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FIRM - LEVEL COMPETITIVENESS AND TECHNOLOGY IN VIETNAM
EVIDENCE FROM A SURVEY IN 2012



NHÀ XUẤT BẢN LAO ĐỘNG XÃ HỘI

Firm-Level Technology and Competitiveness in Vietnam: Evidence from a Survey in 2012

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Preface

This report summarises information from the 2012 round of the Vietnam Technology and Competitiveness Survey (TCS), collaboratively developed 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 here supplement previous survey rounds, and future rounds of the survey will give researchers and policymakers a detailed understanding of the dynamics of technology, profitability, and productivity of Vietnam's growing private sector.

While every effort has been made to introduce readers to the main features of this data set, this is not an exhaustive description of the full range of information collected in 2012: researchers and interested readers are encouraged to review the survey questionnaire and explore the full survey data set.

Acknowledgements

The study team gratefully acknowledges the guidance and support of Mrs. Vu Xuan Nguyet Hong, Vice-President of CIEM, whose leadership ensured effective collaboration between the various researchers and institutions involved in updating the survey questionnaire and taking it to the field.

The report was prepared by Dr. Nguyen Thi Tue Anh, Ms. Hoang Thi Hai Yen and Mr. Le Phan of the Central Institute for Economic Management, and Dr. Theo Talbot and Professor John Rand of the University of Copenhagen. Dr. Carol Newman of Trinity College, Dublin provided valuable input to the preparation of the survey questionnaire and this report. All researchers are indebted to the principle investigator, Professor Finn Tarp, Coordinator of the Development Economics Research Group(DERG) at the University of Copenhagen, Denmark and Director of UNU-WIDER, Helsinki, Finland.

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).

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

As with previous survey rounds, the 2012 Vietnam TCS collects firm-level data about topics ranging from technology investment and innovation to corporate social responsibility. The survey is “backwards-looking,” so the 2012 round collects information about 2011.

The TCS questionnaire was developed 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 over 100 full-time research staff across seven research departments, CIEM is a leading producer of economic analysis and policy evaluation for the Government of Vietnam.

The Danida Business Sector Support Program (Danida BSPS) has generously committed funds that enabled the GSO to implement the survey as a module attached to the annual Enterprise Census in 2011, 2012, and 2013 (the 2010 survey was funded from other sources), and this report focuses on cross-sectional evidence generated by the 2012 survey round. (See CIEM, 2011 and 2012 for descriptive reports covering previous rounds).

A consistent cross-section of firms has been surveyed in each round, creating a unique and growing panel data set enabling researchers to study changes within individual firms over time. This survey’s focus, level of detail, and panel structure make it unique in Vietnam and rare amongst surveys currently implemented in any emerging economy.

1.1 Quantifying Innovation

One motivation for developing the TCS was the recognition by Vietnamese and international researchers that a large number of existing tools to evaluate national competitiveness may not be appropriate for studying innovation in the context of emerging economies. As Krugman (1996) observed, this is a relative concept that is often misunderstood and misused in policy discussions that emphasise “achieving competitiveness”. Simple economic theory suggests that firms that are a long way from the technological frontier can innovate and improve quality simply by adopting and integrating technologies that have already been developed and used elsewhere, so innovation in an emerging economy context may not be the same as pushing forward the technological frontier.

Table 1.1 shows selected indicators from some country-level and cross-country reports on competitiveness in Vietnam. The excerpts are not exhaustive, but suggest that existing measures emphasise variables (like research and development spending) that are more appropriate in the context of a high-income economy. While it is certainly true, for example, that the number of patents developed per year will be correlated with growth in real per-capita income, this does not mean that originating patents is the best way for a lower middle income economy to grow faster or become more competitive (see Lall, 2001, for an influential discussion of the problems associated with evaluating the competitiveness of emerging economies using aggregate indicators).

Table 1.1: Selected Innovation Indicators

Source	Selected Indicators
UNIDO: <i>Viet Nam Industrial Competitiveness Report 2010</i>	Manufacturing Value Added (MVA) per capita Manufactured export capacity Share in world manufactured exports Share of MVA in GDP 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

Rather than focusing on aggregated variables, the TCS investigates firm-level investments in, and outcomes from, technology innovation and corporate social responsibility, focusing on the various channels identified in empirical and theoretical economic literature for how firms improve the methods, processes, and/or physical equipment involved in production. Because of its focus on firm-level information, the survey also examines how technologies diffuse through the productive economy, and whether productive technology used by other firms in the same sector or suppliers and customers creates “spillover effects” of improved, more appropriate or more efficient technology.

1.2 The Vietnam Technology and Competitiveness Survey

While the final questionnaire was mutually agreed in an English version, the survey was implemented in Vietnamese (a translation from the final Vietnamese version to English was performed to ensure consistency). The 2012 survey instrument studies technology development and adaptation along six dimensions summarised in Table 1.2.

Table 1.2: Structure of 2012 Survey Questionnaire

Section	Description	Questions
Taking stock of technologies and technological basis	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.	1.1 – 3.4
Input and supplier relations	The details of major suppliers' locations and the value of inputs obtained, differentiated across domestic and international suppliers.	4.1 – 6.1
Output and customer relations	The details of major customers' locations and value of outputs sold, differentiated between domestic and international customers.	7.1 – 9.2
Innovation and technology capacities	Diagnostic questions targeting the constraints affecting technology adaptation and level of the firms' investment in technology transfers or research and development.	10.1 – 15.4
Competitors	Number and location of competitors, and dimensions (cost / quality) along which competition occurs.	16.1 – 16.6
Corporate Social Responsibility (CSR)	Questions relating to formal and informal commitment to CSR practices.	17.1 – 20.8

It was implemented as a module attached to the General Statistics Office (GSO)'s annual Enterprise Survey (also referred to as the Enterprise Census), a short-form census of all registered firms of ten employees or larger (the minimum cut-off is 30 in the urban centres of Ha Noi and Ho Chi Minh City) implemented by the Government of Vietnam. The TCS was taken to the field by over 300 enumerators under the guidance of 75 supervisors, and data were collected through face-to-face interviews. Enumeration was done by hand and the data were digitised and extensively cleaned in Ha Noi.

1.3 Sampling and Cleaning

In addition to the standard tests for duplicate entries and missing data, the data were cleaned to exclude those firms whose figures for assets and / or revenue were recorded as zero or missing. Firms were excluded if the recorded percentage change from the end of 2012 relative to the end of 2011 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 our final study sample excludes observations in the first and 99th percentiles. Combining the TCS module with data from the Vietnam Enterprise Survey and removing duplicate entries and those firms with inconsistent asset or revenue figures delivers a cross-section of 8,107 firms.

Survey data are organised hierarchically, with firms located in sectors and sectors located in 58 provinces and five major municipalities (63 geographic units in total). Firms are uniquely identified in

the data by a combination of the province in which they operate and a tax code that specifies firms within each province.

While firms vary along many dimensions, we simplify the analysis presented here by grouping firms together according to size, classified as in Table 1.3, below.

Table 1.3: Size Categories

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

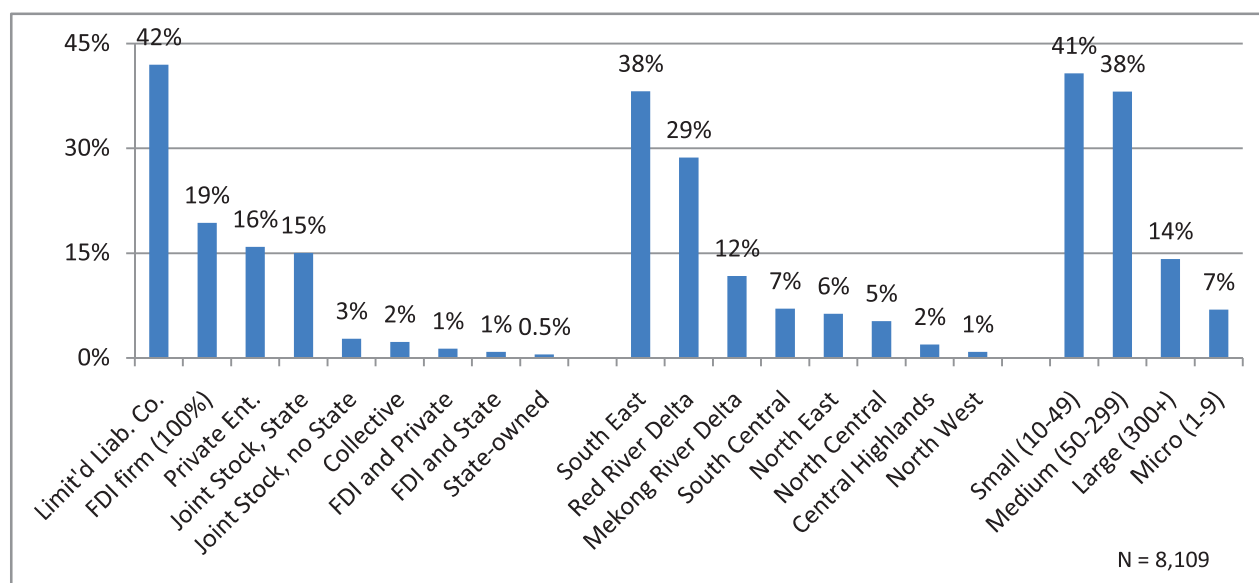
We also disaggregate firms by their equity structure because this summarises a large amount of information about firms’ incentives and cost structures. Table 1.4 below lists the categories of “legal structure” into which firms can select in response to the GSO’s enterprise questionnaire. We use these categories throughout our analysis of the TCS data.

To summarise data by region, we pool provinces into eight regional groupings. The economic geography of Vietnam is highly uneven, with economic activity concentrated in specific areas of the North and South. Figure 1.1 below summarises our underlying sample. Consistent with the density of economic activity in the country, the largest share of firms included here is based in the South East, over 40% are limited liability companies, and small- and medium-sized firms make up 79% of the sample.

Table 1.4: Legal Structure Categories

Legal structure	Description
State-owned	Wholly state-owned
Collective	Cooperatively-owned and managed
Private Ent.	Domestically-owned private
Limited Liab. Co.	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



While small and medium firms make up most of the firms in the sample, the 14% of firms classified as “Large” account for over 70% of the workers reported. The figure is 28% for the medium and small companies combined. This does not mean that smaller firms do not deliver growth and employment, but it does caution against confusing the distribution of firm sizes with the distribution of employment by firm size.

In addition to differences in legal structure and workforce size, the TCS collects data about which industry the firm operates in at a high-level of resolution (the six-digit ISIC level, a standard industrial classification system). Table 1.5 below summarises these classifications at the two digit-level for reference.

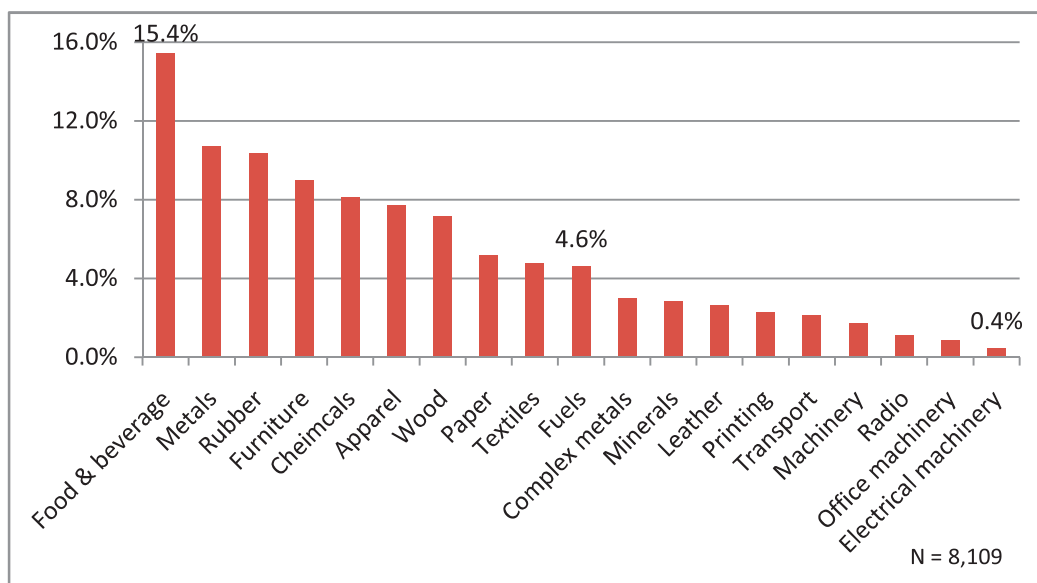
Table 1.5: ISIC 2-Digit Sector Code and Description

ISIC 2-digit Code & Description: Manufacture of...
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 below shows that the majority of the manufacturing firms operate in the food and beverage sector, but this sector (ISIC 15) does not dominate the sample; the overall dataset includes firms in each sector. The sample therefore captures information about firms across size categories, main sectors of operation, and region.

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 11th 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 the Doi moi Policy that has been decided by the VIth Congress of the CPV in 1986, the Vietnamese state prioritized attracting both capital and modern production 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 incentives were regulated by an updated and unique Law on Investment. This legislation applied to both domestic and foreign investors. According to the Law, projects with transfer of advanced technologies are 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.

2.1 Financial Incentives for Technology Transfer

The state also provides several direct benefits to firms operating in “strategic” sectors, through the National Focal Technical – Economic. 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 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. Accordingly , 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 if 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 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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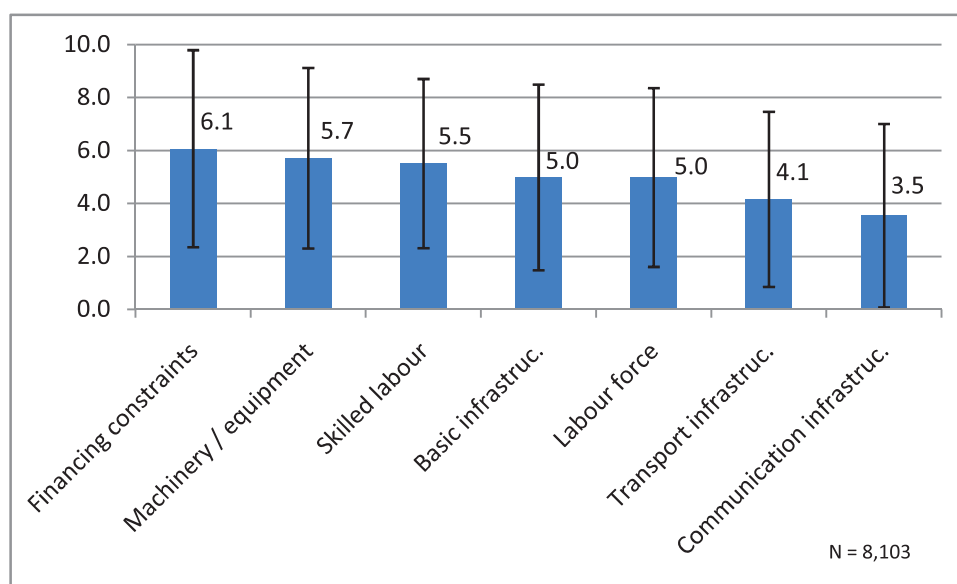
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3 Technology and Competitiveness: Evidence from the 2012 TCS

With increasing regional competition and slowing economic growth, developing or importing technology to produce sophisticated final goods will help to ensure that rising prosperity continues to increase overall living standards, particularly for the rural and urban poor. Firms often realise that innovation is good for business, but lack the capacity or resources to implement a plan to upgrade their production equipment or processes.

Figure 3.1 below summarizes over eight thousand responses to a question asking firms to rank constraints on their economic performance on a ten-point scale; the error bars represent one standard deviation above and below the average score across all firms. These constraints range from financial to macroeconomic issues like poor road networks or inadequate wharf infrastructure impeding the import of intermediate or the sale and export of final goods. Firms consider financing the greatest single constraint. While this is consistent with a number of reports produced by analysts, government institutions, and development partners, the band of one standard deviation shows that financial constraints are not dramatically worse than difficulties accessing machinery or equipment and skilled labour.

Figure 3.1: Constraints on Firms' Economic Performance



This suggests that, firstly, the range of government-initiated programs discussed above are not meeting firms' needs and, secondly, that solving financial constraints alone is probably not sufficient if firms cannot access improved machinery or find skilled operators and managers to oversee production. A general point is that we should not rely on survey averages to diagnose underlying economic problems: averages hide a lot of variation and this variation shows that no single category of

constraint is the “worst.” To be effective, industrial policy must confront a range of constraints on growth.

Simple averages are not very precise (as the overlapping ranges of the error bars above makes clear), and there are many other factors that affect firms’ perceptions of constraints that we cannot capture in a graph. Multivariate regression is the natural framework to study the relative effect of constraints and other outcomes of interest to 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).

Table 3.1: Firm Constraints, Regression Analysis

Dependent variable: Total constraints						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-1.5	(0.8)	-1.6*	(0.8)	-1.5	(0.8)
Medium (50-299)	1.4+	(0.5)	1.8+	(0.5)	1.7+	(0.5)
Large (300+)	4.0+	(0.7)	4.3+	(0.7)	4.6+	(0.7)
State-owned	1.0	(3.3)	-0.1	(3.3)	-0.2	(3.3)
Collective	3.9+	(1.4)	2.8	(1.5)	2.6	(1.5)
Private Ent.	1.7*	(0.8)	1.5	(0.8)	1.4	(0.8)
Limit'd Liab. Co.	2.8+	(0.6)	2.8+	(0.6)	2.8+	(0.7)
Joint Stock, no State	4.7+	(0.7)	4.0+	(0.8)	3.9+	(0.8)
Joint Stock, State	2.9*	(1.3)	2.6*	(1.3)	2.8*	(1.3)
FDI and State	6.4+	(2.3)	6.0+	(2.3)	6.0+	(2.3)
FDI and Private	-1.0	(1.6)	-1.0	(1.6)	-0.7	(1.6)
Observations	8,109		8,109		8,109	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.0014		0.0024		0.0031	

Tobit estimates, left censored, 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. Coefficient on constant term not reported. Robust standard errors in parentheses. + p<0.01, * p<0.05.

The final column of the table controls for all the listed firm characteristics in addition to region- and sector-specific effects, so we are effectively looking at the effect of firm characteristics on total constraints within sectors in regions, and the “precision” of the estimate is roughly analogous to the width of the error bars in Figure 3.1. Larger firms are relatively more constrained: since the relatively small number of the largest firms employs over 70% of workers in our sample, they could be targeted

for narrowly-focused industrial policy. Similarly, limited liability firms, joint stock companies with and without state involvement, and FDI firms with state involvement perceive themselves as relatively more constrained even when we control for the region and sector in which they operate.

There are two main findings from examining firms' reported constraints on performance along a single dimension and in a regression (multidimensional) framework. Because no single constraint dominates the others, industrial policies will have to tackle numerous different constraints simultaneously. This requires coordination across a large number of agencies, government ministries, and development partners. However, a positive point to take away from examining these survey data is that a large number of firms of different legal structures and sizes perceive themselves to be relatively constrained. This suggests that where industrial policy is successful, it can act as a rising tide, improving the performance of numerous different kinds of firms without necessarily privileging any particular type of company, region or sector.

3.1 Technology Transfer

While improving access to appropriate technology will not solve all the constraints on performance perceived by firms, improving production methods, organisation, and machinery will enable Vietnamese firms to compete in higher-quality and higher-value added market segments. This ultimately delivers higher wages to workers and may cause improved working conditions (an aspect of employment studied by the TCS and discussed in section 7 below).

Markusen and Venables (1999) provide a simple theoretical framework to evaluate the different channels (and countervailing effects) under which foreign investment promotes domestic productivity increases (they consider the specific case of industrialisation) through technology transfer. However, while economic theory has identified channels through which technology transfer and spillovers might occur, economic evidence is mixed, and whether or not researchers actually detect beneficial spillovers through linkages between foreign and domestic firms depends on the outcome measure (for example, profitability or productivity), the time period, the empirical methodology used, and the country or countries in the sample. Görg and Greenaway (2004) present a summary of this evidence and find that it is very mixed: we should not automatically conclude that foreign investment will lead to technology transfers or spillovers. Table 3.2 below summarises the different channels for technology transfer.

Table 3.2: Types of Spillover

Type of spillover	Description
Forward linkage	The firm based in Viet Nam is a customer. Technology is transferred from suppliers.
Backward linkage	The firm based in Viet Nam is a supplier. Technology is transferred from customers.
Horizontal	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.

To give researchers an overall picture of the relative importance of these channels in Vietnam, the TCS asks firms to rank various mechanisms for technology transfer by importance on a 10-point scale. Embodied technology refers to improving production by buying new machinery or equipment (for example, installing upgraded welding equipment in a metal fabrication shop). The firm could also purchase technology (for example, licensing a new production process) from an outside firm, or receive technological know-how from an entity within the firm (“Group”) or from a supplier or customer. Finally, new employees could improve the firm’s method of production, generally by bringing with them skills acquired at another firm operating in a similar sector or with similar equipment.

Figure 3.2 below summarises the average importance of each channel by type of firm and overall, while Figure 3.3 does this by firm size. The average importance ascribed to these channels varies widely across types of firms, but new employees and embodied technology dominate across firm types and size categories (and certainly do on average across the whole sample, the last grouping in each figure). This suggests that firms perceive horizontal spillovers and physical technology transfers to be the most important channels for improving production.

Figure 3.2: Ranking of Transfer Channels by Firm Size

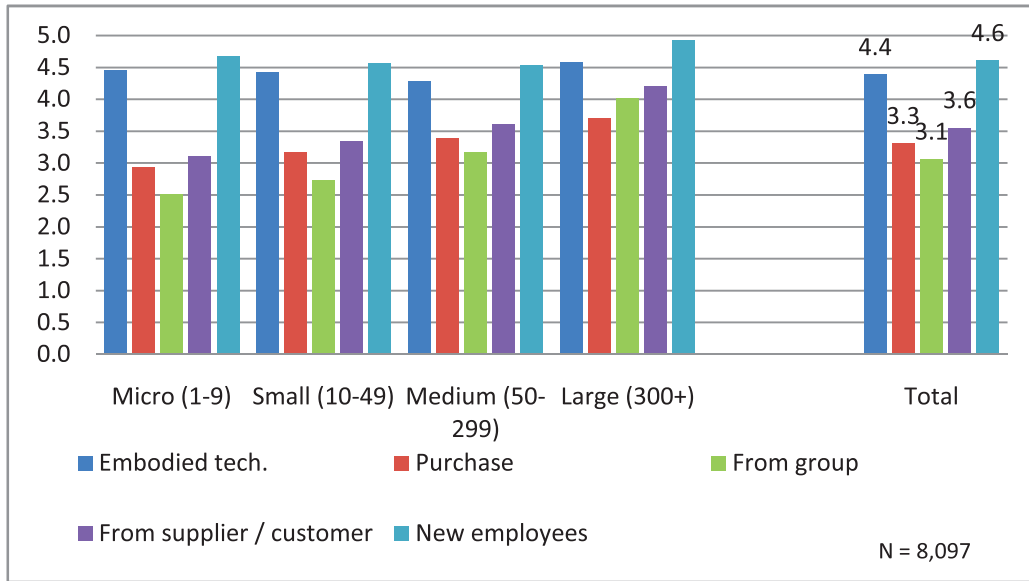
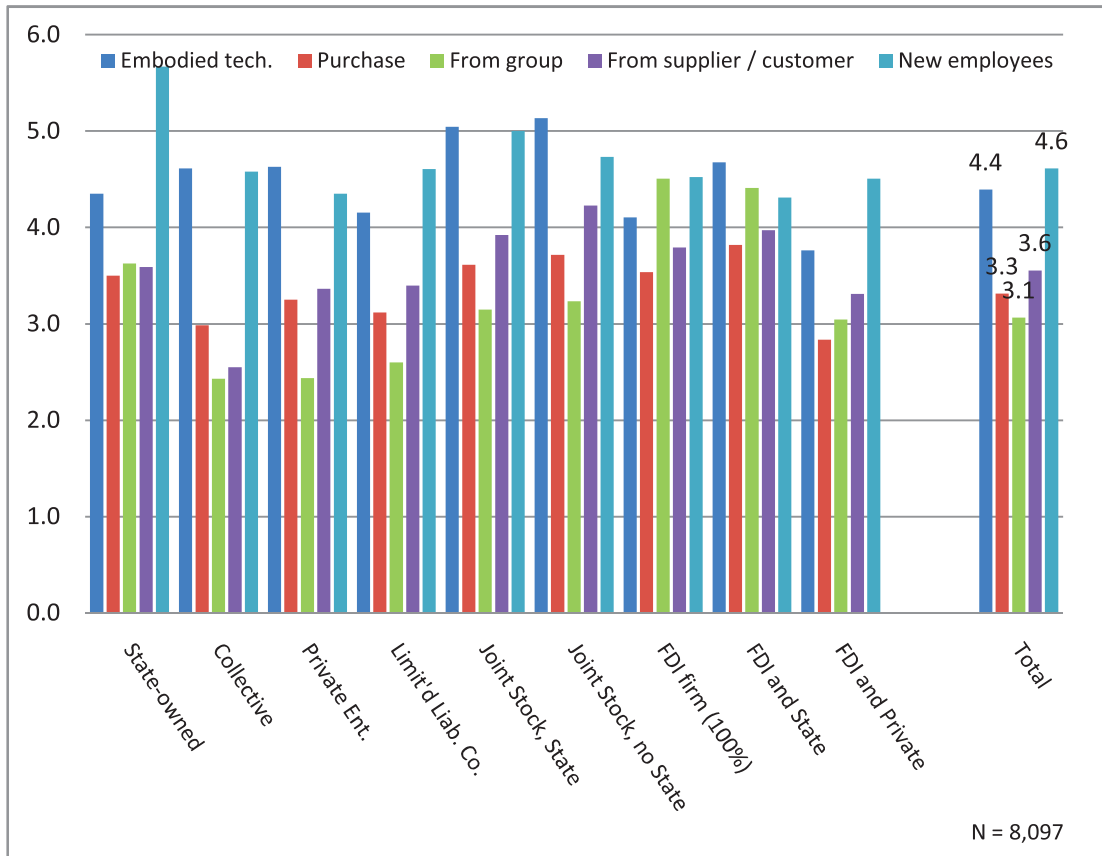


Figure 3.3: Ranking of Transfer Channels by Legal Structure



3.2 Horizontal Spillovers

Horizontal spillovers occur when firms competing in the same sector or closely-related sectors see innovations occurring in their competitors and copy them. One argument for encouraging FDI and

exporting is domestic firms absorb the technologies used by foreign-owned firms through these horizontal spillovers. For example, domestic firms learn about new technologies or processes by competing with foreign firms in international markets, referred to as the internationalisation effect. For example, Kafournos et al. (2008) argue that the reason some innovative firms do not outperform others is because they are not sufficiently internationalised: competing internationally is actually what enables firms to take advantage of innovation.

A horizontal spillover can also occur when a domestic firm improves efficiency by copying technologies by observing a foreign competitor, which has come to be called the demonstration effect. Alternately, a foreign competitor could train Vietnamese workers, making them more productive creating a horizontal spillover due to the worker mobility effect when the workers are hired by local firms. Nguyen and Nguyen (2008) use the earlier rounds of the Vietnam Enterprise Survey and argue the evidence suggests horizontal spillovers do occur, but are mainly limited to the service sector through the worker mobility effect. A related paper is Machikita et al. (2011), who provide an interesting study of how targeted exchanges of skilled workers (in their case, engineers) improved the efficiency of a sample of Vietnamese firms.

Capturing the benefits of these spillovers is one of the main motivations for governments to give tax breaks and other benefits to foreign firms. These firms can both sell better embodied technology to local firms, improving their output and quality, and employ workers who become more productive and bring new production techniques with them when they leave. However, when we look at data from the TCS about where firms actually procure their technology (Table 3.3 below), local firms are the dominant source, though foreign firms in the same and other sectors are certainly important as the main suppliers of machines and equipment to over 28% of the nearly eight thousand respondents.

This suggests that diffusion of better technology amongst local firms, instead of just from foreign firms operating locally, is an important element of overall technology transfer. Given the costs involved in creating incentives for FDI like foregone tax revenue, policymakers should continue to explore how local firms can cooperatively diffuse appropriate technology. The TCS data suggests that while technology provided by foreign firms is important, it is not the only mechanism through which local firms can alleviate key constraints.

Table 3.3: Main Supplier of Technology

Source	Total	%
Vietnamese firm, same sector	1,640	20.26
Vietnamese firm, other sector	3,885	47.99
Foreign firm, same sector	1,487	18.37
Foreign firm, other sector	875	10.81
Total	7,887	100%

Evidence on the worker mobility effect is difficult to collect, since the survey does not capture the full work history of each employee.¹ Of the firms reporting that the skills and experience of new employees were the most important source of technology transfer, 82% of firms said that the main employees responsible for these transfers were Vietnamese nationals, while a further 17% attributed the technology transfer to foreigners working in Vietnam, with the tiny remainder coming from Vietnamese repatriates (the total sample was 7,999 respondents).

Similarly, the average share of transfers firms attributed to Vietnamese national employees who had previously worked for FDI firms is 29% (2,141 observations), compared to 81% (4,706 observations) attributed to Vietnamese employees who had previously worked for a non-FDI and non-state enterprise. We take this evidence to suggest that the domestic private sector can also be a robust source of technology transfer or diffusion through the worker mobility effect, and that industrial policy should not exclusively focus on FDI-financed firms.

A necessary condition for horizontal spillovers is a competitive market. Vietnam’s transition to a dynamic market economy has created competition between firms that try to improve quality or reduce price to capture bigger market shares or, in the case of exporters, attract and retain discerning international customers. A larger number of competitors implies a greater overlap in common production problems, and a greater number of workers with experience in the sector. Cumulatively, more competition in a given sector increases the chance that a firm will capture horizontal spillovers. At the same time, greater competition also means lower average profits because prices are driven down by new entrants. Whether the benefits of competition exceed its costs is ultimately an empirical question.

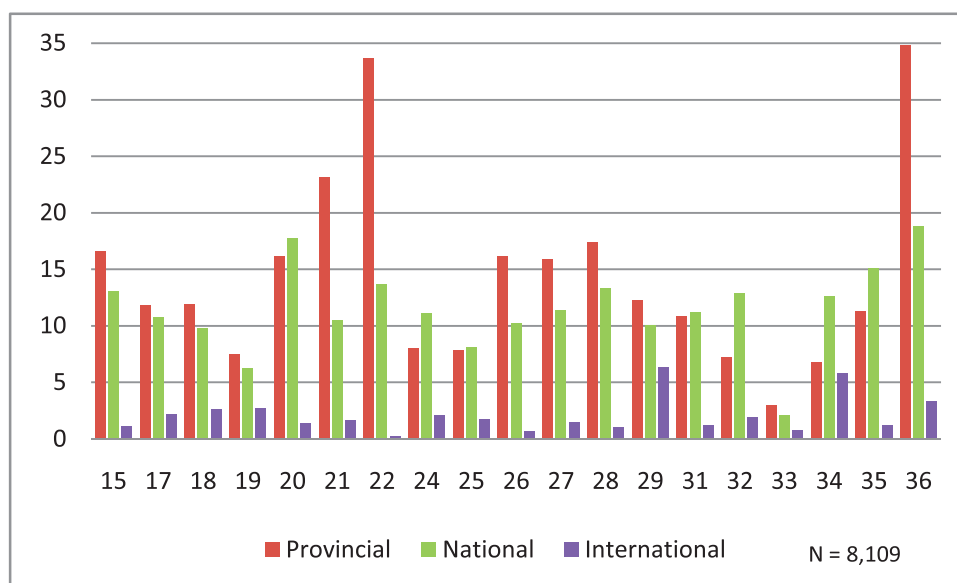
The data in the 2012 round of the TCS summarised in Figure 3.4 below suggests that some sectors are particularly competitive, with firms in eight sectors reporting more than 15 competitors on average, and firms in three sectors reporting an average of more than 20. The majority of this competition, however, is intra-provincial, not national or international. Most firms continue to compete in very

¹This data would allow researchers to see whether firms that hire more employees that previously worked for FDI-financed firms are more productive because of the knowledge and human capital these employees “took with them” when they stopped working for the foreign-invested firm.

local markets, indicating internationalisation difficulties (possibly compounded by poor transport infrastructure discussed above) and limited exporting.

This indicates that the next hurdle for most firms is actually selling in non-local domestic markets; this may be a more achievable short-term goal for industrial policy than encouraging exports, and will also generate a larger number of domestic firms more likely to grow to export status and compete successfully.

Figure 3.4: Average Number of Competitors by Sector



Overall, the TCS provides some preliminary evidence that domestic firms can learn effectively from one another, and that technology transfer even within the same sector may not require an emphasis on encouraging foreign entrants to the domestic market. Export-oriented policies are certainly beneficial for long-run economic growth, but expanding the domestic market of local firms is a reasonable and more easily attainable first step towards export growth and international competition in future.

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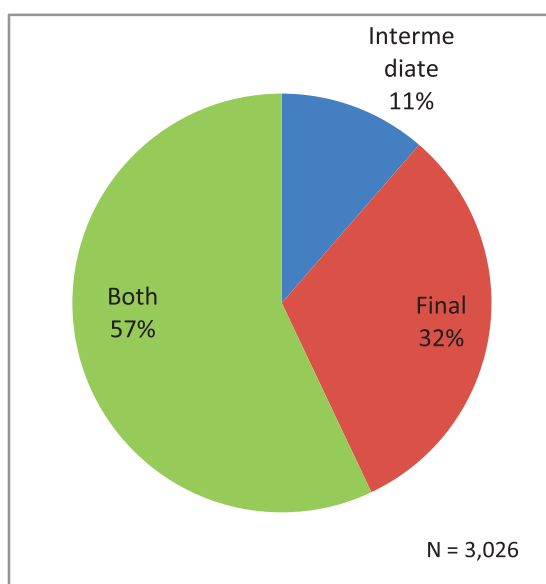
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4 Backward Linkages: Technology Transfer from Customers

In addition to technology transfer and innovation arising from competition or worker mobility, firms can also get improved production technology or methods from suppliers or customers. An example may be an overseas customer that requires hygienic packaging conditions for food and sells the upstream Vietnamese supplier the technology to produce food with this packaging. The same packaging technology could be used in the supplier's other product lines. In this case, the technology transfer has not arisen through worker mobility or observation of other firms in the same sector but due to a linkage with a customer. Technology spillovers that arise from this kind of linkage are called "backward linkages" because the transfer of technology is from a customer back up the supply chain to a supplier.²Javorcik (2004) presents a compelling case that horizontal transfers are unlikely to arise because foreign firms that enter a sector compete with local firms; instead, she finds that the effect of backwards linkages between downstream foreign firms and their local suppliers create large and positive effects on local firms' productivity.

These linkages can occur for producers of both intermediate and final goods. Figure 4.1 shows that the majority of respondents (both firms that report spillovers and those that do not) produce both.

Figure 4.1: Composition of Output

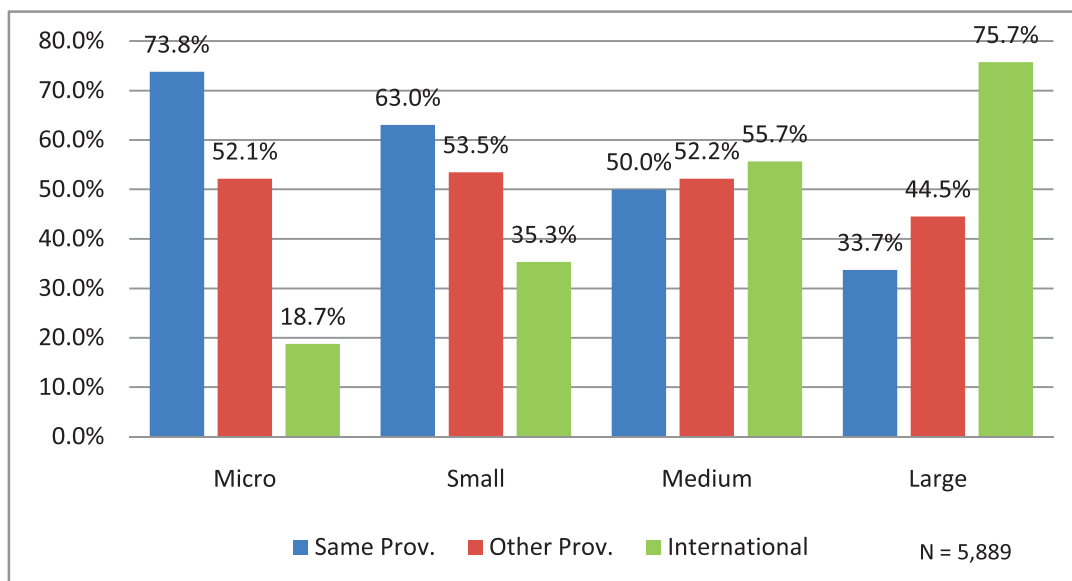


In the case of horizontal spillovers, a lot of emphasis is given to the degree of foreign presence in a given sector. Similarly, in the case of backwards linkages, we are interested in the share of respondents' output that is sold locally, nationally, or internationally (exported). Figure 4.2 below shows that the average share of the most important product sold internationally increases in the size

²Different sources use opposite labels for these linkages, depending on whether we look at the direction of the technology transfer from the perspective of the domestic or foreign firm. A backwards linkage from the domestic customer back up the supply chain is the same as a forward linkage from the perspective of the foreign supplier.

of the firm: larger firms are much more likely to derive most of their sales from exports (note that this is the average of the shares of output firms report selling to different locations, so the groups do not sum to 100%).

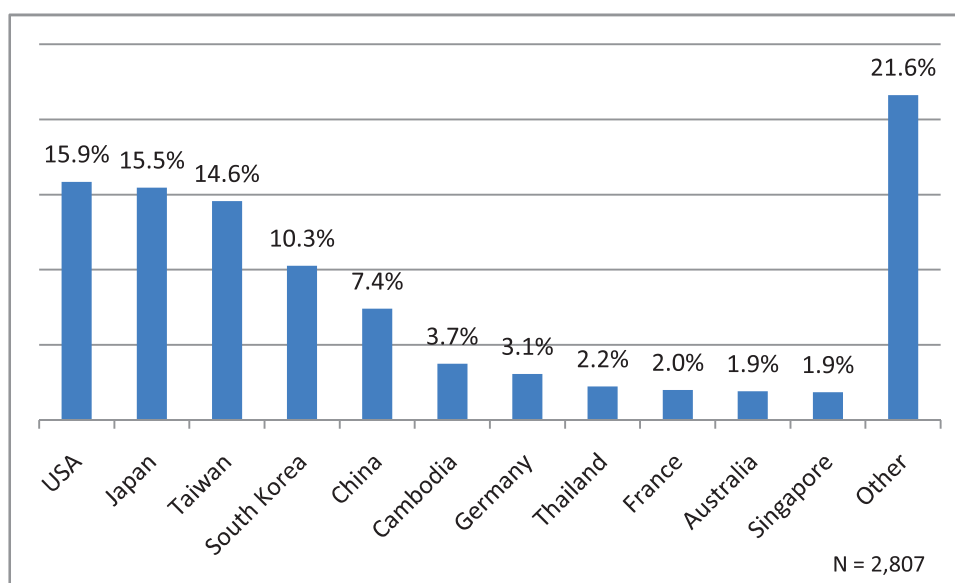
Figure 4.2: Sales Structure by Firm Size



Exporting is typically regarded as an important goal for domestic firms, and some research suggests that exporting (particularly manufactured exports) is an especially important driver of growth amongst low-income economies. Part of what makes exporting “good” is precisely that firms may capture the benefits of backwards linkages from international customers. In some cases, this manifests itself in industrial and trade policy through the objective of giving firms access to target markets. In some cases, the decision of local firms to export at all is motivated by foreign firms in the same sector. Anwar and Nguyen (2011), for example, present evidence from Vietnam that linkages between foreign and Vietnamese domestic firms cause local firms to export and increase their export shares. This can be desirable, and should be part of any coherent trade negotiation strategy. The TCS asks firms to list their most important export destination, which we summarise in Figure 4.3 below.³

³This is the share of exporting firms that listed the country as their most important export destination (not the share of exports to each country).

Figure 4.3: Most Important Country for Exports



Two unexpected findings are that lower-income emerging economies rank highly, and that the top ten most important destinations account for 78% of the exporters. Exporting to traditional high-value markets like the USA continues to be very important, but this should not crowd out emphasis on trade with other emerging economies. Finally, this suggests that a large number of (typically smaller) firms are successfully exporting to untraditional markets like Brunei, Uzbekistan, and North Korea.

Because export performance remains an important policy objective, we explore the determinants of whether a firm is able to export in a regression framework, the results of which are presented in Table 4.1 below.

In the final column of this table we account for both regional effects and sector effects (so we are looking at the determinants of whether a firm is an exporter while controlling for where it is located and which sector it operates in). Larger firms, as we saw in the graphical summary above, are significantly more likely to be exporters, but this is true of both medium and large firms when we control for geography and sector. Negative coefficients associated with firms' legal structures mean FDI firms are relatively more likely to be exporters. This may partially be due to foreign firms' use of Vietnam as a stop along a larger value chain; it may also simply indicate that Vietnamese firms are still learning how to compete internationally. In both cases, the export performance of domestic firms should continue to be tracked and benchmarked relative to FDI firms.

Table 4.1: Export Status by Firm Characteristic

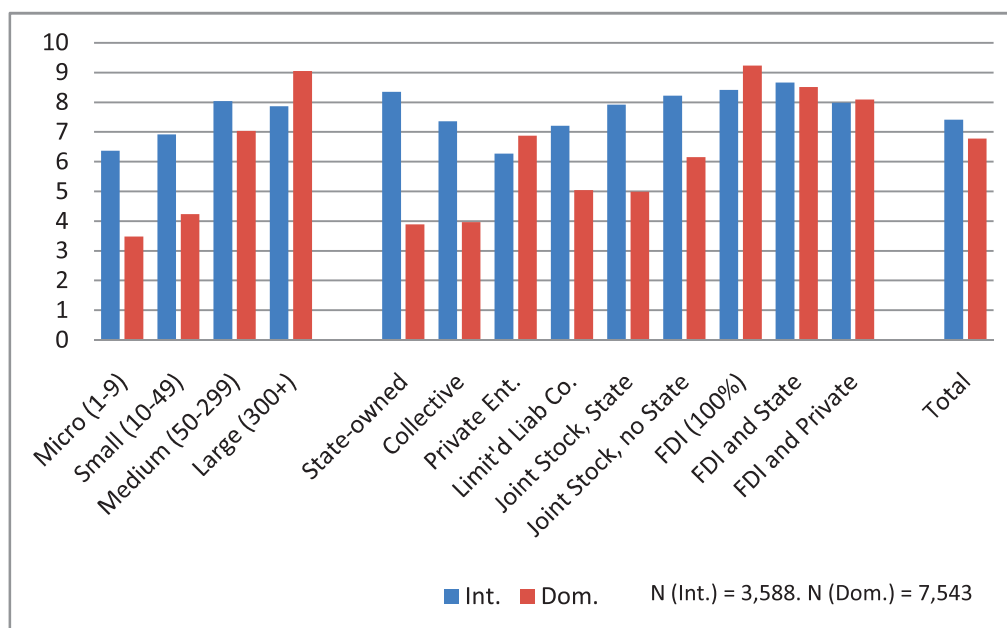
Dependent variable is 1 if firm exports, 0 otherwise						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-0.03+	(0.01)	-0.03+	(0.01)	-0.03+	(0.01)
Medium (50-299)	0.05+	(0.01)	0.08+	(0.02)	0.08+	(0.02)
Large (300+)	0.04+	(0.01)	0.08+	(0.03)	0.10+	(0.03)
State-owned	-0.05+	(0.01)	-0.04+	(0.01)	0.04+	(0.01)
Collective	-0.05+	(0.01)	-0.04+	(0.01)	-0.04+	(0.01)
Private Ent.	-0.06+	(0.00)	-0.05+	(0.00)	-0.05+	(0.00)
Limit'd Liab Co.	-0.06+	(0.01)	-0.05+	(0.01)	-0.05+	(0.01)
Joint Stock, no State	-0.06+	(0.00)	-0.04+	(0.00)	-0.04+	(0.00)
Joint Stock, State	-0.05+	(0.01)	-0.04+	(0.01)	-0.04+	(0.01)
FDI and State	-0.04+	(0.01)	-0.03*	(0.01)	-0.03*	(0.01)
FDI and Private	-0.03+	(0.01)	-0.02*	(0.01)	-0.02*	(0.01)
Observations	6,876		6,876		6,876	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.087		0.12		0.14	

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. Robust standard errors in parentheses. Coefficient on constant term not reported. + p<0.01, * p<0.05.

A strong predictor for technology transfer is contract duration, which may proxy intangibles like trust and the strength of the working relationship between firms. Longer contracts suggest firms can deliver output of consistent quality, making contract duration both a proxy for firms' sophistication and one measure of how favourable conditions are for technology transfer.

Figure 4.4 below summarises average contract duration between firms in the sample and their customers: the duration increases in the size of the firm, but in no size grouping is the average contract longer than a year.

Figure 4.4: Average Contract Duration with Customers (Months)

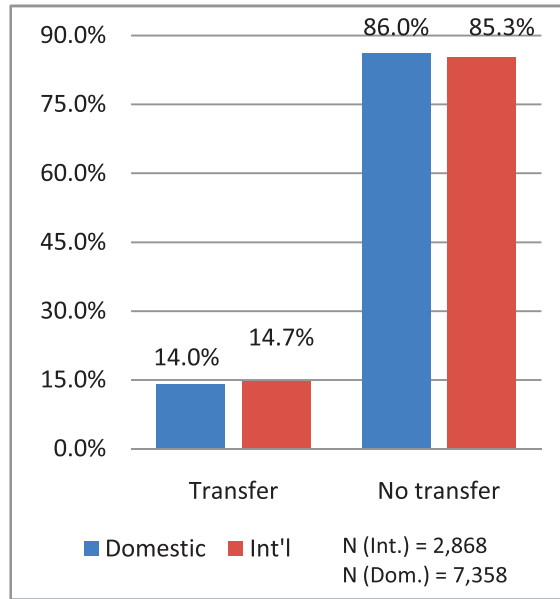


Average contract duration is quite short, limiting firms' ability to build sustainable, long-term relationships with customers and possibly limiting the chance of backward linkages (customers are unlikely to invest time and effort improving the quality of output for short-term supply arrangements). Contract duration appears to be longer amongst firms with some foreign involvement, but the average contract duration across the whole sample is just seven months.

Exporting and contract longevity are proximate factors associated with technology transfer from customers to suppliers. Most existing survey-based evidence about these linkages collects information at the sector-level, rather than the firm-level. The TCS is unique in that it directly captures information from firms about self-reported technology transfers, allowing policymakers to evaluate whether or not increased foreign investment actually creates the positive spillovers that are often simply assumed to exist.

Figure 4.5 below graphs the responses of firms about whether or not they experienced some kind of backward linkage (a transfer of technology from a customer). In both the case of domestic and international customers in samples of 2,868 and 7,358, respectively, roughly 14% of firms report some kind of technology transfer.

Figure 4.5: Technology Transfer from Customers

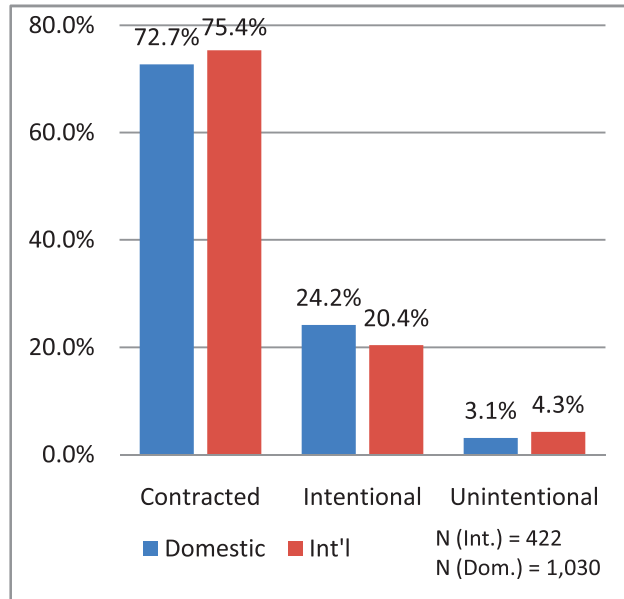


This indicates that a supply chain that includes some foreign presence (through either a foreign-invested firm in Vietnam or an international customer) may not be a more prolific source of technology diffusion than a local firm, in line with the evidence on the source of technology transfers reported above. The sample averages suggest that firms working with foreign companies are not much more likely to experience a backward linkage than firms working with local companies.

Figure 4.6 investigates how these transfers happen. In the sub-sample of firms reporting some kind of backward linkage, we see that the transfer is specified in the contract between the customer and the supplier in Vietnam in over 70% of both the international (sample size is 1,030) and domestic (422) cases. In the majority of the remainder of cases, the backward linkage is intentional, and in only a small minority of 3% of domestic transfers and 4% of transfers from international firms is the technology transfer “unintentional” (though of course we expect some reporting bias in the latter case).

As discussed in section 2 , Vietnam’s industrial policy is based in large part on the assumption that spillovers from foreign firms will occur. Based on simple survey averages, it seems that foreign customers are not more likely than domestic customers to transfer technology to suppliers, and that in both the domestic and international cases most of these transfers are mutually agreed. To analyse the effect of firm characteristics on the probability of whether or not a firm receives a transfer, we turn to regression analysis in Table 4.2.

Figure 4.6: Intentionality of Tech. Transfer from Customers



In this case, all three columns include both region and sector effects, so we are examining the effect of firm characteristics on the probability of reporting a backwards linkage while controlling for these factors. In the domestic case (column one), limited liability companies and joint stock companies are more likely to experience transfers. Simply put, domestic firms are more likely to report transfers from other domestic firms (relative to wholly FDI-financed firms, the base category). In the international case, there is no similarly strong pattern: once again, joint stock firms with no state involvement are more likely than other firm types to report a linkage, and collectives and private enterprises are less likely to do so.

When we combine information on both domestic and international backward linkages (the dependent variable in column three is whether the firm reported either a domestic or international linkage), the coefficients associated with legal structure are not precisely estimated. In the domestic and combined cases, larger firms are more likely to experience transfers than smaller ones.

The overall picture of backwards linkages in the 2012 TCS cross-section is mixed. There is some evidence that international customers are more likely to transfer technology to certain types of domestic firms, but international linkages are clearly not the only source of technology transfer from customers.

Table 4.2: Technology Transfer from Customers, Regression Analysis

Dependent variable is 1 if backward linkage reported, 0 otherwise						
	(1)		(2)		(3)	
	Int'l	se	Dom.	se	Either	se
Micro (1-9)	-0.03*	(0.01)	0.00	(0.01)	-0.02	(0.01)
Medium (50-299)	0.03+	(0.01)	0.02	(0.01)	0.02+	(0.01)
Large (300+)	0.06+	(0.02)	0.04+	(0.01)	0.05+	(0.02)
State-owned	0.12	(0.07)	0.07	(0.06)	0.07	(0.07)
Collective	0.03	(0.03)	-0.06+	(0.01)	-0.00	(0.03)
Private Ent.	0.04*	(0.02)	-0.08+	(0.01)	0.00	(0.01)
Limit'd Liab Co.	0.05+	(0.01)	0.01	(0.01)	0.01	(0.01)
Joint Stock, no State	0.07+	(0.02)	0.04+	(0.01)	0.02	(0.01)
Joint Stock, State	0.11+	(0.03)	0.03	(0.02)	0.04	(0.03)
FDI and State	0.04	(0.05)	-0.01	(0.04)	0.02	(0.04)
FDI and Private	0.03	(0.04)	0.03	(0.04)	0.01	(0.03)
Observations	8,109		8,109		8,082	
Region Effect	Y		Y		Y	
Sector Effect	Y		Y		Y	
Pseudo R-squared	0.045		0.18		0.037	

Note: 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. Robust standard errors in parentheses. + p<0.01, * p<0.05.

On this evidence, policymakers should at least be cautious about assuming that international linkages automatically imply backwards linkages: domestic firms appear to be a rich source of useful technology for other local firms, a result that supports evidence presented above on horizontal spillovers.

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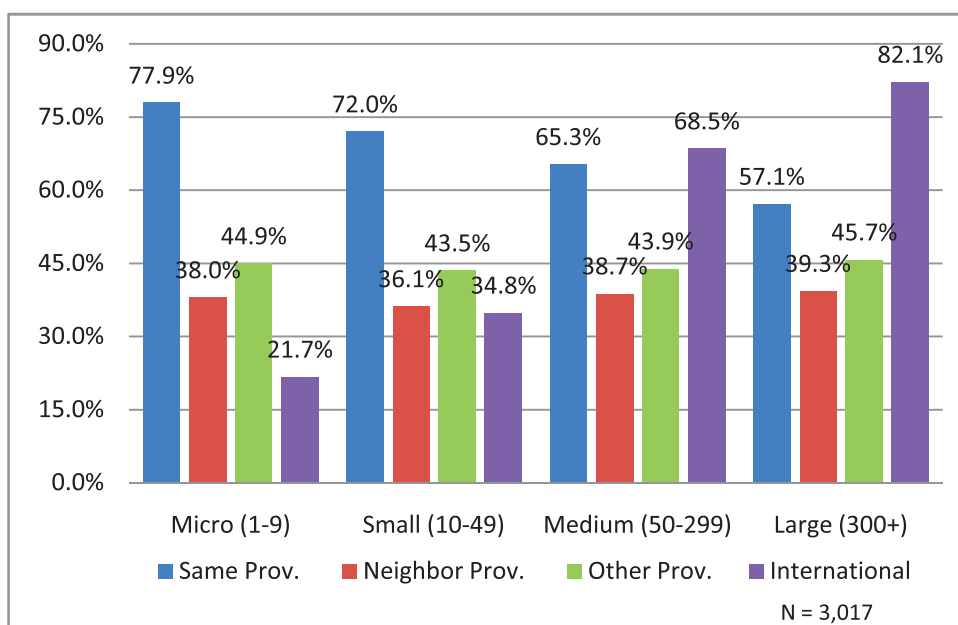
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5 Forward Linkages: Technology Transfer from Suppliers

Forward linkages are the counterpart to the backward linkages explored in section 4 above. These linkages represent technology transfers from suppliers to customers. This could happen, for example, if a firm in Vietnam gets access to new, cheaper, or higher-quality intermediate inputs produced by a foreign firm (either operating in Vietnam or overseas). The sample average of inputs bought in Vietnam reported by firms is 82%, with the remaining 18% procured overseas (sample was 8,107).

Figure 5.1 below shows that the average share of inputs from overseas increases in firm size, but firms in all size categories rely on domestic inputs (the columns are the average share of inputs from each source reported by size category, so need not sum to 100%). For most firms, the majority of inputs originate from the same or neighboring province, suggesting that if forward linkages arise they are more likely to be generated by domestic firms or foreign firms based in Vietnam than through contacts with international suppliers.

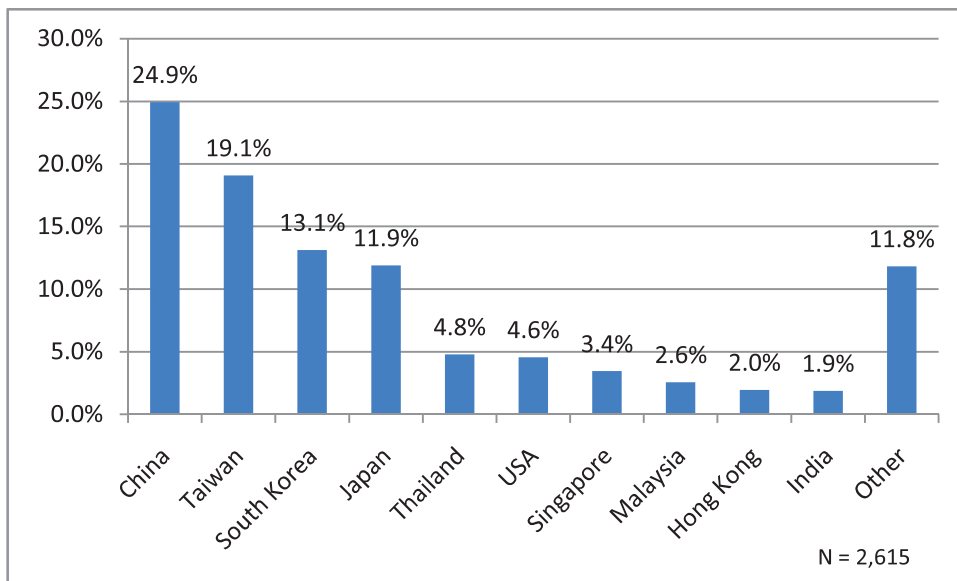
Figure 5.1: Source of Inputs



Given the relevance of these international supply contacts, we also examine the country reported as the “most important” source of inputs (either raw materials or intermediate goods) in Figure 5.2 below. As in the case of Figure 4.3 which showed the relative importance of export destinations, we see that the standard model of importing cheap inputs from low-income countries, processing them, and exporting them to higher-income countries is not necessarily dominant. While China is the most important source country for nearly 25% of the sample (of 2,615), some firms are importing inputs from higher-priced source countries like the USA and Japan. This likely is due in part to Vietnam’s

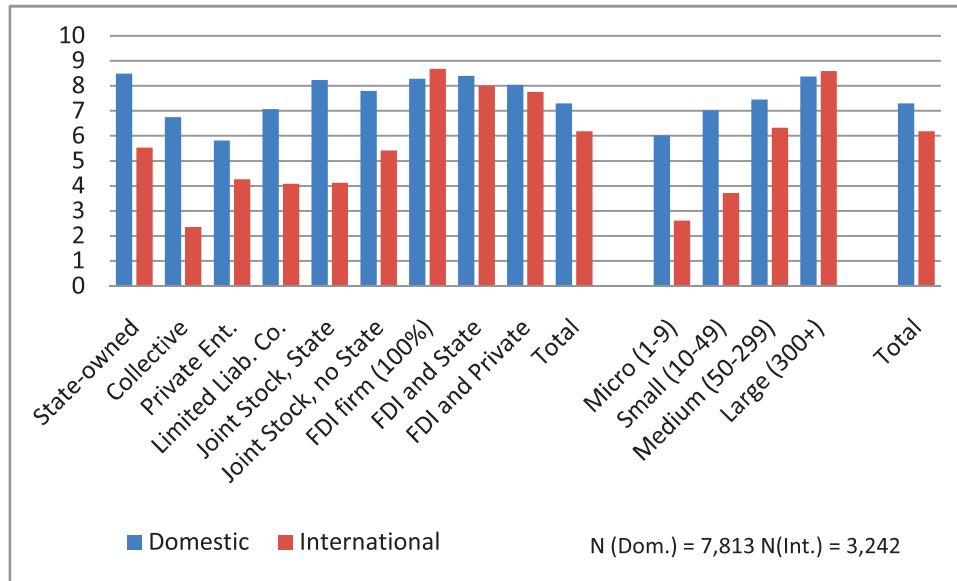
position along a value chain, in which high-quality intermediates are imported for transformation using relatively low-cost labour. Nevertheless, the TCS data from 2012 suggests a more nuanced picture of import sources and destination countries.

Figure 5.2: Most Important Country for Imported Inputs



Just as contract duration is an important indicator of the strength of ties between firms in the case of backward linkages, we examine the average contract duration between Vietnamese customers and their domestic and international suppliers (which may be correlated with forward linkages). Figure 5.3 shows that the average contract duration (measured in months) is, once again, remarkably short, with the average contract lasting less than a year regardless of firm type or size. The sample average (with 7,813 respondents for domestic contracts with suppliers and 3,242 for international contracts) is, in fact, shorter than in the case of relationships with customers. The overall picture of the supply chain relationships we can glean from the TCS data is therefore of relatively short-term production arrangements. The short duration of these arrangements, in turn, makes technology transfer less likely.

Figure 5.3: Average Contract Duration with Suppliers (Months)



Above, we examined the characteristics of firms related to being an exporter, because exporting may be “special” in the sense of producing positive externalities both for the exporting firms and other firms in the same sector. In Table 5.1, we turn to the related case of firms that import intermediate inputs. As in the case of exporters, while larger firms make up a minority of the sample, they are significantly more likely to import intermediate inputs. Relative to FDI firms (the base category), all other firm types are relatively less likely to be importers of intermediates. To the extent that importing intermediates is associated with a forward linkage between suppliers and customers in Vietnam, this pattern of results suggests the majority of potential benefits would accrue to foreign firms, rather than directly to Vietnamese firms. (This does not rule out a longer-run effect in which those gains then spillover to other firms, for example through a horizontal spillover from a single domestic firm to other firms in the same sector).

Table 5.1: Importers of Intermediate Inputs, Regression Analysis

Dependent variable is 1 if firm imports intermediates, 0 otherwise						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-0.00	(0.01)	-0.00	(0.00)	-0.00	(0.00)
Medium (50-299)	0.03+	(0.00)	0.01+	(0.00)	0.01+	(0.00)
Large (300+)	0.06+	(0.00)	0.02+	(0.00)	0.02+	(0.00)
State-owned	-0.37+	(0.11)	-0.36+	(0.10)	-0.31+	(0.10)
Collective	-0.07	(0.04)	-0.02	(0.02)	-0.03	(0.02)
Private Ent.	-0.00	(0.01)	-0.01	(0.01)	-0.01	(0.01)
Limit'd Liab Co.	-0.11+	(0.01)	-0.05+	(0.01)	-0.05+	(0.01)
Joint Stock, no State	-0.25+	(0.03)	-0.10+	(0.02)	-0.10+	(0.02)
Joint Stock, State	-0.20+	(0.05)	-0.12+	(0.04)	-0.10+	(0.04)
FDI and Private	-0.03	(0.04)	-0.00	(0.02)	-0.01	(0.02)
Observations	8,038		7,814		7,814	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.11		0.35		0.37	

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). Sector effects are at 2-digit level. Robust standard errors in parentheses. + p<0.01, * p<0.05.

Having explored indicators that could promote technology transfer through forward linkages, we turn to the firm-level data about whether companies actually experience these effects in Figure 5.4 below. Of the 2,620 firms with international suppliers that responded, nearly 20% reported some kind of positive spillover through a forward linkage; the figure is nearly 29% in a sample of 7,782 firms buying inputs from domestic suppliers. As in the case of backward linkages explored above, forward linkages apparently do not only arise through contact with international firms: domestic companies are more likely to report a backward linkage, and the total number of domestic firms with links to other domestic suppliers is, of course, larger. Of those firms that do experience some kind of technology transfer from suppliers, Figure 5.5 shows that in the majority of contacts between Vietnamese customers and both international and domestic suppliers, this transfer is agreed in the contract.

Figure 5.4: Technology Transfer from Suppliers

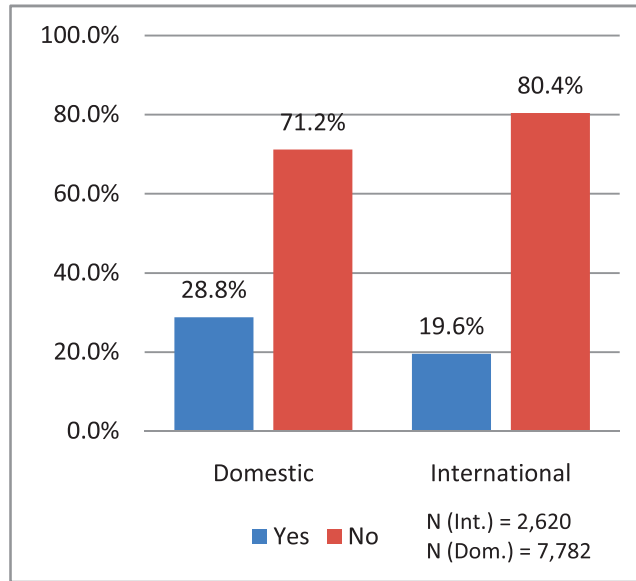
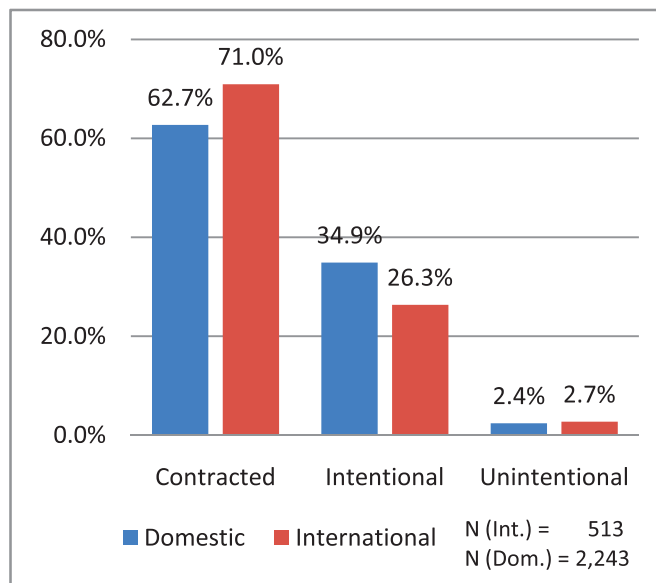


Figure 5.5: Intentionality of Tech. Transfer from Suppliers



A minority of roughly a third say the transfer is not explicitly agreed, while a very small minority of 2.4% in the domestic case and 2.7% in the international case responded that the transfer was unintentional and was not mutually agreed in a contract (samples were 2,243 firms for firms reporting links to domestic suppliers and 513 for firms with links to international suppliers).

Finally, we investigate both international and domestic forward linkages in a regression framework in Table 5.2 below. Larger firms are much more likely to report transfers of technology from suppliers and limited liability and joint stock companies are more likely than FDI firms, the base category, to report such transfers.

Table 5.2: Technology Transfer from Suppliers, Regression Analysis

	Dependent variable is 1 if forward linkage reported, 0 otherwise					
	(1)		(2)		(3)	
	Int'l	se	Domestic	se	Both	se
Micro (1-9)	-0.04	(0.02)	-0.00	(0.01)	-0.02	(0.02)
Medium (50-299)	0.08+	(0.01)	-0.00	(0.01)	0.04+	(0.01)
Large (300+)	0.13+	(0.02)	0.05+	(0.01)	0.07+	(0.02)
State-owned	0.13	(0.08)	0.09	(0.06)	0.16	(0.08)
Collective	0.03	(0.04)	-0.06+	(0.01)	0.08*	(0.04)
Private Ent.	-0.04*	(0.02)	-0.08+	(0.01)	0.01	(0.02)
Limit'd Liab Co.	0.05+	(0.02)	-0.02*	(0.01)	0.07+	(0.02)
Joint Stock, no State	0.08+	(0.02)	0.01	(0.01)	0.10+	(0.02)
Joint Stock, State	0.10+	(0.04)	0.05*	(0.03)	0.09+	(0.04)
FDI and State	0.06	(0.06)	0.07	(0.05)	0.07	(0.06)
FDI and Private	0.08	(0.05)	0.04	(0.04)	0.06	(0.05)
Observations	8,109		8,040		8,107	
Region Effect	Y		Y		Y	
Sector Effect	Y		Y		Y	
Pseudo R-squared	0.071		0.19		0.062	

Note: 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. Robust standard errors in parentheses.+ p<0.01, * p<0.05

As in the case of backward linkages, the evidence from the 2011 cross-section of TCS data implies that linkages are not necessarily more likely to arise through contact with international firms, and that domestic suppliers remain an important source of technology diffusion for the majority of respondents. In both cases, the transfer is usually explicitly addressed in the contract between firms.

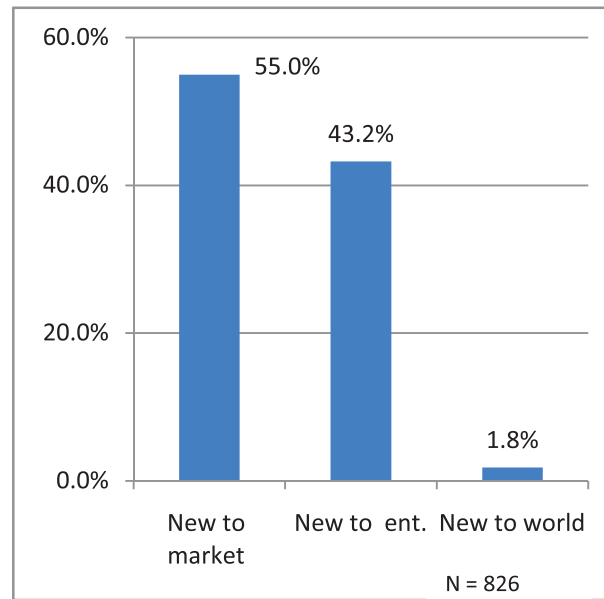
6 Alternative Paths to Innovation: Research, Adaptation, and Modification

Previous sections focus on spillovers: technology transfers that arise from interactions between competitors, buyers, and sellers. Capturing these spillovers is one justification for investment promotion. An alternative to spillovers produced through commercial interaction is investing in research and development to generate new technology. This is generally expensive and prone to failure when compared to adaptation: buying “off-the-shelf” technology known to be effective. Solo (1966) famously pointed out that even if the right technology is available, any technology requires many other complementary factors to be effective. In other words, the “right” technology is not automatically the appropriate one (Chandra (2006) emphasises this point in an extensive study of how some emerging economies achieve success in export markets through adaptation).

Very few studies are able to directly compare the relative benefits of adaptation compared to research and development. One exception is Basant and Fikkert (1996) who do this using data from Indian firms. They find that investments in existing technology (adaptation) provide a better return for the firms than research. Nevertheless, research and development continues to be regarded as a major indicator of technological sophistication, and has been emphasised in some elements of Vietnamese policy.

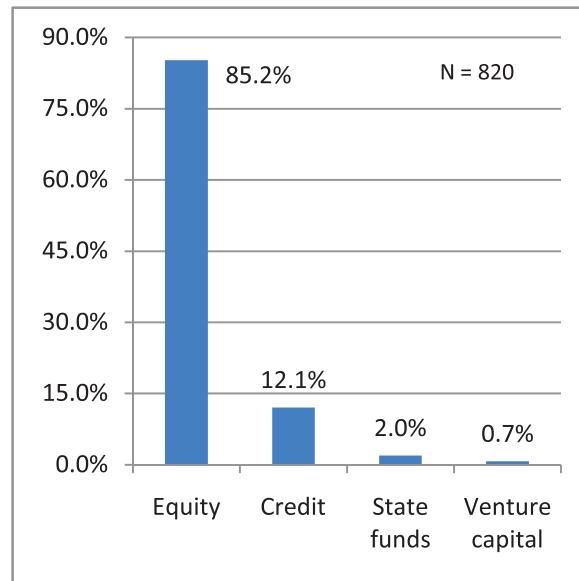
Of the 8,107 firms in the sample, 826 (10.2%) reported investing in some type of research and development in 2011. As we see in Figure 6.1 below, most of this research expenditure (55% in a sample of 826) is dedicated to developing technology that is new to the market in which the firm operates, rather than “frontier research” that is new compared to technology available elsewhere. This indicates that some research and development spending could be better allocated towards adapting and modifying technology that already exists globally, a topic we turn to below. The remainder (43%) is mainly devoted to developing technology that is new to the enterprise, and some of this spending could be allocated towards adopting technology being used by firms in the same sector.

Figure 6.1: Originality of Research Output



While it is difficult to make detailed inferences about the state of domestic research and development, the evidence from the TCS suggests most of the research spending is not allocated to “original” technology but to developing technology that may be available globally or even nationally. To the extent that this is accurate, firms could probably obtain technology at lower cost and with less risk of failure than through investing in original research. Over the short term, policymakers may find the payoffs to industrial policy focused on adopting existing technology are higher than emphasising original research. Figure 6.2 shows that undertaking this research is costly for firms, which mainly finance the mode of innovation through equity like retained earnings. State financing and co-financing programs do exist, but only 2% of the sample of 820 firms reported using this type of financing for research.

Figure 6.2: Financing Research



One possibility is for firms to promote research linkages with institutions, firms, and research centres in other countries, a model that has been successfully implemented in several other countries. Investigating this in the TCS is hampered by a very small number of respondents (just 23) who acknowledged having an external research partner. Of this small sub-sample, over half reported their research partner was in the same province, and around 20% reported the research partner to be in another Vietnamese province; five firms in the sample of over 8,000 reported having a research partner outside Vietnam.

While research and development remains an important frontier activity in many countries, the gains from spillovers and adaptation should still be high enough for an emerging economy like Vietnam that these mechanisms should generally be prioritised over investing in original research outputs.

Given the relevance of research and development to contemporary discussions about what form of industrial policy is appropriate to Vietnam, we analyse the determinants of undertaking research activity in a regression framework in Table 6.1 below.

Table 6.1: Research and Development, Regression Analysis

Dependent variable is 1 if firm does R&D, 0 otherwise						
	(1)		(2)		(3)	
	coef	se	coef	se	coef	se
Micro (1-9)	-0.03*	(0.01)	-0.03*	(0.01)	-0.03+	(0.01)
Medium (50-299)	0.05+	(0.01)	0.05+	(0.01)	0.06+	(0.01)
Large (300+)	0.09+	(0.01)	0.10+	(0.02)	0.13+	(0.02)
State-owned	0.11	(0.06)	0.11	(0.06)	0.11	(0.07)
Collective	-0.01	(0.02)	-0.02	(0.02)	0.01	(0.03)
Private Ent.	-0.04+	(0.01)	-0.04+	(0.01)	-0.03*	(0.01)
Limit'd Liab Co.	0.02	(0.01)	0.02	(0.01)	0.03+	(0.01)
Joint Stock, no State	0.07+	(0.01)	0.06+	(0.01)	0.07+	(0.02)
Joint Stock, State	0.16+	(0.03)	0.15+	(0.03)	0.15+	(0.03)
FDI and State	0.09*	(0.05)	0.09*	(0.04)	0.07	(0.04)
FDI and Private	0.09*	(0.04)	0.09*	(0.04)	0.08*	(0.04)
Observations	8,107		8,107		8,045	
Region Effect	N		Y		Y	
Sector Effect	N		N		Y	
Pseudo R-squared	0.056		0.058		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). Sector effects are at 2-digit level. Robust standard errors in parentheses.+ p<0.01, * p<0.05.

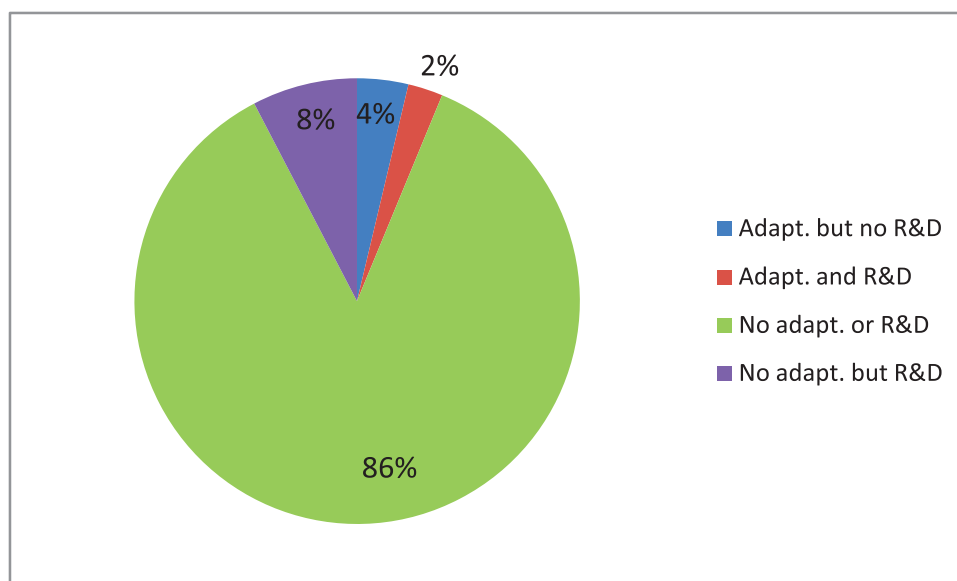
Examining column three (which controls for region and sector effects), we find that firms are significantly more likely to undertake research. Private firms are relatively less likely than FDI firms (the base category) to report having invested in research and development in 2011. Surprisingly, the largest and most precisely estimated coefficients are associated with joint stock companies: while only a small minority of firms do any research at all, larger, public firms are most likely to do so.

6.1 Adaptation and Modification

A natural alternative to making costly investments in research is to pursue adaptation: purchasing appropriate technology and adapting it to local circumstances or for interoperability with existing machinery, equipment, and production processes. This is closely related to the idea of purchasing embodied technology discussed earlier and, indeed, much of the technology transferred through backward or forward linkages may be adapted. The distinction is that adaptation involves the firm actively searching out and investing in specific technologies, rather than transfers that arise through commercial interaction.

The 2012 round of the TCS produced data on research and adaptation for 8,106 firms. As we see in Figure 6.3, the vast majority of these companies did not engage in either activity, while the remainder (16%) invested in innovation through either adaptation, research, or both.

Figure 6.3: Share of Firms Doing Adaptation, Research



In addition to reiterating the earlier finding of research and development's minority role in domestic innovation, this suggests that policymakers can encourage large numbers of firms that currently do not have an adaptation strategy to develop one: investing in technology that already exists is relatively inexpensive (compared to research) and is more likely to succeed.

We use a regression framework to evaluate the role that firm characteristics play in the decision to invest in research or adaptation (results in Table 6.2). Both adaptation and research are more likely amongst larger firms, and joint stock companies are more likely than FDI-firms to engage in both research and adaptation.

Table 6.2: Determinants of Research and Adaptation, 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)	0.00	(0.01)	0.04+	(0.01)	0.02+	(0.00)
Large (300+)	0.03+	(0.01)	0.09+	(0.02)	0.06+	(0.01)
State-owned	0.00	(0.03)	0.06	(0.06)	0.08	(0.06)
Collective	-0.00	(0.01)	0.01	(0.03)	-0.00	(0.01)
Private Ent.	0.01	(0.01)	-0.02*	(0.01)	0.00	(0.01)
Limit'd Liab. Co.	-0.01	(0.01)	0.01	(0.01)	0.02+	(0.01)
Joint Stock, no State	-0.00	(0.01)	0.05+	(0.01)	0.03+	(0.01)
Joint Stock, State	0.03	(0.02)	0.08+	(0.03)	0.12+	(0.03)
FDI and State	0.03	(0.03)	0.02	(0.04)	0.08	(0.04)
FDI and Private	-0.00	(0.02)	0.06	(0.04)	0.02	(0.02)
Observations	6,755		7,459		6,404	
Region Effect	Y		Y		Y	
Sector Effect	Y		Y		Y	
Pseudo R-squared	0.085		0.089		0.15	

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

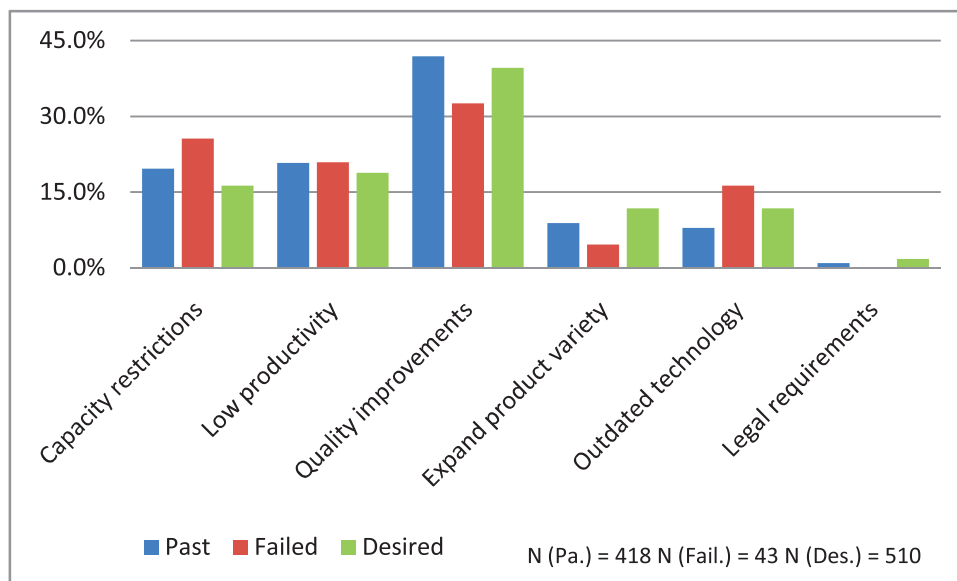
6.2 Constraints to Adapting Technology

Given the intuitive benefits to firms that are able to adapt technology, regression analysis and sample averages presented in section 6.1 are surprising: relatively few firms invest in adaptation, and those that do are larger firms, typically joint-stock companies. Policymakers may want to encourage adaptation 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.

Specifically, the survey questionnaire asks responding firms to summarise their experience of past adaptations, failed adaptations, and desired / anticipated adaptations the firm plans to make in the future. Figure 6.4 shows the share of respondents reporting that the reason listed on the horizontal axis was the main motivation for adaptation. Regardless of whether we examine previous, failed, or future planned adaptation investments, the main motivation for the investment is to improve quality. This is consistent with the idea of firms beginning to move up the quality ladder: while relatively low-cost labour and imported technology that is far from the technological frontier generated a high rate of economic growth, increasing regional competition and domestic labour costs mean that firms are

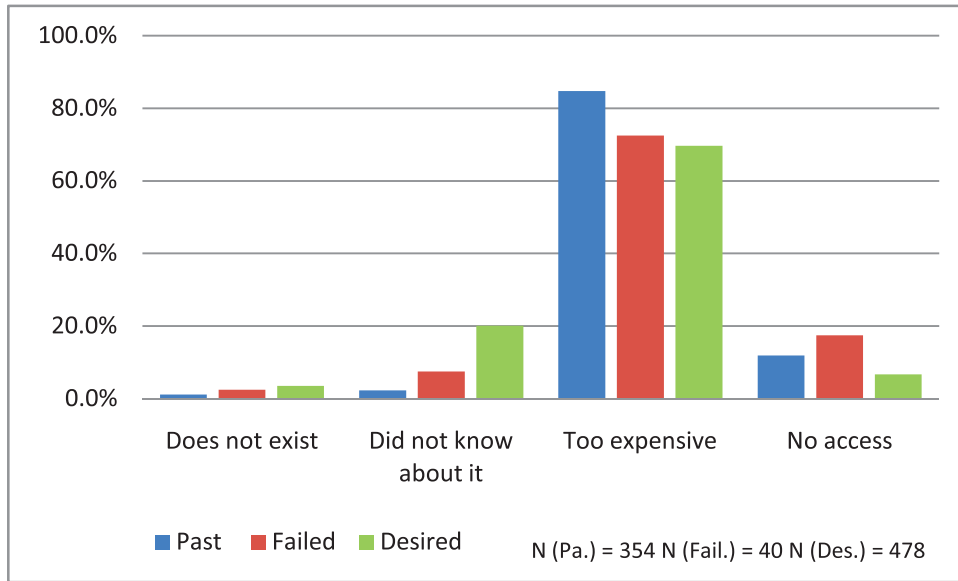
seeking to compete in higher value-added activities. Investing in technology should be one part of this strategy, and firms appear to desire improvements in quality and productivity.

Figure 6.4: Reasons for Adaptation



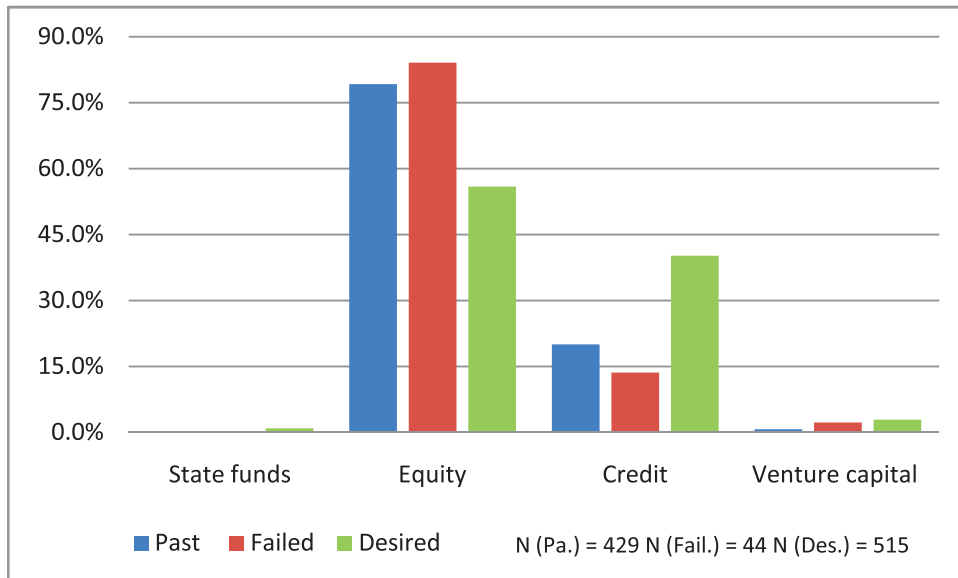
Given that firms want to invest in innovation through adaptation, the TCS also investigates the constraints that firms report prevent them from making these investments. Figure 6.5 shows the share of respondents that listed each constraint as the “most severe.” The sample (though small) is clearly dominated by financial constraints: firms would like to invest in technology that could be adapted but do not have access to credit or enough internal capital. Beck and Demircug-Kunt (2006) show that this problem is not unique to Vietnam: Small- and Medium-size Enterprises (SMEs) in many emerging economies suffer from financing constraints, and argue that policymakers should consider financial innovation (instruments like leasing and factoring of equipment, for example) to meet firms’ need for finance. This represents an area where appropriate industrial policy could intervene, for example by instituting schemes to expand access to low-interest loans for firms with credible technology adaptation strategies.

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. 103

Figure 6.6: Financing of Adaptation



The sample is dominated by firms that rely or relied on equity to finance adaptation, meaning that firms' ability to invest in productive technology depends on internal capital like retained earnings. This corroborates the evidence that financial constraints prevent firms from investing in appropriate

technology, while the large difference between the desired use of credit and the use of credit to finance past and failed adaptations further suggests that firms would make use of credit schemes that are transparent, widely available, and preferential (compared to standard borrowing rates).

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7 Corporate Social Responsibility (CSR)

The concept of Corporate Social Responsibility (CSR) has been widely discussed (see Kitzmueller and Shimshack, 2012 for a thorough review), but there is no general agreement about its definition. Moreover, there is also disagreement in the academic literature about whether CSR improves firm performance or whether improvements in CSR levels is a necessity for firm survival (at given performance rates). Improvements in CSR can be seen as part of a natural development of a modern enterprise in a competitive environment. If a firm wants to survive it has to “follow the stream” and develop/improve its corporate social responsibility. Not doing so can be seen as “managerial slack”, and could cause firms to become uncompetitive and shut down.

However, the management literature (see for example McWilliams and Siegel, 2001) highlights several reasons for a positive association between CSR and firm performance. First, a positive effect may come through improvements of the company’s image and reputation, which in turn has been shown to influence firm competitiveness and performance. Second, an improved CSR strategy may improve employee motivation, retention and recruitment. This effect may come through reputation improvement, but can also come directly through a motivation effect of employees as a result of (perceived) improvements in their working environment. Third, it has been argued that CSR strategies may lead to efficiency gains as firms become more open to alternative production strategies and to investors with a higher sensitivity to sustainability issues. Fourth, improvements in CSR may increase revenue; either indirectly through improved brand image or directly by CSR-driven product or market development (for example, niche markets - e.g. fair trade certification). Finally, CSR has also been described as a way of reducing or managing CSR-related risks, avoiding negative press.

The 2012 survey follows up on the previous reports by re-asking a set of CSR related questions to explore the extent to which firms in Vietnam engage in (and change their) socially responsible behaviour and incorporate these activities into their corporate strategy. Particular attention is paid to three dimensions of corporate social responsibility: The extent to which the firm (i) complies voluntarily with labour and environmental standards (compliance related CSR – 3 indicators), (ii) has a well-developed CSR strategy at the management level that goes beyond compliance with existing regulations (management related CSR - 4 indicators), and (iii) engages in beyond compliance community based activities not directly linked to firm operations (society related CSR - 8 indicators). Based on these indicators we generate a CSR index measuring the degree of CSR related activities undertaken by the individual firm. In this report we attempt to describe how these various indicators of CSR and the CSR index relate to different firm characteristics.

7.1 Measuring Corporate Social Responsibility (CSR)

Although several papers (see Kitzmueller and Shimshack, 2012 for details) have empirically tried to pin down indicators of CSR, no common measurement or definition exists. The International

Organization for Standardization (ISO) has launched a recommendation for CSR behaviour and the UN Global Compact initiative has provided 10 principles as a set of guidelines for insuring that products and services are produced under decent conditions (responsible supply chain management). Among these principles are two human rights related, four labour-related, three environmentally related and one anti-corruption principle. However, according to Kitmueller and Shimshack (2012) the literature often also includes local community/society related CSR initiatives in the definition. According to their comprehensive overview CSR can be defined as “social or environmental behaviour that goes beyond the legal and regulatory requirements of the relevant markets and/or economies” (pp.53). This CSR definition follows closely that of CSR Compass (www.csrcompass.com), where CSR is described by the voluntary initiatives of companies to integrate social and environmental considerations into their business activities and their interactions with stakeholders. This means that CSR activities are characterized by the fact that a company’s activities extend *beyond* its mandatory legal responsibilities (McWilliams and Siegel, 2001). In order to encompass the varied definitions of CSR we consider both compliance and “beyond compliance” indicators. This also allows us to link our results to the previous TCS report from 2011.

As mentioned above, in this report we divide our CSR index into three sub-components (See Table 1 for details):

- 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 are those that firms by law are required to provide. They are providing permanent staff with written contracts, setting up local trade unions, and paying social and health insurance. As such, our measures of labour related CSR are closely linked to whether or not a given firm complies with existing labour regulations. Management-related responsibilities address the extent to which the firm has CSR practices as a central part of its business strategy. Finally, indicators of society-related responsibilities document the extent to which firms actively engage and support local community activities not directly related to the firm’s commercial activities.

Table 7.1: Corporate Social Responsibility (CSR) Indicators

	2011	2012
Labour		
All permanent employees have a written labour contract?	100%	93%
Enterprise has a local/plant level trade union?	48%	51%
Enterprise pays contribution to social insurance for employees?	71%	73%
Enterprise pays contribution to health insurance for employees?	71%	74%
Management		
Has committee/board overseeing CSR practices?	36%	36%
Has written down CSR policy?	72%	72%
Member of groups or has agreements that promote CSR standards?	3%	2%
Has been awarded CSR type certifications or awards?	10%	11%
Community		
1. Environmental Protection	26%	28%
2. Education	8%	9%
3. Infrastructure Development	8%	8%
4. Health Care services	5%	5%
5. Youth Development	3%	3%
6. Poverty Alleviation	20%	22%
7. Local Heritage	3%	3%
8. Sporting events	5%	5%

Note: Data restricted to firms with CSR information in both 2011 and 2012. This leaves 4,901 firm observations each survey year.

Table 7.1 documents the proportion of firms engaged in CSR related activities on the basis of these measures and reveals very little change over time (on average) in the share of firms carrying out specific CSR related activities. Moreover, the share of firms carrying out compliance related CSR activities (labour related responsibilities) is generally high, whereas beyond compliance CSR activities (management and society related responsibilities) are much lower on average. In fact 18 percent of firms in the sample do not carry out any of the beyond compliance CSR related activities.

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, a result that is independent of firm size and form of ownership (see Table 7.2 and Table 7.3). Moreover, a large share of Vietnamese firms provides social and health insurance and severance pay, which is also indicative of most employees having labour contracts in accordance with existing laws. However, from Table 7.2 and Table 7.3 we see that labour law compliance is more likely to be observed in larger firms as well as in state and foreign firms. Levels of unionization across different types of firms follow the same trend, indicating that law compliance and firm size are closely related.

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

	Micro	Small	Medium	Large
Management				
Has a committee/board overseeing CSR practices?	22%	25%	42%	55%
Has a written down CSR policy?	61%	65%	76%	83%
Member of standards groups or agreements that promote CSR standards?	1%	1%	3%	7%
Has been awarded CSR type certifications or awards?	4%	6%	12%	20%
Labour				
All permanent employees have a written labour contract?	95%	97%	97%	97%
Enterprise has a local/plant level trade union?	5%	25%	65%	90%
Enterprise pays contribution to social insurance for employees?	27%	55%	87%	97%
Enterprise pays contribution to health insurance for employees?	29%	56%	87%	97%
Community				
1. Environmental Protection	18%	26%	30%	28%
2. Education	6%	7%	9%	13%
3. Infrastructure Development	5%	8%	9%	9%
4. Health Care services	2%	3%	6%	7%
5. Youth Development	1%	2%	4%	4%
6. Poverty Alleviation	21%	20%	23%	23%
7. Local Heritage	2%	3%	3%	3%
8. Sporting events	4%	3%	6%	9%

The second sub-group of the aggregate CSR index is related to management. As illustrated in Table 7.1, approximately one-third of both the 2011 and 2012 sample report to have some kind of committee in place to determine CSR policies, and this share is increasing in firm size. Moreover, 72 percent of the sample report that they have written down CSR policies. Both these indicators may be a signal of the seriousness of the firm's social responsibility strategy.

However, these statistics should be considered alongside the fact that very few firms are formally certified in relation to the core CSR policies. One clear goal for the future could therefore be to improve policies that help companies obtain internationally recognized CSR certifications such as those described by the International Organization for Standardization (ISO), the UN Global Compact initiative and/or CSR Compass.

In addition to CSR initiatives directly impacting workers through labour contracts or the firm business strategy through management related CSR activities, the firms can participate in and financially support their local communities. 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
Management			
Has a committee/board overseeing CSR practices?	32%	37%	44%
Has a written down CSR policy?	69%	72%	78%
Member of standards groups or agreements that promote CSR standards?	2%	2%	4%
Has been awarded CSR type certifications or awards?	9%	9%	15%
Labour			
All permanent employees have a written labour contract?	97%	97%	96%
Enterprise has a local/plant level trade union?	37%	47%	79%
Enterprise pays contribution to social insurance for employees?	57%	73%	98%
Enterprise pays contribution to health insurance for employees?	58%	74%	99%
Community			
1. Environmental Protection	31%	29%	19%
2. Education	11%	9%	5%
3. Infrastructure Development	11%	8%	5%
4. Health Care services	5%	5%	4%
5. Youth Development	5%	4%	1%
6. Poverty Alleviation	27%	25%	9%
7. Local Heritage	4%	3%	1%
8. Sporting events	5%	6%	4%

The two most common forms of community-based activities relate to environmental protection and poverty alleviation. However, the scale effect does not seem to be as dominant within the community-based activities. For example 21 percent of the micro firms engage in poverty alleviation related CSR activities as compared to 23 percent of the large firms.

7.2 What are the characteristics of CSR adopting firms?

In this sub-section we look at correlates between CSR adoption and selected and firm specific characteristics. It is likely that CSR policies vary across firms in different sectors, however, we do not find any significant variation across sectors in the level of CSR activity of firms. As such we do not present any statistics on differences in CSR activities across sectors or in the relationship between industry characteristics and CSR adoption. We do, however, control for sectors in the analysis presented in this section. More specifically we estimate

$$CSR_{ijst} = \alpha_i + \alpha_j + \alpha_s + \alpha_t + \beta_2 X_{ijst} + \eta_{ijst}$$

using pooled OLS and a fixed effects approach. CSR is an aggregate index (0-16) based on the information obtained from answers to the questions described in Table 7.1 on the right hand-side includes traditional (identified in the literature) firm level determinants of CSR adoption; including a firm size variable (log full-time employment), an indicator variable for Research and Development (R&D) (taking the value one if R&D takes place in-house and zero otherwise), an indicator variable for whether the firm produces intermediates or goods for final use (taking the value one if final use goods

and zero otherwise), ownership characteristics (indicators of majority state or foreign ownership), and location (province, α_j) and sector dummies (α_s). Finally, we include time fixed effects in all estimations (α_t) and control for firm level heterogeneity in the fixed effects specification (α_i).

Table 7.4 presents the results and the following general conclusions emerge.

- First, the time dummy is positive and well-determined throughout the columns indicating that firms are incorporating more and more CSR measures over time.
- Second, in accordance with existing literature, larger and older firms are more likely to engage in CSR activities, although the firm size effect is not well-determined when controlling for firm level heterogeneity in column 3.
- Third, firms with part foreign or state ownership are more likely to adopt CSR practices. This could be a result of stricter enforcement of compliance measures for state firms and the fact that foreign firms often have to adopt stricter standards or compliance measures in order to be allowed to invest.
- Fourth, firms producing for the final goods market are less likely to adopt CSR practices as compared to firms focused on intermediate goods production. This may be explained by the fact that in order to get contracts with suppliers, firms need to comply with certain legal or management standards. This is particularly the case if firms are supplying foreign firms. Foreign firms have to answer (to a greater extent) to their home country governments and international consumers about where for example inputs are sourced.
- Fifth, firms carrying out research and development are also more likely to adopt a variety of CSR practices. This could be a result driven by omitted variables that determines whether a firm is engaged in R&D and CSR activities, and we therefore leave further interpretation of this relationship to future research.

Table 7.4: CSR Determinants/Characteristics

	1		2		3	
	OLS		OLS		FE	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Firm size (log)	0.757***	(37.41)	0.709***	(33.92)	0.078	(1.08)
Firm age (log)	0.229***	(3.97)	0.246***	(4.34)		
RD			1.125***	(12.96)	0.469***	(4.15)
Final			-0.141***	(2.85)	-0.157**	(2.40)
State			0.227***	(3.62)		
Foreign			0.140*	(1.84)		
Year dummy	0.145***	(5.11)	0.146***	(5.14)	0.101***	(3.55)
Province dummies	Yes		Yes		Yes	
Sector dummies	Yes		Yes		Yes	
Observations	9,802		9,802		9,802	
R-sq	0.28		0.30		0.16	

Note: Dependent variable: CSR Index (0-16). OLS (pooled) and FE estimates. t-stats (reported in parenthesis) are heteroskedasticity (cluster) robust. *, **, *** indicate significance at a 10 percent, 5 percent and 1 percent level, respectively

Table 7.5 disaggregates the results by CSR sub-index.

Table 7.5: CSR characteristics by sub-index

	1		2		3	
	Management		Labour		Society	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Firm size (log)	0.180***	(20.96)	0.386***	(40.14)	0.144***	(10.56)
Firm age (log)	-0.034	(1.59)	0.146***	(5.48)	0.135***	(3.67)
RD	0.447***	(12.89)	0.306***	(9.47)	0.372***	(6.34)
Final	-0.033	(1.63)	-0.032	(1.39)	-0.075**	(2.48)
State	0.018	(0.80)	0.188***	(6.11)	0.021	(0.54)
Foreign	0.061*	(1.87)	0.429***	(12.29)	-0.350***	(7.41)
Year dummy	0.024*	(1.79)	0.035***	(3.03)	0.088***	(4.65)
Province dummies	Yes		Yes		Yes	
Sector dummies	Yes		Yes		Yes	
Obs	9,802		9,802		9,802	
R-sq	0.17		0.43		0.15	

Note: Dependent variable: CSR sub-indices. OLS estimates (pooled). t-stats (reported in parenthesis) are heteroskedasticity (cluster) robust. *, **, *** indicate significance at a 10 percent, 5 percent and 1 percent level, respectively

Here the importance of whether we include compliance (labour) related responsibilities in our CSR measure or not becomes apparent. The positive relationship between state ownership and the number of CSR activities is driven by compliance related responsibilities. Moreover, the positive and

significant coefficient on foreign ownership in the aggregate CSR measure is also highly driven by including compliance related CSR activities. Focusing on society related beyond compliance CSR measures, the coefficient on foreign ownership turns negative (and well-determined), which could question the degree of “local content” in foreign firm activities in our sample of firms. This is something that should be analysed in more depth in future research.

7.3 Has the number of CSR activities increased over time?

Although Table 7.1 could suggest that very few firms change their CSR activities over time, Table 7.6 reveals that a lot of variation is taking place behind the aggregate numbers.

Table 7.6: CSR activity variation over time

	All	Micro	Small	Medium	Large	Private	State	Foreign
All								
Improved CSR practices	33%	31%	33%	33%	36%	31%	35%	34%
No change	34%	39%	35%	34%	32%	36%	32%	36%
Less CSR activities	32%	30%	32%	33%	32%	33%	33%	30%
Labor								
Improved labor related CSR practices	24%	25%	22%	25%	28%	22%	24%	28%
No change	52%	55%	55%	49%	49%	55%	51%	49%
Less CSR labor related activities	24%	21%	24%	23%	23%	23%	25%	23%
Management								
Improved management related CSR practices	13%	12%	15%	14%	8%	13%	15%	9%
No change	72%	71%	67%	73%	83%	73%	68%	79%
Less management related CSR activities	15%	17%	18%	13%	9%	14%	16%	12%
Society								
Improved society related CSR practices	20%	17%	20%	20%	21%	20%	22%	15%
No change	63%	68%	64%	62%	61%	61%	60%	72%
Less CSR activities	17%	15%	15%	18%	18%	19%	18%	13%

Some 33 percent of firms improved the variety of CSR activities, but at the same time 32 percent have reduced their CSR related engagement. Most of this variation is taking place within beyond compliance CSR activities, but from the table it is difficult to disentangle whether certain firm characteristics are strongly correlated with changes in CSR related activities. This is also confirmed when running an estimation analysing the relation between selected firm characteristics and changes in the aggregate CSR index (not reported).

However, Table 7.6 does reveal that most firms change their CSR related strategy even in the short run. What the drivers behind these changes are is, however, less clear, and begs for additional in-depth firm specific qualitative research.

7.4 Future research

Understanding what drives firms to incorporate corporate social responsible practices into their production and marketing decisions will be an important research avenue to pursue in the future, as Vietnam strives to become internationally competitive. The 2012 survey in combination with previous survey rounds provides evidence showing that Vietnamese firms are improving compliance related CSR activities, whereas beyond compliance CSR measures are still at the infant stages in most firm business strategies. There is therefore significant room for improvement in the delivery of support to firms that will encourage and enable them to implement especially beyond compliance CSR policies.

While the descriptive statistics presented in this section may help us understand the extent of CSR activities by firms in Vietnam, further research is needed to guide policymakers about how best to improve corporate social responsible behaviour. Several scholars have advocated in favour of indirect measures, where the best way to improve and expand CSR activities is to ensure an equal and stable playing field and promotion of a very competitive business environment. In this case, the main task of policymakers in terms of CSR will be to provide principles/guidelines for insuring that products and services are produced under decent conditions and by providing guidelines describing how firms through voluntary initiatives can integrate social and environmental considerations into their business activities and their interactions with stakeholders.

References

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8 Conclusion

This report summarised evidence about competition, innovation, technology transfer, and corporate social responsibility in Vietnam based on data from 2011 collected through a survey questionnaire implemented in 2012. With a sample of over eight thousand companies, the Technology and Competitiveness Survey is a uniquely powerful tool to understand how Vietnamese firms are developing their technological capacities and the extent to which this is due to foreign investment. Similarly, it is one of the only survey instruments in Vietnam to analyse topics related to the larger social context of business.

Policymakers face the challenge of helping Vietnam's private and public sector firms create more employment with higher real wage rates. The short-term effects of the global economic crisis combined with the long-term reality of slowing economic growth as Vietnam "catches up" make this increasingly difficult. The *Doi Moi* model of relying on low wages and labour reallocation from agriculture to modern sectors has increased welfare for the majority of Vietnamese (with some important exceptions, particularly amongst ethnic minority groups). However, labour reallocation can not increase living standards forever. A key part of the long-term solution is enabling firms to adopt, adapt, and integrate appropriate technology. The TCS remains the only tool currently available to the policymaking and research communities to study this process over time.

Results from this survey round indicate that firms are already working to improve product quality, rather than purely increase supply of goods. However, the 2011 cross-section shows that firms are constrained by access to finance, despite the large number of (possibly overlapping) government programs to support technology investment and diffusion. A key policy recommendation is therefore to make support for technology transfer and investment more transparent and more easily accessible, especially to SMEs.

In addition, foreign direct investment has generated significant numbers of jobs. One ancillary benefit of this investment is anticipated to be technology transfer, either within the same sectors that foreign firms operate (horizontal spillovers), or due to interactions between Vietnamese domestic firms and foreign international or domestic suppliers and customers (forward and backwards linkages). Evidence from the TCS suggests high-tech sectors should not be the only area of focus, since gains in efficiency, productivity, and quality can be made in many other sectors. Similarly, firms report extensive technology transfer from both domestic and international customers, suppliers, and competitors. Policymakers should therefore also emphasize domestic channels of technology spillovers: international and foreign-financed firms are an important source of new technology, but not the only one. Recognizing and supporting this is an important objective for industrial policy going forward.

Many firms can benefit by adapting and modifying existing technology in preference to simply waiting for appropriate spillovers from foreign or domestic firms, or for the uncertain payoffs of paying for

costly research and development. While encouraging the development of a domestic high-tech sector that innovates near the global technology frontier can be an element of industrial policy, many more firms could become more efficient, competitive and achieve greater scale simply by integrating technology that already exists elsewhere into their production process. The government can play a proactive role both by assisting firms in identifying appropriate technology or through helping firms finance technology investments (a significant majority of firms indicated they would have to finance planned technology investments using equity, and the reasons they did not buy off-the-shelf technology was because it was too expensive).

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. Evidence from the 2012 survey round and previous years shows that the average firm is improving aspects of CSR related to compliance with existing legislation, but very few firms exceed this minimum requirement. Policymakers can therefore play a proactive role by developing policies to support beyond-compliance CSR policies by firms. The most effective and fair way to do this may be to provide extensive guidelines that firms can voluntarily adopt to ensure good employment conditions and higher standards of environmental and social stewardship.

The overall prognosis for Vietnam's long-run growth continues to be positive. A combination of favorable demographics and political stability suggest that many of the right conditions are in place for the private sector to create employment growth. However, targeted and transparent industrial policy can help meet the challenges of slowing growth, increased demand for formal-sector employment, and rising wage rates. Enabling firms to access and invest in appropriate technology is a relatively low-cost policy with extremely high potential returns. While foreign direct investment has generated significant employment in a new formal sector of the economy, it is not the only source of technology spillovers and should not be relied upon to deliver increased growth through access to appropriate technology. Survey data produced by the TCS will provide policymakers with evidence and feedback on "what works" in industrial policy. By ensuring that such policy is based on data rather than selective or anecdotal evidence, Vietnam's policymakers are better placed to encourage broad-based growth and shared prosperity.

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