

# Firm-Level Technology and Competitiveness in Vietnam: Evidence from a Survey in 2013

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## Table of Contents

Preface .....	i
Acknowledgements.....	ii
1 Introduction .....	1
1.1 Quantifying Innovation.....	1
1.2 The Vietnam Technology and Competitiveness Survey .....	2
1.3 Sampling and Cleaning .....	4
2 Technology and Innovation Policy in Vietnam .....	9
2.1 Financial Incentives for Technology Transfer.....	10
2.2 Tax Policies to Promote Technology Transfer.....	10
2.3 Other Incentives .....	12
2.4 Implementation.....	12
3 Technology and Competitiveness: Evidence from the 2012 TCS .....	15
3.1 Technology Transfer .....	17
3.2 Horizontal Spillovers.....	20
4 Backward Linkages: Technology Transfer from Customers .....	25
5 Forward Linkages: Technology Transfer from Suppliers .....	35
6 Alternative Paths to Innovation: Research, Adaptation, and Modification .....	43
6.1 Adaptation and Modification .....	46
6.2 Constraints to Adapting Technology .....	48
7 Corporate Social Responsibility (CSR).....	51
7.1 Measuring Corporate Social Responsibility (CSR) .....	52
7.2 What are the characteristics of CSR adopting firms? .....	55
7.3 Future research .....	56
8 Conclusion.....	58

## List of Figures

Figure 1.1: Sample Distribution by Firm Characteristics.....	5
Figure 1.2: Sample Distribution by Sector .....	7
Figure 3.1: Constraints on Firms' Economic Performance.....	15
Figure 3.2: Ranking of Transfer Channels by Firm Size .....	19
Figure 3.3: Ranking of Transfer Channels by Legal Structure .....	20
Figure 3.4: Average Number of Competitors by Sector.....	23
Figure 4.1: Composition of Output .....	26
Figure 4.2: Sales Structure by Firm Size (N=7,993) .....	26
Figure 4.3: Most Important Country for Exports .....	27
Figure 4.4: Average Contract Duration with Customers (Months).....	30
Figure 4.5: Technology Transfer from Customers .....	31
Figure 4.6: Intentionality of Tech. Transfer from Customers .....	32
Figure 5.1 (a): Source of Intermediate Inputs.....	36
Figure 5.1 (b): Source of Raw Material Inputs .....	36
Figure 5.2: Most Important Country for Imported Inputs .....	37
Figure 5.3: Average Contract Duration with Suppliers (Months) .....	38
Figure 5.4: Technology Transfer from Suppliers.....	40
Figure 5.5: Intentionality of Tech. Transfer from Suppliers.....	40
Figure 6.1: Originality of Research Output .....	43
Figure 6.2: Financing Research .....	44
Figure 6.3: Share of Firms Doing Adaptation, Research .....	46
Figure 6.4: Reasons for Adaptation .....	48
Figure 6.5: Reasons for Technology Adaptation Rather than Purchase .....	49
Figure 6.6: Financing of Adaptation.....	50

## List of Tables

Table 1.1: Selected Innovation Indicators .....	2
Table 1.2: Structure of 2013 Survey Questionnaire .....	3
Table 1.3: Size Categories .....	4
Table 1.4: Legal Structure Categories .....	5
Table 1.5: ISIC 2-Digit Sector Code and Description .....	6
Table 2.1: Incentives for Technology Transfer.....	11
Table 3.1: Firm Constraints, Regression Analysis .....	17
Table 3.2: Types of Spillover .....	18
Table 3.3: Main Supplier of Technology .....	21
Table 4.1: Export Status by Firm Characteristic.....	28
Table 4.2: Technology Transfer from Customers, Regression Analysis .....	33
Table 5.1: Importers of Intermediate Inputs, Regression Analysis.....	39
Table 5.2: Technology Transfer from Suppliers, Regression Analysis .....	41
Table 6.1: Research and Development, Regression Analysis .....	45
Table 6.2: Determinants of Research and Adaptation, Regression Analysis.....	47
Table 7.1: Corporate Social Responsibility (CSR) Indicators .....	53
Table 7.2: Corporate Social Responsibility (CSR) Indicators, by firm size.....	54
Table 7.3: Corporate Social Responsibility (CSR) Indicators, by ownership category .....	55

## **Preface**

This report summarises information from the 2013 Vietnam Technology and Competitiveness Survey (TCS), developed, in collaboration, by the Central Institute for Economic Management (CIEM), the General Statistics Office (GSO) and the Development Economics Research Group (DERG) of the Department of Economics (DoE), University of Copenhagen.

The data collected supplements previous survey rounds, and, with the addition of future rounds of the survey, aims to give researchers and policymakers a detailed understanding of the dynamics of technology, productivity and profitability of Vietnam's growing private sector.

This report provides readers with an introduction to the main features of the dataset. As the report does not provide a complete description of the full range of information collected in the 2013 survey round, both interested readers and researchers are encouraged to review the survey questionnaire and explore the full survey dataset.

## **Acknowledgements**

The study team behind the present report is grateful to the Acting President of the Central Institute for Economic Management (CIEM), Dr. Nguyen Dinh Cung and the Director of the Enterprise Department at the General Statistics Office (GSO), Mr. Pham Dinh Thuy, whose leadership ensured effective collaboration between the various researchers and institutions involved in updating the survey questionnaire and taking it to the field. This series of on-going surveys would not be possible without the enduring professionalism and dedication of the enumerators and officials of the General Statistics Office (GSO).

The core research team was led by Professors Carol Newman and John Rand. This team included Christina Kinghan, Ani Vardanyan and Mengyang Zhang from Trinity College Dublin. Dr. Nguyen Tue Anh from CIEM provided valuable input to the preparation of the survey questionnaire and this report. Professor Finn Tarp, Coordinator of the Development Economics Research Group (DERG) at the University of Copenhagen, Denmark and Director of UNU-WIDER, Helsinki, Finland, coordinated and supervised the research effort through all its stages.

While many commentators were responsible for improving the quality of this descriptive report, any remaining errors are the responsibility of the research team.

# **1 Introduction**

The Vietnam Technology and Competitiveness Survey (TCS) collects firm level data on topics ranging from corporate social responsibility to technology investment and innovation. As the survey is backwards-looking the following 2013 report contains information relating to 2012 and focuses specifically on the cross-sectional evidence generated from the 2013 survey round. Descriptive reports containing information pertaining to the 2011 and 2012 survey rounds are available from the Central Institute of Economics Management (CIEM) in Vietnam.

The TCS re-interviews a consistent cross-section of firms each year. This has allowed for the creation of a comprehensive and growing panel dataset. The longitudinal nature of the dataset and the detailed information it contains represents a rare and valuable data source for researchers, enabling them to examine changes within individual firms over time. This type of rich data source is unique, both in Vietnam, but also among surveys implemented in an emerging country context.

Development of the questionnaire was undertaken collaboratively by the Development Economics Research Group (DERG) of the University of Copenhagen, the GSO and the Central Institute of Economic Management (CIEM) within the Ministry of Planning and Investment (MPI). With more than 100 full-time research staff, across seven distinct research departments, CIEM is a leading producer of economic analysis and policy evaluation for the Government of Vietnam.

The funding required to complete this project has been generously provided by Danida.

## **1.1 Quantifying Innovation**

The development of a country's innovative and technological capabilities is regarded as a central tenet in evaluating their national competitiveness. Adaptation of new technologies by firms, investment in R&D initiatives and innovation in work processes are all regarded as crucial elements of sustainable economic growth (Fagerberg et al, 2010). Emphasis on these areas is evident from an examination of the indicators of innovation used in country-level and cross-country reports on competitiveness in Vietnam as detailed in Table 1.1.

Table 1.1: Selected Innovation Indicators

Source	Selected Indicators
UNIDO: <i>Competitive Industrial Performance Report (2013)</i>	Manufacturing value added per capita Medium & high-tech manufacturing value added World manufacturing value added Manufactured export capacity Share of manufactured exports in total exports
European Commission: <i>Science and Technology Innovation in Europe 2013 Edition</i>	Research & Development Expenditure Science and technology workers Number & kind of innovative enterprises Number of patents Number of high-tech manufacturing / services enterprises
OECD: <i>Science, Technology and Industry Scoreboard</i>	Gross domestic expenditure on R&D Researchers (headcount) Government, Enterprise, and Higher Education R&D Personnel Patents Technology Balance of Payments
World Economic Forum: <i>Global Competitiveness Report 2012</i>	Environmental/social sustainability Internet Penetration Quality of scientific institutions Company spending on R&D Availability of scientists/engineers

A key contribution of the TCS is its focus on firm level investments in technology innovation and corporate social responsibility rather than collecting data at an aggregate level. This allows for an in-depth examination of the channels through which firms improve methods, processes and/or physical equipment used in production. Additionally, the survey examines the diffusion of technologies through the productive economy, and whether this leads to positive spillovers for the sector as a whole. This alternate focus provides a snapshot of the levels of technology and competitiveness evident in Vietnam outside of the traditional indicators detailed above.

## 1.2 The Vietnam Technology and Competitiveness Survey

The 2013 TCS examined technology development and adaptation along six key dimensions as summarised in Table 1.2. Although the final questionnaire was in English, the survey was

implemented in Vietnamese. Detailed consistency checks were undertaken to ensure a correct translation.

Table 1.2: Structure of 2013 Survey Questionnaire

<b>Section</b>	<b>Description</b>	<b>Questions</b>
Taking stock of technologies	Capturing the status-quo of the firm’s level of technological investment and sophistication through questions about the age, cost, and type of current production technologies.	<b>1.1 – 3.4</b>
Input and supplier relations	The details of major suppliers’ locations and the value of inputs obtained, differentiated across domestic and international suppliers.	<b>4.1 – 4.5</b>
Output and customer relations	The details of major customers’ locations and value of outputs sold, differentiated between domestic and international customers.	<b>5.1 – 6.6</b>
Technology Transfer Channels	Details the relevance of transfer channels as sources of technology for the enterprise	<b>7.1-7.5</b>
Capacity and the business environment	Concerned with innovative capacity and organisation of technological progress in firms	<b>8.1-12.4</b>
Competitors	Competition faced in main activity, market share and type/intensity of market competition	<b>13.1 – 13.7</b>
Corporate Social Responsibility (CSR)	Questions relating to formal and informal commitment to CSR practices.	<b>14.1 – 17.7</b>

As previously stated, the TCS is implemented as an additional part of the GSO’s annual Enterprise Survey. This survey is a short-form census of all registered firms with ten or more employees (with a minimum cut-off of 30 employees in the urban areas of Ha Noi and Ho Chi Minh City). The survey was carried out by approximately 300 enumerators, under the guidance of 75 supervisors. Data were collected in face-to-face interviews with enumeration completed by hand. The data was then digitised and extensively cleaned in Ha Noi.

### 1.3 Sampling and Cleaning

Standard tests for issues such as duplicate entries and missing data were undertaken. The data was then cleaned to exclude firms whose figures for assets and/or revenue were recorded as either zero or missing or if the figures for assets/revenue were inconsistent. Firms were excluded if the recorded percentage change from the end of 2013 relative to the end of 2012 in reported assets, revenue, or number of employees was lower than 20% or greater than 500%. Finally, the ratio of firm revenue to firm size (in terms of employment) was calculated and observations in the 1<sup>st</sup> and 99<sup>th</sup> percentiles also excluded. After cleaning, combining the TCS module with data from the Vietnam Enterprise survey yielded a cross-section of 8,010 firms.

The survey data is organised hierarchically. Firms are located within a specific sector and these sectors operate across 58 provinces and 5 major municipalities, a total of 63 geographic units. The province that a firm operates in, along with a tax code that specifies firms within each province, acts as the firm's unique identifier. Grouping by size, firms are given a micro, small, medium or large designation in line with the employee thresholds detailed in Table 1.3.

Table 1.3: Size Categories

Size category	Number of employees
Micro	0 – 10
Small	10 – 50
Medium	50 – 300
Large	300 or more

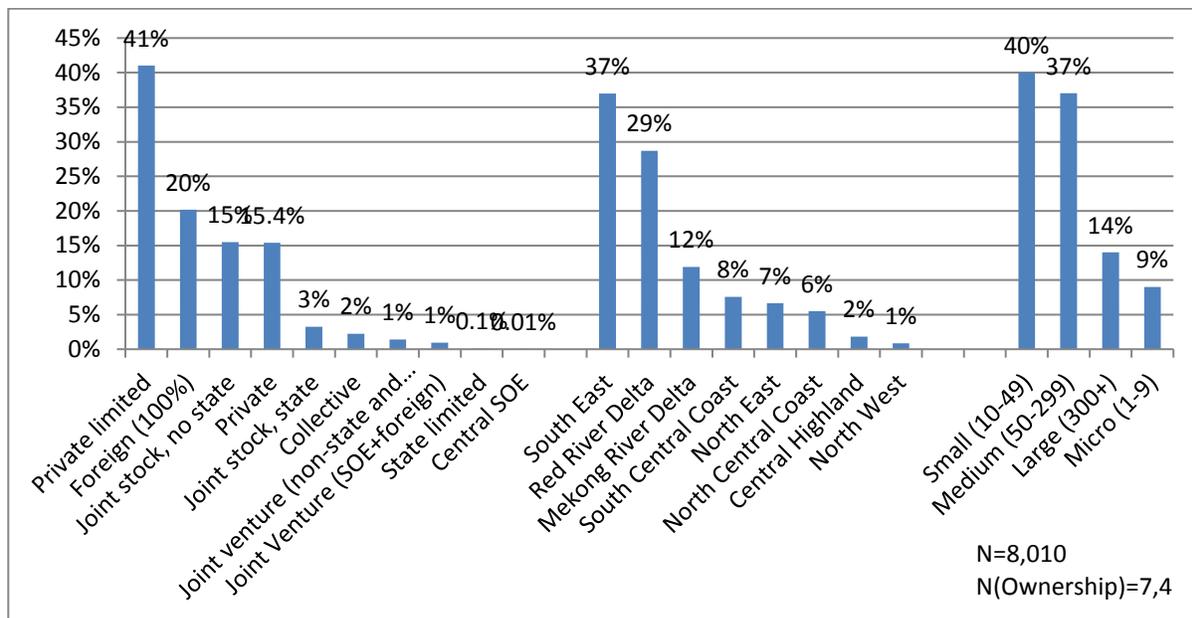
Firms are then disaggregated by their equity structure, as this summarises a large amount of information about firms' incentives and cost structures. Table 1.4 below lists the categories of "legal structure" into which firms can select in response to the GSO's enterprise questionnaire. These categories are used throughout our analysis of the TCS data.

In order to look at the data by region, the provinces are combined to form eight separate groupings. In Vietnam, economic activity is primarily concentrated in specific areas of the North and South leading to an uneven distribution of activity across the country. Figure 1.1 summarises firm activity by legal structure, region and size. We observe that the most common firm structure is private limited liability, with over 40% of firms in this category. Economic activity is concentrated in the South East, with the largest share of firms located in this region. This is consistent with the economic geography of Vietnam. Regarding firm size, over 77% of firms in the sample are small and medium sized firms.

Table 1.4: Legal Structure Categories

Legal structure	Description
State-owned	Wholly state-owned
Collective	Cooperatively-owned and managed
Private Ent.	Domestically-owned private
Private Limited Liab.	Domestically-owned, incorporated
Joint Stock, no State	Publicly-held firm, without government ownership
Joint Stock, State	Publicly-held firm, with government ownership
FDI (100%)	Wholly foreign-owned
FDI and State	Joint government and FDI ownership
FDI and Private	Joint private and FDI ownership

Figure 1.1: Sample Distribution by Firm Characteristics



The majority of firms in the sample are classified as either small or medium with only 14% categorised as large. However, regarding employment, the large firms account for over 72% of the workers reported with the small and medium firms combined accounting for the remaining 27%. These figures highlight the importance of examining both the distribution of firm sizes and the distribution of employees by firm size in an analysis of firm growth and employment.

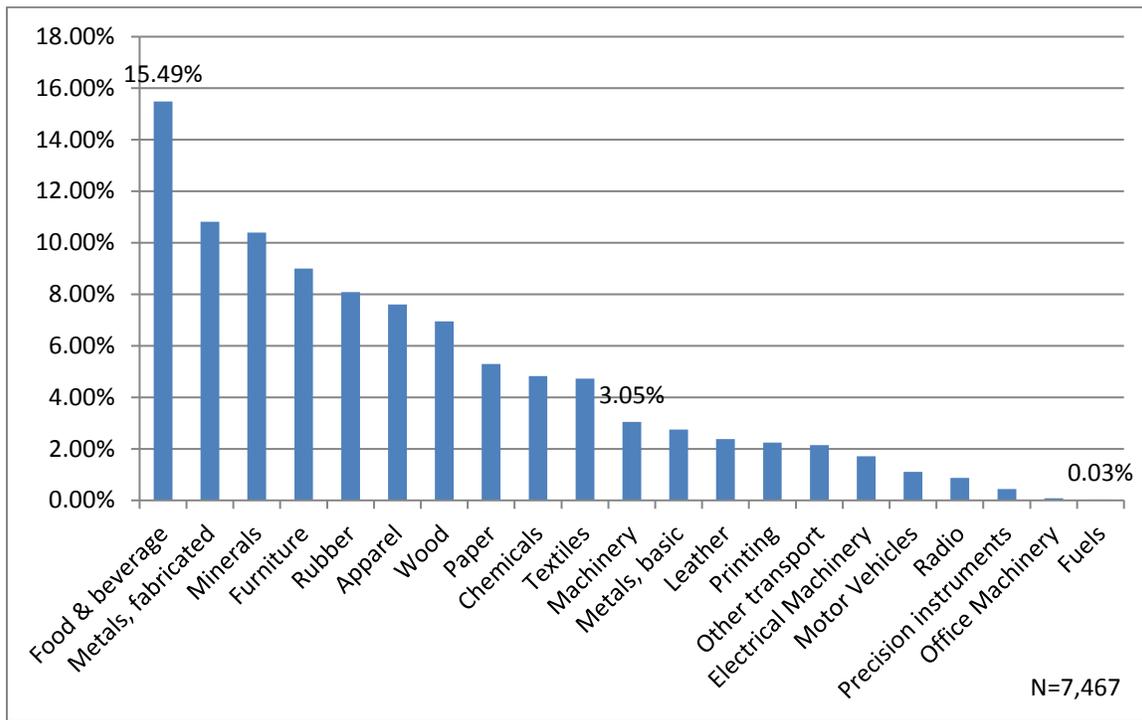
The TCS also collects data on the industry the firm operates in, using the six-digit ISIC level from the standard industry classification system. Table 1.5 below summarises these classifications at the two digit-level for reference. This data provides a detailed insight into the activities undertaken by firms in each specific area.

Table 1.5: ISIC 2-Digit Sector Code and Description

<b>ISIC 2-digit Code &amp; Description: Manufacture of...</b>
15 - Food products and beverages
17 – Textiles
18 - Wearing apparel
19 - Tanning and dressing of leather
20 - Wood and of products of wood and cork
21 - Paper and paper products
22 - Publishing, printing and reproduction of recorded media
23 - Coke, refined petroleum products and nuclear fuel
24 - Chemicals and chemical products
25 - Rubber and plastics products
26 - Non-metallic mineral products
27 - Basic metals
28 - Fabricated metal products
29 - Machinery and equipment
30 - Office, accounting and computing machinery
31 - Electrical machinery and apparatus
32 - Radio, television and communication equipment
33 - Medical, precision instruments, watches and clocks
34 - Motor vehicles, trailers and semi-trailers
35 - Other transport equipment
36 - Furniture
37 - Basic metal industries

Figure 1.2 shows the distribution of firm activity by sector. As in the 2012 TCS, the food and beverage sector dominates, with the majority of manufacturing firms operating in this sector. However, firm activity takes place across all sectors of industry.

Figure 1.2: Sample Distribution by Sector



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## **2 Technology and Innovation Policy in Vietnam**

This section provides a brief overview of the policies in place to promote technology transfer in Vietnam, particularly through FDI. A broad range of policies suggest that the government continues to promote FDI as the main technology transfer channel, and the past two decades have seen the development of an extensive legal framework to support this.

The 11<sup>th</sup> Congress of the Communist Party of Vietnam (CPV) set ambitious targets for modernization: the Ten-Year Social-Economic Development Strategy and the Five-Year Plan call for the “...value of high-tech products and technology application products to reach 35% of GDP in 2015 and 45% of GDP in 2020” (CPV, 2012).

Following a revision of central planning during the VI<sup>th</sup> Congress of the CPV in 1986, the Vietnamese state prioritized attracting both capital and modern production and agricultural equipment. Immediately after the promulgation of the Law on Foreign Investment 1987, the State Council issued the Ordinance on Technology Transfer in 1988 which provided incentives to foreign investment expected to generate technology transfers to local firms. These key pieces of legislation have been regularly updated to meet firms’ increasing demands for autonomy. Generally, the State’s role is evolving towards one of inspection and monitoring.

In 2005, investment policies and technology transfer incentives were regulated by an updated Law on Investment. This legislation applied to both domestic and foreign investors. Transfer of advanced technologies is listed in the fields for investment promotion, including production of new materials or energy, high-tech, bio-technology, information and communication technology, pharmaceuticals, robotics, education and training, healthcare and sport. Both new projects and existing projects that expand can benefit from a range of incentives (this preferential treatment regime is consistent with Vietnam’s commitments as a member of the WTO).

The Law on Technology Transfer was approved by the National Assembly on November 29, 2006 and took effect from July 01, 2007. This was the first time the legislature had directly addressed the degree of autonomy domestic firms would have in negotiating technology transfer agreements. This was followed by Decree No. 133/2008/ND- CP dated December 31, 2008, detailing and guiding the implementation of a number of articles of the law on Technology Transfer. Simultaneously, the High Technology Law was enacted in 2008 to provide policies and incentives to promote specific “high-tech” sub-sectors.

The Vietnamese government approved a National Strategy for Science and Technology Development in April 2012. This set the development of science and technology as a top national priority (World Bank, 2013). The Law of Science and Technology was approved by the National Assembly in June 2013 and will be valid from January 1<sup>st</sup>, 2014. Its overall aim is the promotion of resources for the development of science and technology with an application for industrialization (Vietnam, 2013).

## **2.1 Financial Incentives for Technology Transfer**

The state also provides several direct benefits to firms operating in “strategic” sectors, like pharmaceuticals. The National Focal Technical – Economic Programs were implemented in accordance with Decision No 54/1998/QĐ- TTg dated March 3<sup>rd</sup>, 1998. These programs provide for direct capital support to firms operating in specific sectors; support can even extend to services from the state including consultancy, technology transfer, or training. In addition, the Focal Science - Technology Programs have been developed by the Prime Minister’s Office as part of each five-year plan.

The Ministry of Science and Technology has responsibility for coordinating and implementing these programs through provincial science and technology projects. Finally, according to Decree No 119/1999/ND-CP, enterprises engaged in specific sectors are entitled to take out medium-term and long-term capital loans at preferential rates, and up to 70% of the capital needed for expansion or new investments can be borrowed from the publicly-financed Development Support Fund, the Export Support Fund, or the Scientific and Technological Development Support Fund.

In some cases, the desire to support investment in sectors perceived as modern has resulted in the creation of new government agencies, such as the National Foundation for Science and Technology Development (NAFOSTED), founded by the Decree 122/2003/NĐ-CP. The body began operations in 2008 as a financing body for scientific and technological projects which can issue preferential loans, loan guarantees, and provide direct financial support to firms that fall within its mandate.

## **2.2 Tax Policies to Promote Technology Transfer**

The government’s strategic goal of encouraging higher-value industrial development and increased investment in modern production methods and equipment has been mainstreamed into the tax code. Table 2.1 below summarizes how technology transfer entitles some firms to preferential treatment.

Table 2.1: Incentives for Technology Transfer

Type of taxes	Incentives	Documents
Value Added Tax	Special-use machines, equipment and means of transport which cannot be produced domestically are not liable to value-added tax of they are used in the context of contracts stipulating technology transfer	<i>Item 3, Article 44, Law on Technology Transfer</i>
Enterprise Tax Law	Firms that use their own capital for investment in some sectors can deduct up to 10% of taxed income for scientific or technological investments.	
Import and Export Tax	Import tax exemptions for goods imported for direct in research and development.	<i>Item 2, Article 44, Law on Technology Transfer</i>
Corporate Income Tax	Income from technology transfer under projects eligible for investment preferences is exempt from income tax.	<i>Article 33, Investment Law in 2005</i>
	Income tax rate of 20% for 10 years from the time firms commence their business and production activities FDI-financed firms that invest in projects in scientific or strategic “high-tech” sectors.	<i>Article 3, Decree No.119/1999/ND-CP</i>
	Income tax exemption for the first year from the time the taxable income is generated and a 50% reduction of the payable income tax amount for two subsequent years for enterprises that was mentioned above.	<i>Article 4, Decree No.119/1999/ND-CP</i>
	Income tax exemption shall be given to organizations and individuals that contribute capital in the form of patent or technology	<i>Item 1, Article 44, Law on Technology Transfer</i>
	Income tax exemption for increased incomes for four years and a 50% reduction of payable tax amounts for seven years for firms that invest new production chains, expansion of the production scale, renewal of technologies, improvement of the ecological environment, or raising of the production capacity.	<i>Item 4, Article 44, Law on Technology Transfer</i>
	Income tax exemption for four years for enterprises that invest in technological renewal and invest in specific strategic technologies.	<i>Item 5, Article 44, Law on Technology Transfer</i>

### 2.3 Other Incentives

In addition to foregone taxes and other financial instruments, the state has used the national Investment Law to create a preferential environment for firms likely to import technologies that can then diffuse to other domestic firms. A partial list of incentives provided in the law includes:

- Land use preferences: Investors in preferred sectors shall enjoy reduction or exemption of land rents, land use levies or land use taxes in accordance with the provisions of land law and tax law (*Article 36*).
- Protection of intellectual property (IP) rights: committing to protect the IP of investors (*Article 7*).
- Firms in some sectors that begin operations in special economic zones (SEZs) are entitled to additional tax exemptions (*Article 10, Decree No 80/2007/ND-CP*).

Firms conducting research and development of new technology are seen as particularly important. Accordingly, Decree No 06/2000/NĐ-CP dated March 06, 2000 explicitly promotes investment cooperation with foreign countries in medical examination and treatment, education and training, and scientific research. In accordance with this decree, FDI-financed research firms in Vietnam are entitled to:

- A 10% income tax rate throughout their term of operation.
- An exemption from income tax for four years after they start making profits; and income tax reduction by 50% for the four subsequent years.
- Reimbursement of all the income tax paid on the profits used for re-investment or expansion of operations.
- Pay a reduced 5% tax rate on any repatriated profits.
- The lowest land rental rates available.
- Exchange rate guarantees from the State Bank of Vietnam.

### 2.4 Implementation

While the government provides generous financial support to firms investing in technology or performing research and development, and the majority of these funds have been allocated to large, state-owned enterprises. Data from the General Statistics Office's business survey 2001 -2004 (Dinh et al., 2004) showed that 86% of state owned enterprises received state support for research and development (R&D) projects, while no firms with foreign investment (either portfolio or FDI) received government support for research and development.

Similarly, a conference report prepared by the Ministry of Planning and Investment (MPI) in 2013 concluded that only 838 technology transfer projects were registered with the Ministry from 1999 to 2012, of which half were associated with FDI projects. While registered technology transfer may not be a perfect indicator of spillovers or other channels, it suggests that official schemes to promote transfers are not effective, particularly given the over fourteen thousand registered FDI-financed firms reported to be operating in Vietnam at the end of 2012. Private firms and investors have had limited success taking advantage of these schemes because of difficult, complex, and unclear administrative procedures for accessing funding, and risk aversion by Government agencies that prefer awarding funds to State-owned enterprises rather than private firms. Similarly, most small or medium sized enterprises have not been able to access indirect funding through credit schemes. It is apparently difficult for smaller firms to access loans because they do not have or are unwilling to risk putting up collateral and can only rarely meet the usual requirement of 30% counterpart funding.

This is not an argument against the effectiveness of state finance for firms. For example, Hansen et al. (2009) use firm-level survey data to show that government-financed credit and tax exemptions helped fledgling Vietnamese firms begin operating. However, existing schemes to specifically promote technology transfer and innovation may not be as effective. While Vietnam's legislative environment appears to actively promote investment and technology transfer, in practice the various incentive schemes are difficult to access for non-state firms. Despite numerous capital investment and tax reimbursement programs, the majority of firms surveyed by the TCS report rely on internal financing for research, adaptation, and other forms of technology investment.

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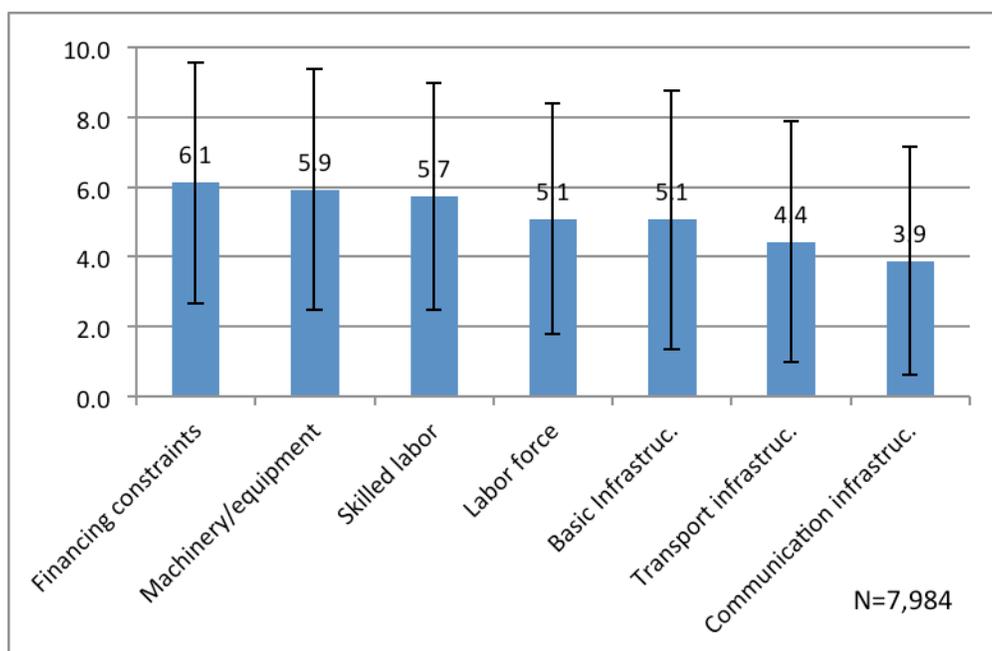
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### 3 Technology and Competitiveness: Evidence from the 2012 TCS

Firms are often aware of the improvements innovation can bring to their organization but may lack the capacity and resources to invest in areas needing technological improvement, such as updated machinery and equipment. However, for sustainable long term growth in the economy, innovation led growth is vital. For Vietnam in particular, the large gains made by the economy in the aftermath of the Doi Moi reform need to be sustained by technological improvements, rather than purely factor and investment led growth, in order to ensure the increases in living standards that rising prosperity brings. This is of particular importance for the rural and urban poor. An in-depth examination, therefore, of the constraints faced by firms in improving their economic performance is of pivotal importance and is detailed in Figure 3.1.

The constraints range from financial and human capital issues to macroeconomic issues such as poor basic infrastructure. Responses are ranked on a ten-point scale with the error bars representing one standard deviation above and below the average score across all firms. Financial issues are highlighted as the greatest constraint faced by firms. However, the band of one standard deviation shows that financial constraints are not dramatically more problematic for firms than other issues around suitably skilled labour and access to equipment.

Figure 3.1: Constraints on Firms' Economic Performance



This emphasises the need for a multi-dimensional approach to policy, aimed at loosening the constraints impacting on a firm's operation. A targeted approach to release one particular constraint is unlikely to lead to noticeable improvements in firm performance. In addition, the constraints highlighted by firms have not changed substantially from those evident in 2012 suggesting that current policy continues to fall short on addressing firms' needs.

Although the information provided in Figure 3.1 gives us an overview of issues faced by firms and the need for a multifaceted policy approach, they are imprecise averages. Additionally, the averages do not provide us with adequate information on both the factors affecting firms' own perceptions of the constraints they face and whether these constraints disproportionately affect a particular segment of firms in our sample. Regression analysis represents one tool available to study the relative effect of the constraints on firms and to accurately inform policymakers.

Table 3.1 below summarises the coefficients of interest and their standard errors from a regression of the sum of total constraints each firm reports against factors that could explain those constraints. The coefficients are reported relative to the "base" categories of small, wholly FDI-owned firms in region seven (Ho Chi Minh City). The final column of the table controls for firm characteristics in addition to region- and sector-specific effects. This allows us to observe the effect of firm characteristics on total constraints within sectors in a specific region. The precision of these estimates are approximately analogous to the width of the error bars shown in Figure 3.1.

As the results of the regression analysis show, firm size seems to matter. In particular, large firms are relatively more constrained than small/medium firms. With large firms providing employment for approximately 73% of workers, a targeted policy aimed at improving the position of these companies may be beneficial, given their importance for the provision of jobs in the economy. A firm's legal structure is also important, with private limited liability firms, joint stock companies with and without state involvement and central state owned enterprises perceiving themselves as relatively more constrained. As over 40% of firms are private limited liability firms, specific policy targeted at these companies could also be merited. The results hold when both region and sector are controlled for and are similar to those observed in the 2012 TCS. It therefore appears that these constraints are a persistent issue for these particular firm types.

A key conclusion from this section is that many firms perceive themselves to be relatively constrained but that no one constraint is a pervasive problem. This illustrates the need for a multifaceted approach to industrial policy that aims to deal with several different constraints concurrently. Although the implementation of such an approach would be difficult to achieve, this report suggests

that, with constraints currently hindering firms operation, it is likely that a successful policy to address these issues would yield improved firm performance across the economy as a whole.

Table 3.1: Firm Constraints, Regression Analysis

Dependent variable: Total constraints						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	0.3	(0.9)	0.4	(0.9)	0.4	(0.9)
Medium (50-299)	1.8***	(0.5)	2.3***	(0.5)	2.3***	(0.5)
Large (300+)	3.9***	(0.7)	4.2***	(0.7)	4.1***	(0.8)
Central SOE	8.1***	(0.6)	9.0***	(2.6)	10.6***	(1.6)
State Limited	5.7	(6.3)	5.3	(2.4)	6.2	(7.1)
Joint, with State	4.8***	(1.3)	3.6***	(2.3)	3.8***	(1.3)
Collective	3.4**	(1.6)	1.7	(2.4)	1.8	(1.7)
Private	2.6***	(0.8)	1.6	(2.7)	1.8**	(0.9)
Private Limited	3.4***	(0.7)	2.8***	(2.4)	2.9***	(0.7)
Joint Stock, no State	4.1***	(0.8)	2.6***	(2.9)	2.7***	(0.8)
Joint Venture (SOE and Foreign)	2.6	(2.3)	1.8	(0.8)	2.0	(2.3)
Joint Venture (Non-state and Foreign)	-3.5	(2.0)	-3.8	(2.0)	-3.7	(2.0)
Observations	7,466		7,466		7,466	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.0011		0.0031		0.0037	

Tobit estimates, left censored, standard errors to right of coefficients clustered at firm level. Base: Small, Foreign (100%), Region 7 (HCMC), Food Processing (ISIC 15). Sector effects are at 2-digit level. Coefficients on constant term not reported. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05.

### 3.1 Technology Transfer

An important avenue for firm innovation and advancement is the transfer of technology among firms operating in an industry or area. This type of positive spillover can benefit firms through knowledge of new improved production and work processes or alternatively through the purchase of more advanced machinery and equipment provided by an organisation with superior technology. It is then possible that these positive spillovers will lead to improved productivity, which in turn would enable firms to compete and operate in higher quality market segments, to the benefit of both the company and its employees. Classical industrial organisation theory highlights three different types of spillovers; forward, backward and horizontal as summarised in Table 3.2. These linkages detail the

potential benefits to domestic Vietnamese firms from interactions with foreign firms as a result of foreign investment in Vietnam.

Table 3.2: Types of Spillover

Type of spillover	Description
<b>Forward linkage</b>	The firm based in Viet Nam is a customer. Technology is transferred from suppliers.
<b>Backward linkage</b>	The firm based in Viet Nam is a supplier. Technology is transferred from customers.
<b>Horizontal</b>	The firm based in Viet Nam is a competitor. Technology is transferred from a foreign firm / foreign-owned domestic competitor to the firm based in Viet Nam.

However, evidence on the productivity increases from technology spillovers is mixed. An analysis undertaken by Gorodnichenko et al (2007), examined whether FDI led to productivity improvements for domestic firms across seventeen emerging market economies. They found that results differed based on region and sector of operation. In addition, they found that differing returns were observed based on the type of spillover the FDI introduced, with backwards spillovers observed to be consistently positive across the sample, but with a limited benefit from horizontal spillovers. With regard to Vietnam specifically, Anwar & Nguyen (2013), in an examination of the productivity of FDI, found significant variation across regions with a strong positive impact of backwards spillovers in the Red River Delta, South Central Coast, South East and Mekong River Delta and negative or insignificant impacts in all other regions. Newman et al. (2014) in an in-depth study using the TCS 2010 to 2012 also explore the relationship between FDI and the productivity of domestic firms in Vietnam. They find evidence of productivity spillovers from FDI through vertical linkages along the supply chain, in particular through forward linkages from foreign-input suppliers to domestic input users. They attribute part of this spillover to technology transfers from FDI firms to domestic firms.

Given the potential positive benefits that could accrue to domestic firms as a result of foreign investment, the TCS asks firms in detail about the importance and prevalence of spillovers in Vietnam. Firms were asked to rank the mechanisms for technology transfer on a 10-point scale. The different channels include ‘Embodied Technology’, which refers to improvements in production with the purchase of new equipment/machinery, ‘Purchase’ whereby firms bought technology, such as

licensing rights to a new production process from an outside firm, 'Group' where technology transfer came from an entity within the firm, 'supplier/customer' technology transfer and finally 'new employees' which captures the human capital gains from employing workers with new skills acquired in previous occupations and an ability to impart knowledge about these new processes or technology to their new employer.

Figure 3.2 below summarises the average importance of each channel by firm size and Figure 3.3 disaggregates this by firm legal structure. The importance of each type of technology transfer varies widely based on the firm size and type. However two sources dominate: the benefits from new employees and the benefits from embodied technology. It therefore appears that firms perceive both physical technology transfers and horizontal spillovers to be the most beneficial in improving productivity. For both large firms and private limited liability companies, technology transfer from suppliers is of almost equal importance to that from new employees. This is consistent with the results found in Newman et al (2014).

Figure 3.2: Ranking of Transfer Channels by Firm Size

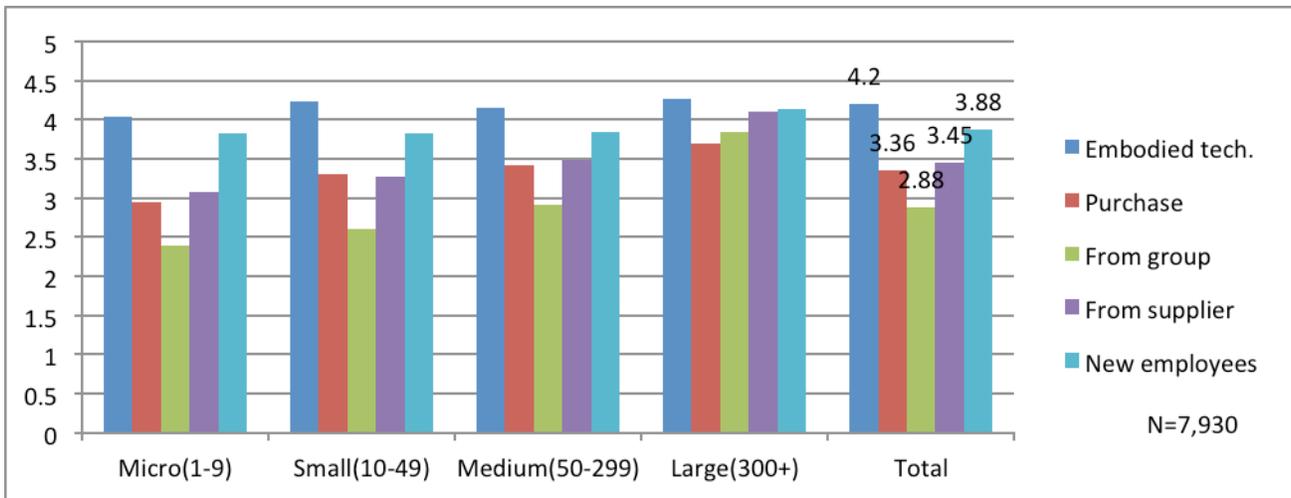
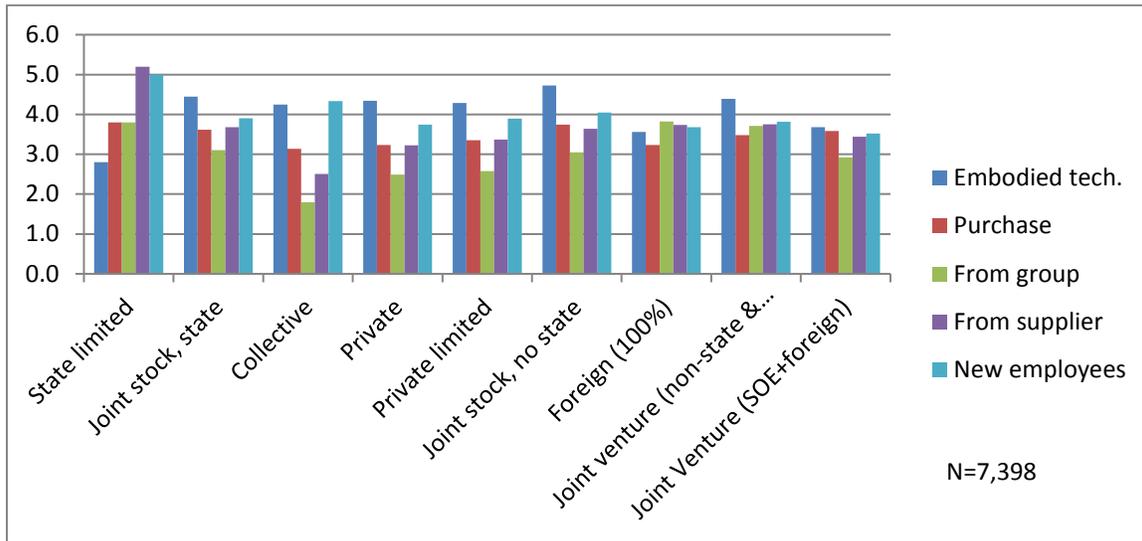


Figure 3.3: Ranking of Transfer Channels by Legal Structure



### 3.2 Horizontal Spillovers

Horizontal spillovers refer to the indirect efficiency or productivity improvements that foreign firms can have on local competitors. These spillovers include transfer of production techniques, marketing and managerial practises and any other transfer of knowledge embodied in goods produced by the sector or related sectors. According to Gorodnichenko et al (2013), domestic firms may learn to imitate processes or to improve the quality of their product/service through observation of the foreign firm. They may also discover new processes and methods through interactions with foreign managers and use these within their own firm. Employees trained by foreign firms with superior technologies can also benefit domestic firms through redeployment of labour, as this knowledge can then be introduced to, and adopted by, the domestic firm.

Looking specifically at Vietnam, Nguyen et al (2008) find limited labour mobility spillovers but strong evidence of competition and demonstration effects, whereby domestic firms copy technologies from foreign firms, when looking directly at the importance of FDI on local firms technical efficiency. Recent evidence however suggests that such horizontal spillovers are unlikely to exist for manufacturing firms in Vietnam. Newman et al's (2014) findings are consistent with much of the international literature on this topic, which finds little evidence for horizontal spillovers. This is attributed to the fact that foreign firms compete directly with domestic enterprises and so have every incentive to prevent their technological advantage from leaking to their competitors.

From a policy perspective, the presence of positive spillovers incentivises the creation of government programs to specifically target and encourage FDI into Vietnam. These incentives commonly take the form of tax breaks and other benefits to foreign firms, sometimes only for an initial number of years of operation in the country. If FDI leads allows domestic firms access to better technologies and equipment, reduces inefficiencies in production processes and increases the skills of the labour force the benefits of offering such incentives may greatly outweigh the costs. In the Vietnamese case the extent to which reported technology transfers through embodied technologies and new employees originate from foreign firms operating in Vietnam or from other domestic producers is pertinent. This information is detailed in Table 3.3 below.

Table 3.3: Main Supplier of Technology

Source	Total	%
Vietnamese firm, same sector	857	10.87
Vietnamese firm, other sector	4,355	55.26
Foreign firm, same sector	1,270	16.12
Foreign firm, other sector	1,399	17.75
Total	7,881	100%

It is evident from this table that the majority of the technology transferred to domestic firms comes from other domestic firms (circa 66%). This suggests that technology transfer is taking place primarily among domestic firms. A key argument for attracting foreign firms to low and low-middle income countries is that their technology is likely to be more advanced than local domestic firms and so there is potential for productivity-enhancing technology transfers and spillovers. It is unlikely that the quality of technology used by other domestic firms is at the same level as that in use by foreign firms thus limiting the extent to which learning can happen. Our data do not allow us to comment on the quality of technology transfers between firms. The extent to which transfers from domestic firms are productivity enhancing is worthy of future investigation.

As the survey does not capture the full work history of each employee, the benefits of labour mobility are difficult to measure. However, we can examine the proportion of those employees, cited by firms as the most important source of technology transfer, who were Vietnamese nationals. This will provide an insight into whether domestic, rather than foreign employees are driving gains made from employee transfers. Of the firms reporting that the skills and experience of new employees were the most important source of technology transfer, 84% of firms stated that the employees were Vietnamese nationals, 15% were foreigners working in Vietnam and remaining 1% Vietnamese repatriates (the total sample was 5,579 respondents).

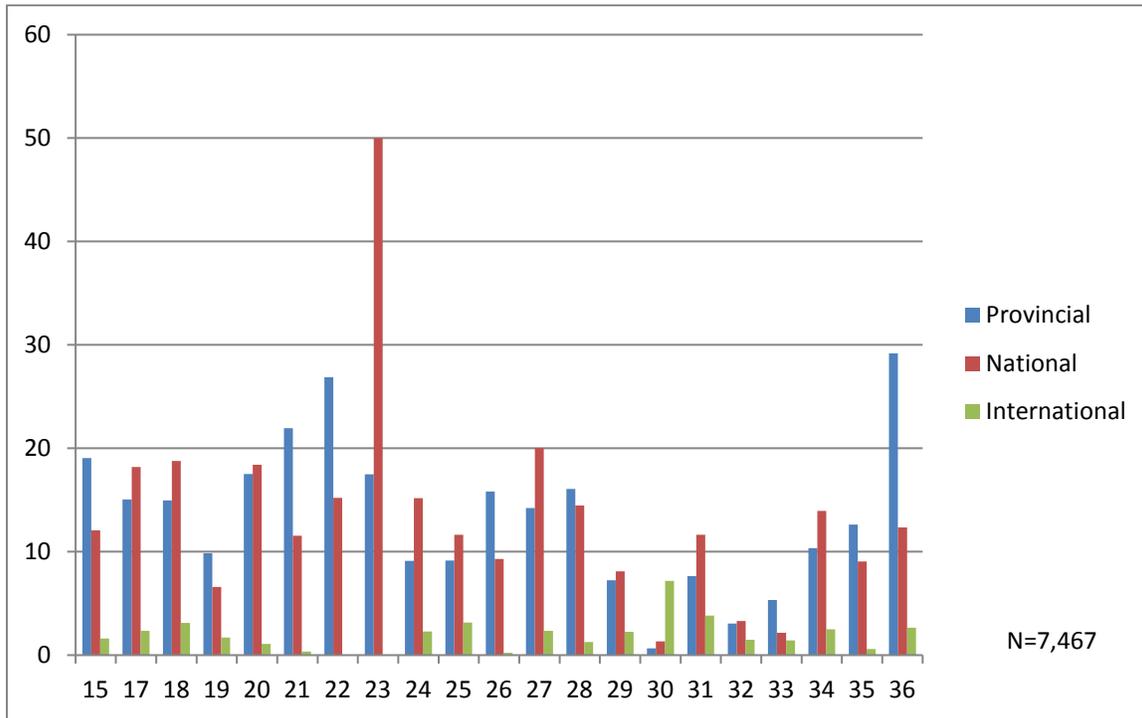
This provides further evidence that the main source of technology transfer, in this case through the mechanism of worker mobility, is through the private domestic sector and not from foreign-invested firms. This is consistent with findings from earlier rounds of the TCS (see Newman et al, 2014) and suggests that there may be a missed opportunity for the private sector in Vietnam in terms of benefiting from the productivity spillovers that FDI presence can offer and should be a focus of future policy.

The business environment can impact on spillovers in a number of ways. One that has been detailed in the literature as particularly important is that of competition, with a positive correlation between competition and the strength of spillovers. Abraham et al. (2006) concluded that spillovers were only positive in sectors with greater levels of competition. It appears that competition acts as a catalyst through which domestic firms improve their performance. This may be the result of increased numbers of competitors prompting quality improvements to attract customers or cost minimisation to reduce price and gain market share. Greater numbers of firms operating in the same market also increases the likelihood that firms will gain access to positive horizontal spillovers. However, a balance between increased competition and the lower average profits this brings is also a consideration and ultimately represents an empirical question beyond the scope of this report.

The data in the 2013 round of the TCS summarised in Figure 3.4 below indicates that some sectors are particularly competitive, with firms in nine sectors reporting more than 15 competitors on average, and firms in four sectors reporting an average of more than 20. This is consistent with levels of competitiveness observed in previous rounds of the TCS. The majority of this competition, however, is intra-provincial. Most firms continue to compete in very local markets, with limited national and international competition. This may be as a result of constraints such as poor basic infrastructure detailed above and is indicative of a larger internationalisation issue. Extremely limited levels of exporting activity are also apparent.

This indicates that the current focus in Vietnam, should be on the expansion of domestic firms to non-local domestic markets. This could be an important precursor to competing internationally. With successful operation across a number of non-local markets, it is likely that domestic firms will be more able to successfully compete in international markets and also to maximise the returns to productivity and innovation that are strongly linked to exporting (Damijan et al, 2008).

Figure 3.4: Average Number of Competitors by Sector



Overall, it appears that the main source of technology transfer within sectors in Vietnam is between domestic firms. This suggests that FDI may not be required for learning to take place between firms. Our analysis, however, says nothing about the impact that interactions between domestic firms have on firm performance which is an area worthy of future investigation. Of particular note is the apparent lack of learning between foreign-invested firms and domestic firms. This suggests that policy efforts to promote linkages between foreign and domestic firms within sectors may be required for the expected productivity spillovers to emerge. Furthermore, although exporting is regarded as important for firm performance, survival and innovation, our results suggest that in the Vietnamese case, a necessary first step may be for domestic firms to expand into non-local domestic markets. This is possibly a more attainable short-term goal for these firms which may better equip them to enter, and survive, in export markets in the long run.

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## 4 Backward Linkages: Technology Transfer from Customers

This section discusses the potential for technology transfer by backward linkages. Positive backward linkages are spillovers accruing to suppliers of an intermediate input through their connections with their clients. Particular attention is given to the potential technology gains to domestic suppliers from their interactions with foreign firms, both those operating in Vietnam but also internationally. Positive backward linkages can take the form of technology improvements arising from a direct transfer of knowledge from foreign customer to the domestic supplier. Alternatively, they can occur via demands upon suppliers to produce a higher quality input, motivating production and process improvements. Finally, they may also arise from improved economies of scale, with greater competition in a particular market due to increased demand from foreign firms.

Evidence of positive backward linkages appears more strongly in the literature than support for horizontal spillovers. This is potentially due to the incentive for a foreign customer to both improve the competitiveness of the market for their inputs, but also to transfer technology that would lead to the production of higher quality inputs. Regarding horizontal spillovers, the incentive is to actively guard against any kind of technology leakage that may benefit a domestic competitor. This is the explanation put forward by Blalock & Gertler (2003) who find positive spillovers from backwards linkages but limited evidence for the presence of horizontal spillovers. As mentioned in Chapter 3 Newman et al. (2014) also find no evidence for horizontal spillovers and limited evidence for positive backward productivity spillovers in the Vietnamese case. Part of this is explained by the increased competition in upstream sectors due to an expansion in imported inputs used by downstream FDI firms. Newman et al. (2014) do find, however, that in cases where domestic firms innovate in terms of varieties or adapting new technology positive backward spillovers are more likely.

Before examining the 2013 data on the extent of backward linkages in Vietnam it is important to examine the proportion of firms in the sample who produce intermediate and final goods (or both). This is shown in Figure 4.1. Over 80% of firms produce a final good, with 20% of these firms also producing an intermediate input. Only 18% of firms sampled exclusively produce an intermediate input. It is firms that produce intermediate inputs for use by firms in downstream sectors that have the potential to benefit from backward linkages with FDI firms.

Figure 4.1: Composition of Output

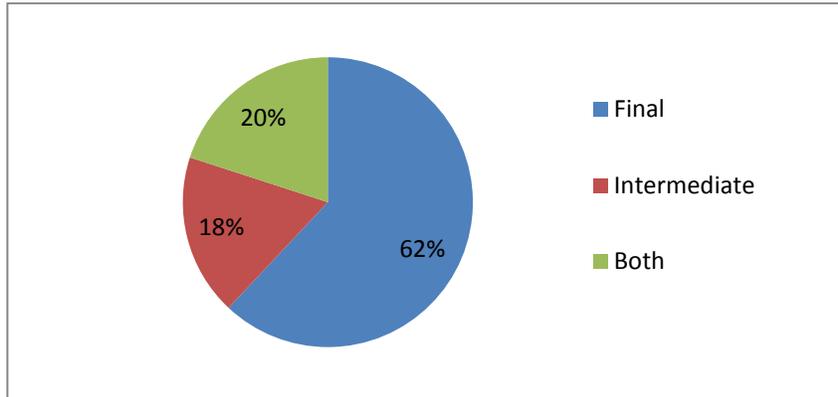
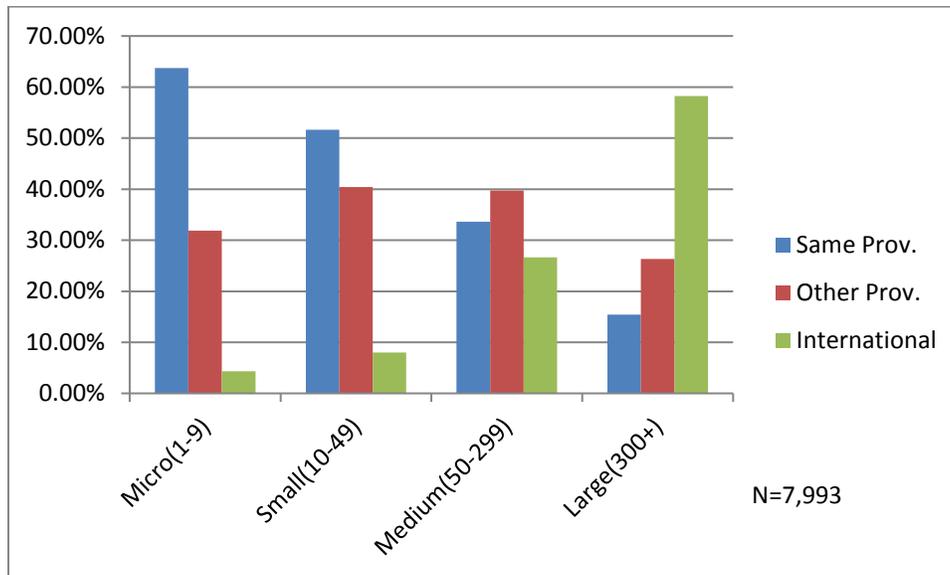


Figure 4.2 details the share of respondents' output sold locally, nationally or internationally by firm size. The proportion of the sample who are suppliers to foreign firms is of particular interest given the potential for large productivity gains from these relationships (Anwar & Nguyen, 2011). There is a strong firm size relationship with larger firms much more likely to derive the majority of their sales from export.<sup>1</sup>

Figure 4.2: Sales Structure by Firm Size



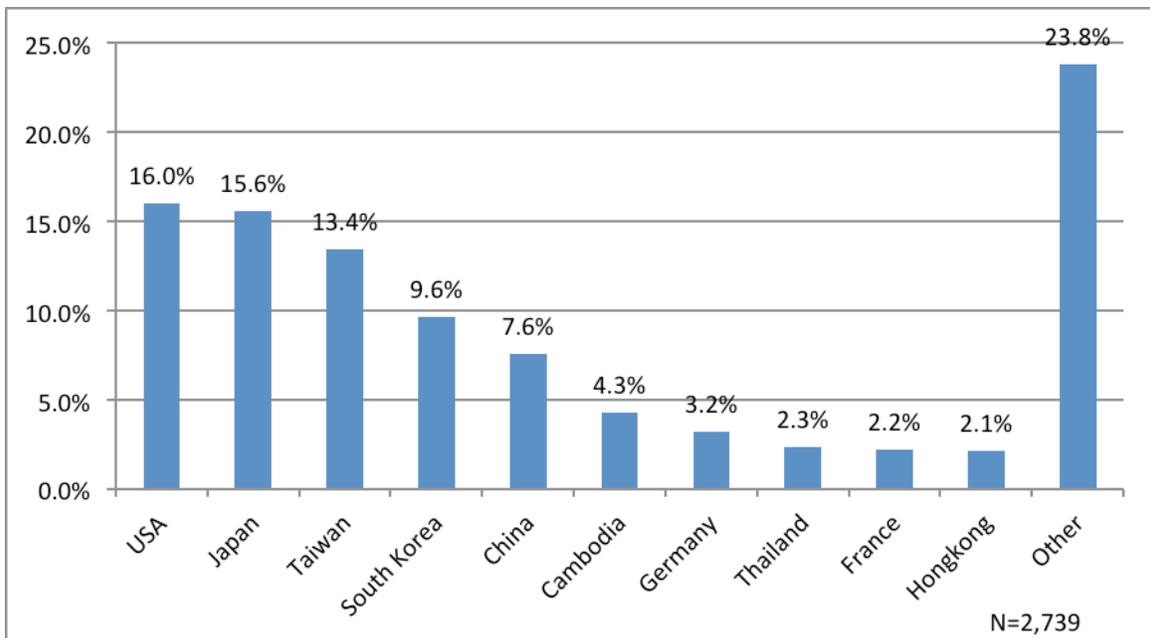
<sup>1</sup> Note that this is the average of the share of output of their most important product that firms report selling to different locations, so the groups do not sum to 100%.

Domestic firms may also benefit from backward linkages by exporting, as this increases the level of contact they have with international customers. De Loecker (2008) finds large productivity gains for export entrants compared to their domestic counterparts and observes that the gap in productivity between exporters and non-exporters widens over time. Newman et al. (2014) using earlier rounds of the TCS data find that domestic firms that export in Vietnam do experience productivity improvements that can be linked with exporting. These productivity gains are only evident, however, for firms that also innovate in terms of production processes and the quality of their output.

In some cases, foreign presence in the domestic economy may influence a domestic firm’s decision to export. Greenaway et al (2004) posit that this may result from export information externalities, increased domestic competition and improved technology and production processes due to linkages with the foreign company. Regarding Vietnam, Anwar and Nguyen (2011), find that these linkages do prompt local firms to export. This should therefore be considered as an additional benefit to foreign presence in the domestic market and should be part of any coherent trade negotiation strategy.

Approximately 34% of firms in the TCS sample (of 8,010) are exporters. The TCS asks these firms to list their most important export destination, which is summarised in Figure 4.3 below.<sup>2</sup>

Figure 4.3: Most Important Country for Exports



<sup>2</sup> This is the share of exporting firms that listed the country as their most important export destination (not the share of exports to each country) and is in line with the most important export destinations in the 2012 TCS

This figure provides an overview of the export market in Vietnam. The top ten most important destinations account for over 75% of exporters. Exporting to traditional high-value markets such as the US continues to be very important to exporters. Interestingly, lower-income emerging economies rank highly in the top export destinations. The presence of spillovers from exporting to emerging economies is unclear, with benefits from exporting traditionally documenting the learning effects to firms in emerging economies from more advanced foreign clients. However, there is some evidence that linkages between firms in emerging economies may be beneficial, as a lower technology gap ensures the diffusion of more appropriate technologies than that of a developed economy (Kubny & Voss, 2013). This may also be applicable in exporting to other emerging economies. Finally, the sample also highlights that domestic firms are successfully exporting to untraditional markets, for example North Korea and Brunei.

An exploration of the determinants of whether a firm is able to export is undertaken by regression analysis. The results are presented in Table 4.1.

Table 4.1: Export Status by Firm Characteristic

Dependent variable: Total constraints						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-0.10***	(0.9)	-0.11***	(0.03)	-0.11*	(0.03)
Medium (50-299)	0.31***	(0.5)	0.30***	(0.01)	0.28*	(0.02)
Large (300+)	0.59***	(0.7)	0.60***	(0.02)	0.56*	(0.02)
Joint, with State	-0.31***	(1.3)	-0.29***	(0.01)	-0.27*	(0.01)
Collective	-0.31***	(1.6)	-0.28***	(0.02)	-0.28*	(0.01)
Private	-0.38***	(0.8)	-0.36***	(0.01)	-0.36*	(0.01)
Private Limited	-0.42***	(0.7)	-0.38***	(0.02)	-0.40*	(0.02)
Joint Stock, no State	-0.38***	(0.8)	-0.33***	(0.01)	-0.32*	(0.01)
Joint Venture (SOE and Foreign)	-0.26***	(2.3)	-0.23***	(0.03)	-0.21*	(0.03)
Joint Venture (Non-state and Foreign)	-0.12***	(2.0)	-0.09**	(0.05)	-0.09***	(0.05)
Observations	7,459		7,459		7,457	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.33		0.36		0.40	

Marginal effects from Probit model, standard errors to right of coefficients clustered at firm level. Base: Small, FDI, Region 7 (HCMC), Food Processing (ISIC 15). Sector effects are at 2-digit level. Coefficients on constant term not reported. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05.

The final column accounts for regional and sector effects, allowing us to examine specifically the determinants of whether a firm is an exporter, regardless of the sector and location in which it operates. Figure 4.2 highlighted that larger firms were most likely to be exporters. When controlling for sector and region, however, this is now true of both medium and large firms, however with a stronger coefficient observed for large firms. Negative coefficients are observed on all firms legal structures showing that they are less likely to export relative to the base category of FDI firms. This potentially indicates that Vietnamese firms are still learning how to compete internationally and may not possess the necessary skills and technologies for successful entry to export markets. These results are in line with those from the 2012 TCS.

Another factor important for backward linkages is contract duration. Longer contractual arrangements between firms allow for the formation of a strong working relationship and trust between both parties. This in turn may act as a predictor for both whether a firm will benefit from backward linkages and the quality of any technology transfer. Average contract duration between firms and their customers is summarised in Figure 4.4. All contracts are, on average, less than 12 months, regardless of firm size. This type of short-term contract may limit the benefits firms can gain from backwards spillovers, without the requisite time needed to establish a good working relationship. Additionally, with the option to move freely between providers, firms have little incentive to invest time and resources in improving the capabilities of any individual supplier. A positive relationship exists between firm size, with contract duration increasing with the size of the firm. Regarding the legal structure of firms, foreign owned firms have the longest contract duration, closely followed by joint ventures firms with foreign investment. In this sense contract duration may be acting as a proxy for higher quality goods and processes evident in foreign owned firms. If this is the case then it is vital that industrial policy focus on improvements to domestic firms competitiveness.

Figure 4.4: Average Contract Duration with Customers (Months)

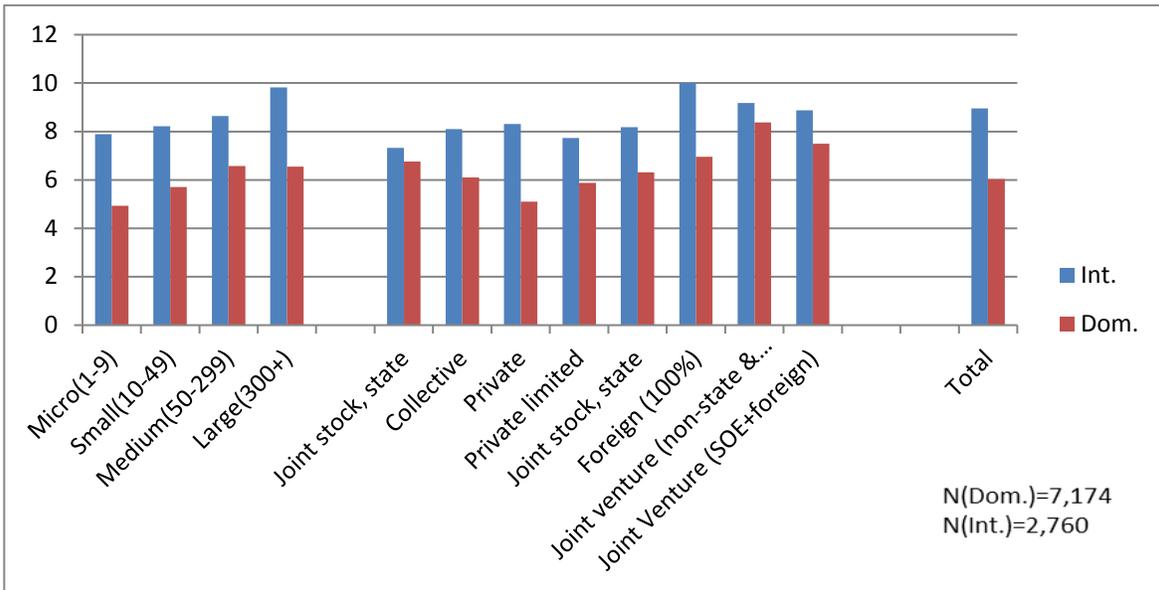
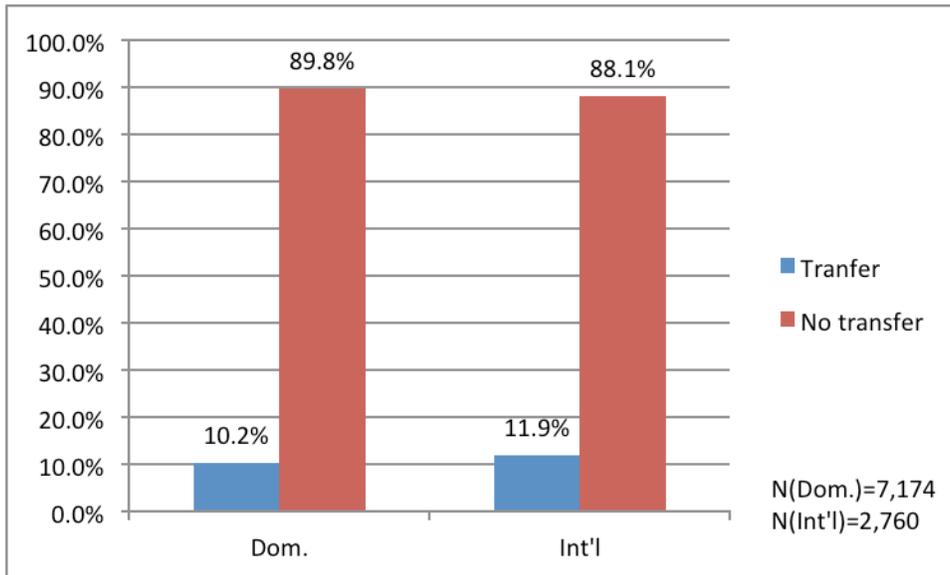


Figure 4.5 below shows the responses of firms in relation to whether or not they experienced some kind of backward linkage (a transfer of technology from a customer). Documenting spillovers at firm level is unique, with most survey data collecting information at sector level only. This allows a granular look at firms self-reported technology transfers, which in turn allows policymakers to accurately evaluate the prevalence of spillovers among firms, in addition to the type of firm that the spillovers originate from. This is highly important from the perspective of designing effective industrial policy to encourage positive spillovers.

The domestic customer sample includes approximately 7,000 firms with the remaining <3,000 international. In both cases circa 11% of firms report some kind of technology transfer.

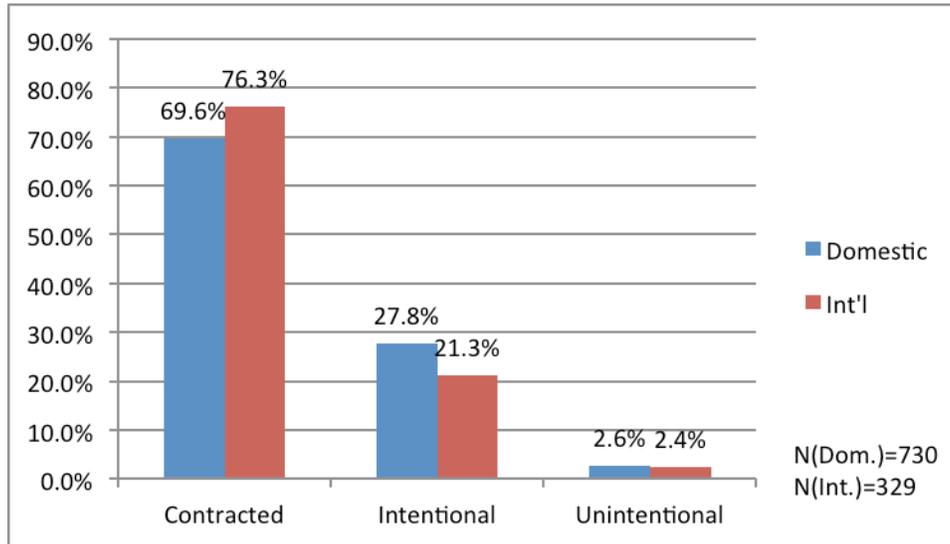
Figure 4.5: Technology Transfer from Customers



This indicates that linkages to foreign firms (either operating in Vietnam or internationally) do not necessarily lead to technology transfers of a larger magnitude than those experienced by firms connected only to other domestic firms.

Figure 4.6 investigates how these transfers occur. Using the sub-sample of firms who reported a backward linkage, it is clear that the vast majority of transfers were formally specified in firms contracts. This amounts to 69% in the domestic sample (of 329 firms) and over 76% for in the international sample (730 observations). Only 3% of transfers were unintentional, with the remainder deliberately carried out by the client (although it is important to note the potential for reporting bias regarding the unintentional case).

Figure 4.6: Intentionality of Tech. Transfer from Customers



Section 2 highlighted the focus in Vietnam’s industrial policy on targeting positive spillovers from foreign firms. Looking at the averages detailed above there is little evidence to suggest first, that large technology transfers are taking place and second, that these spillovers result purely from interactions with foreign firms. The majority of these transfers are also formally set out in firms contracts, rather than resulting from an indirect benefit due to the operation of a foreign firm in the sector or region. To better understand the effect of firm characteristics on the probability of whether or not a firm receives a transfer, we undertake regression analysis as shown in Table 4.2. In this case, all three columns include region and sector effects which allows us to examine the effect of firm characteristics on the probability of reporting a backwards linkage, regardless of the region and sector the firm operates in. Coefficients regarding legal structure are not well determined providing a limited insight into the structure of firms more likely to receive transfers. With regard to firm size, medium and large firms are most likely to receive transfers across all cases. We observe higher coefficients for large firms than medium-sized firms and also higher coefficients for large firms receiving positive backward spillovers from international customers. The regression results again reinforce that transfers originate from both domestic and international customers to the benefit of suppliers located upstream in the supply chain.

Table 4.2: Technology Transfer from Customers, Regression Analysis

Dependent variable: Total constraints						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-0.03***	(0.01)	-0.00	(0.01)	-0.03**	(0.01)
Medium (50-299)	0.02***	(0.01)	0.04***	(0.01)	0.05***	(0.01)
Large (300+)	0.04***	(0.01)	0.09***	(0.02)	0.11***	(0.02)
Joint, with State	0.08***	(0.03)	-0.01***	(0.00)	0.01	(0.02)
Collective	0.06	(0.04)	-0.02**	(0.01)	-0.00	(0.03)
Private	0.07***	(0.02)	-0.02***	(0.00)	0.01	(0.02)
Private Limited	0.06***	(0.01)	-0.02***	(0.00)	0.01	(0.01)
Joint Stock, no State	0.09***	(0.02)	-0.02***	(0.00)	0.02	(0.01)
Joint Venture (SOE and Foreign)	0.03	(0.04)	-0.02**	(0.01)	-0.04	(0.03)
Joint Venture (Non-state and Foreign)	0.01	(0.03)	-0.02**	(0.01)	-0.04	(0.03)
Observations	7,457		7,451		7,457	
Region Effect	Y		Y		Y	
Sector Effect	Y		Y		Y	
Pseudo R-squared	0.039		0.13		0.032	

Marginal effects from Probit model, standard errors to right of coefficients clustered at firm level. Base: Small, FDI, Region 7 (HCMC), Food Processing (ISIC 15). Sector effects are at 2-digit level. Coefficients on constant term not reported. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05.

This section highlights the ways in which domestic firms in Vietnam are linked to international customers through the supply chain. These include linkages through export markets, through long-term contracts and through self-reported technology transfers. In all cases the proportion of firms with linkages of this kind remains small, as was the case in 2012. However, recent evidence based on earlier rounds of the TCS shows that, at least in the case of technology transfers from downstream foreign-invested firms and learning-by-exporting, such linkages may not yield significant productivity improvements for upstream domestic firms without accompanying innovations to processes, quality and technologies (see Newman et al., 2014 and Newman et al., 2014b). This suggests that backward linkages may not be the best mechanism for productivity spillovers from international to domestic firms and that it is necessary to explore other possible sources for enhancing the productivity of the domestic sector.

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## 5 Forward Linkages: Technology Transfer from Suppliers

Forward linkages refer to technology spillovers that occur between domestic customers of intermediate inputs and foreign firms (either local FDI firms or international suppliers of these inputs). In contrast to backward linkages this type of spillover refers to benefits to the downstream sector. As backward and forward linkages together represent vertical spillovers, the same avenues through which backward linkages occur also apply to forward linkages, such as direct technology transfer between customers and suppliers and incentives for sharing production processes and technologies with other parts of the supply chain. In this case a relevant example is access to high quality inputs to a domestic firm's production process. Limited empirical research has focused on the role of forward linkages, with emphasis concentrated on horizontal or backward spillovers. However, distinguishing between types of vertical spillovers, Dritfield et al (2002) found a positive effect for spillovers from forward linkages.

Figure 5.1(a) documents where domestic firms source their intermediate inputs. 12% of firms buy from both domestic and foreign suppliers, 83% only from domestic suppliers and 5% purchase their intermediate inputs from foreign suppliers only. Figure 5.1(b) documents the source of raw materials for domestic firms. A similar pattern is observed, with 16% buying from foreign and domestic suppliers, 78.5% domestic only and 5.5% from only from foreign suppliers.

Firms across all size categories rely on domestic inputs.<sup>3</sup> The localized nature of domestic firms operations is again noted, with the majority of inputs originating from the same, or a closely located province to where the firm operates. This suggests that where forward linkages are observed, they are more likely to be generated by domestic firms, or foreign firms based in Vietnam, than through contacts with international suppliers. Looking specifically at international suppliers, we see that the average share of inputs from overseas is positively related to firm size.

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<sup>3</sup> The columns are the average share of inputs from each source reported by size category, so need not sum to 100%

Figure 5.1 (a): Source of Intermediate Inputs

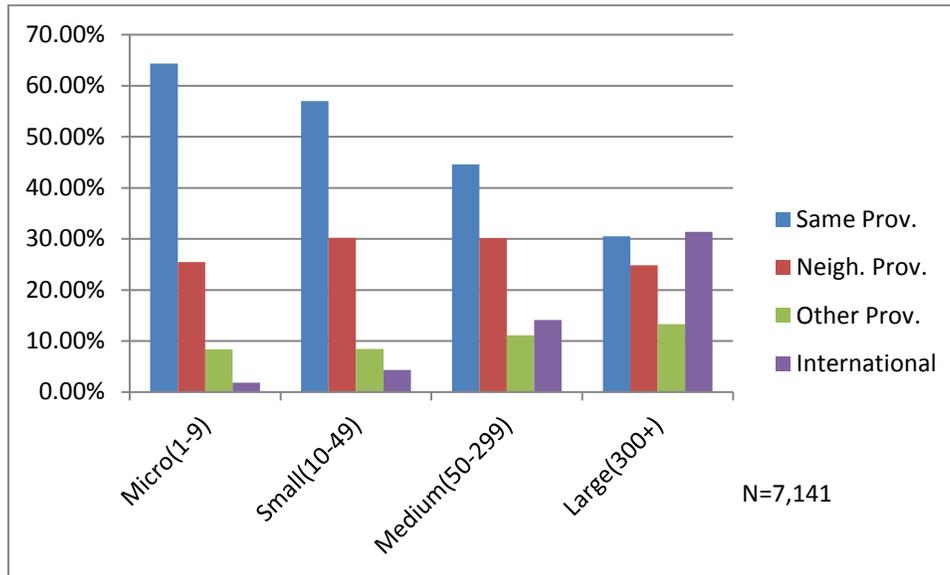
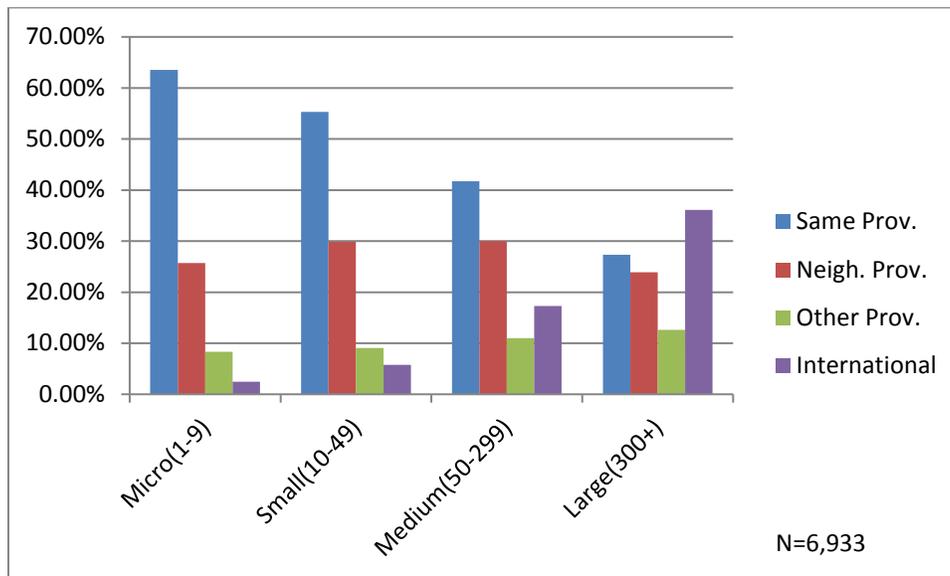


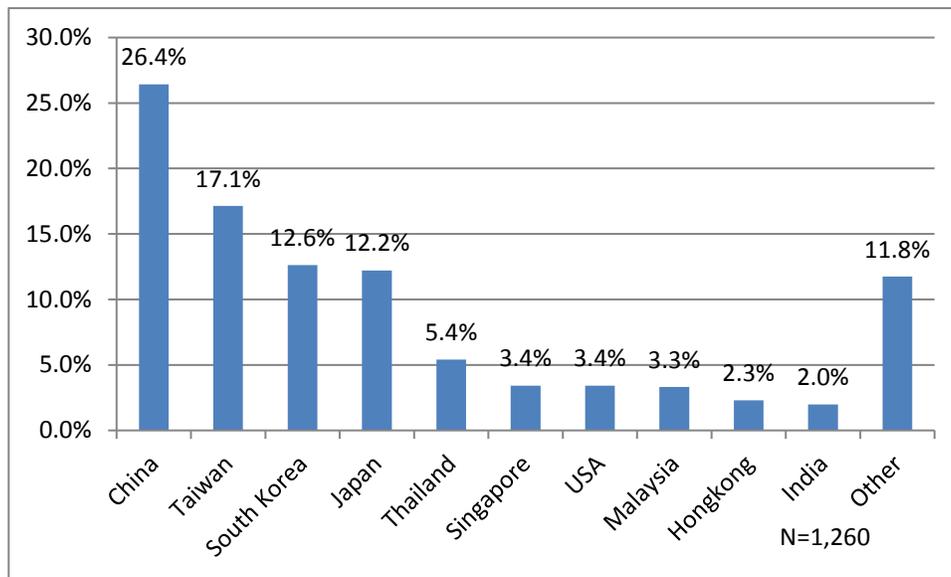
Figure 5.2 (b): Source of Raw Material Inputs



To examine the interactions between domestic and international firms, Figure 5.3 shows the country reported by firms as the most important source of inputs, for both raw materials and intermediate goods. China is listed as the most important source country accounting for approximately 26% of the total sample (1,260). Given China's designation as a cheap source of inputs this is not surprising. However, we also observe firms importing from high cost countries such as the US and Japan. It

appears that firms follow one of two pathways, either importation of high quality intermediate inputs that can be transformed into a final product with relatively cheap labor or the traditional importing of cheap inputs for processing and export to high value added markets. This is most likely decided upon based on the final good to be produced by the firm.

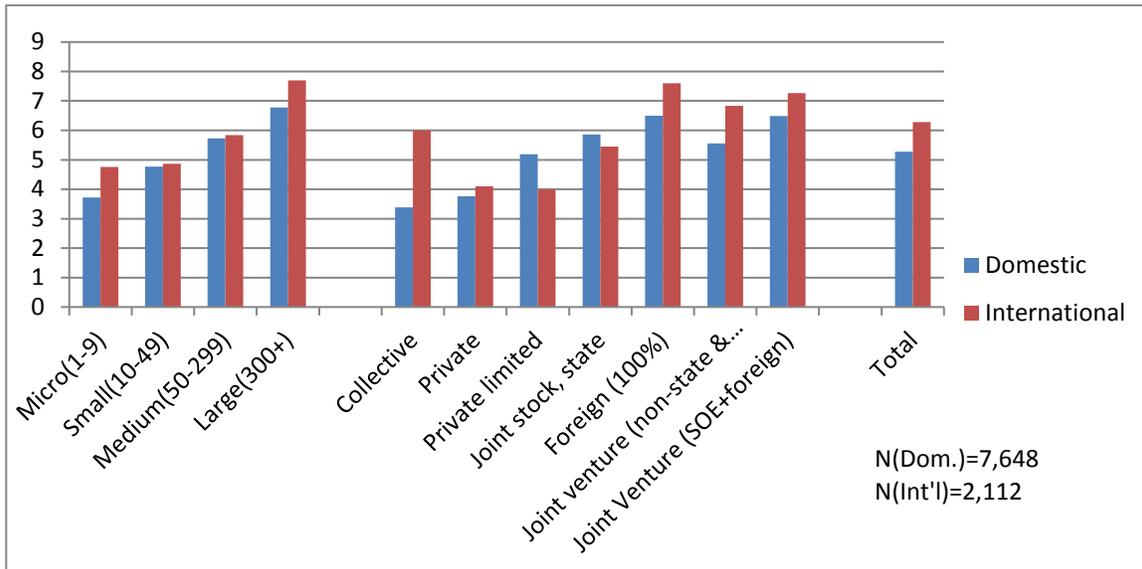
Figure 5.3: Most Important Country for Imported Inputs



Contract duration may be correlated with the presence of forward linkages. In this instance it indicates the strength of the relationship between Vietnamese customers and their suppliers, both domestic and international. One would expect that a stronger relationship with a long-term contract would provide more opportunity for unintentional spillovers or allow customers to develop bargaining power over/mutual agreement with their suppliers which could lead to contractual/intentional spillovers.

Figure 5.4 shows that larger firms and those firms with total or part foreign ownership receive longer contracts, on average. Again, it is possible that these firms have more advanced technologies and processes or are perceived to be more trustworthy/reliable due to their connections with foreign companies. Additionally, larger firms may be exploiting economies of scale due to their size, making their inputs more competitive. However, it is important to note that the average contract duration is less than one year, regardless of firm type or size. This is in line with the domestic supplier contracts detailed in Section 4. The overall picture of the supply chain relationships we can glean from the TCS data is one of relatively short-term production arrangements. This therefore makes technology transfer less likely.

Figure 5.4: Average Contract Duration with Suppliers (Months)



The characteristics of those firms who import their intermediate inputs is examined through regression analysis. It is possible that importers may create positive externalities for both other importers and other related firms, in a similar way that exporters are supposed to generate positive spillovers. Table 5.1 presents the results. The results are similar to those for exporters. Larger firms are significantly more likely to import intermediate inputs, even though they only minority of firms in the sample. Negative coefficients are observed on all legal structures. As these are interpreted relative to a base category of a FDI firm, it appears that, where forward linkages exist, these would accrue to foreign firms, rather than domestic. However, this does not consider long-run ramifications whereby the positive benefits of these spillovers may then lead to positive benefits for domestic firms via horizontal spillovers.

Table 5.1: Importers of Intermediate Inputs, Regression Analysis

Dependent variable: Total constraints						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-0.05***	(0.02)	-0.05***	(0.03)	-0.05***	(0.03)
Medium (50-299)	0.10***	(0.01)	0.09***	(0.01)	0.09***	(0.02)
Large (300+)	0.19***	(0.02)	0.18***	(0.02)	0.17***	(0.02)
Joint, with State	-0.09***	(0.01)	-0.08***	(0.01)	-0.06***	(0.01)
Private	-0.16***	(0.01)	-0.16***	(0.01)	-0.13***	(0.01)
Private Limited	-0.20***	(0.01)	-0.19***	(0.02)	-0.16***	(0.02)
Joint Stock, no State	-0.14***	(0.01)	-0.13***	(0.01)	-0.11***	(0.01)
Joint Venture (SOE and Foreign)	-0.01	(0.03)	-0.00	(0.03)	-0.02	(0.03)
Joint Venture (Non-state and Foreign)	-0.03	(0.02)	-0.03	(0.02)	-0.01	(0.02)
Observations	7,293		7,235		7,234	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.22		0.22		0.25	

Marginal effects from Probit model, standard errors to right of coefficients clustered at firm level. Base: Small, FDI, Region 7 (HCMC), Food Processing (ISIC 15). Sector effects are at 2-digit level. Coefficients on constant term not reported. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05.

An insight into the characteristics of firms likely to experience positive spillovers from forward linkages is in itself of limited usefulness. To discern whether they represent a viable means to improve and promote technology transfer among firms, the prevalence of these linkages among firms must be examined. It is also important to distinguish between positive spillovers resulting from domestic and international firms, to their domestic customers. These factors have important implications for industrial policy, as already discussed in previous sections.

Figure 5.5 below looks at the proportion of firms in our sample who stated that they received a technology transfer from a supplier. Of the 2,112 firms with international suppliers that responded, over 14% reported some kind of positive spillover through a forward linkage; the figure decreases to under 9% for firms buying inputs from domestic suppliers (7,648 observations). In contrast to backward linkages, it appears that forward linkages are more likely to arise through contact with international firms. Of those firms that do experience some kind of technology transfer from suppliers,

Figure 5.6 shows that the majority of these transfers are formally agreed in contracts. No major distinction exists between the type of agreement and whether it is made with a domestic or international supplier.

Figure 5.5: Technology Transfer from Suppliers

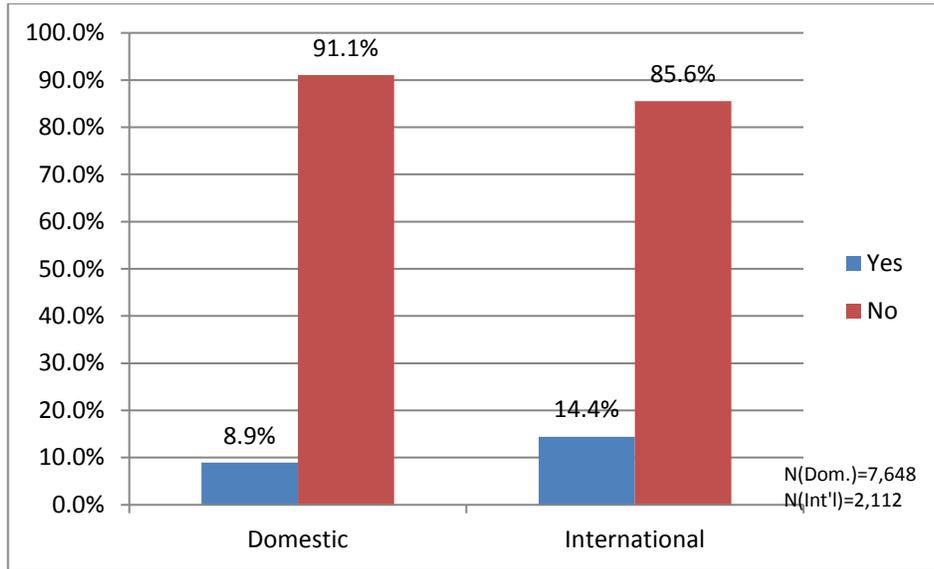
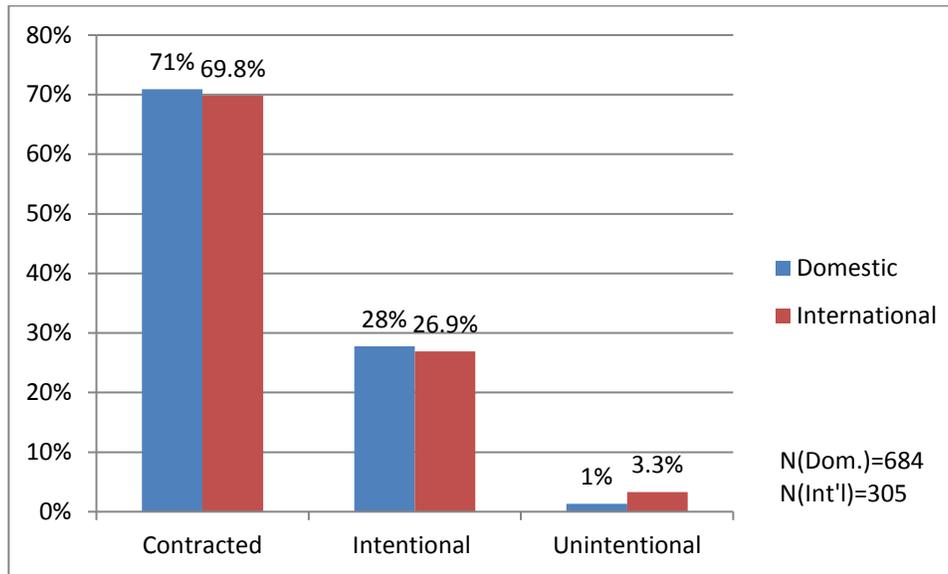


Figure 5.6: Intentionality of Tech. Transfer from Suppliers



A very small minority of 1% in the domestic case and 3.3% in the international case responded that the transfer was unintentional and was not mutually agreed in a contract (samples were 684 firms for firms reporting links to domestic suppliers and 305 for firms with links to international suppliers).

Finally, international and domestic forward linkages are analyzed in a regression framework in Table 5.2 below. Larger firms are much more likely to report transfers of technology from suppliers. Interpreting the results for legal structure where the base category is wholly foreign-owned firms, it appears that domestic firms such as joint stock no state and private limited are more likely to receive technology transfer from domestic firms (Column 1). However, as illustrated in Column 2, all types of firms are less likely to report transfers of technology from international suppliers relative to the base category of FDI companies. Domestic firms again appear to be restricted in accruing technology transfer from international firms. With larger productivity gains from international firms generally posited in the literature, how to improve linkages between foreign and domestic firms should be investigated by policymakers.

Table 5.2: Technology Transfer from Suppliers, Regression Analysis

Dependent variable: Technology Transfers from Suppliers						
	(1)		(2)		(3)	
	Dom.	se	Int'l	se	Both	se
Micro (1-9)	-0.04***	(0.01)	-0.02	(0.01)	-0.04***	(0.01)
Medium (50-299)	0.03***	(0.01)	0.05***	(0.01)	0.05***	(0.01)
Large (300+)	0.07***	(0.02)	0.11***	(0.02)	0.11***	(0.02)
State Limited	0.06	(0.13)			0.01	(0.11)
Joint, with State	0.05*	(0.02)	-0.00	(0.01)	0.03	(0.02)
Collective	-0.02	(0.02)	-0.05***	(0.01)	-0.05***	(0.02)
Private	-0.01	(0.01)	-0.02**	(0.01)	-0.03	(0.01)
Private Limited	0.02*	(0.01)	-0.02***	(0.01)	-0.00	(0.01)
Joint Stock, no State	0.03*	(0.01)	-0.02**	(0.01)	0.01	(0.01)
Joint Venture (SOE and Foreign)	0.09*	(0.05)	0.02	(0.03)	0.06	(0.04)
Joint Venture (Non-state and Foreign)	0.01	(0.03)	-0.03***	(0.01)	-0.03	(0.03)
Observations	7,457		7,387		7,457	
Region Effect	Y		Y		Y	
Sector Effect	Y		Y		Y	
Pseudo R-squared	0.039		0.078		0.044	

Marginal effects from Probit model, standard errors to right of coefficients clustered at firm level. Base: Small, FDI, Region 7 (HCMC), Food Processing (ISIC 15). Sector effects are at 2-digit level. Coefficients on constant term not reported. Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Section 4 highlighted the limited existence of backward linkages in the Vietnamese case and results from in-depth studies based on previous rounds of the TCS suggest that productivity spillovers through these linkages are limited at best. In contrast, as shown in this section, forward linkages appear to provide much greater opportunities for domestic firms to benefit from relationships with foreign firms through spillovers from foreign and international suppliers of intermediate inputs to domestic firms. Indeed, when the analysis is limited to domestic firms only, Newman et al (2014) find strong evidence for positive productivity spillovers from upstream FDI firms supplying inputs to downstream domestic firms. Although these spillovers may be less for domestic firms than foreign firms as suggested by the results presented in Table 5.2, they are still a potentially important source of productivity growth for domestic firms. In fact, part of these spillovers can be explained by reported technology transfers from input suppliers to domestic customers. Given these findings future policy efforts in relation to FDI should focus on attracting investment into upstream sectors that supply inputs to downstream Vietnamese firms. This appears to be the route through which productivity gains are most likely to be realized.

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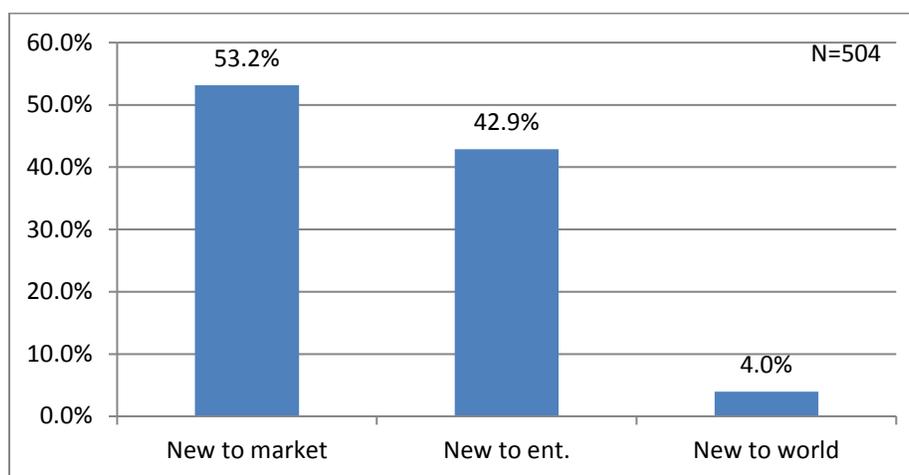
Newman, C., Rand, J., Tarp, F. and Nguyen Thi Tue Anh (2014) "Exporting and productivity: the role of ownership and innovation in the case of Vietnam" UNU-WIDER, Working Paper Number 2014/70

## 6 Alternative Paths to Innovation: Research, Adaptation, and Modification

Thus far, we have focused primarily on the technology transfer arising from spillovers. However, this represents just one potential pathway through which firms can improve their technological capabilities. Firms can invest in new and innovative R&D, an approach based on original research into, and development of, technologies not yet available in the market. Alternatively, firms can undertake a type of diffusion-based innovation, where the focus is on adaptation of existing technologies, using knowledge and techniques already developed, but new to the firm itself. R&D is highly regarded as a major indicator of innovation and technological sophistication, however evidence on the effectiveness of R&D in a developing or emerging economy is mixed. Innovative R&D projects are prone to failure, highly expensive and also very intensive in terms of their physical and human capital requirements. Given that emerging economies tend to be located at a distance from the technological frontier, it is possible that firms will see productivity improvements merely from investment in existing technology that improves their current operations. Indeed, Basant & Fikkert (1996) find that investments in existing technologies provide a better return for firms that innovative research, in the context of Indian firms.

Approximately 514 (6.4%) of the 8,010 firms in our sample invested in some form of R&D in 2012. Figure 6.1 shows the type of research undertaken by firms. 53% of this research expenditure was focused on developing technology that is new to the market the firm operates in, rather than 'frontier research' which represents only 4% of research expenditure (from a sample of 504 firms). The remaining 43% was used to research development into technologies that are new to the enterprise.

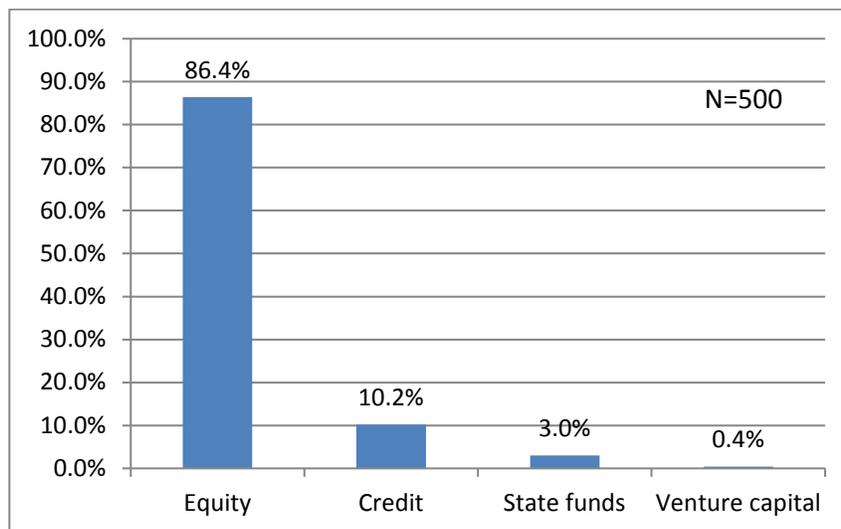
Figure 6.1: Originality of Research Output



Evidence from the TCS therefore suggests that most of the expenditure on research is focused on developing technology that may already be available on a global or even national level. If this is the case, then a firm's current R&D expenditure may be more productively applied to investment in obtaining this existing technology and adapting it for use within the firm. Adaptation also reduces issues around the high failure rates and costliness of innovative R&D as detailed above. Over the short term, policymakers may find the payoffs to an industrial policy focused on adopting existing technology higher than one emphasising original research. This view is reinforced by Chuang & Lin (1999) who examine R&D, FDI and spillovers for Taiwanese firms. They posit that a preferred environment for R&D is one where firms have already advanced their technical capabilities via technology transfer (from FDI/Spillovers).

Figure 6.2 shows how this expenditure is financed. The cost of undertaking new research is funded primarily from firms own equity (86%) with limited state assistance for research into new technologies (3%).

Figure 6.2: Financing Research



A potential solution to the expensive of R&D for firms is to develop linkages with other similar firms, intuitions or research centres who would be interesting in assisting with research into a particular area/sector. We are unable to accurately observe the extent to which these linkages exist through the TCS due to a limited number of respondents acknowledging the presence of an external research partner.

Overall, although R&D is regarded as essential for continued innovation and technological advancement, the presence of positive spillovers and adaptation of existing technologies should

provide sufficient productivity gains for an emerging economy like Vietnam and as such these mechanisms should be prioritised over original R&D investment in the short run. Nonetheless, examining the determinants of undertaking research activity is still important in order to inform appropriate industrial policy for Vietnam with regard to R&D investment. The regression framework in Table 6.1 below shows the results of this analysis.

Table 6.1: Research and Development, Regression Analysis

Dependent variable is 1 if firms does adaptation, research or both, 0 otherwise						
	(1)		(2)		(3)	
	Adapt.	se	R&D	se	Both	se
Micro (1-9)	-0.02	(0.01)	-0.02	(0.01)	-0.02	(0.01)
Medium (50-299)	0.04***	(0.01)	0.05***	(0.01)	0.05***	(0.01)
Large (300+)	0.08***	(0.01)	0.09***	(0.01)	0.11***	(0.02)
Joint, with State	0.16***	(0.03)	0.14***	(0.03)	0.13***	(0.03)
Collective	0.01	(0.02)	-0.01	(0.02)	0.00	(0.02)
Private	-0.00	(0.01)	-0.01	(0.01)	0.00	(0.01)
Private Limited	0.03***	(0.01)	0.02***	(0.01)	0.03***	(0.01)
Joint Stock, no State	0.08***	(0.01)	0.06***	(0.01)	0.06***	(0.01)
Joint Venture (SOE and Foreign)	0.07	(0.04)	0.06	(0.04)	0.05	(0.03)
Joint Venture (Non-state and Foreign)	0.04	(0.03)	0.04	(0.03)	0.04	(0.03)
Observations	7,459		7,459		7,457	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.066		0.071		0.11	

Note: Marginal effects from Probit model, standard errors to right of coefficients clustered at firm level. Base: Micro, FDI, Region 7 (HCMC), Food Processing (ISIC 15). Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05.

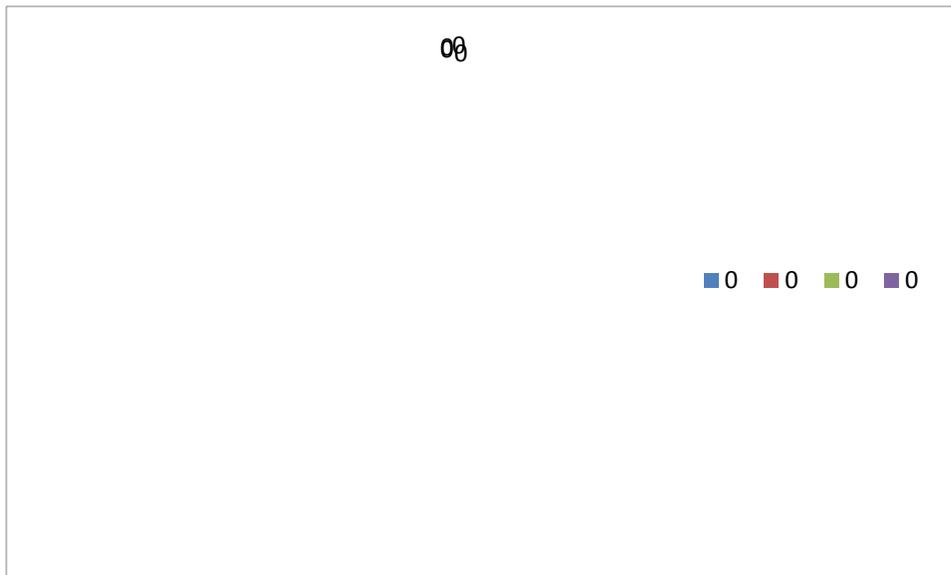
Controlling for sector and region effects (Column 3), we observe that larger firms are significantly more likely to undertake R&D. However medium sized firms are also more likely to undertake R&D compared to micro/small. Firm size seems to matter. Regarding firm legal structure, although some of the coefficients are not well determined it appears that joint stock both with and without state and private limited companies are more likely to invest in research compared to the FDI base category.

## 6.1 Adaptation and Modification

As already stated, adaptation of existing technologies for emerging economies may have larger returns for firms, compared to costly investment in innovative R&D (Basant & Fikkert, 1996). This is a related idea to the purchase of embodied technology, seen earlier as an important source of technology transfer, however it is distinguished by the intentional seeking out of new and more efficient technologies by firms for adaptation rather than transfers from commercial interactions. This also distinguishes this type of technology adaptation from technology transfer as a result of vertical linkages. The type of technology gained from these interactions depends on the technology present in customer/supplier organisations and so is limited in its scope to improve firm production and processes.

The 2013 round of the TCS produced data on research and adaptation for 8,010 firms. As we see in Figure 6.3, the vast majority of these companies did not engage in either technology adaptation or R&D activity with only 8% of firms undertaking one, or both forms of investment in innovation.

Figure 6.3: Share of Firms Doing Adaptation, Research



This suggests that policymakers should focus on encouraging firms to invest in adaptation of technology that already exists. With over 90% of firms in the sample currently without an adaptation strategy and with benefits to firms of more advanced technologies documented in the literature, it is possible that this would lead to large productivity gains. This type of policy is also likely to be more feasible for firms to implement and may therefore yield a higher success rate. This finding again shows the unique insights on innovation gained from the TCS. Looking specifically at firm level allows

policymakers to see the type of tailored policy that may improve firm performance in Vietnam, rather than implementing policies based on traditional measures of encouraging innovation, such as R&D, that may then fail.

We use a regression framework to evaluate the role that firm characteristics play in the decision to invest in research or adaptation, with results shown in results in Table 6.2. Both adaptation and research are more likely amongst larger firms. Regarding firm structure, although some coefficients are poorly defined, it appears that joint stock with state companies are more likely to conduct adaptation and R&D whereas private limited and joint stock no state are more likely to engage in R&D only.

Table 6.2: Determinants of Research and Adaptation, Regression Analysis

	<b>Dependent variable is 1 if firms does adaptation, research or both, 0 otherwise</b>					
	(1)		(2)		(3)	
	Adapt.	se	R&D	se	Both	se
Micro (1-9)	-0.01**	(0.01)	-0.01	(0.01)	-0.01**	(0.00)
Medium (50-299)	0.02***	(0.01)	0.04***	(0.01)	0.02***	(0.00)
Large (300+)	0.04***	(0.01)	0.08***	(0.01)	0.04***	(0.01)
Joint, with State	0.05***	(0.01)	0.10***	(0.03)	0.05***	(0.02)
Collective	0.01	(0.01)	-0.01	(0.02)	0.01	(0.02)
Private	0	(0.01)	0	(0.01)	0	(0.01)
Private Limited	0.01	(0.01)	0.02***	(0.01)	0.01	(0.00)
Joint Stock, no State	0.01	(0.01)	0.05***	(0.01)	0.01	(0.01)
Joint Venture (SOE and Foreign)	0.02	(0.02)	0.03	(0.03)	0.02	(0.02)
Joint Venture (Non-state and Foreign)	0	(0.01)	0.05	(0.03)	0	(0.01)
Observations	6,927		7,107		6,927	
Region Effect	Y		Y		Y	
Sector Effect	Y		Y		Y	
Pseudo R-squared	0.11		0.1		0.11	

Note: Marginal effects from Probit model, standard errors to right of coefficients clustered at firm level. Base: Micro, FDI, Region 7 (HCMC), Food Processing (ISIC 15). Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05.

## 6.2 Constraints to Adapting Technology

Given the benefits to firms from more advanced technologies, the regression analysis and sample averages presented in section 6.1 are surprising, with relatively few firms investing in adaptation, and those that do primarily larger firms. It is possible that constraints are hampering the ability of firms to invest in this area. If this is the case then an understanding of these constraints and how to improve them is of interest to policymakers, particularly if adaptation is to be considered as a relatively low-cost way for companies to invest in improved technology. To support this, the TCS investigates why firms want to invest in adaptation and the constraints that prevent them from doing so.

The survey questionnaire asks responding firms to summarise their experience of past adaptations, failed adaptations, and desired or anticipated adaptations the firm plans to make in the future. Figure 6.4 shows respondent's main motivation for adaptation. Improving quality stands out as the most important reason. Firms appear to desire improvements in quality and productivity. This may be due in part to increasing levels of competitiveness in the economy necessitating product improvements, or indicative of firms trying to move into, and compete in, higher value-added markets. This suggests that firms are aware of the potential productivity gains from investments in technology and reinforces the importance of examining the constraints to implementing these improvements.

Figure 6.4: Reasons for Adaptation

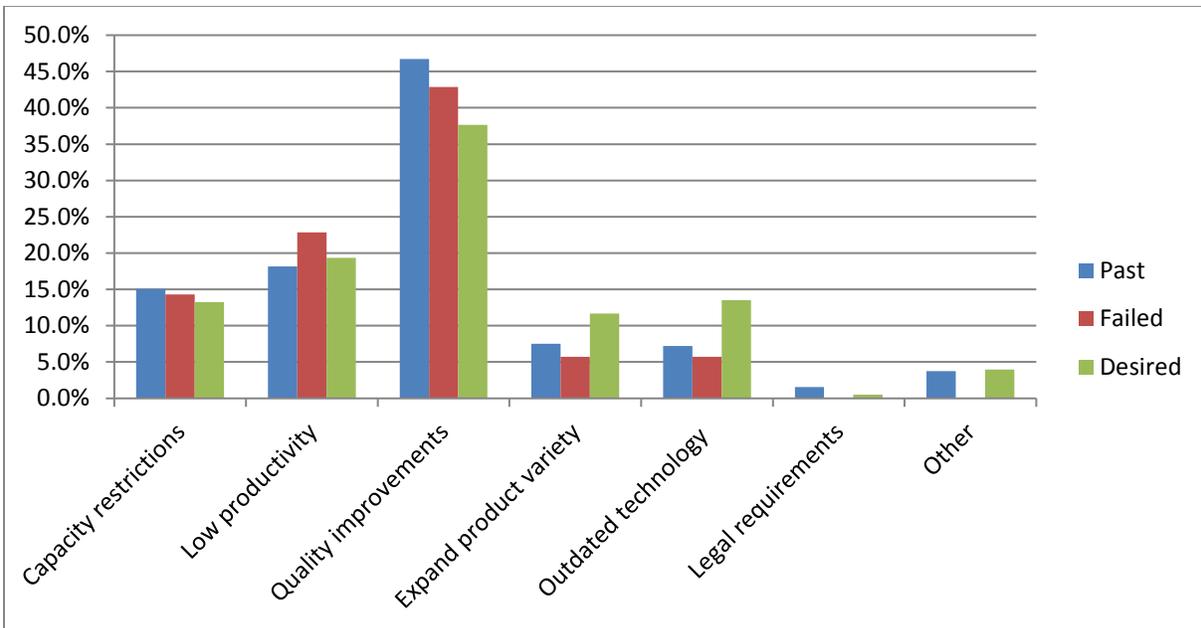
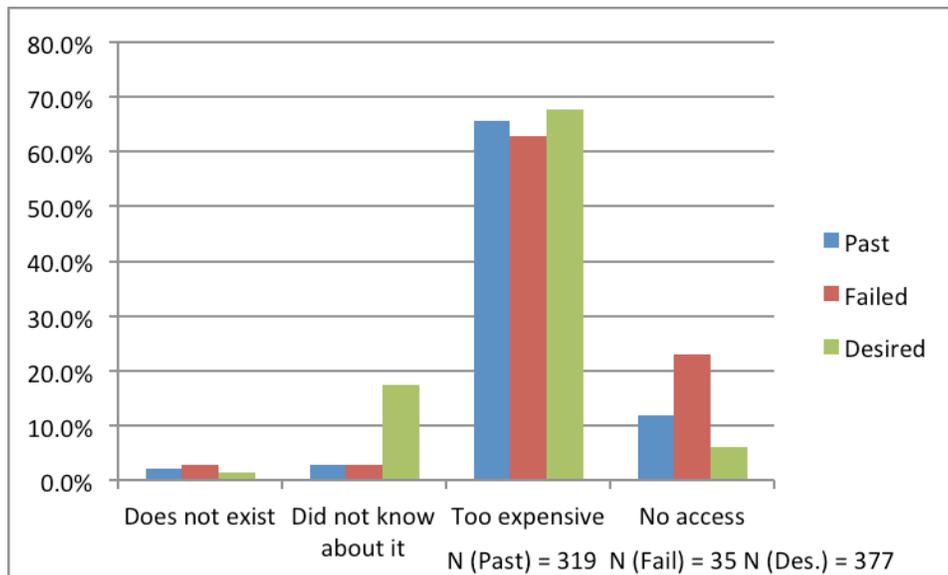


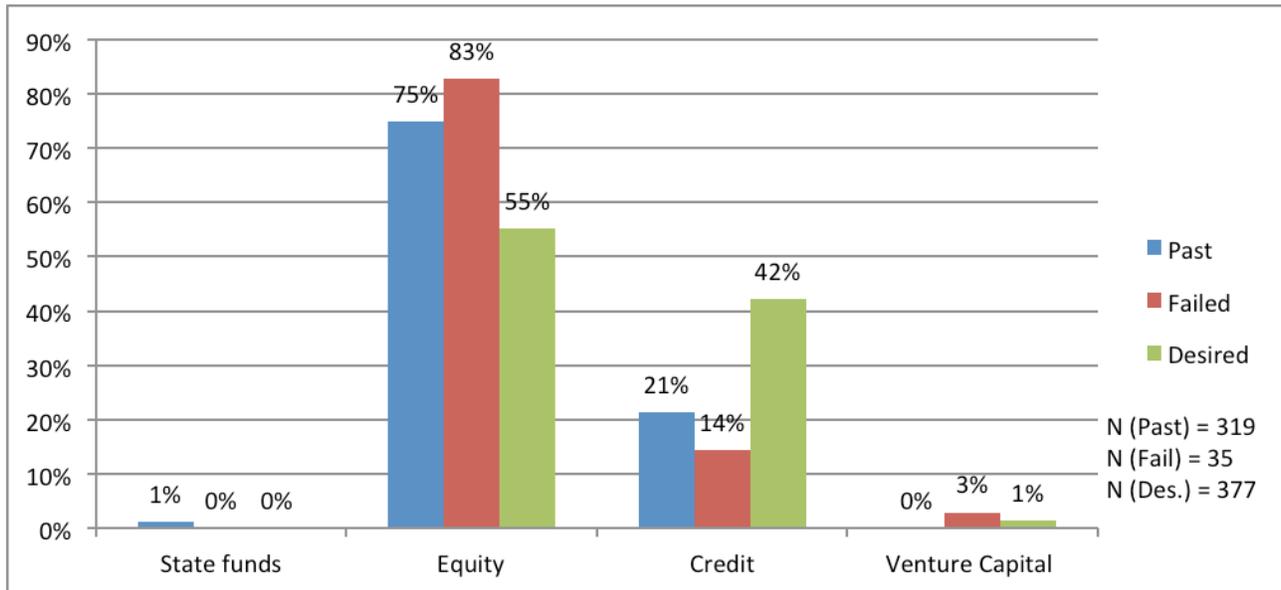
Figure 6.5 shows the share of respondents that listed each constraint as the “most severe.” The sample is dominated by financial constraints. Firms are unable to invest in technology adaptation due to credit constraints or lack of sufficient capital with the firm. Access to finance is a common constraint for firms in emerging economies. Indeed, an evaluation by the World Bank (2013) of the SME sector stated that financial constraints are frequently observed in developing countries and according to both theoretical and empirical evidence, the burden of these constraints tends to fall disproportionately on small and medium sized firms. They posit that promoting reforms in this area can be considered favourable to SME development. Indeed, this is an area where domestic industrial policy could assist, for example by developing schemes to expand access to loans for firms with plausible strategies for adaptation of technology into their organisation.

Figure 6.5: Reasons for Technology Adaptation Rather than Purchase



The need for improved access to finance is underlined by survey data on how firms financed or plan on financing adaptation. Figure 6.6 summarises the share of respondents reporting various funding mechanisms as being the most important.

Figure 6.6: Financing of Adaptation



This again highlights credit restrictions on firm decisions to adapt technology, with a significant gap between desired financing from credit and actual financing from credit. The sample is dominated by firms who rely on equity to finance adaptation, meaning that firms' ability to invest is limited by their available internal capital such as retained earnings. Firms may then be investing in technology adaptation that is not sufficient for them to realise real gains from production improvements. This suggests that firms would make use of credit schemes that are transparent, widely available, and preferential (compared to standard borrowing rates) and is an important consideration for industrial policy in this area. As the conclusions from this section echo those in the 2012 TCS report, it appears that current policy is failing resolve these concerns.

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## 7 Corporate Social Responsibility (CSR)

The concept of Corporate Social Responsibility (CSR) and adoption of a comprehensive CSR policy is seen as increasingly important in business environments, both in developing and developed economies. Firms are increasingly called upon to operate in a way that is socially responsible. However, despite the focus on CSR, an actual definition of what it entails remains elusive. Indeed, it appears that the issue is not lack of a definition, but an abundance of definitions, each differing in their expectations for CSR (Dahlsrud, 2006). Alongside these differing views on what CSR is, are competing views as to its relevance, with disagreement in the literature about whether it improves or burdens firm performance. Indeed, Jensen (2002) argues that CSR needlessly raises firm costs and that this then disadvantages the firm relative to competitors who are not engaging in CSR.

Proponents of CSR highlight the economic benefits from implementing a superior CSR strategy. Cheng et al (2014) investigate the effect of CSR on firm financial constraints and conclude that firms with better CSR performance have significantly lower capital constraints. They attribute this to two factors. First, lower agency costs as a result of improved engagement with stakeholders and second, through reduced informational asymmetries resulting from increased transparency in the organisation. McWilliams & Siegel (2001), highlight positive effects resulting from improved image and reputation and the follow on effect this has on firm competitiveness and performance. It is possible that firms with an active and vocal CSR strategy are perceived to be taking responsibility for their actions and advocating a positive impact through their activities with various stakeholders, for example community, employees and customers. This could potentially improve firm performance by attracting and retaining both skilled staff to the organisation and also clients who respond to the firm's progressive reputation.

The 2013 survey follows a similar format to previous years of the TCS, again to allow an examination of CSR in firms over time. The survey explores the extent to which firms in Vietnam change their socially responsible behaviour and incorporate CSR into their corporate strategy. Three dimensions of CSR are examined: The extent to which the firm (i) complies voluntarily with labour and environmental standards (ii) has a well-developed CSR strategy at the management level that goes beyond compliance with existing regulations and (iii) engages in beyond compliance community based activities not directly linked to firm operations. This information is used to generate a CSR index to examine the degree of CSR activities undertaken by firms. How the CSR indicators and CSR index relate to firm characteristics is then examined.

## 7.1 Measuring Corporate Social Responsibility (CSR)

The indicators detailed above encapsulate the key markers of CSR, as found commonly across the literature. CSR strategies can be evaluated based on those firms that fulfil only the required legal aspects of CSR, and those that go beyond mandatory policies. Two bodies have established views of CSR on based around each of these evaluations. The UN Global Compact initiative provided a set of ten principles to ensure responsible supply chain management, for example, basic labour rights and an anti-corruption principle. The CSR Compass then put forward a view of CSR as the voluntary initiatives of companies to integrate social and environmental considerations into their business activities and their interactions with stakeholders. Both of these views are represented in the examination of CSR presented in this chapter.

The three components of CSR highlighted above are measured through a number of specific indicators. The number of indicators for each component is shown below. Table 7.1 lists each of these in detail.

- Labour related responsibilities (3 indicators): Compliance indicators
- Management related responsibilities (4 indicators): Beyond compliance indicators
- Society related responsibilities (8 indicators): Beyond compliance indicators

Labour-related responsibilities encapsulate the mandatory legal responsibilities of the firm. Examples are the provision of official contracts, access to trade unions and paying health insurance. In general, this measure examines firm compliance with existing labour regulations. Management-related responsibilities look at whether CSR represents a central tenet of a firm's business strategy. Finally, society related responsibilities addresses whether firms actively engage with and embrace CSR in the form of local community initiatives, above and beyond that required legally and through activities often not related to the company's commercial purpose.

Table 7.1 documents the proportion of firms engaged in CSR related activities on the basis of these indicators. It is apparent that CSR in Vietnam currently resembles that of cooperation with compliance related CSR activities. However, it is positive to note that this co-operation, especially with regard to labour regulations, is very high (over 95% of firms have written labour contracts for all employees). Compared to the 2012 TCS little change in observed, highlighting a lack of advancement to CSR activities that are 'beyond compliance'. It appears that firms in Vietnam are applying a minimal CSR strategy to their organisations.

Table 7.1: Corporate Social Responsibility (CSR) Indicators

	2013
<b>Labour</b>	
All permanent employees have a written labour contract?	95%
Enterprise has a local/plant level trade union?	49%
Enterprise pays contribution to social insurance for employees?	72%
Enterprise pays contribution to health insurance for employees?	72%
<b>Management</b>	
Has committee/board overseeing CSR practices?	46%
Has written down CSR policy?	74%
Member of groups or has agreements that promote CSR standards?	3%
Has been awarded CSR type certifications or awards?	9%
<b>Community</b>	
1. Environmental Protection	24%
2. Education	8%
3. Infrastructure Development	7%
4. Health Care services	5%
5. Youth Development	3%
6. Poverty Alleviation	19%
7. Local Heritage	3%
8. Sporting events	5%

Note: N=8,007

Disaggregating by sub-group of the CSR index and starting with labour related CSR indicators; we observe that most permanent workers have written labour contracts, independent of firm size and form of ownership (see Table 7.2 and Table 7.3). Furthermore, a large share of Vietnamese firms provides social and health insurance, which is indicative of the existence of labour contracts in accordance with current laws. However, looking at firm size and legal structure it is evident that larger firms and those owned by the state or foreign interests are more likely to provide these benefits, than smaller, private firms. Regarding the availability of a trade union, nearly 90% of state owned firms are unionised, this is also the case with large firms. This is in line with developed countries where larger and in particular public sector organisations are generally heavily unionised. It is worth noting an improvement in the proportion of micro firms who have access to a trade union, this doubled from 5% in 2012 to 10% in 2013.

Table 7.2: Corporate Social Responsibility (CSR) Indicators, by firm size

	Micro	Small	Medium	Large
<b>Management</b>				
Has a committee/board overseeing CSR practices?	31%	36%	53%	70%
Has a written down CSR policy?	62%	69%	78%	88%
Member of standards groups or agreements that promote CSR standards?	1%	1%	3%	9%
Has been awarded CSR type certifications or awards?	4%	6%	11%	19%
<b>Labour</b>				
All permanent employees have a written labour contract?	94%	95%	96%	96%
Enterprise has a local/plant level trade union?	10%	26%	67%	90%
Enterprise pays contribution to social insurance for employees?	33%	57%	87%	97%
Enterprise pays contribution to health insurance for employees?	34%	58%	87%	97%
<b>Community</b>				
1. Environmental Protection	18%	24%	25%	28%
2. Education	3%	7%	9%	13%
3. Infrastructure Development	4%	7%	8%	7%
4. Health Care services	2%	3%	5%	9%
5. Youth Development	2%	2%	4%	5%
6. Poverty Alleviation	16%	20%	20%	18%
7. Local Heritage	3%	3%	3%	3%
8. Sporting events	3%	3%	6%	9%

The second sub-group of the aggregate CSR index is related to management. There is a clear increase across all firm sizes and structures in the number of firms reporting to have a committee or board in place to examine CSR. This could be indicative of an increasing awareness among firms of CSR and an increase in the number of firms who have, or who are intending to develop, a CSR strategy. However it is important to note that this year's sample size is much larger than in 2012 and thus this change could explain the increases observed in the tables. As illustrated in

Table 7.1, almost 46% of firms (compared to 33% in 2012) have a committee in place to determine CSR policies and 74% confirm that they have written down CSR policies (72% in 2012).

However, official certification in core CSR policies has been undertaken by relatively few firms. We observe highest percentages of certification in state owned and large firms (approximately 20%) and no clear increase in certification levels is observed relative to the 2012 TCS. This could represent an area that policy could improve upon, in order to formalise the CSR standards of firms in line with certification provided by international bodies such as the UN Global Compact Initiative described above.

Firms can participate in and financially support their local communities through various activities. This refers to the ‘beyond compliance’ CSR approach discussed earlier. Tables 7.1-7.3 show the range of community-based activities enterprises engage in.

Table 7.3: Corporate Social Responsibility (CSR) Indicators, by ownership category

	Private	State	Foreign
<b>Management</b>			
Has a committee/board overseeing CSR practices?	43%	69%	60%
Has a written down CSR policy?	73%	88%	82%
Member of standards groups or agreements that promote CSR standards?	3%	9%	5%
Has been awarded CSR type certifications or awards?	8%	21%	15%
<b>Labour</b>			
All permanent employees have a written labour contract?	96%	98%	96%
Enterprise has a local/plant level trade union?	40%	95%	81%
Enterprise pays contribution to social insurance for employees?	65%	98%	98%
Enterprise pays contribution to health insurance for employees?	65%	98%	99%
<b>Community</b>			
1. Environmental Protection	26%	33%	16%
2. Education	9%	21%	6%
3. Infrastructure Development	8%	12%	3%
4. Health Care services	5%	16%	4%
5. Youth Development	4%	10%	2%
6. Poverty Alleviation	22%	32%	8%
7. Local Heritage	4%	6%	1%
8. Sporting events	5%	14%	4%

Note: N(Private)= 5640, N(State)= 320, N(Foreign)=1680

While it is positive to see that the two most common forms of community activities relate to the environmental protection and poverty alleviations (two important issues in Vietnam), less than one third of firms engage in this kind of CSR, regardless of firm size or structure. Again this reinforces the view of CSR in Vietnam as being primarily in place to comply with existing regulations. The two most common forms of community-based activities relate to environmental protection and poverty alleviation.

## 7.2 What are the characteristics of CSR adopting firms?

This section analyses correlations between CSR adoption and selected firm specific characteristics, controlling for those factors identified in the literature as important determinants of CSR for firms. These include a firm size variable (log full-time employment) and a binary indicator variable for Research and Development (with a value of one if R&D takes place in-house and zero otherwise) in addition to indicators for whether firms produce intermediate or final goods. Ownership

characteristics, location and sector dummies are also included. The dependent variable in this analysis is the CSR index, this is an aggregate index ranging from 0-16 derived from the answers documented in Table 7.1. The results are shown in **Error! Reference source not found.** below and are disaggregated by sub-index.

Table 7.4: CSR determinants by sub-sector

Note: Dependent variable: CSR Index (0-16) or sub-indices, Base: province 1, Sector 15, Robust standard errors in

VARIABLES	(1)		(2)		(3)		(4)	
	CSR (all) coef	se	CSR (Manag.) coef	se	CSR (Labour) coef	se	CSR (Society) coef	se
Firm size(log)	0.7***	(0.0)	0.2***	(0.0)	0.4***	(0.0)	0.1***	(0.0)
R&D	1.4***	(0.1)	0.5***	(0.0)	0.3***	(0.0)	0.6***	(0.1)
Firm produces final goods	0.2***	(0.1)	0.0	(0.0)	0.1**	(0.0)	0.1	(0.0)
state	0.9***	(0.1)	0.2***	(0.1)	0.3***	(0.0)	0.4***	(0.1)
foreign	0.1**	(0.1)	0.2***	(0.0)	0.4***	(0.0)	-0.4***	(0.0)
Observations	7,464		7,464		7,466		7,466	
R-squared	0.3		0.2		0.5		0.1	
Province Effect	Y		Y		Y		Y	
Sector Effect	Y		Y		Y		Y	

parenthesis. \*\*p<0.01, \*\*\* p<0.05

### 7.3 Future research

Corporate social responsibility in Vietnam currently takes the form of compliance with legally mandated governance within the firm. There is limited evidence of CSR that extends out past the firm into relations with external stakeholders. However, given that where this type of CSR exists its focus is on environmental protection and poverty alleviation, improvements in CSR may have a positive impact on these issues in local communities. The implications for firm performance are unclear. As the literature states that benefits to CSR generally arise where superior strategies are implemented, CSR may currently represent a cost on Vietnamese firms. Under increasing competitiveness this area may then be neglected. Policies to encourage CSR could focus on improving firm's perceptions of CSR and facilitating its extensions to that of 'beyond-compliance. Comparing to the 2012 TCS survey improvements in CSR are minimal and seem to be limited to an increasing percentage of firms exploring CSR as an addition to their business strategies. However, if this indicates increasing awareness and willingness to consider CSR then this in itself is a positive change.

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## 8 Conclusion

This report documents the findings from the 2013 Technology and Competitiveness Survey. As evidenced throughout the report, detailed information was provided on levels of competitiveness, technology transfer, innovation and corporate social responsibility currently evident in Vietnam. A large sample of approximately eight thousand firms and comprehensive information available at firm level provided an in-depth snapshot of many aspects of firms operating environment. These attributes make the TCS an invaluable and unique tool for both researchers and policymakers. It is one of the only survey instruments in Vietnam available to analyze topics such as the development of technological capabilities within firms, the role of foreign investment in the dissemination of technological advantages to domestic firms and more broadly, the social context of the business environment. With this round of the survey, an additional year of data is also available for use in longitudinal empirical research investigating changes within firms over time.

The importance of innovation and technological development for an economies continued growth should not be understated. This type of productivity-enhancing growth is increasingly vital for Vietnam, given that the large gains realized after the Doi Moi reform are not sustainable. The focus of policymakers needs to shift towards the development of sustainable real growth, in order to foster growth in employment, in real wages and ultimately in living standards, particularly for Vietnams urban and rural poor.

It is apparent from the survey that firms are aware of the benefits of investment in technology and are already doing what they can to improve product quality. However, the presence of constraints is potentially preventing them from investing to the extent that real gains can be realized. Throughout the report it was noted that the 2013 analysis is broadly similar to the 2012 TCS. This highlights that the operating environment and firms circumstances are largely stagnating. It is of pivotal importance that policies are enacted to assist firms in moving forward. In particular, focus on loosening the constraints detailed in the analysis should be decisively addressed. As it stands current industrial policy does not appear to be sufficient in dealing with these issues.

Evidence on the benefits to foreign direct investment and indeed relationships with international clients and supplier, is also provided in the report. The benefits to the interactions of domestic and foreign firms is anticipated to be technology transfers, occurring as a result of spillovers. This can be either from horizontal spillovers, resulting interactions between firms operating in the same sector, backward linkages, resulting from relationships between foreign firms and domestic suppliers or finally, from forward linkages, where foreign firms supply intermediate inputs to domestic clients. The TCS shows only small numbers of firms report spillovers and that these spillovers are reported to occur between in interactions between domestic firms as well as interactions of domestic firms with

foreign firms. While the presence of spillovers between domestic firms is positive, no indication is given of the quality of the transfers, which would impact on the return that firms would gain as a result. It is likely that spillovers originating from foreign firms are a higher quality than those from domestic firms and this is an important consideration for policymakers to weigh the costs of attracting FDI to the benefits that domestic firms get, versus the benefits that arise from purely domestic interactions.

An additional avenue for technology improvements is adaptation of new technologies. It appears that for firms in Vietnam investment in R&D is primarily in developing technologies that are already in existence elsewhere. Given the high potential failure associated with R&D in addition to the high costs, it would likely be more beneficial to firms to adopt and modify existing technology rather than investing in R&D. Adapting technologies is also likely to be more beneficial to firms that transfers as a result of spillovers, as they can seek out technology specific to their firm rather than receiving transfers that are limited by the technological advancement of the contributing firm and indeed may not even arise in the first place. Given the productivity gains observed from improved technology, policies to stimulate this type of investments should be given serious consideration and should include reference to loosening the constraints faced by firms.

Finally, as Vietnam's economy becomes more competitive there may be increased pressure on firms to reduce their commitments to CSR in pursuit of increased profit margins. Corporate social responsibility in Vietnam currently seems to take the form of fulfilling obligations within the firm and in line with those legally required from companies. It appears that benefits to CSR are only realized in firms that adopt a wider reaching and more superior CSR strategy that extends to the external community and stakeholders. As such we would not expect to observe particular gains to Vietnamese firms from their current CSR policies. Policies that support 'beyond compliance' CSR strategies in firms could potentially assist in improving this.