The relationship between internationalisation and innovation has received increasing attention from international business researchers and managers over the past decade. Most studies have reported the positive influence of internationalisation on innovation at the firm level, e.g. Bloom et al. (2015) and Higon and Driffield (2011) documented the positive impact of imports and exports on innovation, respectively. Many developing countries are now interested in finding the effective ways of encouraging firm innovation through internationalisation, especially for SMEs (UNCTAD, 2007). However, only a few studies investigate the influence of internationalisation on SME innovation in developing or emerging economies: e.g. Abubakar et al. (2018) is the first empirical research paper which used the cross-sectional data of five countries in Sub-Saharan Africa to examine the impact of internationalisation on SME innovation in the context of the least developed countries.

Theoretically, firms that invest more in R&D are viewed as having greater capacity to be innovative, according to the knowledge production model (Griliches, 1979; Acs, 2002). However, SMEs in developing or emerging countries typically have limited internal resources needed for innovation and face with weak domestic markets; therefore, utilisation of external resources via internationalisation is particularly important for small firm innovation in developing countries. Based on national system of innovation theory (which confirms that information and knowledge collection for innovation of small firms often take place in a social context, outside the firm) and especially the institutional theories which argue that innovative behavior of small firms in developing or emerging countries needs to be examined in the context in which it occurs (Capello, 1999; Welter and Smallbone, 2011), this paper is
the first empirical research study that investigates the influence of different modes of internationalisation on the innovation of SMEs in the context of emerging countries. The paper uses firm-level panel data from the Viet Nam SME survey (CIEM, ILSSA, UCPH, and UNU-WIDER, year 2011, 2013 and 2015), which tracks over 2500 manufacturing enterprises from nine provinces over time. A logit model for panel data is used to analyse the data since the dependent variables (product and process innovation) take only two possible values. Three modes of internationalisation are used: exporter, importer and acting as suppliers to international customers, i.e. outsourcee (Altomonte et al., 2013; Abubakar et al., 2018). R&D is the moderator variable since it plays an important role in firms’ innovation performance and might influence the impact that internationalisation has on the innovation performance of firms (Ren et al., 2015; Raymond et al., 2010). Control variables: firm age, firm size, higher educated workforce, competition, member of business association and access to finance (Abubakar et al., 2018; Bocquet et al., 2013). This study contributes to the literature on internationalisation and innovation by showing that exporting and importing have a significant influence on new process innovations while acting as suppliers to international customers has a weak impact on new product innovations of Vietnamese SMEs. The results also show that R&D, firm size, firm age, higher education of employees, competition and difficulty of access to finance are important determinants of SME innovation in Vietnam. Findings are compared with those from developed economies in order to identify distinctive features.

Key References
Abubakar, Y.A., Hand, C., Smallbone, D., Saridakis, D., 2018. What specific modes of internationalization influence SME innovation in Sub-Saharan least developed countries (LDCs)? Technovation
Impact of various modes of internationalisation on innovation capability. The case of manufacturing SMEs in emerging markets - Vietnam

Nhan Ton Nguyen

Abstract

The relationship between internationalisation and innovation has received increasing attention from international business researchers and managers over the past decade. Most studies have reported the positive influence of internationalisation on innovation at the firm level, e.g. Bloom et al. (2015) and Higón and Driffield (2011) documented the positive impact of imports and exports on innovation, respectively. Many developing countries are now interested in finding the effective ways of encouraging firm innovation through internationalisation, especially for SMEs (UNCTAD, 2007). However, only a few studies investigate the influence of internationalisation on SME innovation in developing or emerging economies: e.g. Abubakar et al. (2018) is the first empirical research paper which used the cross-sectional data of five countries in Sub-Saharan Africa to examine the impact of internationalisation on SME innovation in the context of the least developed countries.

Theoretically, firms that invest more in R&D are viewed as having greater capacity to be innovative, according to the knowledge production model (Griliches, 1979; Acs, 2002). However, SMEs in developing or emerging countries typically have limited internal resources needed for innovation and face weak domestic markets; therefore, utilisation of external resources via internationalisation is particularly important for small firm innovation in developing countries. Based on national system of innovation theory (which confirms that information and knowledge collection for innovation of small firms often takes place in a social context, outside the firm) and especially the institutional theories which argue that innovative behavior of small firms in developing or emerging countries needs to be examined in the context in which it occurs (Capello, 1999; Welter and Smallbone, 2011), this paper is the first empirical research study that investigates the influence of different modes of internationalisation on the innovation of SMEs in the context of emerging countries.

The paper uses firm-level panel data from the Viet Nam SME survey (CIEM, ILSSA, UCPH, and UNU-WIDER, year 2011, 2013 and 2015), which tracks over 2500 manufacturing enterprises from nine provinces over time. A logit model for panel data is used to analyse the data since the dependent variables (product and process innovation) take only two possible values. Three modes of internationalisation are used: exporter, importer and acting as suppliers to international customers, i.e. outsourcee (Altomonte et al., 2013; Abubakar et al., 2018). R&D is the moderator variable since it plays an important role in firms’ innovation performance and might influence the impact that internationalisation has on the innovation performance of firms (Ren et al., 2015; Raymond et al., 2010). Control variables: firm age, firm size, higher educated workforce, competition, member of business association and access to finance (Abubakar et al., 2018; Bocquet et al., 2013).
This study contributes to the literature on internationalisation and innovation by showing that exporting and importing have a significant influence on new process innovations while acting as suppliers to international customers has a weak impact on new product innovations of Vietnamese SMEs. The results also show that R&D, firm size, firm age, higher education of employees, competition and difficulty of access to finance are important determinants of SME innovation in Vietnam. Findings are compared with those from developed economies in order to identify distinctive features.

1. Introduction

The relationship between internationalisation and innovation has received increasing attention from international business researchers and managers over the past decade. Most studies have reported the positive influence of internationalisation on innovation at the firm level, e.g. Bloom et al. (2015) and Higón and Driffield (2011) documented the positive impact of imports and exports on innovation, respectively. Many developing countries are now interested in finding the effective ways of encouraging firm innovation through internationalisation, especially for small and medium enterprises (hereinafter SMEs), UNCTAD (2007).

SMEs are considered the most progressive, most flexible and most efficient form of business in an economy. They properly complement the operation of big firms, help to enhance competitiveness and create new jobs. They are increasingly recognized as central contributors to innovations and play a crucial role in the national economies of countries all around the world. In the globalization process, which created rapid technological changes, shorter product lifecycles and higher rivalry environment, SMEs are increasingly more often faced with international competition.

Enterprises involved in international relations are more competitive and productive than those, that do not develop international activities. Internationalisation significantly affects the innovativeness of SMEs. International cooperation helps enterprises overcome some of the barriers to innovation and increase innovation performance, which has been one of the key drivers of sustainable competitive advantage for SMEs (Dadfar et al., 2013).

Although the relationship between internationalisation and innovation has captured the interest of many scholars and practitioners, few studies focus on the issue from the perspective of SMEs in developing or emerging economies: e.g. Abubakar et al. (2018) is the first empirical research paper which used the cross-sectional data of five countries in Sub-Saharan Africa to examine the impact of internationalisation on SME innovation in the context of the least developed countries.

Extending research into the emerging markets context not only allows international strategy scholars to address important problems facing these countries, where majority of humanity lives, but also to enrich and expand theory in useful new ways. The greatest payoff from studying enterprises in emerging markets is not finding out how they differ from enterprises in developed markets, but this is an opportunity to develop more comprehensive theories of the internationalisation process (Ramamurti, 2012).
In this context, a study of SMEs in Vietnam, top three emerging economies with fastest growth in Asia (Asian Development Outlook report by the Asian Development bank) can help extend the existing knowledge in this stream of research. Same as the other emerging economies in the world, SMEs are the important force for economic development in Vietnam. In Vietnam, SMEs constitute 98% of total number of enterprises, 51% of employment and 40% of GDP. The taxes and fees paid by SMEs to the government budget have increased by more than 18 times in 10 years and account for more than 17 percent of total government revenue.

This paper contributes to the literature in two ways. First, this paper is the first empirical research study that investigates the influence of different modes of internationalisation on the innovation performance of SMEs in the context of emerging countries. Since the strategic importance of internationalisation to improve the innovation capability, exploring the interactions between various modes of internationalisation and innovation can provide policymakers with effective tools to help improve the performance of the SMEs in emerging markets generally and in Vietnam specifically. Second, for the empirical analysis, we test for firms’ international modes of entry by using several proxies (i.e., exporter, importer and outsourcee). In doing so, we enable a broader interpretation of each firm’s internationalisation activities.

Our results are consistent with most of the existing studies on internationalisation and innovation. We find the evidence showing that exporting and importing have a significant influence on new process innovations while acting as suppliers to international customers has a weak impact on new product innovations of Vietnamese SMEs. The results also show that R&D, firm size, firm age, higher education of employees, competition and access to finance are important determinants of SME innovation in Vietnam.

This paper is structured as follows. The next section reviews the theoretical background, existing literature on the firms’ international activities and innovation performance, which leads to the research hypotheses. Next, we explain the methodology by describing the model and the measurements of the variables used in this study. Then, we present the results and discuss the findings. Finally, we conclude the paper with some final remarks.

2. Theoretical backgrounds, literature and hypotheses

Theoretically, firms that invest more in R&D are viewed as having greater capacity to be innovative, according to the knowledge production model (Griliches, 1979; Acs, 2002). However, SMEs in developing or emerging countries typically have limited internal resources needed for innovation and face weak domestic markets; therefore, utilisation of external resources via internationalisation is particularly important for small firm innovation in developing countries. Based on national system of innovation theory (which confirms that information and knowledge collection for innovation of small firms often takes place in a social context, outside the firm) and especially the institutional theories which argue that innovative behavior of small firms in developing or emerging countries needs to be examined in the context in which it occurs (Capello, 1999; Welter and Smallbone, 2011), this paper is the first empirical research study that investigates the influence of different modes of internationalisation on the innovation of SMEs in the context of emerging countries.
2.1 Conceptualising SME Innovation

Innovation not only includes major (radical) innovations but also minor (incremental) technological advance (Trott, 2007). This study concentrates on incremental innovation since SMEs are more likely to be making more incremental changes rather than radical technological breakthroughs, especially when located in emerging markets. The reason is that most SMEs in emerging countries operate significantly below the technological frontier, and for that reason SMEs’ innovation efforts in these countries primarily deal with assimilating, customising, mastering and eventually improving technologies developed elsewhere (Goedhuys and Sleuwaegen, 2010). Therefore, this study uses the new products (i.e. firms introduce new or improved product) and processes innovation (firms introduce new production process/new technology) as the key indicators of SME innovation which are also in accordance with Schumpeter's definition of innovation (Schumpeter, 1934).

2.2 Export and innovation

Exports offer learning opportunities and provide incentives for innovation. It allows firms to acquire knowledge that was lacking in the domestic market. Firms have a chance to access new, diverse knowledge through the act of exporting (Salomon and Shaver 2005). Exports force firms to innovate by exposing them to stronger competition as well as to the requirements and innovation environment of diverse markets and customers. Firms must react to foreign customer demands and regulations of host governments, which can initiate new products or processes (Kafouros et al., 2008; Almodóvar et al., 2014).

Several researchers have found evidence that exporters tend to innovate more than non-exporters especially when operating in technologically lagging industries (Salomon and Shaver, 2005; Salomon and Jin, 2008). Girma et al. (2007) showed that Irish exports were able to increase innovation activities with a time lag of one period. Keller (2002) in his survey of diffusion of international technology reported evidence of learning-by-exporting in case studies. Other studies also found that exporting leads to enhanced innovation, e.g., Altomonte et al. (2013), Filippetti et al. (2012).

However, most of them are about big firms in developed countries and have no clear focus on SMEs in emerging markets. There is a lack of empirical evidence about the influence of exporting on SME innovation in emerging markets. This leads us to the following hypothesis:

H1: Exporting increases the likelihood of new product and process innovation of SMEs in emerging markets.

2.3 Imports of intermediate production inputs and innovation

Previous studies have suggested that imports of intermediate inputs could enhance innovation by allowing domestic firms to have good access to overseas' knowledge (Coe and Helpman, 1995; Acharya and Keller, 2008) and improving firms’ exposure to new products and probably processes. Because the equipment and products imported from a foreign country contain new knowledge, importation enables learning in the markets beyond the one where those products and equipment were produced (Filippetti et al., 2012). Consequently, importation can help to set up and maintain
channels of communication that encourage cross-border learning of production methods and product design (Keller, 1999).

Imports can also act as an industry-wide competitive force (Salomon and Shaver, 2005), which pushes firms to innovate in order to sustain their market position. Furthermore, the firm engaged in importing intermediate production inputs may need to adjust its production processes to accommodate intermediate inputs. On the other hand, imports may also change the taste and preferences of domestic consumers. Domestic firms may engage in innovation to respond to such changes. The competitive, adaptive, preference-changing effects suggest a positive relationship between imports and innovation.

Many authors have studied the importance of imports for international technology diffusion and innovative activities of firms. For example, Coe and Helpman (1995) in a study of 21 economies, reported that the level of imports is important for international technology diffusion. Other studies such as Eaton and Kortum (1996, 1997) and Keller (1999) also showed this relationship. Bloom et al. (2015) found that the imports of intermediate production inputs increased the likelihood of innovation. Similarly, a study by Schneider (2005) on 47 countries found that high-tech imports from developed countries were positively correlated with US patents. Several other studies have also found that imports matter (Coe et al., 1997; Xu and Wang, 1999; Keller, 2002).

Nonetheless, the major gap in the literature as it relates to the research problem of this paper is that the prior work is mainly not focused on SMEs in emerging markets. There is a dearth of empirical evidence on the relationship between importing and the SME innovation in emerging markets. This leads us to the following hypothesis:

H2: Importing increases the likelihood of new product and process innovation of SMEs in emerging markets.

2.4 Outsourcee and innovation

Acting as suppliers to foreign customers (outsourcee) can promote innovation as a result of the resource-sharing and knowledge-spillover benefits of collaboration (Ahuja, 2000). Outsourcees can obtain access to external knowledge, hence improve their learning skills and expertise (Powell et al., 1996). By customising products for their customers’ specific needs and developing new machineries and instruments (or other advanced services) that might eventually be purchased by downstream producers, outsourcees can earn profits. Since profits provide the incentive for firms to improve products through costly innovations, participation as suppliers in global value chains logically should encourage innovation.

In some industries, which experience a rapid development of technological progress and knowledge distribution, single firms no longer possess the necessary skills to produce significant innovations in all areas of progress (Powell and Brantley, 1992; Hagedoorn and Duysters, 2002). In such circumstances, acting as suppliers to foreign customers help to create the crucial specialised knowledge necessary to improve firms’ competitive position. Outsourcees have created a market for complementary innovations and have given rise to networks of innovators. This has been possible through a simple division of labour, which in turn has generated a division
of knowledge creation. The presence of networks conducting complementary innovation tends to occur in those industries with technological ease of entry for specialised innovators in the market, e.g., the software industry, computer and chemical industries (Naghavi and Ottaviano, 2010).

Literature has documented a strong evidence that outsourcing of production may breed innovation. Glass and Saggi (2001) found that international outsourcing lowered the marginal cost of production and thus increased profits, creating greater incentives for innovation. Other research also reported the positive relationship between outsourcee and innovation, across diverse industries such as biotechnology (Powell et al., 1996; Baum et al., 2000), telecommunications (Godoe, 2000), chemicals (Ahuja, 2000) and semiconductors (Stuart, 1998, 2000).

However, most of them are about big firms in developed countries and have no clear focus on SMEs in emerging markets. There is a lack of empirical evidence about the influence of outsourcees on SME innovation in emerging markets. This leads us to the following hypotheses:

H3: Outsourcees increases the likelihood new product and process innovation of SMEs in emerging markets.

Fig. 1 outlines the research framework from which our hypotheses are derived. In summary, based on prior research on internationalisation and innovation we argue that the various modes of internationalisation (exporter, importer and outsourcee) increase the innovation performance of SMEs in emerging markets. On the other hand, previous studies have showed that R&D spending affects a firm’s innovation (Wadhwa & Kotha, 2006; Wang & Kafouros, 2009). It is also related to a firm’s absorptive capability (Cohen & Levinthal, 1990), which is essential for international firms to be able to enjoy and trade upon learning advantages of newness (Zhou & Wu, 2014). R&D not only helps bring about new information, but it can also improve the firm’s ability to absorb and utilise existing information. Therefore, our research framework suggests that R&D acts as a moderator since it plays an important role in firms’ innovation performance and might influence the impact that internationalisation has on the innovation performance of firms (Ren et al., 2015; Raymond et al., 2010).
3. Research Methodology

3.1 Data

The paper uses firm-level panel data from the Viet Nam SME survey (year 2011, 2013 and 2015) which is a collaborative effort of the Central Institute for Economic Management (CIEM), the Institute of Labour Science and Social Affairs (ILSSA), the Development Economics Research Group (DERG) at the University of Copenhagen, and UNU-WIDER. Viet Nam SME survey tracks over 2500 manufacturing enterprises from nine provinces, across approximately 18 sectors over time. The population of non-state manufacturing enterprises in the selected provinces is based on two data sources from the General Statistics Office of Vietnam (GSO), the Establishment Census from 2002 and the Industrial Survey of 2004–06. Joint ventures, including those with state involvement, have been excluded from the sampling framework due to the unclear nature of government involvement in such ownership structures. The data are typically collected in the months of June-August, which are based on face-to-face interviews with firm owners/managers and employees. Enterprises are classified according to the current World Bank definition, with micro firms having less than 11 employees, small firms up to 50 employees, medium-sized firms up to 300 employees, and large firms having more than 300 employees. Stratified sampling was used to ensure an adequate number of enterprises in each province with different ownership forms.

3.2 Measures

3.2.1 Dependent variables: product and process innovation

New process innovation: takes value 1 if a firm has introduced new processes/technology in the survey year and/or past two years and takes value 0 otherwise.

New product innovation: takes value 1 if a firm has introduced a new products or improvements of existing products in the survey year and/or past two years and takes value 0 otherwise (Abubakar et al., 2018; Bocquet et al., 2013).
3.2.2 Internationalisation variables

In terms of various modes of internationalisation, the paper focuses on the following modes of entry (Altomonte et al., 2013; Abubakar et al., 2018 and Filatotchev & Piesse, 2009):

*Exporter:* takes value 1 if a firm has sold abroad, directly from its home country, some or all of its own products/services in the survey year and/or past two years and takes value 0 otherwise. We also use the *export value*, which is the proportion of a firm’s export sales to the total sales revenue, to measure the level of exporting.

*Importer:* takes value 1 if a firm has purchased at least part of its intermediate goods from abroad in the survey year and/or past two years and takes value 0 otherwise. We also use the *import value*, which is the proportion of a firm’s intermediate goods from abroad to the total intermediate production inputs, to measure the level of importing.

*Outsourcee:* takes value 1 if the firm itself has produced as subcontractor with non-domestic firm in the survey year and/or past two years and takes value 0 otherwise.

3.2.3 Moderator

*R&D* is the moderator variable since it plays an important role in firms’ innovation performance and might influence the impact that internationalisation has on the innovation performance of firms (Ren et al., 2015; Raymond et al., 2010).

We follow Abubakar et al. (2018) and Bocquet et al. (2013) to measure R&D as a binary variable that takes the value of 1 if a firm has conducted formal R&D in the last two years and the value of 0 otherwise.

3.2.4 Control variables

In addition to the key hypotheses-testing variables, following previous studies we control several factors that may affect a firm’s innovation performance.

3.2.4.1 Firm level controls

*Firm age* is measured as the number of years since the establishment began operations up to the year of the survey (Hansen, 1992).

*Firm size* is measured as the number of employees (regular full-time labour force) in the last fiscal year (Acs, and Audretsch, 1987). Firms are sorted into three size groups: micro firms (0–10 employees), small firms (11–50 employees) and medium-sized firms (51–300 employees).

*Higher educated workforce* is measured as the proportion of highly educated employees (university and college degree) in the firm (Radas, 2009; Bocquet et al., 2013).

3.2.4.2 Firm external controls

*Competition* is a binary variable, equal to 1 if a firm has faced competition in its field of activity in the survey year and/or past two years and 0 otherwise (Covin et al., 1999; Ozsomer et al., 1997).
Access to finance is equal to 1 if a firm has experienced any problems getting loans from bank in the survey year and/or past two years, and 0 otherwise (Abubakar et al., 2018; Bocquet et al., 2013).

Member of a business association is equal to 1 if a firm has been a member of one or more business associations in the survey year and/or past two years, and 0 otherwise (Bocquet et al., 2013).

We summarize our variables and their definitions in Table 1.

3.3 Analysis

3.3.1 Bivariate

McNemar test is used to test whether there is a significant different in the proportion of firms has introduced new product and process innovation between groups: exporter and non-exporter, importer and non-importer, and outsourcer and non-outsourcer.

3.3.2 Multivariate

Fixed effects logit model for panel data is used to analyse the data since the dependent variables (product and process innovation) take only two possible values (Abubakar et al., 2018; Bocquet et al., 2013).

\[ \text{Inno}_{i,t} = \beta \text{International}_{i,t} + \gamma_1 \text{RD}_{i,t} + \gamma_2 \text{R&D} \times \text{International}_{i,t} + \delta \text{Z}_{i,t} + \alpha_i + \epsilon_{i,t} \]

where subscripts \( i \) and \( t \) represent the firm and time period respectively, \( \text{Inno}_{i,t} \) is the dependent variable, i.e., innovation performance, \( \text{International}_{i,t} \) is various modes of internationalisation variable, i.e., exporter, importer and outsourcer, \( \text{R&D} \) is Research and Development variable, \( \text{Z}_{i,t} \) is a set of explanatory variables typically used in this type of study, i.e. firm level controls (firm age, firm size and higher educated workforce) and firm external controls (competition, member of business association and access to finance), \( \alpha_i \) is the time-constant factor and \( \epsilon_{i,t} \) is the error term that includes firm-specific and time-specific effects.
Table 1: Definition of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
</tr>
<tr>
<td>New process</td>
<td>1 if a firm has introduced new production processes/new technology in the survey year and/or past two years and 0 otherwise.</td>
</tr>
<tr>
<td>New product</td>
<td>1 if a firm has introduced a new products or improvements of existing products in the survey year and/or past two years and 0 otherwise.</td>
</tr>
<tr>
<td><strong>International modes</strong></td>
<td></td>
</tr>
<tr>
<td>Exporter</td>
<td>1 if a firm has sold abroad, directly from its home country, some or all of its own products/services in the survey year and/or past two years and 0 otherwise.</td>
</tr>
<tr>
<td>Export value</td>
<td>proportion of a firm’s export sales to the total sales revenue.</td>
</tr>
<tr>
<td>Importer</td>
<td>1 if a firm has purchased at least part of its intermediate goods from abroad in the survey year and/or past two years and 0 otherwise.</td>
</tr>
<tr>
<td>Import value</td>
<td>the proportion of a firm’s intermediate goods from abroad to the total intermediate production inputs.</td>
</tr>
<tr>
<td>Outsourcee</td>
<td>1 if the firm itself has produced as subcontractor with non-domestic firm products in the survey year and/or past two years and 0 otherwise.</td>
</tr>
<tr>
<td><strong>R&amp;D</strong></td>
<td>1 if a firm has conducted formal R&amp;D in the last two years and the value of 0 otherwise.</td>
</tr>
<tr>
<td><strong>Firm level controls</strong></td>
<td></td>
</tr>
<tr>
<td>Firm Age</td>
<td>number of years since the establishment began operations up to the year of the survey.</td>
</tr>
<tr>
<td>Firm size</td>
<td>The number of employees (regular full-time labour force)</td>
</tr>
<tr>
<td>Medium-sized firm</td>
<td>51–300 employees</td>
</tr>
<tr>
<td>Small firm</td>
<td>11–50 employees</td>
</tr>
<tr>
<td>Micro firm</td>
<td>0–10 employees</td>
</tr>
<tr>
<td>Higher educated workforce</td>
<td>the proportion of highly educated employees (university and college degree) in the firm.</td>
</tr>
<tr>
<td><strong>External factors</strong></td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td>1 if a firm has faced competition in its field of activity in the survey year and/or past two years and 0 otherwise.</td>
</tr>
<tr>
<td>Access to finance</td>
<td>1 if a firm has experienced any problems getting loans from bank in the survey year and/or past two years, and 0 otherwise.</td>
</tr>
<tr>
<td>Member of a business association</td>
<td>1 if a firm has been a member of one or more business associations in the survey year and/or past two years, and 0 otherwise.</td>
</tr>
</tbody>
</table>

4. Results
4.1 Descriptive statistics

Table 2 presents the descriptive characteristics of the sampled SMEs. Not many manufacturing SMEs report having new process (8%) while a considerable number of the manufacturing SMEs report having new product (30%) innovations. As for the international modes of entry, exporter and importer (higher than 3%) are three times more popular than acting as the suppliers to foreign customers (1%).
Table 2: Descriptive statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>%</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New process</td>
<td>8.16</td>
<td></td>
</tr>
<tr>
<td>New product</td>
<td>30.05</td>
<td></td>
</tr>
<tr>
<td><strong>International modes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exporter</td>
<td>3.31</td>
<td>0.008</td>
</tr>
<tr>
<td>Export value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importer</td>
<td>3.35</td>
<td>0.017</td>
</tr>
<tr>
<td>Import value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outsourcee</td>
<td>1.02</td>
<td></td>
</tr>
<tr>
<td><strong>R&amp;D</strong></td>
<td></td>
<td>0.70</td>
</tr>
<tr>
<td><strong>Internal factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm Age</td>
<td>15.187</td>
<td></td>
</tr>
<tr>
<td>Firm size (medium-sized firm)</td>
<td>5.46</td>
<td></td>
</tr>
<tr>
<td>Small firm</td>
<td>19.53</td>
<td></td>
</tr>
<tr>
<td>Micro firm</td>
<td>75.01</td>
<td></td>
</tr>
<tr>
<td>Higher educated workforce</td>
<td></td>
<td>0.032</td>
</tr>
<tr>
<td><strong>External factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td>87.04</td>
<td></td>
</tr>
<tr>
<td>Access to finance</td>
<td>22.70</td>
<td></td>
</tr>
<tr>
<td>Member a business association</td>
<td>7.69</td>
<td></td>
</tr>
</tbody>
</table>

Note: Observation: 7578

In terms of the firm characteristics, the average age of the SMEs in our sample is about 15 years. A vast majority of the firms are micro (75%); the remaining are small-sized firms (20%) and only a small amount of the firms are medium sized firms (5%). About 0.7% reported conducting formal R&D during the research period, thus suggesting that a small number of firms with internal R&D. The average proportion of workforce with college and university degree is low (about 3%).

In terms of external factors, a great number of SMEs reported having competition (87%) and nearly 23% reported experiencing problems getting the bank loan. Only 8% of SMEs in our sample is a member of one or more business association.

4.2 Bivariate

Table 3 reports the results of McNemar test between exporter and non-exporter, importer and non-importer, and outsourcee and non-outsourcee group.

The number of SMEs that exported their products reported having new process and new product innovations are significantly higher (about 16% for both new process and new products innovations) than those of SMEs without exporting their products.

Similarly, the number of SMEs that imported production inputs reported having new process and new product innovations are significantly higher (16% and 13% higher, respectively) than those of SMEs without imported production inputs.

Finally, the number of SMEs that acted as the suppliers to foreign customers reported having new process and new product innovations are also significantly higher (about 12% for both cases) than those of SMEs without acting as the suppliers to foreign customers.
Table 3: McNemar test

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>New process (%)</th>
<th>McNemar's chi2(1)</th>
<th>New product (%)</th>
<th>McNemar's chi2(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter = 0</td>
<td>7,447</td>
<td>7.57</td>
<td>178.19 ***</td>
<td>29.47</td>
<td>1813.65 ***</td>
</tr>
<tr>
<td>Exporter = 1</td>
<td>255</td>
<td>23.14</td>
<td>45.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importer = 0</td>
<td>7,440</td>
<td>7.55</td>
<td>170.80 ***</td>
<td>29.58</td>
<td>1786.78 ***</td>
</tr>
<tr>
<td>Importer = 1</td>
<td>262</td>
<td>23.28</td>
<td>42.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outsourcer = 0</td>
<td>7,625</td>
<td>7.97</td>
<td>444.95 ***</td>
<td>29.88</td>
<td>2152.19 ***</td>
</tr>
<tr>
<td>Outsourcer = 1</td>
<td>77</td>
<td>19.48</td>
<td>44.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** p < 0.01

The McNemar tests for the above cases are all statistically significant at 0.01 level.

4.3 Multivariate

4.3.1 Various modes of internationalisation and innovation

Exporter and innovation

Like Altomonte et al. (2013) and Ariffin and Figueiredo (2004), our results in table 4 report the positive relationship between exports and the new process innovations of manufacturing SMEs in Vietnam (statistically significant at 0.05 level with model I and at 0.1 level with model III). However, unlike Higón and Driffield (2011) and Sun and Du (2010) our results show no evidence about the relationship between exports and the new product innovations.

SMEs in emerging markets mainly acquire knowledge and improve their process or technology through the act of exporting. This can be explained by looking at the products that SMEs in an emerging market normally export. For instance, manufacturing SMEs in Vietnam basically export crude oil, textile products or electronics components. With these kinds of products, it is very hard for an emerging economy to come up with new product innovation. All they can do is to improve the process or technology so that they can manufacture the products more efficiently.

Importer and innovation

Our findings report the positive relationship between imports and the new process innovations (statistically significant at 0.05 level with model I and at 0.01 level with model III) which are consistent with Coe and Helpman (1995) and Bloom et al. (2015).

However, no evidence is found about the relationship between imports and the new product innovations of manufacturing SMEs in Vietnam. This finding implies that in contrast to developed economies, where imports of intermediate goods are considered important for product innovation (Paunov, 2011, Damijan and Kostevc, 2010), importing does not seem to have a significant influence on new product innovations manufacturing SMEs in emerging markets. SMEs in emerging markets mostly modify its production processes to accommodate intermediate inputs.
Table 4: The relationship between internationalisation and new product/process innovation.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International modes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exporter</td>
<td>0.943**</td>
<td>0.022</td>
<td>0.013*</td>
<td>0.007</td>
</tr>
<tr>
<td>Export value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importer</td>
<td>0.982**</td>
<td>0.120</td>
<td>0.019***</td>
<td>0.005</td>
</tr>
<tr>
<td>Import value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outsource</td>
<td>0.672</td>
<td>0.583</td>
<td>0.791</td>
<td>0.639*</td>
</tr>
<tr>
<td><strong>Firm specific characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td>1.618**</td>
<td>1.221**</td>
<td>2.454**</td>
<td>1.367**</td>
</tr>
<tr>
<td>Firm Age</td>
<td></td>
<td></td>
<td>-0.188***</td>
<td>-0.017*</td>
</tr>
<tr>
<td>Firm size (medium-sized firm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small firm</td>
<td></td>
<td></td>
<td>-0.610</td>
<td>-0.224</td>
</tr>
<tr>
<td>Micro firm</td>
<td></td>
<td></td>
<td>-1.345***</td>
<td>-0.530*</td>
</tr>
<tr>
<td><strong>External factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher educated workforce</td>
<td>1.955**</td>
<td>1.917***</td>
<td>1.779*</td>
<td>2.176***</td>
</tr>
<tr>
<td>Competition</td>
<td>0.264</td>
<td>0.275**</td>
<td>0.301</td>
<td>0.261**</td>
</tr>
<tr>
<td>Access to finance</td>
<td></td>
<td>-0.061</td>
<td>0.270*</td>
<td>-0.056</td>
</tr>
<tr>
<td>Member of a business association</td>
<td>0.252*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LR chi2(14)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1315</td>
<td>3842</td>
<td>1284</td>
<td>3742</td>
</tr>
</tbody>
</table>

*** p < 0.01, ** p < 0.05, * p < 0.1.

Outsourcee and innovation

There is no evidence about the relationship between outsourcee and the new process innovations while there is weak influence of outsourcee on the new product innovations (statistically significant at 0.1 level with model IV). The main task for outsourcees in the emerging markets such as Vietnam is to customise products for their foreign customers’ needs, not to act as an upstream supplier where firms can develop new machineries and precision instruments (or other advanced services) that might subsequently be purchased by downstream producers (Naghavi and Ottaviano, 2010; Glass and Saggi, 2001). Therefore, although outsourcees can obtain access to external knowledge, they primarily promote new product innovation.
4.3.2 Other factors

R&D and innovation

The data show that firm level spending on formal R&D is the most consistent significant factor positively associated with new product and new process innovations in all the models developed (statistically significant at 0.05 level). This finding is in line with the literature on determinants of innovation (Griliches, 1979; Radas and Bozic, 2009), as R&D is considered as one of the most important factors explaining innovation.

However, the interaction terms of various modes of internationalisation and R&D are not statistically significant. SMEs in emerging markets such as Vietnam does not pay much attention on R&D (only 0.7% of the firms reported investing in R&D); therefore, R&D does not influence the impact of internationalisation on SMEs innovation performance in emerging markets.

Firm age and innovation

Firm age is negatively associated with new process innovations (statistically significant at 0.01 level) and new product innovations (statistically significant at 0.1 level). This result is consistent with developed economies where the older firms tend to show lower innovative performance (Hausman, 2005).

Firm size and innovation

The results show that the micro firms are less innovative in the new process (statistically significant at 0.01 level) and in the new product (statistically significant at 0.1 level with model II). There is also weak negative relationship of small firms and process innovation (statistically significant at 0.1 level with model III). In other words, the larger the firm size, the more innovative the firm is; which contrasts with findings in developed economies where smaller size is associated with more innovation (Acs and Audretsch, 1987). One logical explanation for this dissimilarity is that in developed economies, innovative small firms acquire external knowledge spillovers more easily from research universities, public and private research institutions. In contrast, in emerging markets, the knowledge infrastructure is undeveloped (UNCTAD, 2011a, 2011b, 2016), which implies lower external knowledge spillovers.

Higher education workforce and innovation

There are positive relationships between the higher education workforce and the new process innovations (statistically significant at 0.1 level with model I and at 0.05 level with model III) or new product innovations (statistically significant at 0.01 level). These findings are consistent with strategic management literature, that is hiring many employees with higher education favours firms’ product and process innovations (Bocquet et al., 2013).

Competition and innovation

Competition enhances the probability of innovating in new products (statistically significant at 0.05 level) while no evidence is found for the innovating in new process.
Access to finance and innovation

There is a weak positive impact of the difficulty of access to finance on the new process innovations (statistically significant at 0.1 level). Firms facing problems with accessing financial support are more likely to innovate in new process than firms that have no obstacle suggesting that process innovation may be perceived by SMEs in Vietnam as a mean of increasing revenues internally to overcome the dearth of external finance in their environments.

Member of a business association and innovation

Being a part of a business association has no overall impact on the probability of innovating since we find no statistically significant association between being a member of a business association and innovation. This contrasts with the findings in the developed countries where small firms can benefit from additional resources and be able to enhance their innovation when they are part of a group (Bocquet et al., 2013).

5. Summary and Concluding Remarks

The role of internationalisation in improving innovation has been investigated carefully; however, previous studies have mainly focused on large firms in developed countries. This study is likely the first to empirically examine the different international modes of entry (importer, exporter and oursourceree) that matter for SME new product and process innovations in emerging markets.

This study contributes to the literature on internationalisation and innovation by showing that exporting and importing have a significant influence on new process innovations (but no evidence is found for new product innovation) in emerging markets while acting as suppliers to international customers has a weak impact on new product innovations (but no evidence is found for new process innovation) of Vietnamese SMEs.

These findings are in contrast with findings in developed countries, where export, import and acting as suppliers to foreign customers are considered important for new product and new process innovation as discussed earlier in our literature review (section 2). This can be explained by the fact that SMEs in emerging markets such as Vietnam mainly focus on quantity (not quality) and mostly export processed commodities and raw materials (e.g. textile products, crude oil). Furthermore, regarding the importation, SMEs in emerging markets primarily modify their production processes to accommodate intermediate inputs. As a result, unlike in developed countries, export and import only influence the new process innovation of SMEs in emerging countries. Finally, regarding the outsourcees, their central task is to manufacture products for their customers whereas outsourcees in developed countries might act as upstream suppliers and can develop new machineries, instruments or advanced services. Therefore, being an outsourcee only improve the SME new product innovation in emerging markets, which contrasts with findings in developed countries where outsourcees play an important role in both SME new product and new process innovation.

Regarding the antecedents of SME innovativeness, consistent with innovation literature, we confirm that R&D, higher education workforce, competition and the difficulty of access to finance are positively influence the SME innovation capability. However, different from developed
countries, where smaller size is associated with more innovation, in emerging markets with lower external knowledge spillovers, the larger the firm size, the more innovative the firm is. Moreover, our study shows no statistically significant association between being a member of a business association and innovation, which contrasts with the findings in the developed countries where being a part of a group can improve firms’ innovation.

Overall, this study has been able to enrich and extend the literature on internationalisation and innovation by focusing on SMEs in emerging markets – Vietnam. In addition, our findings report that of all the various internationalisation modes tested, exporter and importer play a critical role in SME new process innovation when acting as suppliers to foreign customers might affect the SME new product innovation in emerging markets. This paper also contributes to the literature of innovation by showing that R&D, firm size, firm age, higher education of employees, competition and difficulty of access to finance are important determinants of SME innovation in emerging markets.

References


