394.531	-2115.2207	-2416.0678	-2412.6227	-2394.531	-2115.2207	-2416.0678	-2412.6227	-2394.531	-2115.2207
Chi 2(degrees of freedom)	428.25(126)	415.66(126)	451.84(132)	412.91(129)	428.25(126)	415.66(126)	451.84(132)	412.91(129)	428.25(126)	415.66(126)	451.84(132)	412.91(129)
Obs.	2224	2215	2215	1984	2224	2215	2215	1984	2224	2215	2215	1984

Notes: All the models include control variables (full results are available on request).
Values in *italics* are standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 5.6c The association between internationalisation operations and different types of innovation (medium-sized firms)

Sample	**Product innovation**				**Process innovation**				**Product and process innovation**			
mlogit regression	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)	(1c)	(2c)	(3c)	(4c)
Exports	0.023				-0.009				0.048			
	0.032				*0.021*				*0.029*			
Imports		0.066**				-0.024				0.061**		
		0.030				*0.021*				*0.028*		
International operations (base category: no trade)												
Exports only			-0.038				0.018				0.057	
			0.049				*0.026*				*0.041*	
Imports only			0.029				-0.001				0.069*	
			0.039				*0.026*				*0.037*	
Exports and imports			0.081**				-0.033				0.084**	
			0.039				*0.028*				*0.037*	
International operations (base category: imports)												
Exports only				-0.046				0.020				0.054
				0.050				*0.027*				*0.041*
Exports and imports				0.054				-0.026				0.094**
				0.041				*0.029*				*0.039*
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
log Likelihood	-1400.4305	-1389.9263	-1387.2424	-1184.4998	-1400.4305	-1389.9263	-1387.2424	-1184.4998	-1400.4305	-1389.9263	-1387.2424	-1184.4998
Chi 2(degrees of freedom)	247.49(124)	256.53(126)	261.89(132)	244.47(129)	247.49(124)	256.53(126)	261.89(132)	244.47(129)	247.49(124)	256.53(126)	261.89(132)	244.47(129)
Obs.	1230	1226	1226	1057	1230	1226	1226	1057	1230	1226	1226	1057

Notes: All the models include control variables (full results are available on request).
Values in *italics* are standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1.

5.5. Discussion

5.5.1. Outward internationalisation (i.e., exporting) and innovation

This paper examines the relationship between outward internationalisation, in the form of exporting, and innovation in SMEs. Our results first show that there is a direct and positive relationship between exporting and innovation in all SMEs. Therefore, we can argue alongside previous studies that exporting encourages firms to introduce innovation by exposing them to a greater level of competition as well as diverse markets and consumers.

Our results therefore provide support for the limited but growing number of studies that highlight the importance of learning by exporting (e.g., Liu & Buck, 2007; Lileeva & Trefler, 2010; Filippetti et al., 2012; Amodóvar et al., 2014; Love & Roper, 2015; Hernández & Nieto, 2016; Chen et al. 2017; Damijan, Kostevc & Rojec, 2017). Moreover, we find evidence on the association between exporting and product innovation and between exporting and a combination of product and process innovation. Our results are consistent with the previous studies that examine the effect of exporting on product innovation (e.g., Higón & Driffield, 2010; Bratti & Felice, 2012; Iacovone & Javorcik, 2012; Pérez et al., 2012; Lee et al., 2014; Olabisi 2017). However, we do not find evidence on the association between exporting and process innovation (e.g., Damijan et al., 2010; Higón & Driffield, 2010; Abubakar et al., 2019); we argue that this may be due to the fact that we introduce a combination of product and process innovation, which isolates the pure individual effects.

The sub-sample analysis reveals some interesting results too. It shows that micro and small firms that are engaged in outward internationalisation (i.e., exporting) have a higher probability of introducing product innovation and a combination of product and process innovation. However, we find that, for medium-sized firms, exporting is not associated with any type of innovation. We argue, alongside the previous literature, that the need for product innovation is stronger for smaller firms than for larger firms (Golovko & Valentini, 2014). Since small firms face resource constraints compared with larger firms, they tend to invest to adapt their existing products or introduce new products to the market so that they can continue operating and competing successfully in the export market. In conclusion, our findings suggest that learning and acquiring knowledge through exporting are potentially important for innovation in SMEs (Kafouros et al., 2008; Higón & Driffield, 2010; Altomonte et al., 2014; Amodóvar et al., 2014).

5.5.2. Inward internationalisation (i.e., importing) and innovation

We examine the relationship between inward internationalisation, in the form of importing, and innovation in SMEs. Our results show that there is a positive and significant relationship between importing and innovation in SMEs. Therefore, we also find evidence on learning via importing; hence, we argue that inward internationalisation activities expose firms to knowledge that exists outside their customary boundaries (Amodóvar et al., 2014). Our results are consistent with some previous studies that examine the effect of importing on innovation (e.g., Liu & Buck, 2007; Fritsch & Görg, 2015; Hernández & Nieto, 2016; Chen et al., 2017; Abubakar et al., 2019), suggesting that there is a positive association between importing and innovation in SMEs. Moreover, we find evidence on the association between importing and product innovation and between importing and product and process innovation in all SMEs as well as in the split analysis between different-sized firms. Our results are consistent with the previous literature that finds a positive effect between importing and product innovation (e.g., Blind & Jungmittag, 2004; Liu & Buck, 2007; Goldberg et al., 2010; Paunov, 2011; Abubakar et al., 2019).

However, we do not find evidence on the association between importing and process innovation either in the full-sample analysis or in the analysis of the sample split by size bands. In contrast, we find evidence on the association between importing and a combination of product and process innovation. Although previous studies (e.g., Bertschek, 1995; Damijan & Kostevc, 2010) find evidence for their individual effects, we argue that the acquisition of knowledge obtained from importing is an important channel for international knowledge spillovers (e.g., Coe & Helpman, 1995; Keller, 1998), and therefore it can enable firms to engage in introducing both types of innovation at the same time.

When differentiating between firms according to their size bands, we obtain similar results. The findings show that micro, small and medium-sized firms that are engaged in importing activities have a higher probability of introducing product innovation and a combination of product and process innovation. In addition, we do not find evidence on the relationship between importing and process innovation when differentiating between SMEs of different sizes. We argue alongside previous studies (e.g., Paunov, 2011) that the gains from importing intermediate goods or inputs allow firms to obtain new and previously unavailable different inputs that allow for better production methods or different final outputs.

5.5.3. Outward and inward internationalisation (i.e., exporting and importing) and innovation

Finally, we examine the relationship between outward-inward internationalisation, in the form of exporting and importing, and innovation in all SMEs and in different sizes of SMEs. Our results suggest that engaging in a single individual international operation (either exporting or importing) or in both international operations simultaneously increases innovation in SMEs - but the effect is found to be larger in magnitude for firms that perform both operations at the same time. These results are confirmed in the full-sample analysis and in the sub-sample analysis for micro and small firms. As for medium-sized firms, the results show that, compared with not trading at all, exporting does not have a significant effect on innovation. The findings suggest that only engaging in importing activities or both internationalisation operations simultaneously has a significant association with innovation in medium-sized firms.

Moreover, we find that outward-inward internationalisation operation has a stronger effect on introducing product innovation and a combination of product and process innovation in the sample of all SMEs and in the different-sized sub-sample estimates. We argue that our results are consistent with the literature on organisational learning in its emphasis on the role of knowledge in creating absorptive capacity (e.g., Cohen & Levinthal, 1990; Zahra & George, 2002; Eriksson & Chetty, 2003). It is suggested that firms that look beyond their national borders have the ability to acquire internationalisation and market knowledge (Eriksson, Johanson, Majkgard & Sharma, 1997). In this context, our results are consistent with the existing research that considers the effect of both outward and inward international operation simultaneously (e.g., Hernández & Nieto, 2016). Carrying out both internationalisation operations at the same time helps firms to combine the diverse knowledge in a more comprehensive way, therefore generating complementary knowledge that can increase the opportunity for learning and result in better forms of innovation.

5.6. Conclusion, implications and limitations

Internationalisation studies traditionally focus on analysing outward operations, with most scholars, until recently, ignoring the critical role of inward operations (Quintens, Pauwels & Matthyssens, 2006). Moreover, although research on onward and inward operations has started to receive more attention from scholars, it remains an area of study in which many research and policy questions await answers (Hernández & Nieto, 2016). In this paper, we contribute to the previous literature on the association between outward and inward internationalisation operations in firms' innovation in the context of SMEs. We follow previous recent studies (e.g.,

Hernández & Nieto, 2016; Gerschewski et al., 2018) and apply the organisational learning theory, which stresses the role of knowledge in developing absorptive capacity (Zahra & George, 2002; Eriksson & Chetty, 2003). It is suggested that firms that operate beyond their national borders gain different types of knowledge, such as internationalisation knowledge, market knowledge and technological knowledge (Eriksson et al., 1997; Fletcher & Harris, 2012). Therefore, this research shows that undertaking outward-inward internationalisation operations simultaneously allows firms to gain diverse knowledge that increases their opportunities for learning and their absorptive capacity, which can ultimately enhance their innovation activities. In particular, this paper adds to the development and enhancement of our understanding of the role and the impact of conducting outward and inward internationalisation simultaneously on firms' innovation, discussed so far in both the IB and the small business literature. To summarise the results briefly, our study shows that firms engaging in outward and inward internationalisation operations have a greater probability of introducing product innovation or a combination of product and process innovation. We argue that trade facilitates the transfer of knowledge and ideas across countries (Grossman & Helpman, 1991) and that internationally engaged firms have the ability to innovate more because they have the opportunity to learn more from the diverse sources and because of their intra-firm worldwide pool of information (Criscuolo, Haskel & Slaughter, 2010).

From an academic point of view, this research contributes to the ongoing debate regarding inter-connected internationalisation strategies and their potential effect on firms (Hernández & Nieto, 2016). This paper advances our understanding of the importance of different types of internationalisation operations and their effect on SMEs' innovation. Our argument points towards the idea that sharing related and diverse knowledge and information through different internationalisation operations can potentially increase firms' absorptive capacity in the form of innovation. The results show that each internationalisation operation itself has a different effect on innovation; however, the effect of combined internationalisation operations has a greater effect on innovation in SMEs. From managerial and policy makers' point of view, this research suggests that owner-managers of small firms should not limit their consideration to only the positive effect of undertaking a single type of international operation; rather, firms' innovation is affected by undertaking both outward and inward international operations simultaneously. The specific and diverse knowledge flow from these two operations may lead to a higher probability of introducing innovation, more specifically product innovation and a combination of product and process innovation. Hence, it can be suggested that our research is of importance for owner-managers of SMEs, because, despite their limited

resources, these firms can benefit from different international operations, especially where intangible resources, such as knowledge flows, are fundamental to their operations. As for policy makers, this study argues, alongside previous studies (e.g., Korhonen, Luostarinen & Welch, 1996; Hernández & Nieto, 2016) that governments should promote programmes that encourage not only entry into foreign markets but also international sourcing through importing.

Our research has some limitations that may provide interesting lines for future research. First, due to the data limitation, we only provide theoretical justification for the claim that organisational learning increases firms' absorptive capacity when outward and inward internationalisation operations are performed simultaneously. Further research may include empirical measures of the organisational learning generated from international operations and investigate whether this generates an effect on the association between outward-inward internationalisation and innovation via moderation and/or mediation. Finally, our measure of international operations is limited to the propensity to export to and import from international markets. Further research may consider including other measures of internationalisation, such as the intensity of exporting and importing, to test the association for highly internationalised SMEs.

To conclude, this paper examines the association between different internationalisation operations and innovation in SMEs. Given the gaps in the previous literature, this paper does not limit its analysis to examining a single type of internationalisation operations. Contrary to previous empirical studies, this paper examines the effect of outward, inward and outward-inward internationalisation operations. Moreover, we reach beyond this distinction to examine the above association for different types of innovation introduced by SMEs (i.e., product, process, and product and process innovation). Most importantly, this paper examines this association for the first time in different-sized SMEs. It highlights the role of organisational learning and the knowledge flow generated by engaging in both internationalisation operations for product innovation and a combination of product and process innovation. Accordingly, this paper contributes to the previous literature by providing empirical evidence that indicates that SMEs that are engaged in outward and inward internationalisation operations simultaneously are able to take greater advantage of the acquired knowledge flow and information and have a higher probability of introducing innovation.

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Appendix

Table 5.7 Variable definitions used in this study

Variable	Definition
Innovation	Dummy variable = 1 if the firm has introduced product or process innovation.
Innovation types index	Index ranges from 0 to 3: 0 if the firm did not introduce any innovation; 1 if the firm introduced product innovation only; 2 if the firm introduced process innovation only; 3 if the firm introduced both product and process innovation.
Outward internationalisation (i.e., exporting)	Whether the firm sells goods and/or services outside the UK (coded 1) or not (coded 0).
Inward internationalisation (i.e., importing)	Whether the firm imports goods and/or services from outside the UK (coded 1) or not (coded 0).
Internationalisation operations	Dummy variable = 1 if the firm is not involved in international operations.
	Dummy variable = 1 if the firm exports outside the UK only.
	Dummy variable = 1 if the firm imports from outside the UK only.
	Dummy variable = 1 if the firm both exports and imports from outside the UK.
Size of the firm	ln(1 + number of employees).
Age of the firm	Broken down into age bands (0–5 years = 1, 6–10 years = 2, 11–20 years = 3, >20 years = 4). Dummy variables are created for each category.
Legal status	Legal status of the business (sole proprietorship = 1, company = 2, partnership = 3). Dummy variables are created for each category.
Sites	Number of sites the business has (1 site = 1, 2 sites = 2, 3 sites = 3, 4–10 sites = 4, 11+ sites = 5). Dummy variables are created for each category.
Turnover	Broken down into turnover bands (1 = less than £82,000, 2 = £82,000–99,999, 3 = £100,000–£249,000, 4 = £250,000–£499,000, 5 = £500,000–£999,999, 6 = £1 m–£1.99 m, 7 = £2 m–£2.8 m, 8 = £2.81 m–£4.99 m, 9 = £5 m–£9.99 m, 10 = £10 m–£14.99 m, 11 = £15 m–£24.99 m, 12 = £25 m or more). Dummy variables are created for each category.
Business environment – finance	Dummy variable = 1 if the major obstacle for the business is obtaining finance.
Business environment – competition	Dummy variable = 1 if the major obstacle for the business is competition in the local market.
External advice/information	Dummy variable = 1 if the firm sought external advice/information.
Regions	Location of the business (England = 1, Scotland = 2, Wales = 3, Northern Ireland = 4). Dummy variables are created for each category.
Sectors	SIC 2007 (1-digit) classification. Dummy variables are created for each category.

Table 5.8 Descriptive statistics

Variable	All firms	Micro firms	Small firms	Medium-sized firms
Innovation*	41.89	50.27	30.82	18.91
Innovation combination*				
No innovation (base category)	58.11	63.99	51.71	46.42
Product innovation	20.03	18.68	21.31	23.01
Process innovation	6.46	5.45	7.42	8.70
Product and process innovation	15.41	11.88	19.56	21.87
Outward internationalisation*	21.78	16.96	27.79	30.00
Inward internationalisation**	22.90	17.42	28.58	34.26
International operations**				
No international operation (base category)	67.87	73.60	61.81	56.20
Outward internationalisation only	9.23	8.98	9.62	9.54
Inward internationalisation only	10.40	9.54	10.43	13.78
Outward–inward internationalisation	12.49	7.89	18.15	20.47

* n_{SMEs} = 8319; n_{micro} = 4865; n_{small} = 2224; n_{medium} = 1230.
** n_{SMEs} = 8285; n_{micro} = 4844; n_{small} = 2215; n_{medium} = 1225.

Table 5.9 Correlation between the key explanatory variables and the dependent variable (innovation) by firm size

Variable	All firms	Micro firms	Small firms	Medium-sized firms
Outward internationalisation	0.191*	0.168*	0.212*	0.129*
Inward internationalisation	0.192*	0.191*	0.168*	0.133*
International operations				
No international operation	-0.221*	-0.213*	-0.227*	-0.132*
Outward internationalisation only	0.077*	0.076*	0.116*	0.083
Inward internationalisation only	0.080*	0.106*	0.048*	0.017
Outward–inward internationalisation	0.170*	0.152*	0.0158*	0.141*

n_{SMEs} = 8285; n_{micro} = 4844; n_{small} = 2215; n_{medium} = 1225.
* p < 0.05.

Table 5.10 Correlation between the key explanatory variables and the dependent variable (innovation combinations) by firm size

Variable	All firms	Micro firms	Small firms	Medium-sized firms
Outward internationalisation	0.186*	0.162*	0.193*	0.144*
Inward internationalisation	0.188*	0.192*	0.150*	0.131*
International operations				
No international operation	-0.217*	-0.214*	-0.203*	-0.148*
Outward internationalisation only	0.078*	0.075*	0.104*	0.038
Inward internationalisation only	0.081*	0.115*	0.038	0.022
Outward–inward internationalisation	0.163*	0.144*	0.146*	0.135*

n_{SMEs} = 8285; n_{micro} = 4844; n_{small} = 2215; n_{medium} = 1225.
* p < 0.05.

Table 5.11 Propensity score matching results

Approach	Nearest-neighbour matching				MMWS approach	
Model	Model 1		Model 2		Model 3	
	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.
Exporting	0.171***	0.025			0.147***	0.025
Importing			0.168***	0.020	0.189***	0.021
Exporting and importing					0.235***	0.029

*** p < 0.01.

Chapter 6: Conclusion

SMEs are the key drivers of growth, prosperity and innovation in the economy for both developing and developed countries (Acs & Storey, 2004; Audretsch, Van der Horst, Kwaak, & Thurik, 2009; Hessels & Parker, 2013; Cowling et al., 2018). Given their economic and social importance, a significant number of studies have been directed to theoretically and empirically examine the small business sector in the economic and management fields. In recent years especially there has been growing attention on the internationalisation processes of SMEs, for example, as a way of expanding their business operations, exchanging knowledge and information, stimulating creativity and innovation and improving business efficiency and productivity (see Hilmersson, 2014; Love & Roper, 2015; Onkelinx et al., 2016).

Although the number of studies examining the factors that affect SMEs internationalisation has increased (e.g., Bijmolt & Zwart, 1994; Cassiman & Golovko, 2011; Brambilla et al., 2012; Alvarez et al., 2013; Anderson et al., 2013; Boehe, 2013; Eberhard & Craig, 2013; Ghauri et al., 2014; Love & Roper, 2015; Evangelista & Mac, 2016; Haddoud et al., 2017; Saridakis et al., 2019) and the factors that affect SMEs innovation (e.g., Al-Laham et al., 2011; Cassiman & Golovko, 2011; Bratti & Felice, 2012; Rosli & Mahmood, 2013; Fritsch & Görg, 2015; Abubakar et al., 2019) and their growth (e.g., Barrett & O'Connell, 2001; Carmeli & Schaubroeck, 2005; Erden et al., 2014; Alassadi & Al Sabbagh, 2015; Gerschewski et al., 2018), there is still a large gap concerning internationalisation aspects of SMEs. For example, we still do not know, for instance, whether or not, and if so to what extent, formal and informal networks play on the internationalisation propensity of SMEs, the role of managerial and workforce training undertaken within internationalised firms to improve efficiency and performance, or whether or not internationalisation activities stimulate organisational creativity and innovation. This thesis attempts to fill these gaps by offering theoretical and empirical insights within the context of UK SMEs.

Using a large-scale datasets from the UK Longitudinal Small Business Surveys (undertaken in 2015 and 2016), this thesis investigated three under-research topics within the international business and small business literatures. First, the thesis examines the association between formal and informal interpersonal networks and SMEs internationalisation by differentiating between SMEs according to their size-bands (**Chapter 3**). The motivation behind this is that to analyse networks as a multi-concept (disaggregate) dimension rather than a one dimension. The aim was to observe the differences in networking behaviour for

internationalisation within SMEs according to their size. Second, the thesis sought to investigate the potential effect of different types of training received by employees and owner-managers of internationalised SMEs on the firm's performance, and to compare these effects with non-internationalised SMEs to extract specific strategic behaviour and public policies that can be designed to boost performance within each distinctive group (**Chapter 4**). Finally, the thesis examined the effect of different internationalisation operations involving import and export on different types of innovations in SMEs. In particular, the thesis differentiated between outward internationalisation, inward internationalisation and outward-inward internationalisation and looked at their potential effects on various types of innovation (**Chapter 5**).

A stated earlier, the analysis of the large-scale survey data of owner-managers of SMEs in the UK employed in this thesis allows us to address important research questions related to the small business sector, and provides important insights for policy makers and academics in the field of small business, international business and human resource management. Specifically, the findings of the first empirical study suggests that there is a positive and significant relationship between networks and SMEs internationalisation which gives support to previous studies (e.g., Zhou et al., 2007; Ge & Wang, 2013; Oparaocha, 2015; Hånell & Ghauri, 2016; Stoian et al., 2016; Rosenbaum, 2017). Most importantly, however, the results shows that micro firms are reluctant to use any type of networks for internationalisation purposes. The results for SMEs, excluding micro firms, suggest that formal networks have a stronger effect on internationalisation than informal networks. The study therefore argues that firms with more than ten employees become more complex as they increase in size, however they are still small enough to employ more staff in order to provide the internally required skills and knowledge. Interestingly, when testing for the effect of different combinations of networks, the results show that SMEs networking behaviour for internationalisation changes when altering the size of the firm. The results suggest that when the size of the firm increases from micro to small, the effect of networks on internationalisation increases, however when the size of the firm increases from small to medium, the effect of most of the network sources used in the study (such as accountants, solicitors, family and friends) on internationalisation reduces. These results are in line with Watson's (2007) argument, indicating that the relationship between networking and SMEs' growth is probably non-linear. This thesis argues that although it is beneficial to expect that a certain level of networking can impact a firm in a positive way, it is also reasonable to expect that an extreme level of networking might generate inverse effects on the firm. The thesis, however, does not determine the optimal level of networking due to

data constraints, and thus calls for future research in the area to collect appropriate data and employ appropriate optimization techniques to potentially identify a threshold to be used as a benchmark for SMEs and policy makers.

On the other hand, the analysis of the second study shows that formal and/or informal employee's training is positively and significantly related to the actual and intended performance of SMEs. These results are in line with those of previous studies (e.g., Litz & Stewart, 2000; de Wiele, 2010; Chinomona, 2013; Jones et al., 2013) highlighting the importance of employee training as a powerful mechanism that enables firms to grow and develop their capabilities and competitive advantages through the human factor. Most importantly, the estimation results reveal that the combined measure of training, including formal and informal training practices, has a stronger effect on SME performance than the individual measures of training. This thesis thus argues that a combination of both types of employee's training may allow employees to gain more advanced knowledge and skills that are appropriate to their roles and tasks in the company. Additionally, using both formal and informal training methods may improve organisational engagement and commitment, which can ultimately be linked to firm productivity and better organisational financial outcomes. The analysis shows that only a combination of formal and informal owner-managers training is significantly related to the actual and intended performance of SMEs. This thesis thus argues that knowledge and skills can be obtained from offering both informal and formal training (Westhead & Storey, 1996), suggesting that SMEs should focus on diverting their resources to providing both types of training for owner-managers in order to achieve better performance outcomes. Interestingly, when differentiating between firms according to their internationalisation involvements (i.e., those who export and those who do not export), the estimation results shows that employee's training (i.e., formal and/or informal) significantly affects actual and intended performance in non-internationalised firms, however for internationalised firms, the estimation results shows that there is only a positive association between the combined measure of owner-managers' training (i.e., formal and informal) and intended performance. The thesis argues that the heterogeneity and complexity of the international markets requires owner-managers to be involved in these operations and to receive appropriate training and other development activities. The thesis also argues that at the strategic level, what works in the domestic market may not work in the international market (Evangelista & Mac, 2016) concluding that the experience of owner-managers, obtained through training, enables them to develop specific knowledge needed for internationalisation

initiatives (Hitt et al., 2006) as well as to manage the workforce, relationships, and operations in the new markets (Manolova et al., 2002).

Finally, the analysis of the last empirical study shows that internationalisation operations are positively associated with innovation in SMEs. Nevertheless, the effect is found to be stronger for the combined outward-inward internationalisation operations than single forms of internationalisation operations (i.e., inward internationalisation or outward internationalisation). The results of this thesis are therefore consistent with the literature on organisational learning in its emphasis on the role of knowledge in creating absorptive capacity (e.g., Cohen & Levinthal, 1990; Eriksson & Chetty, 2003). It is suggested that firms that look beyond their national borders have the ability to acquire internationalisation and market knowledge (Eriksson et al., 1997). In this context, the results of this thesis are consistent with previous limited research that considers the effect of both outward and inward international operation simultaneously (e.g., Hernández & Nieto, 2016). What is emphasised here is that undertaking both internationalisation operations at the same time can help firms to combine their diverse knowledge in a more comprehensive way and therefore generate complementary knowledge, which can increase the opportunity for learning, and result in better and improved innovation.

Although each empirical study presented in this thesis deals with a specific aspect of internationalisation in the context of SMEs, the three empirical studies are interlinked and contribute to our knowledge and understanding of the nature of small businesses, and provide useful insights for academics, policy makers and practitioners. Indicatively, the first empirical study makes a substantial contribution to the International Entrepreneurship field (IE) (e.g., Ellis, 2011; Frenhaber & Li, 2012; Zhang et al., 2016), the International Business (IB) field (e.g., Boehe, 2013; Chetty & Blankenburg-Holm, 2000; Eberhard & Craig, 2013) and the Small Business (SB) literature (e.g., Larsson, Hedelin & Garling, 2003; Hånell & Ghauri, 2016) by providing, for the very first time, a theoretical framework and empirical evidence regarding the relationship between interpersonal networks and internationalisation within different-sized SMEs. Additionally it provides new policy avenues to help SMEs enter new markets and boost their export activities through their networking strategies and approaches.

Similarly, the second empirical study addresses two major theoretical and empirical gaps in the literature. First, the study distinguishes between employee training and owner-manager training (see Storey, 1994; Jones et al., 2013) to understand the extent to which training efforts are spread across the workforce and management. Secondly, the study distinguishes between internationalised and non-internationalised SMEs and argues that

internationalisation requires valuable firm-specific assets to operate in a global market (Onkenlinx et al., 2016), and that different forms of training may thus enhance the skills of managers and employees, leading to the improved performance of SMEs. By doing so, the second study contributes to the literature by lending some prima facie support to the argument that 'the impact of owner-managers training on firms' profitability may be different from that of non-managerial employees' (Georgiadis & Pitelis, 2016: 410). The study also contributes to the IB literature by examining the effect of training in internationalised firms, a topic that is under-researched to date. The findings open up various avenues for strategic decisions related to training in SMEs that policy makers and business owners can make to promote workforce learning and enhance employee abilities and knowledge. It can be argued that the firm level benefits gained through training can have a spill-over effect to the economy through, for example, employee mobility and by stimulating other firms to invest in people to stay competitive.

Finally, the last empirical study contributes to developing and enhancing our understanding regarding the role and the impact of undertaking outward and inward internationalisation simultaneously in a firm's innovation. Notably, this study contributes to the IB and SB literature by providing evidence of the effect of SMEs internationalisation operations and innovation. The final study argued with previous studies (e.g., Korhonen, Luostarinen & Welch, 1996; Hernández & Nieto, 2016) that governments should promote programmes that not only encourage entry into foreign markets but also encourage international sourcing through importation. In this way, SMEs, despite their limited resources, will gain more advantages from engaging in different internationalisation operations, especially gaining intangible resources such as knowledge flow which will ultimately improve their performance and their contribution to the whole economy in a positive way.

Overall, this thesis has made three important empirical contributions to the IB and SB fields, with a strong focus on SMEs and dealing with important topics related to the internationalisation propensity of SMEs, to their performance, and to their innovation, and investigating the role of the key factors of each, with an emphasis on networking, training and different forms of international activities. Although the thesis answers important research questions, it generates a number of other questions that should be answered by other young scholars or established academics. To do this, quantitative, qualitative and mixed methods research projects can be carried out to provide further support in the context of other economies and to extend the current work both theoretically and empirically in line with the direction provided in the conclusions of each empirical chapter.

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