Chapter 9

Trade Liberalization and Innovation Linkages Micro-evidence from Vietnam SME Surveys

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CHAPTER 9

Trade Liberalization and Innovation Linkages
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Vietnam has long been pursuing its far-reaching trade liberalization program which has led to rapid economic growth and poverty reduction. Innovation has long been considered an important factor for creating and maintaining the competitiveness of nations and firms. This paper investigates the impacts of trade liberalization on innovation activities by SMEs, the most dynamic and important sector for Vietnam's future economic development. Using the recently released Vietnam Small and Medium Enterprise Survey, we find that innovation, as measured directly by 'new products', 'new production process' and 'improvement of existing products' are strongly influenced by trade liberalization.

***Keywords*:** Innovation, Export, Vietnam, SME, Trade liberalization

JEL Classification: D21, L23, O31, O32

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1. Introduction

After 20 years of reform, Vietnam has put in place the fundamentals of a market economy and actively participated in the globalization process by opening up the economy to international flows of capital and trade in goods and services.[2] The emergence of the market-based economy with appropriate institutions, stable macroeconomic environment and the support of the government for business development have allowed Vietnam to (i) unlock the potential of the agriculture sector, turning Vietnam from a food-hungry country to the world's third largest rice exporter[3]; (ii) encourage the development of a vibrant domestic private sector; (iii) attract a large amount of foreign investment; (iv) realize its comparative advantages and gain more benefits from international trade. These factors underlie the economic success that Vietnam has been achieving since the early 1990s. The country is now recognized as being among the most successful developing countries in terms of economic growth and poverty reduction.

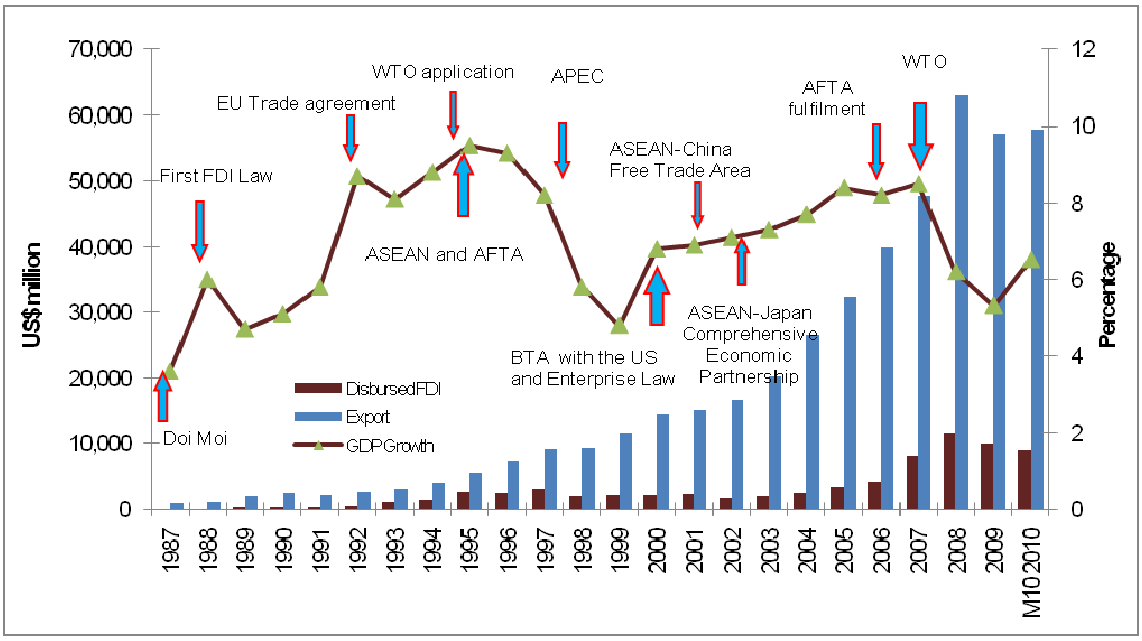
As can be seen in Figure 1, during the period 1990–2008, the annual GDP growth rate averaged more than 7 percent, and Vietnam's growth rates today remain among the highest the region. The average annual GDP growth was about 5-6 percent during the period1990–91, climbing to and then staying at about 8 percent from 1992 to 1997. GDP growth, however, declined between 1998 and1999, partly because of the Asian crisis and the dissipation of the effects of reform. Since 2000, the economy has regained its momentum. Its annual growth rate exceeded 7 percent—reaching 8.5 percent in 2007—then dropped back to an estimated 6.2 percent in 2008, owing to the effects of the global recession. High and continuous GDP growth rates and successful economic development from 2000 to 2008 have resulted in significant improvements in the population's welfare and in substantial poverty reduction. According to the

[2] "Globalization" is a loaded concept and may mean different things to different people, in different contexts. From an economic perspective, it usually refers to the removal of barriers to the cross-border movements of goods, funds, personnel and information. The more easily such movements take place, the higher the degree of globalization.

[3] Che *et al.* (2003) report that market reform leads to an increase in rice productivity, pointing to the importance of market competition, secured property rights and efficient use of resources. See http://www.crawford.anu.edu.au/degrees/idec/working_papers/IDEC03-7.pdf

Vietnam Household Living Standard Survey, the total poverty incidence declined from 58 percent in 1993 to 37 percent in 1998, 29 percent in 2002, 19.5 percent in 2004, and 16 percent in 2006 (SRV 2003; Nguyen 2009). In addition, improvements have been made in other aspects of human welfare, such as the sharp rise in the percentage of literate adults (to over 90 percent), longer life expectancy (over 70 years), and a lower mortality rate for children less than five years old (40 per 1,000 live births in 2003).

Figure 1. Vietnam Trade Liberalization and Economic Development



Note: In 1992, Vietnam signed a trade agreement with the European Union (EU). In 1995, it joined ASEAN and committed to fulfill the agreements under AFTA by 2006. Vietnam applied for WTO membership in 1995 and became a member in 2007. In 1998, it became a member of the Asia-Pacific Economic Cooperation (APEC) and, in the year 2000, signed the Bilateral Trade Agreement with the United States (VN-U.S.BTA). This agreement came into force in December 2001. Recently, Vietnam has also joined regional integration clubs such as ASEAN-China Free Trade Area (2002) and ASEAN-Japan Comprehensive Economic Partnership (2003).

As a result of its effort to integrate into the global economy, Vietnam has substantially liberalized its trade and investment regimes which have enabled Vietnam to attract a large inflow of foreign direct investment (FDI) and witness trade expansion. The process has created a growing and dynamic private sector consisting of mainly small and medium enterprises. In the face of Vietnam's increased integration into the

world market, and particularly following the country's entry into the WTO at the end of 2006, the SMEs are having a great opportunity to expand by exporting to other markets. But at the same time they are also facing tough competition on their door step.

According to endogenous growth theory, technological innovation is important to the "sustained" growth of an economy (Romer, 1986; Lucas, 1988).[4] Like many other emerging market economies/countries, globalization brings about opportunities and also pressures for Vietnamese domestic firms to innovate and improve their competitive position. Many of these pressures and opportunities operate through increased competition from, and linkages with, foreign firms and exposure to the international market. The major problem is that the Vietnamese private sector, and small and medium enterprises in particular, is not yet sufficiently competitive. As a result, most companies cannot yet withstand the competitive pressure resulting from liberalization and the opening to the world market, not to mention exporting to the world market. The key question facing policy makers is how to improve the competitiveness of Vietnam's enterprises, especially the SME sector which accounts for a large part of the economy. Among the many initiatives being proposed to improve the competitiveness of Vietnam's SMEs, innovation policy has attracted attention not only from policy makers, but also from researchers and the business community (Nguyen *et al*., 2008). These initiatives are based on the assumption that innovation can affect a firm's competitiveness and hence export status by increasing productivity (and reducing costs), and by developing new goods for the international market.[5]

In this paper, we use the conceptual frameworks of a number of recently developed models (e.g. Sutton, 2007) to examine the determinants of innovation by Vietnamese SMEs in the context of increased competition and linkages resulting from trade liberalization. Specifically, we focus on the effect of competition and transfer of capabilities stemming from globalization, which may be brought about through various channels, including the spillover effects of FDI, exposure to international trade, and

[4] The acquisition of knowledge and intelligence, technological innovation and human capital accumulation are the main reasons for the economic growth of the newly industrialized economies (Bassanini and Scarpetta, 2002; Hu & Mathews, 2005; Mueller, 2006, Nguyen and Nguyen 2010).

[5] This can be analyzed in the context of firms that compete in markets with differentiated products. Firms sell low-quality goods in domestic markets, but if they want to sell abroad then they must upgrade technologies to produce high-quality goods.

increased competitive responses by domestic firms. After briefly reviewing the previous studies in section 2, we present our data and econometric specification in section 3. We discuss our empirical results in section 4 while we conclude in section 5.

2. Trade Liberalization and SME Development in Vietnam

The evolution of globalization for Vietnam in the last 20 years is also illustrated in Figure 1. Vietnam has substantially liberalized its trade and investment policies since the late 1980s. During the early years of economic reform, Vietnam liberalized its trade regime through signing trade agreement with around 60 countries. It has also implemented a preferential trade agreement with the European Union since 1992. Later on, the country actively sought membership of regional and global organizations.[6] Vietnam has been a member of the Association of South East Asian Nations (ASEAN) since June 1995 and the Asia Pacific Economic Co-operation (APEC) since 1998. In 2000 Vietnam signed a historic comprehensive trade agreement with the USA to normalize trade relations between the two countries. Recently, Vietnam has also joined regional integration clubs such as ASEAN - China Free Trade Area and ASEAN-Japan Comprehensive Economic Partnership. Most recently, in 2007 Vietnam became the latest member of the World Trade Organization.

This process of trade regime liberalization has led to increased trade flows, and in particular export, for the country. In a recent paper, Abbott *et al*. (2009) observe that each time Vietnam reached a significant bilateral agreement, trade flows with that partner surged. Vietnam has also seen a steady growth in its international trade over the period. The average growth rate of export and import is around 20%. The total value of international trade over the GDP, which is one indicator of the openness of an economy, reached 150 per cent in 2007, up from 61 per cent in 1994. The structure of import and

[6] International integration processes picked up from the early 1990s after the collapse of the Berlin wall, and Vietnam lost its traditional markets in Eastern Europe and The Soviet Union in the late 1980s. The US trade embargo against Vietnam was only lifted in 1994, and the relationship with the US was normalized in 1995. Another important achievement and event is that since 1993 Vietnam has begun to receive overseas development assistance (ODA) from foreign governments which have contributed to the substantial increase in financial resources for Vietnam's development.

export has substantially changed in comparison with the previous period. Vietnam has exported oil, various manufacturing and agriculture-processing products, and imported not only consumption goods, but mainly raw materials for domestic production and initially progressive techniques and technology to promote the growth and efficiency of the economy. The composition of Vietnamese exports has gradually reflected the success of the industrialization process. The share of manufactured products, particularly labor intensive products like textiles and garments, footwear, and seafood, has been increasing and replacing the traditional agricultural products. In 2005, the share of manufactured handicraft products alone accounted for more than 40 per cent of total export value (CIEM 2005).

The Law on Foreign Direct Investment (FDI) was first promulgated in 1987 and later amended in 1990, 1992, 1996 and 2000 which helped Vietnam to attract a large volume of foreign capital when domestic savings were insufficient to meet investment needs. By 1987, the private sector virtually did not exist in Vietnam. By allowing foreign direct investment, Vietnam in effect imported/implanted the private sector of its own for the first time after the unification of the country. Since then, FDI has indeed become an integrated part of the Vietnamese economy and an important factor in Vietnam's economic growth during the 1990s. In order to create a more level playing field and to ensure that its laws allowed for national treatment for FDI enterprises prior to Vietnam's 2006 accession to the World Trade Organization, in 2006 Vietnam promulgated two important laws, the Investment Law and the new Enterprise Law[7], creating a corporate law regime that applies to both foreign and domestic enterprises.[8]

Thanks to the progressively liberalized regulations toward FDI, the FDI sector has now become an important part of the national economy. After a slowdown in FDI inflow in the aftermath of the Asian financial crisis, recently, new large FDI inflows have emerged, in part as a result of reforms committed to as part of WTO accession that

[7] Specifically, on November 29, 2005, the National Assembly of Vietnam adopted the Law on Investment No. 59/2005/QH11 ("New LOI") and Law on Enterprises No. 60/2005/QH11 ("New LOE") which apply to all enterprises established by domestic and/or foreign investors.

[8] Besides FDI, Vietnam also started to receive the ODA from international donors in 1993 and the amount committed and disbursed has been increasing since then. These capital sources constitute a positive assistance to infrastructural construction such as transport and communication, information, agricultural and rural development, public health, education and training, administrative reform, legislation, and structural reform.

relaxed rules restricting FDI, making Vietnam a more attractive FDI destination. The sudden increases in the share of the FDI sector during the period 2007-2008 can be partly explained by the WTO accession of Vietnam which generated hype among foreign investors about the prospect of doing business in Vietnam.[9] Although Vietnam has been successful in attracting FDI in recent years, the real benefits from FDI still seem controversial. Previous studies have found little evidence of technical spillover from FDI enterprises to local counterparts (Nguyen *et al.*, 2008). In addition, the country has become heavily dependent on FDI capital as an important source of input to sustain economic growth.

As discussed above, the last 20 years have witnessed comprehensive reforms being implemented in Vietnam which, together with an open-door policy to attract foreign direct investment and trade liberalization with the culmination of WTO accession in 2007, have created a growing dynamic private sector in Vietnam. However, the vibrant emergence of the private sector and SMEs is a recent development in Vietnam. When Vietnam opened up to outside world under its Doi Moi, starting with some timid reforms, the Vietnamese government officially granted its recognition of private enterprises in the early 1990s with the introduction of the Company Law and the Law on Private Enterprises. Despite this early official recognition for the private business sector, private enterprises developed slowly with only 39,600 enterprises established during the 1990s. Major growth in the formal private sector came with the 1999 Enterprise Law, which gave a much clearer legal status for the private sector. Since the Law became effective on 1 January 2000 the country has experienced a boom in private SMEs. They have now become a strong part of the national economy and have made a significant contribution to economic growth, job creation, exports and poverty reduction.

Small and medium-sized enterprises (SMEs) are a very heterogeneous group [10] and their definition varies by country. Usually the definition is based on the number of

[9] Vietnam requires registration of intended FDI, and not all of those registrations are implemented.

[10] SMEs operate in a wide array of business sectors, ranging from handicraft producers for village markets, coffee shops on the street, and Internet cafés in a small town to small sophisticated engineering or software firms selling to overseas markets and a medium-sized manufacturers supplying inputs to multinational automakers in both domestic and foreign markets.

employees, and value of sales and/or value of assets. The most commonly used criteria among a large number countries (both developed and developing) are the number of employees, for which the upper limit of number of employees in SMEs is set at between 200 and 250, with a few exceptions such as in Japan (300 employees) and the USA (500 employees).[11] In Vietnam, SMEs are defined using two criteria: number of employees and registered capital. According to Vietnamese laws and regulations (Government Decree 90/2001/ND-CP), Vietnamese SMEs are legally defined as "independent production and business establishments" with registered capital not exceeding VND 10 billion[12] or annual labor not exceeding 300 people. Based on this definition, the SMEs in Vietnam account for 97 percent of the total number of Vietnamese enterprises (calculated based on annual labor) or some 85 percent (calculated based on capital), given by the latest statistical data of the Vietnam General Office of Statistics.

Economic reform during the last decades has directly stimulated the development and performance of Vietnamese SMEs. As can be seen in Table 1 which classifies SMEs by the number of employees, the SMEs account for 97 percent of the total number of firms in 2008, an increase from 92 percent in 2000. The average growth rate of the SMEs under this classification was 23 percent in contrast with the average rate of just seven percent for the large enterprises. Under the capital classification criteria used in Table 2, the SME sector also account for 96% of the total number of firms with an average growth rate of 22 percent. In contrast to the employment classification, the SMEs' growth rate is still higher than 20 percent but two percentage point lower than the large enterprises. Vietnamese SMEs have been outperforming other enterprises in exploiting Vietnam's comparative advantage in labor-intensive production (Harvie, 2001).

[11] See Promoting SMEs for Development http://www.oecd.org/dataoecd/6/7/31919278.pdf

[12] At current exchange rate equivalent to around USD 450,000 decreasing from USD 600,000 due to the Dong's depreciation.

Table 1a. Distribution of Small and Medium Enterprises 2000-2008 (by Employees)

	Total Number of Firms (including SME)	SME	Micro Enterprises	Small Enterprises	Medium Enterprises	Large Enterprises
2000	42288	92%	54%	34%	4%	8%
2001	51680	93%	54%	35%	4%	7%
2002	62908	93%	53%	37%	4%	7%
2003	72012	94%	51%	39%	3%	6%
2004	91756	95%	53%	38%	3%	5%
2005	112950	96%	56%	37%	3%	4%
2006	131318	96%	61%	32%	3%	4%
2007	155771	96%	61%	33%	3%	4%
2008	205689	97%	62%	33%	2%	3%

Table 1b. Growth Rate of Firms 2001-2008

	Total Number of Firms (including SME)	SME Average	Micro Enterprises	Small Enterprises	Medium Enterprises	Large Enterprises
2001	51680	23%	23%	25%	7%	9%
2002	62908	22%	18%	29%	16%	15%
2003	72012	15%	12%	20%	9%	6%
2004	91756	29%	33%	25%	16%	6%
2005	112950	24%	29%	18%	11%	4%
2006	131318	17%	26%	3%	7%	5%
2007	155771	19%	19%	19%	19%	8%
2008	205689	33%	33%	34%	10%	6%

Source: GSO. Calculation by authors. Classification by number of employees.

Table 2a. Distribution of Small and Medium Enterprises 2000-2008 (by Capital)

	Total number of Firms (including SME)	SME	Small Enterprises	Medium Enterprises	Large Enterprises
2000	42288	97%	88.8%	7.9%	3.3%
2001	51680	97%	89.2%	7.6%	3.1%
2002	62908	97%	89.0%	7.8%	3.1%
2003	72012	97%	89.0%	7.8%	3.2%
2004	91756	97%	89.3%	7.6%	3.1%
2005	112950	97%	89.7%	7.4%	3.0%
2006	131318	97%	89.6%	7.4%	2.9%
2007	155771	96%	87.8%	8.6%	3.6%
2008	205689	96%	86.4%	9.9%	3.7%

Table 2b. Growth Rate of Firms 2001-2008 (by Capital)

	Total number of Firms (including SME)	SME	Small Enterprises	Medium Enterprises	Large Enterprises
2001	51680	22%	23%	18%	16%
2002	62908	22%	21%	25%	22%
2003	72012	14%	14%	14%	16%
2004	91756	28%	28%	24%	23%
2005	112950	23%	24%	19%	19%
2006	131318	16%	16%	17%	15%
2007	155771	18%	16%	37%	46%
2008	205689	32%	30%	52%	34%

Source: GSO. Calculation by authors. Classification by capital.

Table 3 presents a **breakdown of Vietnamese SMEs, categorised in terms of ownership,** for the period 2000-2008. The first row shows the total number of SMEs. The data indicates that, after a period of 9 years up to 2008, the numbers of SMEs increased by more than five times from 39897 in 2000 to 201590 in 2008. In the last three rows, the number of SMEs is computed as a share of each ownership type on total. The ownership structure of SMEs indicates that **most SMEs are non-state owned**. The number of state-sector SMEs decreased due to the progress of privatization. In 2000, nearly 11% of SMEs were state owned versus only 3% foreign-owned. In 2008, the SMEs in these two ownership sectors represent only 3.3 percent of the total number.

Table 3. Number and Ownership Structure of Vietnamese SMEs 2000-2008

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	39897	49062	59831	68687	88222	109336	127593	151780	201580
Ownership structure									
State owned enterprise	10.5	7.6	6.1	4.6	3.4	2.4	1.9	1.5	1.1
Non-state enterprise	86.4	89.0	90.9	92.5	93.9	94.9	95.5	95.9	96.7
Foreign investment enterprise	3.0	3.4	3.0	2.9	2.7	2.6	2.6	2.5	2.2

Unit: %
Source: Author's elaboration based on Enterprise Census 2000-2008 of GSO of Vietnam.

Table 4 presents the percentage of the total number of firms in Vietnam which are SMEs. The first row shows the share of total SMEs on total firms. The data shows that almost 98 percent of the total number of existing firms in Vietnam are SMEs. Broken down into type of ownership, the last three rows indicate the share of SMEs in each ownership sector. The fact is that SMEs constitute an overwhelming share of the private sector in Vietnam (99%). Share of SMEs in foreign owned firms (joint venture or 100% foreign owned) decreased slightly, but still made up more than three quarters of the firms in that sector. Share of state-owned SMEs decreased due to privatization.

Table 4. Share of Vietnamese SMEs in Total Firms by Type of Ownership

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	94.3	94.9	95.1	95.4	96.1	96.8	97.2	97.4	98.0
Ownership structure									
State owned enterprise	72.8	70.1	67.7	64.9	64.4	65.5	66.3	67.0	67.1
Non-state enterprise	98.5	98.5	98.5	98.4	98.6	98.7	98.8	98.8	99.1
Foreign investment enterprise	79.5	81.8	78.0	76.4	76.8	77.6	77.3	77.7	79.2

Unit: %.
Source: Author's elaboration based on Enterprise Census 2000-2008 of GSO of Vietnam.

Table 5 presents the sectoral structural change of Vietnamese SMEs. The data shows that most of structural changes occurred in 2000-2008 within the fishing and services sectors. The number of SMEs working in the fishing industry decreased remarkably during the last nine years. Less than 1% of SMEs remain in fishing (compared to about 6% in 2000). In contrast, more SMEs engage in the service sector (about 21% in 2008 compared to 15.4% in 2000).

Table 5. Sectoral Structure of Vietnamese SMEs

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total (100%)	39897	49062	59831	68687	88222	109336	127593	151780	201580
Agriculture and forestry	1.96	1.48	1.37	1.15	0.99	0.86	0.75	0.68	3.54
Fishing	6.14	5.21	4.01	2.13	1.53	1.24	1.02	0.85	0.67
Mining and quarrying	0.86	1.16	1.34	1.39	1.27	1.11	1.02	1.07	1.05
Manufacturing	22.93	22.38	21.97	21.84	20.90	19.98	19.24	18.80	17.78
Electricity, gas and water supply	0.25	0.27	0.28	0.34	1.64	2.18	1.98	1.83	1.53
Construction	8.89	10.54	12.02	13.22	13.23	13.39	13.48	13.46	13.73
Trade	43.48	41.81	41.08	41.03	40.67	40.66	41.00	40.41	40.17
Services	15.48	17.15	17.93	18.91	19.79	20.60	21.51	22.90	21.53

Unit: %.
Source: Author's elaboration based on Enterprise Census 2000-2008 of GSO of Vietnam.

SMEs in Vietnam have an important role to play in the country's economic development and industrialization process. The performance of SMEs can be observed though the state, non-state (largely comprising of SMEs) and foreign-owned sectors. Regarding GDP contribution, according to CIEM (2005), in 2005 the state-sector firms' contribution to GDP at current prices was almost the same as it was in 2000 (38.42% vs.

38.52% respectively). Non-state-sector contribution to GDP reduced from 48.2% in 2000 to 46.03% in 2005. As a result, the foreign investment sector contribution increased (15.89% in 2005 vs. 13.27% in 2000).[13] CIEM (2005) also reported the investment behavior by ownership. Interestingly, share of non-state-sector investment increased remarkably, with 32.2% of total 2005 investment versus 22.6% in 2000. This implies that the private sector, or SMEs, are now paying more attention to investment into their production. Hansen (2006) studied the determinants of growth and survival of SMEs. A study, which was based on a panel data of Vietnamese SMEs from 1990 to 2000, shows that innovation has positive and significant effect on survival of SMEs.

The development of SMEs is limited in many aspects, especially by market constraints and by SMEs' internal limitations, including capital shortage,[14] old equipment, outdated technology, and lack of skills and management experience [15](Webster and Taussig, 1999) and also by lack of appropriate government support.[16] In Vietnam, SMEs have received comparatively little support and attention. Until now, the most comprehensive document that lays out the details of the government action plan to develop the SME sector is the Decision No: 236/2006/QD-TTg on the 5-year SME development plan 2006-2010 by the Prime Minister, issued on October 23, 2006. [17] Though some legal documents have been issued to support the SMEs, in practice they are not yet fully implemented. The recent Decree 56/2009/ND-CP on SME development support in 2009, for example, enumerates the types of support SMEs can receive from the government, but does not provide guidance on how to actually receive that support.

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[13] More recent estimates suggest that the SMEs contribute about 45% of Vietnam's GDP. http://cab.org.in/CAB%20Calling%20Content/Financial%20Cooperatives%20in%20India%20-%20Where%20are%20the%20Members/Innovative%20Ways%20in%20Financing%20SMEs.pdf

[14] http://www.devoutreach.com/mar03/article/tabid/1373/Default.aspx

[15] Modern corporate governance practices, such as those applicable in OECD countries are not yet fully adhered to by Vietnamese private SMEs.

[16] http://www.adb.org/Media/Articles/2010/13364-vietnam-sme-reforms/

[17] http://www.business.gov.vn/uploadedFiles/Decision%20236-2006.pdf

3. A Literature Review

Successful innovation in new products and processes is increasingly being regarded as the central issue in economic development (Porter, 1998).[18] The concept of innovation was first studied by Schumpeter (1943) which was later developed by generations of economists into what now can be referred to as "innovation theory" thanks to the pioneering work of Nelson and Winter (1982), Dosi (1984) and Pavitt (1984). Historically, innovation literature was focused on the role of internal research and development (R&D) on firm innovation (Griliches, 1979). However, despite the fact that R&D is often a cornerstone of an effective innovation strategy, internal R&D expenditures played only a partial role in firm innovation rates.[19] It is now increasingly recognized that the ability to exploit external knowledge is critical to firm innovation (Cohen and Levinthal, 1990; Henderson and Cockburn, 1994; Teece *et al.*, 1997).

Traditionally, only those firms involved in R&D activities for new processes and products are considered technologically innovative firms.[20] But Mansfield (1968) suggests that both the firm that introduces new equipment in the market and the firm that first uses it are considered innovative. De Propris (2002) separates the innovation into four types: product, process, incremental and radical innovation. Relevant to our study, according to this author (De Propris, 2002) product innovation corresponds to the introduction to the market of new or improved products, whereas process innovation relates to the sequences and nature of the production process. Process innovation is

[18] According to Rothwell (1994) there are five generations of innovation models. The first generation model of innovation is also known as "technology push". The second generation innovation model – "need pull" – implies a shift toward a market/customer focus. The third generation is called the "coupling model" - a coupling of the push and pulls models. The fourth generation model of innovation, the "integrated model" suggests the coupling of marketing and R&D activities, together with strong supplier linkages and close coupling with leading customers. Finally, the fifth generation innovation is the "networking model".

[19] There is a large amount of literature on R&D and firm performance commonly referred to as the CDM models. However, the relationship between a firm's performance and R&D spending is often imperfectly understood.

[20] Molero *et al.* (1998) characterize them as firms that execute activities on a regular basis, formally or informally, pursuing either the creation of new product and process technologies or their improvement, in order to obtain results –quantitative or qualitative- that could increase their competitive capacity against other firms that work in the same market, or open for them new markets, that is, supporting the growth of the firm.

often more difficult to detect but it is very important, especially for buyer-supplier transactions. Both radical and incremental innovations can be either in product or process.[21]

There are numerous studies on the process of innovation itself (i.e the process leading to innovation) as its measurement is critical for both practitioners and academics. Yet the literature is characterized by a diversity of approaches, prescriptions and practices that can be confusing and contradictory. It is, however, generally believed that the innovation process consists of a complex sequence of decisions. Examples include the CDM model literature structuring the firm's decisions on how, and how much to innovate in a multi-stepped process. According to De Propris (2002), it seems that the idea that innovation is a linear and sequential process proceeding through specific steps has been replaced by a systemic approach to innovation. Edquist and McKelvey (2000) and Lundvall (1992) argue that the innovation process should rather be considered as a circular and complex system embracing interactive elements.

Faced with increasing international competition, innovation has become a central focus in firms' long-term strategies. Firms competing in global markets face the challenges and opportunities of change in markets and technologies. According to Veugelers and Cassiman (1999), one important aspect within innovation management is the optimal integration of external knowledge, since innovation increasingly derives from a network of companies interacting in a variety of ways.

A large volume of literature exists on the expected impact of trade liberalization on domestic economic performance. In general, there is consensus on the fact that trade openness leads to economic growth beyond that expected when no policy change occurs (Rodrik 1999). It is generally believed that trade liberalization should be beneficial for the domestic economy as well as the world as a whole. The reasons behind this include greater consumer welfare despite any loss in fiscal revenue, greater access to technology, the dynamic effects of competitiveness, inflows of investment, and

[21] Fernández (2005) suggests that a radical innovation occurs when the technological knowledge needed, in order to exploit it, is very different of the already existent knowledge while incremental innovation refers to improvements due to use or experience; it can often take the form of smaller enhancements around major radical innovations. Freeman and Perez (1988) argue that the incremental innovation is crucial for firms' productivity growth even though it is often underestimated in comparison to radical innovation.

improved resource allocation; access to better technologies, inputs and intermediate goods; economies of scale and scope; greater domestic competition; availability of favorable growth externalities like transfer of know-how, and many others.

At the firm level, trade liberalization could affect domestic enterprises and their innovation. Increased competition: lower import barriers (tariffs, quotas and other non-tariff barriers) would lead to increased foreign competition in the domestic market which will force inefficient domestic firms to try to improve their productivity by eliminating waste, exploiting external economies of scale and scope, and adopting more innovative technologies, or they may shut down. Lower production costs due to cheaper imported inputs which allow them to compete more effectively both against imports in domestic markets and in export markets. Another strand of the literature emphasizes the importance of international exposure through exporting as a source of new knowledge accumulation. Being exposed to international competition, the exporting firms can acquire important new knowledge through the process of learning-by-exporting. In addition, international competition can also be a stimulus for the firm to innovate for itself. Girma *et al.* (2004) report that exporters are more productive and they do select themselves in exporting although they also report that exporting increases a firm's productivity.

As with trade liberalization, investment liberalization also has positive and negative impacts on domestic firms and the SMEs. Sutton (2007) develops an industrial organization model to explain the impact of trade liberalization on the behavior of firms in the emerging market economies. The model assumes that a firm's competitiveness depends not only on its productivity but also on the quality of its product, with productivity and quality jointly determining a firm's "capability." Sutton's model (2007) predicts that after an initial shakeout, firms in emerging markets will strive to adjust by raising their capabilities, which may be improved by the vertical transfer of capabilities to the emerging market economies through the supply chain of multinational enterprises (MNEs). With the characteristic of public goods, knowledge and technologies that MNEs bring along when they invest abroad could have long-run impacts on the host country through the externality generated as suggested in endogeneous growth models (Grossman and Helpman 1991, Lucas 1988, Romer 1990).

It is commonly recognized that MNEs possess more advanced technology. When MNEs choose to penetrate a foreign market through direct investment, they are likely to bring along more sophisticated technology and superior managerial practices. These give them a competitive advantage over indigenous firms which tend to be more familiar with consumer preferences, business practices, and government policies in the host country market (Blomstrom and Sjoholm, 1999). It is possible that a portion of the technologies and experiences transported by MNEs will be diffused from their affiliates to the indigenous establishments in the host economy. Business associations with MNEs provide important learning opportunities for the domestic firms. They could reduce the costs of innovation and imitation for local firms, which will in turn speed up productivity improvement (Helpman, 1999). FDI may raise productivity levels of domestic firms in the industries which they enter by improving the allocation of resources in those industries. The presence of multinationals, together with their new products and advanced technologies, may force domestic firms to imitate or innovate. The threat of competition may also encourage domestic firms which might otherwise have been laggards to look for new technology. Another route for the diffusion of technology is the movement of labor from foreign subsidiaries to locally-owned firms. For example, local firms may learn to imitate a new process or improve the quality of their product through observation, interaction with foreign managers in business chambers, and from former employees of foreign multinational enterprises (MNEs). Local firms may also benefit from the entry of new professional services or suppliers as a result of the MNE entry. Foreign firms may act as catalysts for domestic suppliers to improve the quality or time efficiency of their goods or services by demanding higher standards. On the other hand, foreign firms may have a negative effect on domestic firms' output and productivity, especially in the short run, if they compete with domestic firms and "steal" their market or their best human capital. As domestic firms cut back production they may experience a higher average cost as fixed costs are spread over a smaller scale of production (Aitken and Harrison, 1998).

4. Data and Econometric Methodology

In this paper, we use the Vietnam Small and Medium Enterprise Survey conducted in 2007 and 2009 to investigate the link between innovation activities and exporting. The survey has been conducted four times: in 1991, 1997, 2002, 2005, 2007 and 2009 by the Ministry of Labor, Invalid and Social Affairs (MOLISA) and the Stockholm School of Economics, and in 2005 by MOLISA and University of Copenhagen. Although the SME survey is a longitudinal survey, we only have access to the data in 2005, 2007 and 2009. In our study, we chose to focus specifically on 2007 and 2009 data as the period under study is the period that Vietnam experienced increased trade liberalization.[22] The SME survey was meant to be a national representative survey, and was conducted in ten provinces in Vietnam. In all areas covered by the survey, the sample was stratified by ownership to ensure that all types of non-state firms were included. The SME survey is a rich dataset, containing a battery of information about firms' characteristics including enterprise dynamics and growth, bureaucracy, informality, tax, employment, education, social insurance, innovation, export, investment and finance.

In Vietnam, the survey is the only source of data that contains innovation information for enterprises in general, and SMEs in particular. An important advantage of our data is that firms self-report various types of innovation activity. The survey distinguishes between whether the firm introduced new products (product innovation), improved existing products (product modification) or introduced new production process/new technology (process innovation). These are the measures of innovation we used in this paper. [23]

[22] While data from previous waves are not available, the SME survey in 2002 did not distinguish between product vs. process innovation.

[23] Most studies on innovation use patent data or R&D expenditures, which are problematic. Patents are generally viewed as having several weaknesses: 1) patents measure inventions rather than innovations; 2) the tendency to patent varies across countries, industries and processes; and 3) firms often use methods other than patents to protect their innovations (such as technological complexity, industrial secrecy, and maintaining lead time over competitors). Using R&D expenditures may also be problematic because not all innovations are generated by R&D expenditures, R&D does not necessarily lead to innovation, and formal R&D measures are biased against small firms (Michie, 1998; Archibugi and Sirilli, 2001). Perhaps most important for the purposes of this paper is that in

For empirical analysis, basically, we estimate the following equation

$$Innovation = \gamma' Z + competitio\, n' \beta + spillover\, ' \varphi + \varepsilon \quad (1)$$

where *Innovation* is an indicator taking value of 1 if firm *i* is an innovator in the survey year and 0 otherwise, Z is a vector which includes a firm's characteristics such as firm size (**numwork**) proxied by the number of workers, firm age (**lnfirmage**), skill of the labor force (**skillratio**), capacity utilization (**over_cap**). Regional dummies and ε is an error term. As the dependent variable is a binary response variable, the equation (1) is estimated as a probit or logit model. As discussed above, our data allows us to distinguish between product innovation, process innovation and product modification, *Innovation* in (1) is a generic measure of innovation. In particular, in the empirical investigation, we consider three measures of innovations:

- *Product Innovation:* This is a dichotomous variable that takes the value 1 when the firm introduces new products in the survey year; and 0 otherwise.
- *Process Innovation*: This is a dichotomous variable that takes the value 1 if the firm introduces new production processes/new technology; and 0 otherwise.
- *Product modification*: This is a dichotomous variable that takes the value 1 if the firm introduces any major improvement to existing products or changed specification in the survey year; and 0 otherwise.

The SME survey data also allow us to capture the degree of competition faced by each firm in various ways. Firms that are able to charge a larger markup are deemed to have less competition. We are able to observe the pricing strategy of individual firms, i.e. if they price their products/services according to their competitors (**com_price**). We are also able to capture the effects of Foreign Competition (**foreign_com**) with a dummy variable. As discussed above, foreign firms can spur innovation among domestic firms through competition but they can also directly transfer capabilities. The SME survey also permits us to capture in various ways the extent to which there may be a spillover from foreign firms to domestic firms. We use three variables to capture the linkages and exposure to foreign firms and international trade. In particular we use the

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emerging-market economies these types of innovations are less likely to be observed as firms are expected to engage more in imitation and adaptation of already created and tested innovations, rather than in generating new inventions, and are less likely to expend resources on R&D.

percentage of sales to FDI firms (**sale_mne**), the share of inputs imported (**input_import**), and whether a firm exports (**export**).

The argument for including firm size (**numwork**) is that large companies have more resources to innovate and can benefit from economies of scale in R&D production and marketing. Capacity utilization has been found to be a strong predictor of innovations (Becheikh *et al.*, 2006), the effect of capacity over-utilization (**over_cap**) on innovation is a priori indeterminate. If firms are too busy fulfilling demand, they may be more interested in extending their current capacity than finding new ways of producing goods and services. At the same time, if firms are at capacity they may need to innovate. The skill level of the labor force (**skillratio**), captures the human capital available within the firm. This variable might be expected to be positively correlated with innovation as it reflects the involvement of workers in R&D and more skilled workers are able to give feedback to the firm on how to improve a product. Age of the firm in number of years since the firm began operations (**lnfirmage**) is included because older firms developed routines that are resistant to innovation and/or older firms will accumulate the knowledge necessary to innovate. We report in Appendix 1 a detailed description of the variables.

5. Empirical Results

The estimation results for 2007 and 2009 are presented in Table 6 and 7 respectively. Many interesting findings are contained in these two tables that we will now discuss. We first focus on the competition effects. As can be seen in Table 6, the effects of competition, both domestic and international, have important impacts on innovation activities. The competitors' pricing (**com_price**) has a positive impact on product innovation but not on process innovation or product modification. But foreign pressure (**foreign_com**) also had positive impacts on all kinds of innovation activities in 2007. Sales to MNEs lead to improvement in the innovation activities of domestic firms in all aspects (i.e. new products, new process, and product improvement). In 2009, however, the results are a bit different. Although pressure from price competition

(**com_price**) helps to improve innovation in terms of product modification/improvement, it has no effect on product innovation and process innovation. However, still resembling the effect in 2007, foreign competition pressure helps firms to improve their innovation activities in terms of process and product improvement, not new product innovation. Different from the results in 2007, sales to MNEs and imported inputs seem to lose their importance. The estimated parameters are not statistically significant. However, the estimated effect of exporting is still statistically significant.

Table 6. Estimation Results for 2007

	New Product			**New Process**			**Product Modification**		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
sale_mne	0.01*	0.00	0.08	0.01*	0.00	0.01	0.00	0.00	0.71
input_import	0.00	0.00	0.66	0.00	0.00	0.32	0.00	0.00	0.72
over_cap	-0.25*	0.14	0.07	-0.14	0.09	0.13	-0.23**	0.07	0.00
lnfirmage	-0.16	0.08	0.04	-0.14**	0.05	0.01	-0.13***	0.04	0.00
skillratio	0.08**	0.06	0.14	-0.04	0.05	0.42	-0.19***	0.04	0.00
export	0.41**	0.18	0.02	0.26**	0.13	0.04	0.42***	0.13	0.00
com_price	0.21*	0.12	0.09	-0.08	0.10	0.41	-0.13	0.08	0.12
numworker	0.00*	0.00	0.07	0.00***	0.00	0.00	0.00***	0.00	0.00
foreign_com	0.10	0.10	0.29	0.29***	0.07	0.00	0.32***	0.06	0.00
HN	0.53	0.17	0.00	0.43	0.10	0.00	0.50	0.09	0.00
Haiphong	1.10	0.16	0.00	-0.02	0.13	0.86	0.43	0.11	0.00
Hatay	0.38	0.17	0.03	0.19	0.10	0.06	0.21	0.09	0.02
Longan	0.89	0.19	0.00	0.09	0.15	0.57	0.02	0.13	0.85
Phutho	0.35	0.20	0.08	-0.51	0.15	0.00	-0.08	0.10	0.43
Quangnam	0.57	0.21	0.01	0.03	0.14	0.83	-0.07	0.12	0.58
Nghean	0.35	0.18	0.05	-0.31	0.12	0.01	0.21	0.09	0.02
Khanhhoa	0.08	0.33	0.81	-0.28	0.20	0.16	-0.44	0.16	0.01
Lamdong	0.53	0.24	0.03	0.14	0.17	0.43	0.42	0.15	0.01
Constants	-1.83	0.23	0.00	-0.81	0.16	0.00	0.04	0.13	0.77
	Number of obs = 2537 LR chi2(18) = 97.56 Prob > chi2 = 0.0000 Log likelihood = -481.456 Pseudo R2 = 0.0920			Number of obs = 2537 LR chi2(18) = 179.92 Prob > chi2 = 0.0000 Log likelihood = -1022.29 Pseudo R2 = 0.0809			Number of obs = 2537 LR chi2(18) = 259.73 Prob > chi2 = 0.0000 Log likelihood = -1613.93 Pseudo R2 = 0.0745		

Table 7. Estimation Results for 2009

	New product			New process			Product modification		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
sale_mne	0.00	0.00	0.87	0.00	0.00	0.44	0.00	0.00	0.41
input_import	0.00	0.00	0.11	0.00	0.00	0.44	0.00	0.00	0.82
over_cap	-0.02*	0.15	0.90	-0.25**	0.10	0.02	-0.17**	0.08	0.03
lnfirmage	0.04	0.08	0.67	-0.18***	0.05	0.00	-0.15***	0.04	0.00
skillratio	0.09	0.06	0.13	0.03	0.05	0.55	-0.15***	0.04	0.00
export	0.36**	0.18	0.04	0.47***	0.12	0.00	0.51***	0.12	0.00
com_price	0.09	0.17	0.60	-0.06	0.11	0.62	-0.32***	0.09	0.00
numworker	0.00**	0.00	0.06	0.01***	0.00	0.00	0.00**	0.00	0.01
foreign_com	0.19	0.12	0.11	0.23***	0.07	0.00	0.29***	0.06	0.00
HN	0.11	0.17	0.52	0.15	0.11	0.17	0.01	0.09	0.95
Haiphong	0.10	0.20	0.61	-0.21	0.13	0.12	0.05	0.10	0.60
Hatay	-0.13	0.19	0.52	-0.11	0.11	0.33	-0.10	0.09	0.23
Longan	-0.05	0.27	0.84	-0.23	0.17	0.17	-0.25	0.13	0.05
Phutho	0.07	0.22	0.74	-0.18	0.14	0.19	-0.01	0.10	0.93
Quangnam	0.23	0.22	0.31	0.02	0.15	0.88	0.04	0.12	0.75
Nghean	-0.71	0.35	0.04	0.09	0.11	0.41	-0.35	0.10	0.00
Khanhhoa	0.58	0.22	0.01	0.00	0.18	0.99	-0.22	0.15	0.13
Lamdong	0.41	0.27	0.13	-0.01	0.20	0.96	-0.26	0.16	0.11
Constant	-2.27	0.24	0.00	-0.80	0.14	0.00	0.18	0.12	0.13
	Number of obs = 2532			Number of obs = 2532			Number of obs = 2532		
	LR chi2(18) = 50.28			LR chi2(18) = 147.23			LR chi2(18) = 192.50		
	Prob > chi2 = 0.0001			Prob > chi2 = 0.0000			Prob > chi2 = 0.0000		
	Log likelihood = -316.1651			Log likelihood = -976.00			Log likelihood = -1623.801		
	Pseudo R2 = 0.0737			Pseudo R2 = 0.0701			Pseudo R2 = 0.0560		

6. Conclusion

In this paper, we attempted to investigate the impact of trade liberalization on innovation activities by SMEs in Vietnam. We identified two channels for the trade liberalization – innovation linkages: FDI and trade. We proxy for these two channels using various measures. The results indicate tentatively that the impacts of trade liberalization on innovation are significant and important, depending on the channels and proxies used. However, the current version of paper suffers from a number of limitations. First, we have not yet exploited the panel structure of the data set. We have not yet been able to obtain the necessary ID to link the data together. Secondly, there is

a possibility of reverse causality between the proxies we used for trade liberalization and innovation activities that we have not yet fully investigated. It is expected that these issues will be taken up in the next version of the paper.

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Appendix 1: Variable Description

Variable	Description
Dependent variable	
NEWPRODUCT	1 if firm introduces new product(s), 0 otherwise
NEWPROCESS	1 if firm introduces new production process, 0 otherwise
MODIPRODUCT	1 if firm makes major improvements of existing product(s) or changes specification, 0 otherwise
Independent variables	
numwork	firm size - the number of workers
lnfirmage	firm age – years in operations
skillratio	skill of the labour force
over_cap	capacity utilization – 0/1 variable indicating if capacity is over used
com_price	a dummy variable, equal 1 if pricing according to competitor
foreign_com	a dummy variable, equal 1 if subject to foreign competition
sale_mne	percentage of sale to FDI firms
input_import	the share of inputs imported
export	a dummy variable, equal 1 if exporting, 0 otherwise