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Mauritius

Mauritius Productivity Study

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Mauritius Productivity Study and Report 2020/2021

WORLD BANK GROUP

Acknowledgments

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Introduction

A sound business environment is indispensable to the development of a strong private sector capable of sustained economic growth. Well-designed economic policies that follow best practices can help generate and sustain such an environment. Evaluating policies and tracking their effects at regular intervals needs to be an integral part of monitoring and improving economic growth and dynamism in Mauritius. Using a nationally representative sample of private businesses operating in the formal sector and outside of agriculture and extractive operations, this report moves beyond aggregate measures to examine the business environment as it is experienced by individual Mauritian firms. This report scrutinizes the experience of businesses in conjunction with concrete outcomes such as productivity and employment with direct linkages to the economic wellbeing of the population of Mauritius. Incorporating firm-level data and self-reported experiences of firms with careful statistical analysis to pinpoint the relationships among variables, this report surfaces revealing patterns in the data with important policy implications.

With steady economic growth since its independence, Mauritius is seen as a model of success within the Sub-Saharan African and Indian Ocean regions despite its limited resource endowment and geographical remoteness. One notable attribute of the country's development path is its inclusiveness, which has contributed significantly to poverty reduction. Today Mauritius stands as a high-income economy according to the World Bank latest income level classifications.[1]

Although the country boasts one of the most thriving economies in Africa, it faces many challenges that could inhibit future growth and threaten its position as a high-income economy. These include the erosion of its preferential access to certain markets via trade agreements, sharpened regional and international competition, relatively low technological adoption—particularly by small and medium-sized firms, which may impede the transition toward high valued products and services—and COVID-19's negative shocks, mainly on tourism, trade, manufacturing and financial services.

Main findings of the report: An overview

The report draws on extensive surveys of a representative sample of firms by firm size, region, and sector (the World Bank's Enterprise Survey) implemented in 2020. The main findings are:

Productivity findings:

- While the story of the Mauritian economy over the last several decades has been one of growth and productive structural transformation, recent years have seen that growth flatten or even decline. This dynamic comes at a moment when Mauritian firms continue to trail their high-income competitors on important productivity measures in key sectors. Further compounding the issues surrounding structural transformation, Mauritian firms have labor cost shares similar to other high-income economies while productivity more closely resembles that of upper-middle-income economies. This may indicate that the road to increasing productivity levels will require bolstering worker skills and adopting technological improvements that complement the labor cost structure.
- While Mauritian manufacturing appears to generally remain on a flat or declining trajectory, food manufacturing stands out both in terms of productivity, growth, and investment. Despite this above-average performance, the food manufacturing sector remains characterized by low value-added goods, a correspondingly low labor-cost share, and low penetration of foreign investment. While this sector may be able to continue such performance, it seems unlikely that the sector can grow

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[1] https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2020-2021

beyond servicing a relatively limited scope of goods and markets without significant investment both within the sector and within complementary services sectors that can support and drive such growth.

- Other stand-out sectors include the retail and wholesale trading sectors which perform well on relative measures of productivity notwithstanding some signs of slowing.
- To continue to drive productivity growth, focus should be paid on opening cross-sectoral support linkages, supporting broad investment in education programs that prepare people for work, as well as fostering outward orientation across all sectors in the economy. While such steps may strengthen investment, innovation, and research and development (R&D) spending, the country's services and manufacturing sectors should also natively look to increase R&D spending, bring new products and services to the market, and to invest in capital accumulation. Such steps can improve international competitiveness perhaps creating a reinforcing cycle whereby firms participate further in export markets, adopt international standards and improve products thereby driving productivity growth.
- Logistically, tracking productivity measures and labor market trends will require continued estimates of firm-level productivity, including heterogeneous inputs. Such measures can be produced by detailed, firm-level surveys such as the ES, which can be regularly implemented to provide a window into tracking and acting on dynamic changes over time.

Business environment findings:

- Businesses' perceptions of a wide variety of aspects of the business environment have markedly improved since the enterprise Survey that was conducted in 2009 including: infrastructure services like electricity and transportation; crime, corruption, and political stability; access to land; and an adequately skilled workforce. Firms identified access to finance (A2F) and competition from unregistered, informal businesses as the business environment areas that are most likely to harbour constraints for their operations.
- Access to finance is the most commonly cited major constraint with about 40 percent of businesses identifying it as such with the highest concentrations in younger, smaller firms and in sectors including garment manufacturing and hotels & accommodation. Businesses that are part of a multinational corporation or Mauritian conglomerate are less affected by access to finance along with higher productivity firms. As with several other findings in the report, the relative resilience of outward-oriented firms in the realm of finance and may point to better integration in international financial markets of these players.
- While informal competition is widespread, it is particularly acute for about 10 percent of registered firms who report that their primary competition in the market is unregistered businesses. This level is higher than what is found in other high-income economies and closely matches data collected in 2009 suggesting that significant scope for improving enforcement remains. As in much of the world, informality in Mauritius is concentrated in construction, transportation, and food sectors and presents particular challenges for formal-sector growth among smaller, young firms that are most likely to face these unregistered competitors as their main competition.
- The landscape of competition and market contestability in Mauritius has improved as indicated by the share of formal businesses that have managed to construct or retain a monopoly position in their main market has decreased substantially from 2009 to 2020, dropping from 24 percent to only 6 percent. Most businesses operate in markets with a large number of competitors with sixty percent of firms facing 25 or more competitors in their main market for products or services. Retailers report high levels of competition as do textile and garment manufacturers, transportation businesses and accommodation providers. Highly competitive retail and transportation sectors are generally

desirable and, this level of competition should bolster a dynamic and competitive landscape. While accommodation providers face high levels of international competition for tourism spending where businesses can readily compete on quality, textile and garment manufacturers face a proliferation of competition from factories operating in low labor-cost economies and may continue to face difficulty competing even with imported labor and market access support through AGOA.

- Within this increasingly competitive landscape, businesses in Mauritius are bringing new products and services to their markets at a slightly elevated rate (42 percent) compared to other High-Income economies (38 percent) and compared to SSA (40 percent). On the other hand, measures of innovation such as the percentage of product and service innovations that are new to the market, the percentage of firms introducing process innovations and, the percentage of firms spending money on research and development lag both High-Income and regional comparator economies. Of the 42 percent of Mauritian businesses that introduced a new product or service in the recent past, only a little more than half were products or services new to their markets compared with 64 percent of products and services introduced in other High-Income economies and 71 percent in other African economies. Process innovations are typically more indicative of technological progression and here, Mauritian businesses lag comparators with only 17 percent of firms introducing process innovations compared with 25 percent of firms in High Income economies and 33 percent in African economies. Likewise, the percentage of firms that spend money on R&D is lower, at only 9 percent of businesses, in Mauritius than in High Income economies where nearly 14 percent of businesses spend on R&D and in other African economies where the number is higher-still at 16 percent.

- Whereas the overall low rate of innovation is mirrored in low R&D spending, businesses that are export-oriented, spend on R&D, or invest in fixed capital assets demonstrate a higher propensity for innovation which may reveal a path for other businesses to follow. A similar group of businesses, with the addition of firms with FDI, exhibit higher productivity. Despite the association of innovation activity with higher productivity, Government programs targeting innovation have had low uptake and do not appear to be associated with productivity gains. Improving the targeting and uptake of these programs may help bend the curve on innovation and improve international competitiveness.

Skills and labor market findings:

- Adding to the difficult competitive environment facing textile and garment manufacturers, the relatively low skill of their workforce may be limiting to enterprises trying to upgrade their production processes and improve their productivity and competitiveness. Over half of enterprises in the sector reported that 'inadequately educated workers' are a moderate to severe obstacle to their operations with less than a third of workers having completed secondary school and less than a fifth of workers having completed a degree program.

- More broadly by sector, between 80 percent and 94 percent of businesses report that the current skill level of their workforce is 'as required' or above given the needs of the business suggesting that hiring the kind of workers needed by businesses may be difficult for some. Looking at reported unfilled vacancies by occupational group reveals that 'skilled manual workers' and 'plant and machine operators' are especially difficult to hire, with fill rates hovering around 10 percent and 29 percent respectively. In addition to struggling to hire for specific occupations, businesses report a high level of difficulty in finding new workers with specific skills namely, work-ethic, English language skills, problem solving skills and managerial skills.

- Training and up-skilling of the workforce by businesses appears especially limited for small businesses who are unlikely to provide any formal training opportunities for workers. Across all

firm sizes, an average of fewer than one in five businesses had provided any formal training to workers in the previous year. While businesses that provided training frequently matched training topics to the same areas they identified as skills shortages within their workforce, they often failed to provide any formal language training even when the reported need was critical. Learning why businesses do not engage in language training programs may reveal an opportunity for up-skilling the labor force in this dimension.

- Compounding these labor market issues, Mauritians are less inclined to work as skilled manual laborers and so, firms fill these vacancies with expatriates working on time-bound work permits. Just over twenty percent of firms have had recourse to this kind of foreign labor, with the textile and garment sector being by far the most foreign labor-intensive.

- Women are active in both business ownership and the labor force in Mauritius with nearly half of businesses having at least some degree of female ownership while women make up about 32 percent of workers. However, the picture changes dramatically when the focus shifts to upper levels of responsibility and decision making. Women account for only 13 percent of top managers in Mauritius and only nine percent of businesses are majority female owned. Overall, labor force participation of women is reported to be hampered by a lack of support mechanisms such as on-site and alternative childcare as demonstrated in the data where firms that provide some support mechanisms report fewer skills shortages. Further, having female management is associated with both fewer skill shortages and with increased support mechanisms for female employees suggesting that encouragement and support of female entrepreneurs may lead to increased female labor market participation rates as well. Unlocking women's potential in the Mauritian private sector is key to promoting more dynamism in the economy with potential gains not only for women but for the whole of Mauritian society.

Report Outline

Based on extensive consultations with stakeholders in Mauritius, this report consists of 3 chapters that take stock of the country's recent productivity trends and put forward specific policy recommendations to boost productivity growth in the future. The impetus for this report, and its underlying data collection exercise, is to support the mandate of Mauritius's National Productivity and Competitiveness Council (NPCC). The NPCC seeks to encourage a national dialogue on productivity that informs stakeholders and promotes sound government policy and public-private partnerships. The chapters that follow focus on 3 key areas of policy-relevant research:

- Chapter 1: Productivity trends by sector and the role of structural transformation as well as innovation in productivity.
- Chapter 2: The business-enabling environment for productivity—including competition and targeted government support—as well as its firm-level determinants—such as innovating, training, and adopting good management practices.
- Chapter 3: Skills gaps and other labor market determinants of productivity—including the role of regulations, active programs and migration.

In terms of its methodology, this report relies on an Enterprise Survey (ES) that follows the global World Bank template, enabling cross-country benchmarking, but with a set of additional questions tailored to the Mauritian context and the above-mentioned priority areas. Additional sources of data and information used are discussed within each chapter.

Data Collection and Structure

The NPCC hired a private contractor to conduct an Enterprise Survey in Mauritius in 2020 with assistance and training from the World Bank Enterprise Analysis Unit (DECEA). The survey followed a global methodology developed by DECEA to maximize its comparability with Enterprise Surveys conducted in over 140 economies worldwide. It is a survey of a representative sample of private firms in the non-agricultural, non-extractive formal sector of the Mauritian economy with five or more employees. The data was collected for the purpose of taking a closer look at the private sector's experiences with a focus on productivity. In addition to a set of standard questions asked around the world, the Mauritius survey includes questions on a number of pertinent topics including: business composition, affiliation with conglomerates and foreign firms, tourism, FDI outflows, competition and market share, digitization and automation, ecological practices, Government program uptake, skills, workforce composition, and recruitment.

An initial target was set for 1,200 interviews to provide robust statistical analysis across 9 sectors. A suitable sampling frame was produced by combining the most comprehensive business lists available throughout the country, including lists from Statistics Mauritius, the Mauritius Chamber of Commerce and Industry (MCCI), Mauritius Export Association (MEXA), the Tourism Authority, Mauritius Telecom and those identified in a recent NPCC and World Bank project. The lists were cleaned, removing duplications and businesses identified as operating outside of the population of interest (for example, businesses with fewer than 5 employees and those in agriculture, extractives, healthcare, education, utilities and financial services). This process yielded nearly 7,000 contacts. Fieldwork revealed that roughly 2,300 of these contacts were associated with operational businesses within the population of interest, as defined above, and thus eligible for the survey. The sample was selected to be representative of the private sector in Mauritius using a stratified random sampling approach, with size and sector as strata. The resulting data, with appropriate sampling weights, can be used to characterize the private sector in the country.

The data collection process faced significant challenges, which made the initial target unattainable. Sampling frame quality resulted in significant delays to fieldwork as desk research was required to screen more than 65,000 contacts from the sources listed above. The COVID-19 pandemic presented a unique set of challenges during much of the 2020 data collection period. Adjustments to data collection and to the survey questionnaire itself were made in May of 2020 and included additional attempts to contact temporarily shuttered businesses, increased remote fieldwork, and questions regarding impacts associated with COVID-19. To ensure comparability, all businesses that had been interviewed prior to the introduction of this module were approached to complete this additional module. In total, 80 businesses refused to answer this additional module of questions. An exhaustion of viable contacts within the sampling frame—including callback attempts spanning multiple months—was unable to generate 1,200 interviews as targeted. Consequently, fieldwork ended up with 732 interviews. Box 0.1 discusses lessons learned from fieldwork and points to future improvements in data collection.

Box 0.1: Lessons learned and future waves of data collection:

The World Bank welcomes the desire of NPCC to collect future rounds of firm-level Enterprise Survey data in Mauritius on a regular basis and can offer technical support for future rounds. During the 2020 round of data collection, the achieved sample size was just over 60 percent of the original target sample size of 1200. While some of the reduced sample size can be attributed to difficulties in convincing firms to participate during the pandemic, a number of lessons can be learned from the fieldwork that will be relevant when collecting data in future rounds as desired by Mauritian stakeholders.

- The original sample target of 1200 interviews was primarily developed to generate a dataset that would allow disaggregation along 10 different sectors. This ambitious desire for disaggregation

■ requires a large number of observations per sector in order to guarantee sufficient statistical power when analyzing the data. Unfortunately, the reduced sample of 732 interviews proved insufficient to supporting certain desired analysis across 10 separate sectors.

■ Sample frames used in the 2020 data collection effort required a much larger amount of pre-fieldwork processing to identify eligible businesses than anyone had imagined when the process began. Beginning from lists containing roughly 65,000 contacts, 7,000 were identified as contacts likely in the population of interest. The remaining contacts either fall outside of the covered sectors or were micro-sized businesses with fewer than 5 employees. While future rounds of data collection can benefit from the frame cleaning done in 2020, additional work will be needed to maintain an up-to-date and comprehensive sampling frame from which to sample.

■ With a well-maintained, comprehensive sampling frame optimizing sample designs to ensure adequate statistical power to facilitate desired comparisons and disaggregation will become easier. Such a sampling frame makes the data needed for power calculations readily accessible and can be used to determine how many and which sectors are viable candidates for targeting.

■ Mauritius may find it desirable to expand the population of interest to cover businesses not included in the 2020 round. For example, micro-sized establishments could easily be included in the survey as they are included in the existing frames. The survey instrument can be relatively easily tailored to accommodate micro-enterprises and the results would greatly increase the number of analytical comparisons that can be made within Mauritius.

■ Future rounds of data collection would likely benefit from additional outreach to both potential participants and those who kindly participated in the 2020 effort. A short document summarizing some of the main descriptive findings of the 2020 survey could be used as recruitment tool for new participants and distributed to participants of the 2020 round so they can see how the data is used, learn about the situations their peers face in the market, and to encourage their participation in future surveys.

The Enterprise Surveys provide a rich source of information about firms and the environment in which they operate. This information is a useful complement to existing macroeconomic data that is commonly used by researchers to study dynamism and constraints within the private sector. Survey responses, such as from the Enterprise Surveys, are not only useful for corroborating findings based on macroeconomic data but also for exploring firm heterogeneity and how laws and regulations are experienced by firms. As the discussion below shows, firm heterogeneity is a common feature of the Mauritian economy.

Distribution of the sample

A total of 732 firms, of varying sizes and sectors, were surveyed between February and November 2020. The main objective of the stratification criteria for size and sector was to ensure that enough observations for a robust analysis were available for each level of stratification. Figure 0.1 shows the sample distribution by size and sector. Large firms proved especially difficult to recruit, with a participation rate of only 19 percent, compared with small and medium-sized firms, with participation rates of 37 percent and 35 percent, respectively. These participation rates are on par with other Enterprise Surveys conducted around the world and are a testament to the extra recruitment effort that went into conducting the survey during the COVID-19 pandemic.

Table 0.1: Distribution of the Sample by Sector of Activity and then Firm Size

	Sector	Interviews
Manufacturing	Food production	41
	Textiles and garments	28
	Other manufacturing	103
Services	Construction	55
	Wholesale and auto sales	100
	Retail sales	159
	Transport and logistics	57
	Hotels and restaurants	163
	ICT	26

Size	Interviews
Small 5-19 employees	405
Medium 20-99 employees	237
Large 100+ employees	90

While COVID-19 had significant impacts on the timing and difficulty of data collection, firms also experienced significant economic shocks during this time period. The overwhelming majority of the core data collected in this Enterprise Survey provides a snapshot of businesses and the business environment as of the end of December 2019—that is, prior to the pandemic—as the questions limit responses to fiscal year 2019. This means that sales, workforce and other figures reflect firms' pre-pandemic situations. The additional module of questions targeting COVID-19 impacts reveals significant disruptions and changes that occurred after fiscal year 2019. Given the timing and size of the economic shock associated with the pandemic, readers may be especially interested in distinguishing what happened as a result of COVID-19 from the results that follow in the subsequent chapters, which reflect the situation as of the end of 2019.

COVID-19 Findings Overview

The COVID-19 pandemic and subsequent policies and restrictions on individuals and businesses have generated broad impacts on Mauritian businesses, including temporary closures, revenue losses and workforce changes.[2] At some point during the pandemic, 86 percent of businesses surveyed reported being temporarily closed. In manufacturing, firms were most likely to have been closed temporarily, with 94 percent reporting as such. In services, firms were less likely to close temporarily, with 71 percent reporting closures, as many remained open to provide essential services. At the same time, manufacturing firms reported closures averaging just over 8 weeks, while those services firms that did shutter their businesses were likely to close for longer durations, averaging nearly 12 weeks.

Revenue losses from COVID-19 have been large and widespread. The average loss in business revenue at the time of the interview was 32 percent compared with the same month one-year prior in 2019. Over three quarters of firms reported losses. Figure 0.2 shows that these losses were particularly pronounced in the hotels and restaurants, where 96 percent reported drops and the average loss amounted to three quarters of monthly revenue. At the same time, a relatively small number of firms saw no change in sales (14 percent)

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[2] Note that, because no baseline survey was available, this survey was not able to produce estimates for permanent business closures or other market exits.

or even an increase in sales (10 percent), with manufacturing firms faring marginally better than those in services.

Figure 0.2: Revenue Changes in Selected Sectors

	Sector	Revenue in 2020 compared to same month in 2019
Manufacturing	Food production	-21.8%
	Textiles and garments	-27.8%
	Other manufacturing	-18.2%
Services	Construction	-24.4%
	Wholesale and auto sales	-23.9%
	Retail sales	-19.8%
	Transport and logistics	-40.4%
	Hotels and restaurants	-74.4%
	ICT	-21.5%

Businesses were largely able to retain workers by utilizing furloughs and Government-provided wage subsidies. The median firm employed 17 people and let go 0 workers (mean was a loss of 3.9 workers) while also furloughing 0 workers (mean of 28). Overall, employment shrank in only about 11 percent of businesses.

Meanwhile, cash flow reductions led to about 5 percent of businesses reporting that they had to delay payments to suppliers and/or workers.

In response to the pandemic, the Government of Mauritius assembled a set of assistance programs that have had an impact on nearly every business in the private sector. A resounding 73 percent of firms interviewed responded that they had already received some form of Government assistance related to the pandemic, while the remaining 27 percent expected to receive some assistance in the near future. The most commonly accessed were assistance schemes related to wage subsidies (94.5 percent of firms receiving assistance), followed by cash transfers (13.4 percent) and a payment deferral programs (12.6 percent). There was less uptake of certain assistance schemes, including fiscal relief (2.9 percent) and access to new credit (3.8 percent), but that may reflect eligibility requirements.

Employment reductions induced by COVID-19 were associated with the receipt of a particular category of Government assistance. Firms that report having received Government assistance—including the deferral of credit payments, rent or mortgage; suspension of interest payments; or rollover of debt—were approximately three times more likely to have also reduced the number of permanent or temporary workers. Along similar lines, firms that once emerged from a Mauritian sugar estate were three times as likely to have reduced their workforce as other firms.[3] While the former finding may simply reflect that this type of

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[3] Both of these results are robust to a number of specifications and controls, including receipt of other forms of assistance, size, sector, age, gender of top manager, productivity, and membership in a conglomerate or holding company. Marginal effects computed for businesses receiving this type of government assistance show probability of decreasing workforce as a response to COVID at 48% vs. 13% for others. Marginal effects computed for sugar estate affiliates show probability of decreasing workforce as a response to COVID at 44% vs. 15% for others.

Government assistance is reaching businesses with the most acute financial needs, the finding regarding sugar estates warrants further examination.

Female-managed businesses are no more likely than their male-managed counterparts to have decreased their workforce as a result of COVID-19. However, female-managed businesses appear to be more likely to receive Government assistance in the form of cash transfers (22 percent of female-managed vs. 13 percent of male-managed) or by way of deferral of credit payments, rent or mortgage, suspension of interest payments, and rollover of debt (23 percent of female-managed vs. 12.4 percent of male-managed).[4]

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[4] Both of these results are robust to a number of specifications and controls, including receipt of other forms of assistance, size, sales, sector, age, productivity, and membership in a conglomerate or holding company. Marginal effects show probability of receiving cash transfer at 18% for female-managed vs. 9% for male-managed businesses. Marginal effects show probability of receiving cash transfer at 21% for female-managed vs. 8% for male-managed businesses

Note that while the nominal difference in uptake by gender of top manager is small for schemes providing access to new credit (5.7% vs. 4.8%) and for fiscal reduction and exemptions (6.3% vs. 4.2%), once controls are included for size, sector, sales, and productivity, these differences are large and significant with access to new credit (11.3% vs. 4.4%) and for fiscal reduction and exemptions (7.7% vs. 1.8%).

Chapter 1: Productivity Trends and Structural Transformation

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Key Findings – Chapter 1

- *Mauritius's economy has been characterized by sustained growth over the last several decades. While early growth was driven by structural transformations—first toward, then away from manufacturing—this trend is no longer as visible.*

- Mauritius lags other high-income economies in terms of revenue per worker; the island economy is much more on par with economies in the upper-middle-income category.

- However, Mauritian firms' labor cost shares are similar to high-income economies', indicating that increasing productivity levels will involve skill and technological improvements commiserate with those labor costs.

- While Mauritian manufacturing is generally on a flat or declining trajectory for productivity, food manufacturing stands out in terms of growth and investment. However, the food manufacturing sector is still characterized by low value-added goods, correspondingly low labor-cost share and low penetration of foreign investment.

- By contrast, the economy's trade sector (retail and wholesale) generally performs well, but there are indications of slowing or declining growth.

- The specific role of foreign-owned firms is noteworthy: compared to domestic firms, foreign-owned ones are growing and investing at higher rates.

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1.1. Introduction

While economic growth in Mauritius has been robust in recent decades, this growth was initially driven by a process of structural transformations. As that process slows, the country needs to turn to sustained improvements in its existing sectors, at the same time fostering innovation in new, highly productive sectors.

Indeed, structural change has been an integral part of Mauritian economic development, with resources reallocated first from agriculture to manufacturing and then from manufacturing to services (UNCTAD, 2016a). To be more precise, steady revenue from the agriculture sector—accruing from preferential trade agreements with the United Kingdom and European Union (in particular, for access to European markets for fixed quantities of sugar at preferential prices)[5]—was used to promote industrialization. By the 1980s and until the late 1990s, industry's value-added share of the economy soared while that of agriculture declined. However, industry showed signs of stagnation in the 1990s and 2000s, following the Multifiber Agreement (MFA) phase out and adjustment, which adversely impacted highly labor-intensive firms. Simultaneously, during the 1990s, the services sector development was in full swing, so that by the 2000s, the latter became the economy's dominant sector.

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[5] http://wtochairs.org/sites/default/files/EU_Guaranteed_Sugarto_publishJIBE.pdf

Table 1.1 shows how profoundly the sectoral composition of the country has changed since the 1970s. In 1973 the country experienced its first boom, known as the "sugar boom," mainly from its agriculture sector's guaranteed revenue. In turn, this revenue was used to promote industrialization and the development of an export processing zone (EPZ). As seen in Table 1.1, in just over 40 years, the share of gross value-added (VA) provided by agriculture went from more than 20 percent to less than 4 percent, while the share of services went from 60 percent to more than 80 percent.

Table 1.1: Share (%) of Gross Value Added (VA) by Industry Group at Current Basic Prices, 2006- 2020

Year	1976	1980	1990	2000	2010	2020
Agriculture, Forestry & Fishing	22.5	12.4	12.1	7	4.1	3.9
Industry	17	18.2	26.1	25.4	18.4	14.4
Services[6]	60.5	69.4	61.8	67.6	77.5	81.7

Source: Statistics Mauritius, National Accounts.

At this point in time, challenges that could hinder future growth for Mauritius include sharpened international competition, lagging technological adoption and negative shocks from the COVID-19 crisis. Against this backdrop, understanding how the profound structural changes in the country have impacted the dynamics of labor productivity becomes crucial. More precisely, this chapter analyzes trends in labor productivity within the economy's main sectors while also assessing how Mauritius compares with its peer economies in terms of labor productivity.

1.2. Trends in Labor Productivity

Value added per worker has increased overall but fallen relative to total labor compensation. Figure 1.1 shows the prevailing trends for the economy as a whole as well as for its main sectors. It relies on existing data from Mauritius's National Accounts and Digest of Labor Statistics published by Statistics Mauritius (SM). Two measures are used: i) value added (VA)/employment measure and ii) VA/labor compensation ratio. All data are shown on the same scale and indexed relative to values in 2006. The figure reveals that overall labor productivity as measured by VA/labor compensation is declining slightly, while productivity as measured by VA/employment is trending upward. Still, the VA/employment increase over the nearly 20-year period was a slight 4 percent, in real terms. This indicates that the unit cost of labor (i.e., labor compensation/VA) has been rising, though this rate has varied over the years. From 2007 to 2013 there was a steep ascent in the unit cost of labor (as demonstrated by the notable drop in VA/compensation) which coincided with a 13 percent increase in the salaries of public officers[7] in 2008 following a salary revision in Government (Pay Research Bureau) as well as a seasonal wage rise in the sugar industry.[8] From 2016 to 2019 it is notable that the

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[6] It must be noted that in the 1970s, 80s and 90s, the services sector was dominated mainly by public sector services, such as social security, education, public administration and health. Following the development of the tourism, financial, ICT and construction sectors, starting around the year 2000, the private sector services' share started rising.

[7] Compensation of employees in the general government sector, which accounts for around 25% of total compensation. https://www.bom.mu/pdf/Research_and_Publications/Annual_Report/AnnualRep2004/Labor_Market_and_Price_Developments. pdf

[8] The value added and labor input ratio reflects not only the skills and aptitudes of workers and the intensity of their efforts but also the presence of other inputs like capital.

gap between the two labor productivity measures has widened significantly, indicating a shift toward increased labor cost relative to value added.

Figure 1.1: Labor Productivity Trends

a. Overall Labor Productivity (2006=100)

b. Manufacturing Labor Productivity (2006=100)

Accomodation and Food Services Labor Productivity (2006=100)

Wholesale, Retail and Trade Labor Productiivty (2006=100)

Construction Labor Productivity (2006=100)

Other Services Labor Productivity (2006=100)
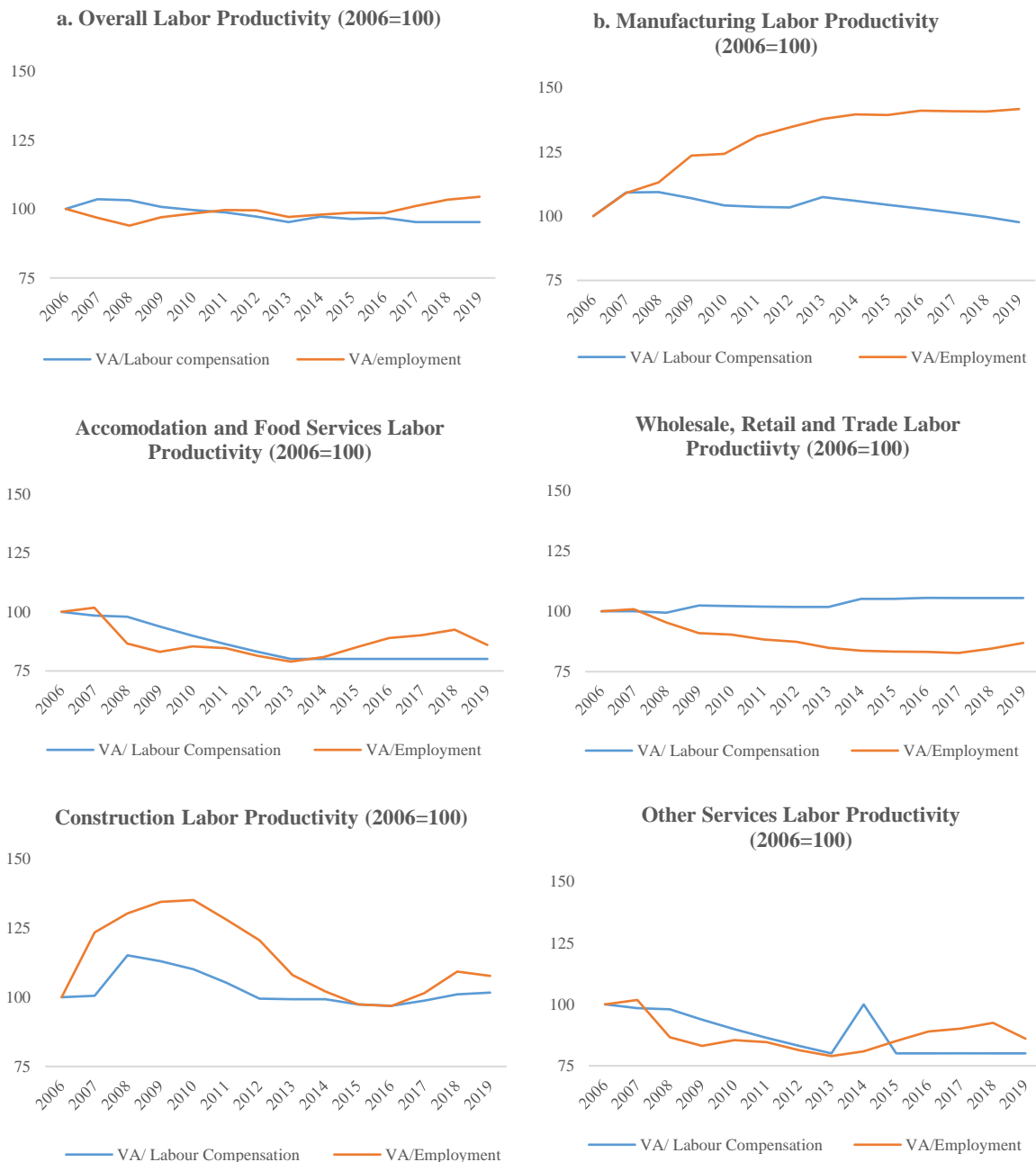
Focusing on the manufacturing sector, the measures of VA/employment and VA/compensation diverged shortly after 2008, with the per-worker measure rising substantially and the latter measure (VA relative to total labor compensation) remaining flat. This departure is anecdotally supported by the phase out of the Multifiber Agreement in 2005, as many foreign firms closed their doors, causing massive job losses in the textiles and garments subsectors, thereby raising VA/employment. This is

supported by the declining labor share of manufacturing overall, which fell from 37 percent in 2010 to 32 percent in 2019, almost entirely driven by declines in non-food manufacturing (Figure 1.2). As a consequence, VA/employment rose sharply after 2008. However, in the 5 years between 2015 and 2019, the sector's labor productivity has essentially flattened. This is a matter of concern as manufacturing has historically been the engine of the island's economic growth and social development. There are two reasons for a low labor productivity increase: i) the roll out of new technologies among the textile and garment firms which have remained in operation (and are mostly domestically owned) has been minimal[9] and ii) firms in this sector have not upgraded to higher value-added products and thus have not moved into the upper segments of the market.[10]

Figure 1.2: Labor Share: 2010, 2019
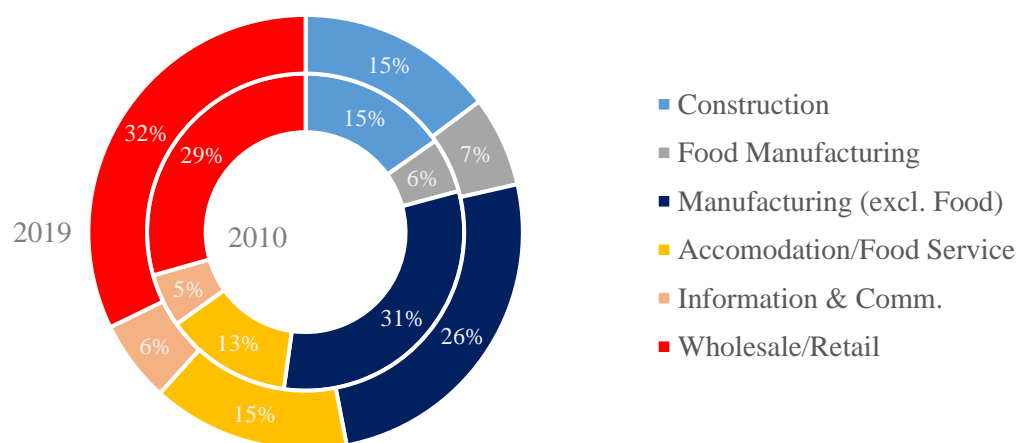
Note: Authors' calculations based on SM data.

The services sectors in general exhibit no major differences between the two measures of labor productivity (as seen in Figure 1.1's charts for accommodation and food services, construction and other services). The sole exception is the wholesale retail and trade sector where VA/compensation is visibly higher than VA/employment, likely driven by declining unit labor costs. Within services, labor productivity growth has been generally flat for several years: since around 2015, there has been little growth in terms of either labor productivity measure. These sluggish figures are worrisome since services account for more than 70 percent of gross value added and signal the need for national reinvention and further development into new services sectors in order for Mauritius to maintain its position as a high-income economy in the future.

1.3. Decomposing Labor Productivity Growth

Labor productivity growth in an economy can be achieved in one of two ways. First, productivity can grow *within* economic sectors through capital accumulation, technological change, churn toward more productive surviving firms, and/or a reduction of the misallocation of resources across plants. That is, the sectors themselves can become more productive, on average; this is usually called the "within effect." Second, labor can move *across* sectors, from low- to high-productivity sectors, increasing

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[9] The ratio between output and labor input depends to a large degree on the presence of other inputs.
[10] https://undp-strategic-options-for-the-mauritius-textile-and-apparel-industry-final-draft.pdf

overall labor productivity in the economy, known as the "structural effect." Rodrik and McMillan (2011) decompose labor productivity into a within-sector effect and structural-change effect as per the following equation:

$$\Delta P_t = \sum_{i=1}^{n} \emptyset_{i,t-k} \, \Delta P_{i,t} + \sum_{i=1}^{n} \Delta \emptyset_{i,t} \, P_{i,t-k} + \sum_{i=1}^{n} \Delta \emptyset_{i,t} \Delta P_{i,t}$$

where the left-hand side gives the change in labor productivity levels. The first term on the right gives the *within-sector* change. That is, a sector can be either more or less productive between two periods. The second two terms, when added together, show *structural* change. They show to what degree shifts in employment share move toward (or away) from more (or less) productive sectors. Applying the above equation to the most recent Census of Economic Activity (CEA) data, produced by Statistics Mauritius, gives the results shown in Table 2.

Table 2: Labor Productivity Growth Decomposition

	Percent Change	=	Within Sector Change	+	Structural Change
2010-2013	11.0%		9.6%		1.5%
2013-2016	9.8%		8.4%		1.4%
2016-2019	9.9%		9.5%		0.4%

Note: Authors' calculations using CEA data, according to Rodrik-McMillan (2011)

Table 2 reveals several interesting findings. First, labor productivity has increased steadily since 2010 (confirming the overall results seen in Figure 1.1). Within-sector change accounted for nearly 90 percent of labor productivity growth in all 3 of the considered sub-periods. This can be compared to a recent study in 21 advanced economies that revealed much lower within-sector growth and consequently, structural change accounted for roughly a third of labor productivity growth.[11] The relatively low contribution of structural change can be partly explained by the fact that Mauritius embarked on its structural transformation as early as the 1970s and had already reaped much of the gains generated by the 1980s and 1990s. Confirming this, the contribution of structural change has slowed over time, with a dramatic decrease noted in the most recent period (2016 to 2019). Put another way, the shift of labor between sectors accounted for 14 percent of productivity growth in both 2010 to 2013 and 2013 to 2016, but it accounted for a mere 4 percent in the last few pre-COVID years.[12] This indicates a need to develop new sectors that will be drivers of economic growth as further reallocation of workers from one existing sector to another is not likely to procure ample productivity rewards.

However, inspecting labor productivity statistics at the aggregate level (sector level) may not provide deep insights for policy making and, at the aggregate level, differences sometimes cancel each other out. For this reason, drilling down into more detailed data, particularly at firm level, becomes more relevant for guiding policy making. The following sections draw from the results of the Enterprise Survey 2017-2019, conducted by the National Productivity and Competitiveness Council (NPCC) in collaboration with the World Bank.

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[11] Borio, C., E. Kharroubi, C. Upper, and F. Zampolli. 2017. "Labour reallocation and productivity dynamic: financial causes, real consequences." *BIS Working Papers: No. 534.* Accessed via: https://www.bis.org/publ/work534.pdf
[12] That is, this share is the structural change term divided by the overall change in labor productivity.

1.4. Comparative Labor Productivity Results from the Enterprise Survey

Box 1.0 provides some guidance on the different types of productivity measures presented below. Making comparisons with World Bank Group income-classification groups, Mauritius is on par with upper-middle-income averages but lags its high-income peers (Figure 1.3). In fact, the average firm in Mauritius is only half as productive as a comparator firm in high-income economies, based on revenue per worker.[13] Even when values are adjusted for local prices, specifically for purchasing power parity (PPP), this is still the case. However, when looking at the distribution of labor productivity, the more highly productive firms in Mauritius (those above the 75th percentile) have roughly the same level of revenue per worker as the median firm in other high-income countries (Figure 1.4).

Box 1.0: Measuring Productivity

Labor productivity and value added / labor costs. Labor productivity reflects the ratio of revenue-based output to one input, namely the number of workers. Labor productivity has the advantage that it is relatively easy to calculate and intuitively understandable. However, the level of labor productivity also does not reflect the relative costs of inputs, and as such, the measure may not completely capture productivity per se, as would a quantity per worker output, which is unavailable.

A second, simple measure is the ratio of revenues to labor costs. Like labor productivity, this ratio is straightforward and uses the one, key input of labor. This ratio also has the advantage that it incorporates total labor costs, including wages; the ratio of revenues to labor costs will adjust to the amount of labor and its costs relative to the revenue generated by a firm. Higher values of this ratio can reflect either lower labor costs relative to revenues and/or the more efficient use of other inputs (e.g. capital) per dollar of labor cost. Note also that the inverse of the ratio of revenues to total labor costs is also known as the factor share of labor.

Total factor productivity (TFP). TFP is the residual share of output that cannot be explained using a broader set of inputs in production. It represents the efficiency with which firms utilize available inputs (namely, capital, labor, and material inputs) to create output from the production of goods. As such, it is only available for manufacturing.

TFP estimates computed from Enterprise Survey data are revenue-based (sometimes called TFPR). As such, TFPR may capture not only productive efficiency but also the prices commanded in both the markets for a firm's output and its inputs. TFPR as a result cannot be separated from market power, or, say, the ability of a firm to negotiate and pay lower input prices.

TFP requires an estimation, unlike the two straightforward measures described above. This estimation is typically done for specific industries, which will likely have industry-specific production functions. See Box A.1 for more details about how these levels are estimated across global comparators and within Mauritius. It is important to note that one limitation to cross-country comparisons is that, due to the sector-specific nature of these estimates, relative measures across comparator groups are more accurate within broad sectors (e.g., Mauritian food manufacturing vs. food manufacturing in other

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[13] Note that value added measures are not available for all sectors using the Enterprise Survey; as such, labor productivity measures based on the survey use total revenues.

regional economies). Comparisons of TFP levels across countries for all of manufacturing can be informative, though should be interpreted with caution.

Figure 1.3: Average Revenue per Worker relative to Mauritius
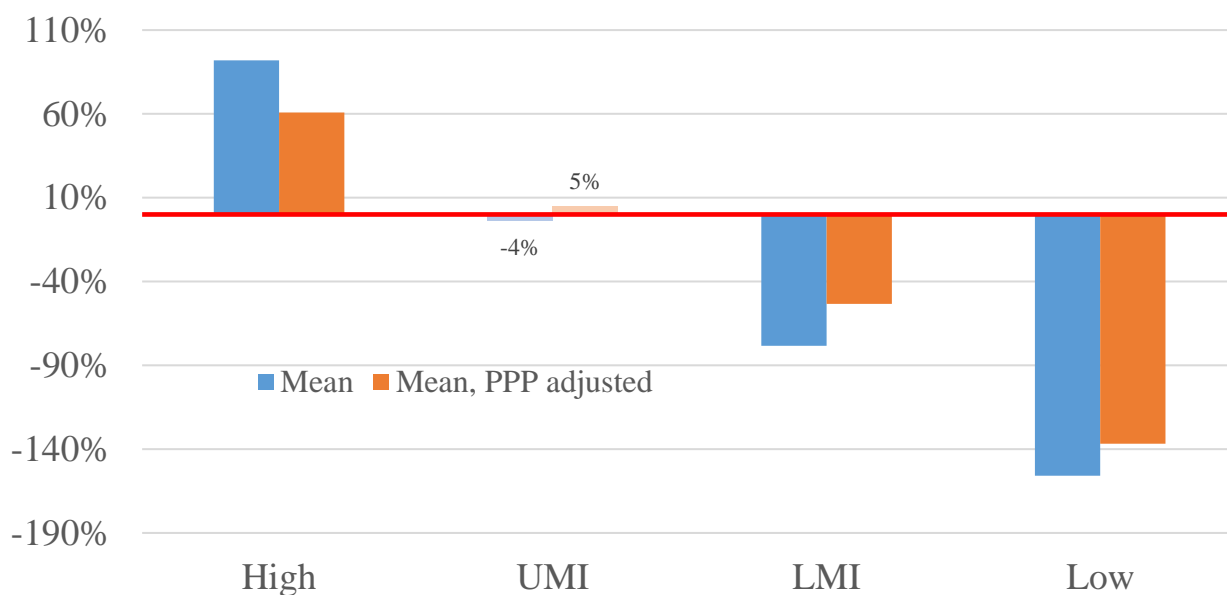
Note: figures represent relative coefficients compared with Mauritius from a regression of (log) revenues per worker (2009, USD) on dummy variables for income groups. The mean results are from a linear (OLS) regression and median results are from a quantile regression. Lighter shaded bars are not significant at a 90% confidence level. All regressions include survey weights, rescaled so that each included country is given the same relative weight. UMI: Upper Middle Income. LMI: Lower Middle Income.

Figure 1.4: Distribution of Revenue per Worker (log, 2009 USD)
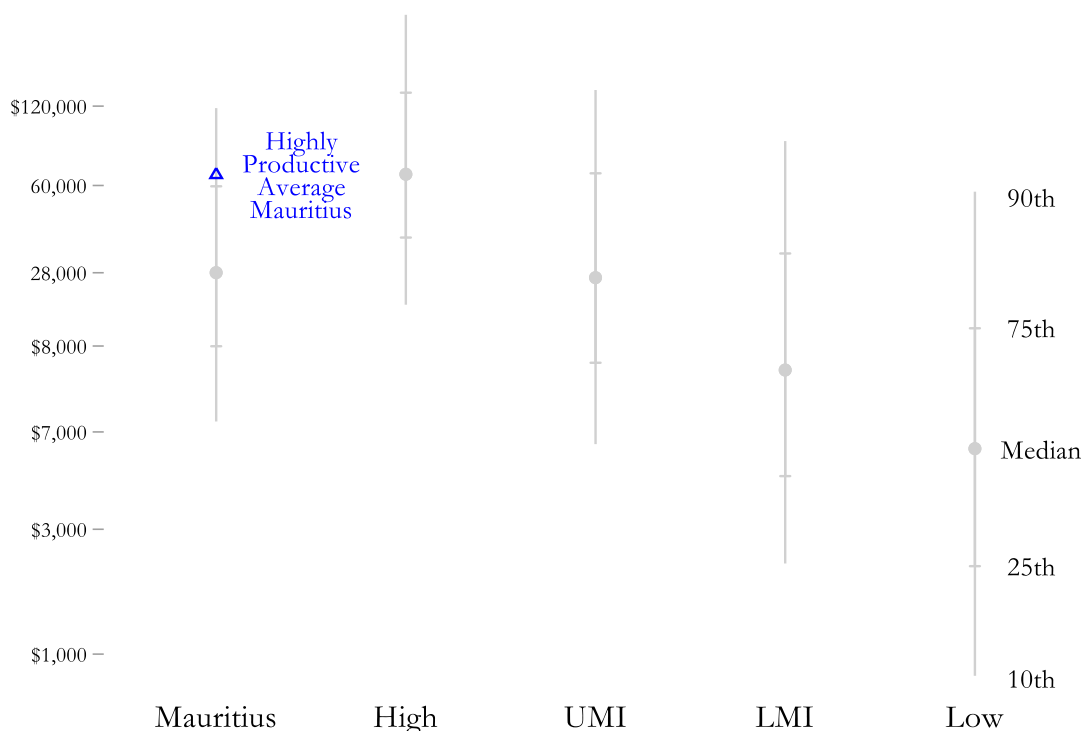
Note: 10th, 25th, median (50th), 75th and 90th percentiles shown. The blue diamond is the average level of sales per worker among "highly productive" firms in Mauritius, which are those firms that have an above-median level within each industry (food manufacturing, manufacturing excl. food, construction, accommodation, retail/wholesale, and other services). Distributions are first calculated as an-economy level average with survey weights, then a simple average of each country is taken within income group. UMI: Upper Middle Income. LMI: Lower Middle Income.

Figure 1.4 also gives a sense of the range of labor productivity measures, showing the interquartile range (the 25th to 75th percentile) as well as the 10th and 90th percentiles. Such dispersion can be interpreted as the spread between the most and least productive firms in an economy and gives a sense of the relative productivity spread between the top, middle, and low productive firms. Research has generally shown that wide dispersion, an indicator of both highly productive firms and a lagging distribution, is generally poor for economic performance (Syverson, 2011).[14] In fact, the ratio of the 90th to the 10th percentile (in terms of labor productivity) is 1.31 in Mauritius—meaning that the top, most productive firms are 131 percent as productive as the lowest—compared to 1.25 in high-income economies and below the wider dispersion of 1.35 in UMI economies. Looking at the ratio of the 90th percentile to the median, this measure is 1.14 in Mauritius, more disperse than the high-income average of 1.13, but less so than in UMI economies of 1.16. Together, these distributions indicate that while

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[14] See: Syverson, C. 2011. "What Determines Productivity?". *Journal of Economic Literature*, 49(2): 326-65.

Mauritian labor productivity is lagging high-income economies, these measures are on-par in terms of dispersion and are, in fact, less disperse than in UMI economies.[15]

As noted above, an alternative measure of productivity is the ratio of sales to a common input, in this case the total labor costs of a firm. As was shown in Figure 1.1.a., the last 15 years in Mauritius have seen an increase in labor productivity on a per-worker basis, but a decline in those measures based on total compensation, an indication of a shift toward higher-cost labor. Figure 1.5 puts these trends in an international context and shows the ratio of sales to total labor costs for Mauritius compared with other income groups. To avoid the influence of outliers, the figure compares median levels of the sales/labor costs ratio, across income groups.[16] These show that, unlike Mauritius's lower levels relative to high- and upper-middle-income countries (Figures 1.3 and 1.4), Mauritius is (statistically) on level with high-income countries as a group, with median sales/total labor cost ratios of 4.4 and 4.7, respectively.[17] By contrast, the middle-income and low-income groups have higher relative ratios, boosted by their lower total labor costs.

Figure 1.5: Ratio of Sales to Total Labor Costs
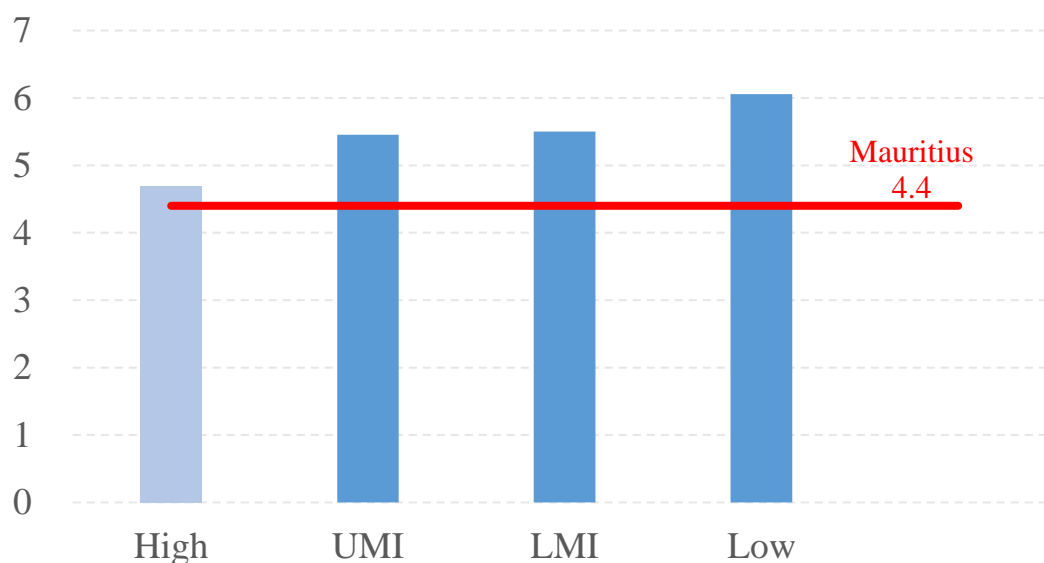
Note: median ratios shown (calculated using quantile regression). Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. UMI: Upper Middle Income. LMI: Lower Middle Income.

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[15] Note that dispersion measures should be taken with caution as they are based on representative (weighted) survey responses, and so reflect true dispersion with some uncertainty. Likewise, an ideal measure would be TFP-based within very narrowly defined industries (see Syverson, 2011). However, such measures are not widely available using this data, and so labor productivity dispersion measures are given for illustrative purposes.

[16] The comparison of medians is done using quantile regression, applying survey weights, which are rescaled so that each country has a total weight of 1. This is done to ensure that larger total survey weights (e.g., in the case of larger economies) do not drive income group comparisons. Similar analyses were carried out for the revenue/worker measure, but differences were minimal.

[17] Note that the inverse of these measures is the ratio of total labor costs to revenue: A revenue/labor costs measure of 4.4 is equivalent to a 23% share of labor costs to revenue.

1.5. Comparing Labor Productivity across Key Firm Characteristics

Comparing firms of different types (for example, exporters vs. non-exporters), both in terms of comparisons within Mauritius, but also across comparator income groups, is another helpful exercise. Figure 1.6 reports the relative labor productivity measures for comparator sectors in Mauritius. Both measures of revenue per worker (the left panel) and revenue as a ratio to total labor costs (the right panel) are shown. Across both measures, Mauritius's trade services—retail and wholesale—are largely productive, with relatively high revenue per worker and revenue comparative to total labor costs. This also appears to be the case, within the manufacturing industry, for food manufacturing—a result that holds when using total factor productivity (TFP) measures as in Box 1.1. On the other end of the spectrum, the accommodation and food services sector (hotels and restaurants) fares poorly across both measures: However, these comparatively lower levels appear to be driven by the restaurants in the sector (See Box 1.2).

Figure 1.6: Relative Labor Productivity by Sector in Mauritius
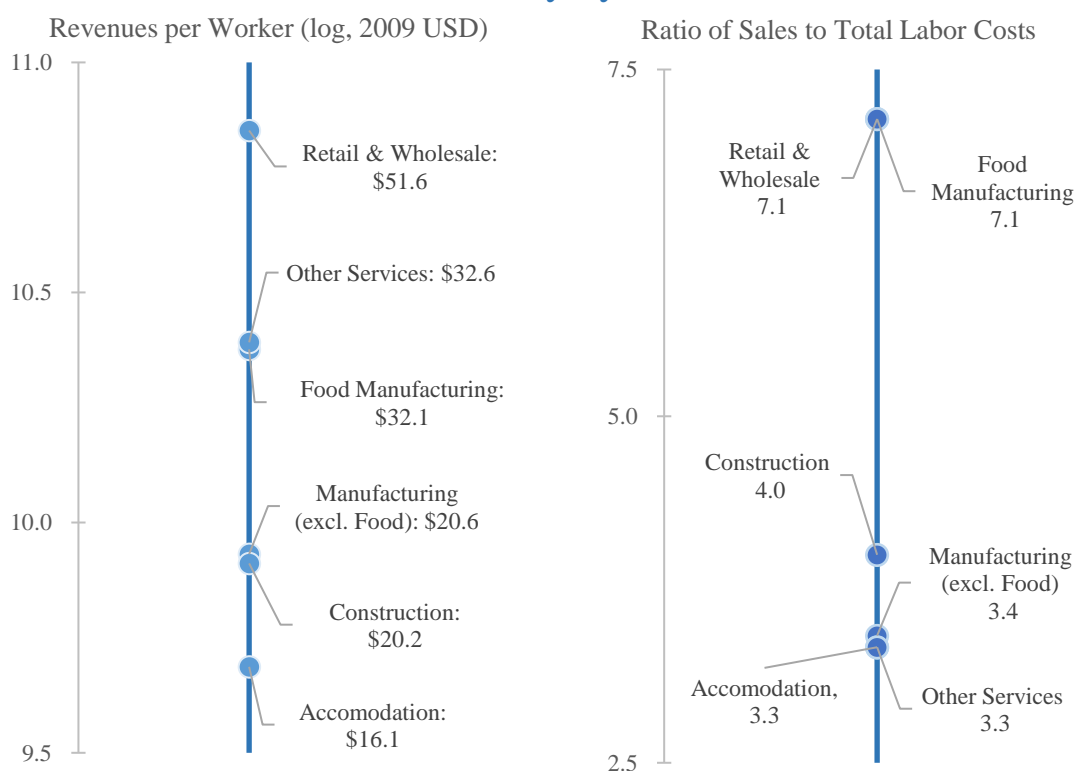
Note: authors' calculations based on Enterprise Surveys data. Panel a uses a log scale but shows level values in 1,000s of USD.

Similar comparisons can also be provided comparing basic labor productivity measures across income groups, providing comparisons of like-to-like firms; for example, comparing the labor productivity of food manufacturing firms in high-income economies relative to Mauritius. Figure 1.7 presents such comparisons, both for the revenue per worker measure (panel a) and the ratio of sales to total labor costs (panel b). Recall that Figure 1.3 shows that Mauritius is on level with upper-middle-income countries in terms of revenues per worker but trails its high-income peers; Figure 1.7 reveals that there is considerable underlying heterogeneity. For instance, it appears that this trailing performance, vis-à-

vis high-income countries, is driven by performance in the construction, non-food manufacturing, and accommodation and food services [though this last group is driven by lagging performance among restaurants, but not hotels (See Box 1.2)].[18] In panel b, there is only a statistically significant difference of higher performance in terms of the ratio of revenue to labor costs in the non-food manufacturing category (called "other manufacturing").

Figure 1.7: Relative Labor Productivity by Sector across Income Groups
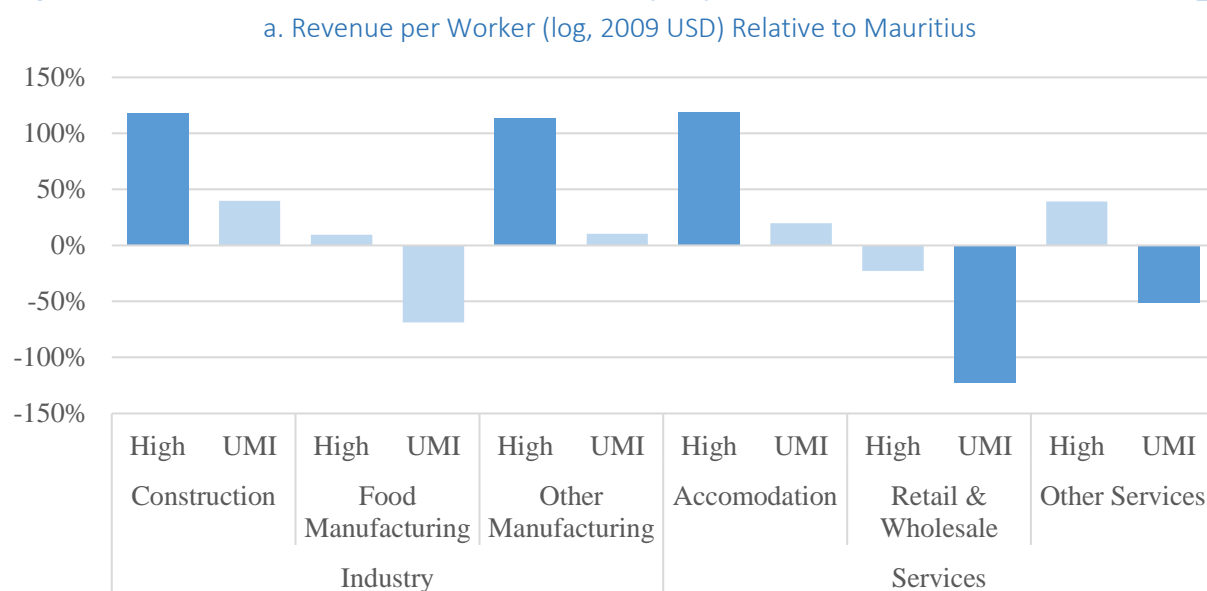
a. Revenue per Worker (log, 2009 USD) Relative to Mauritius

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b. Ratio of Sales to Total Labor Costs
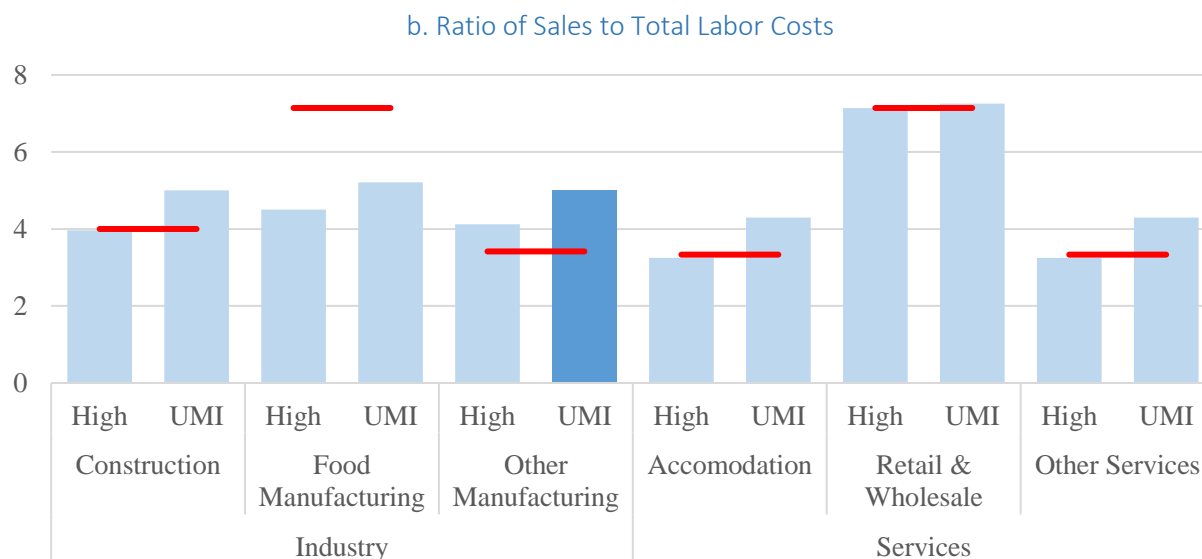
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. For sectoral comparisons, statistical significant differences are relative to "other manufacturing" (i.e., manufacturing excluding food).

Figures 1.8 through 1.10 provide similar comparisons across 3 additional categories: specifically, exporters and non-exporters; foreign-owned and domestic firms; and across basic size categories.[19] Within Mauritius, exporting firms (with at least 10 percent of sales exported) show significantly higher productivity measured via revenue per worker, by 40 percent. Exporters also have a median sales-to-total-labor-costs ratio of 7.1, compared to 5.5 for non-exporters, another statistically significant difference in productivity, despite exporters being 79 percent larger on average than non-exporters.[20] While there is no statistically significant difference in terms of revenue per worker when comparing foreign-owned and domestic firms, the latter group do have a higher median ratio of sales to labor costs (6.5 compared to 5.6, or a difference between a share of labor costs to revenues of 15 percent compared to 18 percent).

Turning to comparisons across income groups, Figure 1.8 shows comparable labor productivity measures, differentiating by exporter status. Broadly, a body of research has shown that exporting firms tend to have higher levels of productivity comparatively, and the gap between different income groups often narrows when comparing exporters. This would be the case if the relative productivity measures were significant for non-exporters, but they are not significant—or if Mauritian exporters had higher productivity than those in other income groups. However, there is no evidence of a narrower gap between Mauritian exporters and either high-income or upper-middle-income exporting firms. Rather, the same pattern as shown above in Figures 1.3 and 1.4 holds: Mauritian firms (regardless of exporting status) lag high-income averages on the revenue per worker measure and are below the median upper-middle-income measure of revenue to labor costs. This underlies a general finding that relative sales per worker are not comparatively high, and yet firms in the country do not leverage their low labor costs relative to output. Figure 1.9 explores the same measures by whether a firm is foreign-owned

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[19] Exporting firms are defined as those that export at least 10% of their annual revenues; non-exporting export less than 10%, including those with no exports at all. Foreign-owned firms, likewise, are those with at least 10% foreign ownership. Domestically owned firms have less than 10% foreign ownership, including those with no foreign ownership at all. Size categories are according to employment size: small (5–19 employees), medium (20–99), and large (100+).

[20] Results of domestic comparisons not shown for space considerations.

(meaning 10 percent+ foreign ownership), compared with those with no or less than 10 percent foreign ownership (domestically owned). The pattern as among exporters is virtually identical, with the small exception that the differential between upper-middle-income foreign-owned firms and Mauritian foreign-owned firms is not statistically significant for the revenue to total labor costs ratio.

Figure 1.8: Relative Labor Productivity by Exporting Status
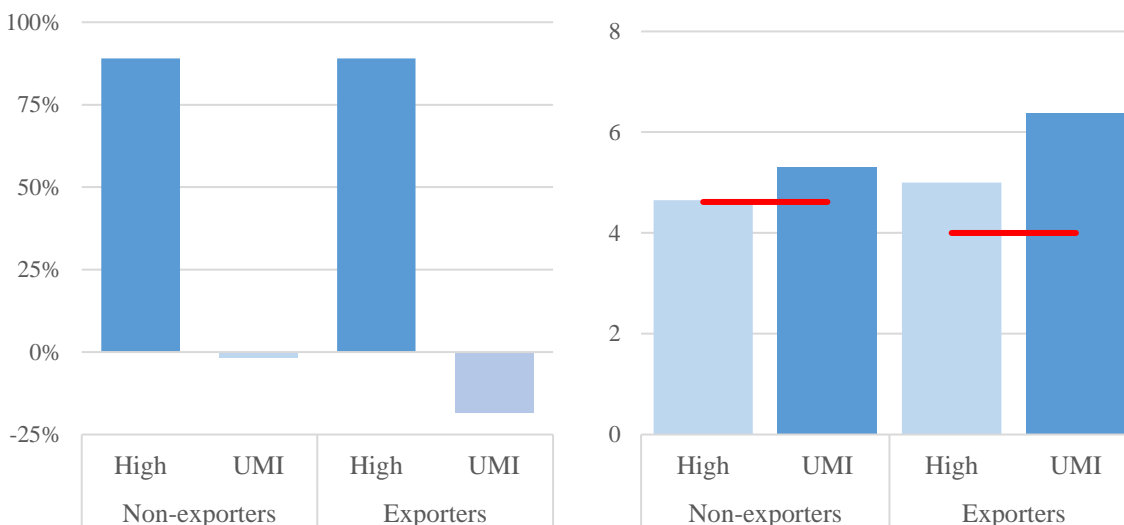
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%.

Figure 1.9: Relative Labor Productivity by Foreign Ownership
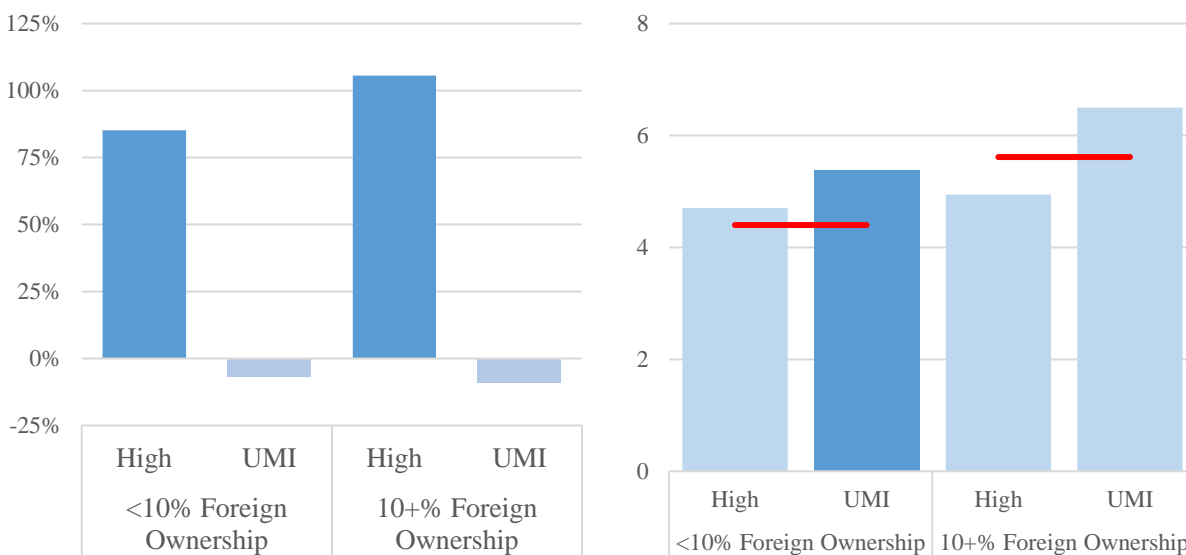
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%.

Firm size—here measured in terms of the total number of employees—also may help explain productivity differentials. Several previous analyses have shown that larger firms tend to be more productive, and so there is further reason to believe that the gap between income groups among firms of the same size category will narrow at larger sizes. This holds to some extent in Mauritius: medium-sized firms are 24 percent more productive than small ones as measured by revenue per worker; however, there is no statistically significant difference between large firms and small nor medium-sized firms as measured by sales-to-total-labor-costs ratios. Large firms and medium-sized firms are 28 percent and 37 percent more productive than small ones (with no statistically significant difference between the two), when sector composition is taken into account.[21] Across income groups, there does not appear to be a narrowing gap among large firms across income groups relative to revenue per worker (panel a) or sales to total labor costs (panel b).

Figure 1.10: Relative Labor Productivity by Firm Size

Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. For firm-size comparisons, statistical significance is relative to small firms.

Box 1.1: Comparing Total Factor Productivity across Select Sectors

Labor productivity measures are largely informative: revenue per worker gives a scaled measure of output as a ratio of people employed; the sales-to-total-labor-costs ratio, in turn, incorporates the price of that labor. However, each measure, in its own way, only considers one input (labor). Often it is useful to estimate output relative to many possible inputs, including labor but also taking capital and materials costs into account. Revenue-based total factor productivity (TFPR), as explained in Annex A.1, can provide such an estimate; although these estimates are only appropriate when expressed as relative measures within well-defined industries, as a caveat in the methodology box explains. Also note that these measures are only available for manufacturing firms.

Table B.1 shows results from a series of regressions, separately for 3 sectors: food (and beverages), textiles and garment manufacturing. The results, expressed as percentages, are productivity levels

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[21] This is done by including a series of sector fixed effects.

(TFPR) relative to Mauritius. Two panels are shown. The first uses rescaled weights, where each country is given equal consideration; the second panel does not rescale these weights and so gives greater weight to the overall population of firms globally.

Table B.1 Relative TFPR to Mauritius						
a. Rescaled weights				b. Raw weights		
	Food	Textiles	Garments		Food	Textiles	Garments
High	2.6%	5.3%	38.1%***	High	5.7%	-6.5%	45.5%***
	(11.2%)	(8.3%)	(3.0%)		(10.2%)	(6.1%)	(2.3%)
UMI	-9.6%	-5.0%	20.9%***	UMI	-3.3%	-2.6%	26.3%***
	(11.1%)	(7.6%)	(3.7%)		(10.6%)	(6.8%)	(3.2%)
LMI	-20.4%*	-21.9%***	-10.9%***	LMI	-24.0%**	-26.0%***	-5.1%*
	(11.2%)	(7.7%)	(3.1%)		(10.4%)	(6.5%)	(2.8%)
Low	-18.5%*	-21.7%**	2.0%	Low	-12.5%	-29.3%***	2.2%
	(11.3%)	(8.5%)	(5.9%)		(12.3%)	(7.2%)	(5.3%)

Note: * p<.1, ** p<.05, ***p<.01. Results are coefficients of a regression of TFPR against a series of income group dummies. Regressions are run for each industry and coefficients in turn approximate a percentage difference in TFPR, relative to Mauritius (the baseline group). Standard errors are parentheses. Regressions are run using Stata's svy prefix and include finite population corrections (fpc). In panel a, survey weights are rescaled so that each country has equal consideration in pooled regressions; in panel b, this rescaling is not done and, therefore, more weight is given to larger populations of firms in each sector.

Reading the results on their own is informative. Compared with high-income and upper-middle-income (UMI) groups, there are no statistically significant differences in the food and textiles sectors. These results can also be illuminative compared with other measures, such as the labor productivity ones in Figure 6. Significantly different results for labor productivity and TFPR, for instance, could indicate that relative capital or material-intensity could account for diverging measures. However, even accounting for capital-intensity and materials use, the relative values hold.

A second key point is that in garments manufacturing, measured via TFPR, Mauritius trails comparable high and UMI groups significantly: for instance, high-income country garment manufacturing in panel a is roughly 40 percent more productive. UMI garment manufacturers are over 20 percent more productive when compared with the same sector in Mauritius. The results do not change across panels.

The lagging performance of the sector coincides with China's tremendous surge in apparel exports after the phasing out of the MFA. Consequently, industrial analysts in several countries have been advising governments and firms to expand operations and cut down costs significantly in the expectation of preserving their position in the global division of labor in textiles and apparel (McKinsey 2001, Hashim 2005). As a result, the focus has been on competing on the basis of low wages and large volumes so that no massive investment in innovative processes nor in R&D has taken place.

Box 1.2: Disaggregating Accommodation and Food Services: Hotels and Restaurants

The accommodation and food services sector—consisting of hotels, villas, room rentals, restaurants and bars, as well as several other services—is central to the Mauritian economy. As noted in this chapter, accommodation and food services were categorized as one sector for the Enterprise Survey. At this level of analysis, however, the sector does comparatively poorly on measures of labor productivity, both when compared with other Mauritian sectors and compared with the high- and upper-middle-income groups.

However, this sector is diverse; and so, it is valuable to disaggregate its components' performances. Comparing the hotel sector to restaurants, the former group has average labor productivity levels (revenue per worker) that are 40 percent higher. This difference is statistically significant at a 99 percent level.[a] There are no statistically significant differences in the sales-to-total-labor-costs ratios.

Figure B1.2 shows comparative levels of both labor productivity measures, comparing the Mauritian hotel and restaurant sectors, separately, with the same sectors in comparable high- and upper-middle-income economies. As in Figure 6, all estimates are relative to the same sector in Mauritius; differences that are not statistically significant (i.e., not at a confidence level of at least 90 percent) are shaded lightly. The figure's left panel shows that the comparatively lower performance of Mauritius's accommodation and food services sector is driven by differences between revenue per worker in the restaurant sector, compared with high-income economies as a group. In fact, the hotel sector performs better on the measure, though the comparisons are not statistically significant. Likewise, the median sales-to-total-labor-costs ratio in Mauritian hotels is 3.6—in other words, 28 percent of revenues are allocated to labor costs—and this level is indistinguishable from the median values of both high- and upper-middle-income economies. By contrast, the median ratio for restaurants is significantly higher when compared to the group of upper-middle-income economies.[b]

Figure B.1.2: Labor Productivity Measures Relative to Mauritian Accommodation Sector
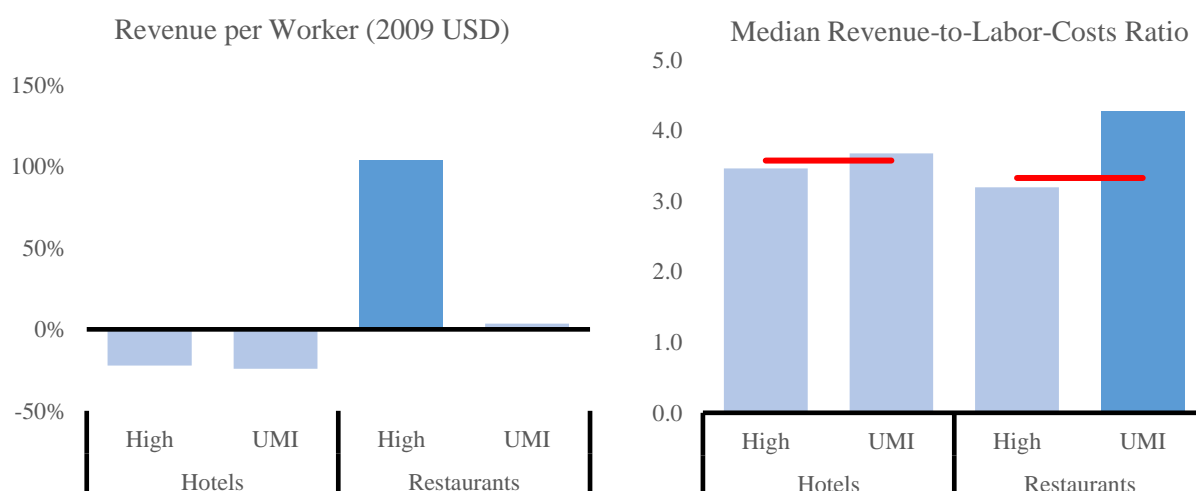
[a] The hotels category includes villas, short- and medium-term room rentals, as well as hotels. Restaurants also include bars/canteens.
[b] Based on quantile regressions.

1.6. Growth, investment and innovation

Sustaining economic growth in Mauritius—a process that has been driven previously by structural transformation and now increasingly by within-sector productivity improvements—also requires a look at the comparative types of firms that are growing, investing and innovating. Figure 1.11, in panels a and b, presents the growth of sales (in real terms) and permanent employment. As before, several categories of interest are shown; now, however, a category of low- and high-productive firms is added

to see how those firms are growing relative to one another.[22] In terms of sales growth, the most productive firms significantly outpace the growth of low-productivity comparators[23] and foreign-owned firms (those with at least 10 percent foreign ownership). Meanwhile, in terms of sectors, there are no discernable patterns, with the exception of retail and wholesale, which is a laggard compared with the other sectors.

Figure 1.11: Sales and Employment Growth

a. Average Real Sales Growth (%)

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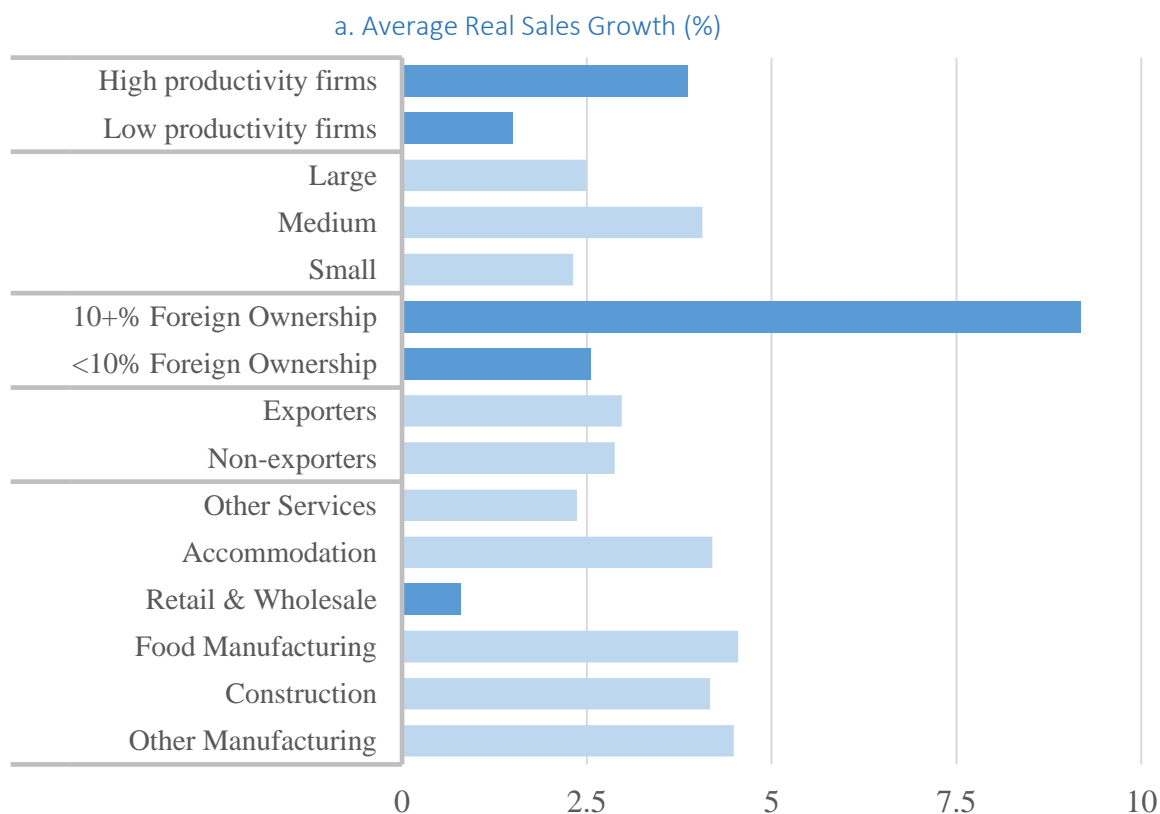
[22] The categorical cut of low- or high-productive is defined as above-median labor productivity, determined by the key sectors within Mauritius.

[23] Note that this comparison should be taken with caution as low or high productivity is defined after the growth period, meaning growth is endogenously defined.
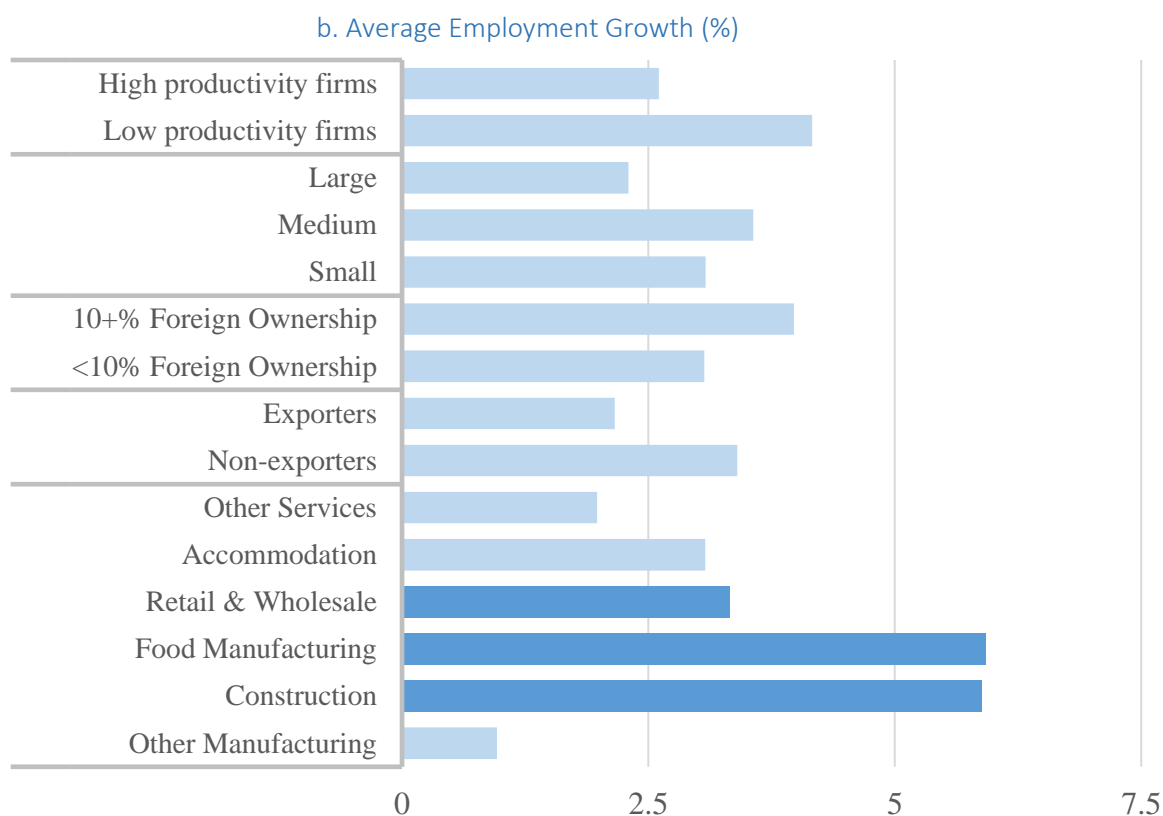
b. Average Employment Growth (%)

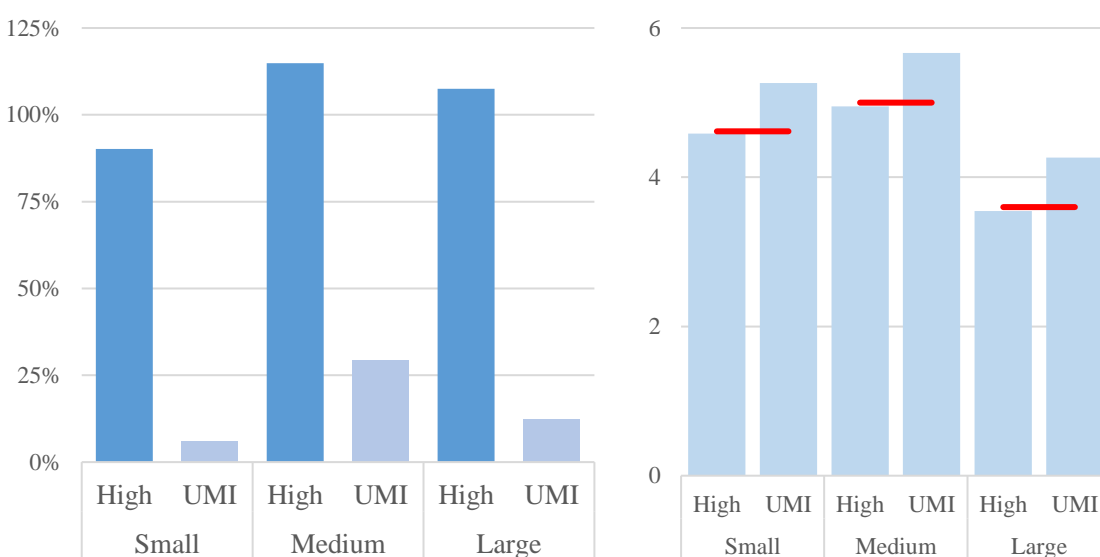Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. For sectoral comparisons, statistically significant differences are relative to "other manufacturing" (i.e., manufacturing excluding food). Likewise, for comparisons based on firm-size, small firms are the reference category. When only 2 categories are defined (e.g., exporter vs. non-exporter), statistical significance is relative to each category.

It is helpful to look at employment growth in conjunction with revenue growth to understand what is sustainable. If employment growth outpaces sales growth, labor productivity will decline; moreover, if both sales and employment continue to grow apace, labor productivity growth can be sustained or even increase. Panel b of Figure 1.11 shows annualized employment growth as a complementary measure to the revenue growth measure in panel a. Notably, only the sectoral comparisons shows statistically significant differences: food manufacturing, construction, and wholesale/retail all show higher employment growth rates than the general manufacturing category (excluding food). This is in line with the general trend of transformation away from manufacturing, though food manufacturing does seem to be an exception.

While not all comparisons on the employment growth are statistically significant, some additional insights emerge by looking at panels a and b together. For instance, while foreign-owned firms' revenue growth significantly outpaced domestic firms', the former group also had nominally higher employment growth, an indication of sustained productivity growth. By contrast, the Mauritian trade sectors (that is, retail and wholesale) have shown the opposite trend: they are accruing workers at a faster pace than sales growth. This is a potentially problematic development, underlining the more general trend of declining labor productivity laid out at the beginning of the chapter.

Growing labor productivity within sectors is often the result of capital accumulation, technological change and/or a decline in misallocation across plants. One direct measure of such physical investment

(which frequently occurs together with investment in workers) is the share of firms that have recently[24] purchased fixed assets (that is, buildings, vehicles, machinery, and equipment). Figure 1.12 shows the share of firms investing in fixed assets across the same relevant categories.

Bolstering earlier patterns, foreign-owned firms are investing at a significantly higher rate than domestic ones, as are exporters. Given the small domestic market, firms in Mauritius exploit foreign markets equally well as those in the high-income group. The usual observation is that foreign ownership is a channel for enhancing competitiveness by drawing innovative technologies, know-how, skills and competence necessary for incorporation into global networks of distribution and production.

Figure 1.12: Share of Firms Investing in Fixed Assets
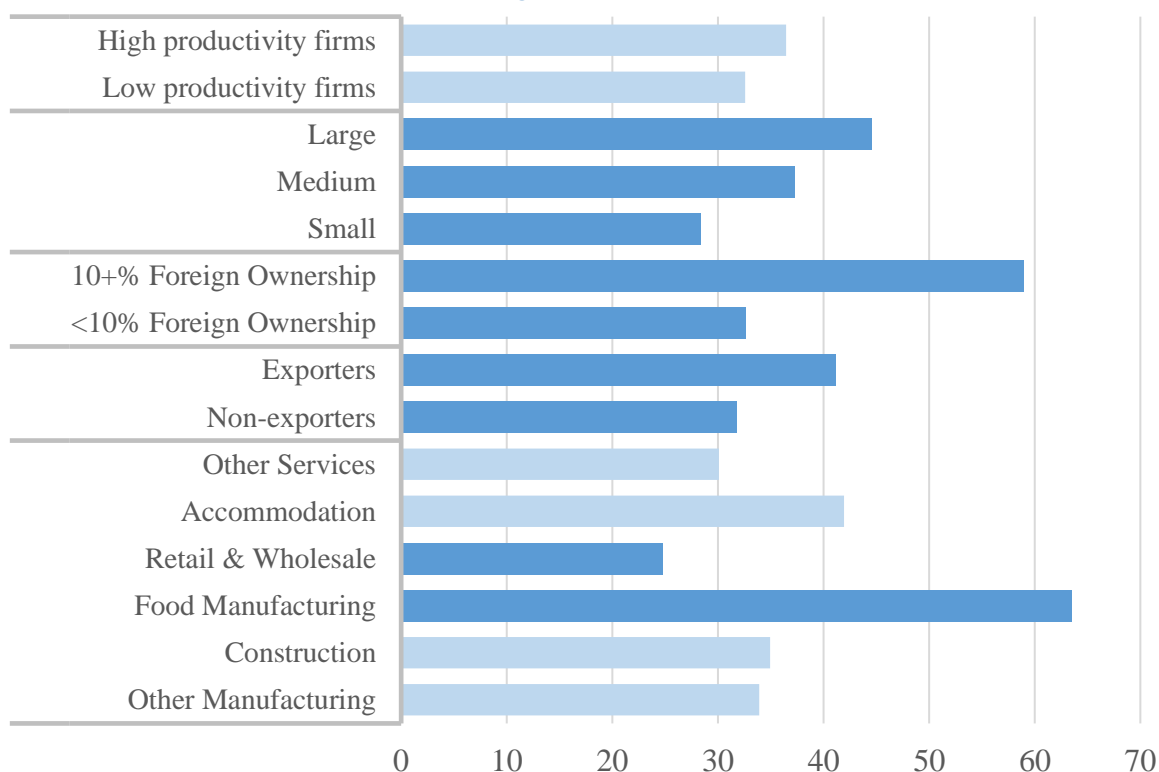
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. For sectoral comparisons, statistical significant differences are relative to "other manufacturing" (i.e., manufacturing excluding food). Likewise, for comparisons over firm-size, small firms are the reference category. When only two categories are defined (e.g., exporter vs. non-exporter), statistical significance is relative to each category.

1.7. Outward Orientation and Ownership Structure

Being a small, island country, Mauritius has a natural linkage to external markets through trade and external investment, a so-called external orientation. And, as noted above, this general orientation has correlated with higher general performances by outwardly oriented firms. This sub-section delves into the orientation issue further by looking at how outward orientation varies across Mauritius's key

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[24] Here defined as in the last completed fiscal year prior to the survey.

industries. It also looks at several dimensions of foreign linkages beyond direct exports and foreign ownership. Specifically, Figure 1.12 shows several individual measures of outward orientation. In addition to the previous indicators for foreign ownership (10 percent+ of ownership) and direct exports (10 percent+ of sales), first, a measure of indirect exports (10 percent+ of sales) is included. Additionally, a measure for "direct foreign linkage" is included. This indicates if an establishment i) has production facilities abroad; ii) manages or is licensed to run a foreign-owned facility; and/or iii) has a dedicated supplier abroad. Each of these is considered in turn, shown with values relative to those firms that do not have that measure—in the case of a dedicated supplier of foreign inputs/supplies, the relative comparison is to those firms with no foreign-origin supplies, and so another category is included for firms using foreign inputs/supplies but with no dedicated supplier. Lastly, though not a direct measure of outward orientation, another dominant form of ownership structure in the Mauritian economy is being part of a conglomerate, which can provide agglomeration on par with foreign linkages. This measure is also included.

Figure 1.13: Relative Revenue per Worker (2009 USD)
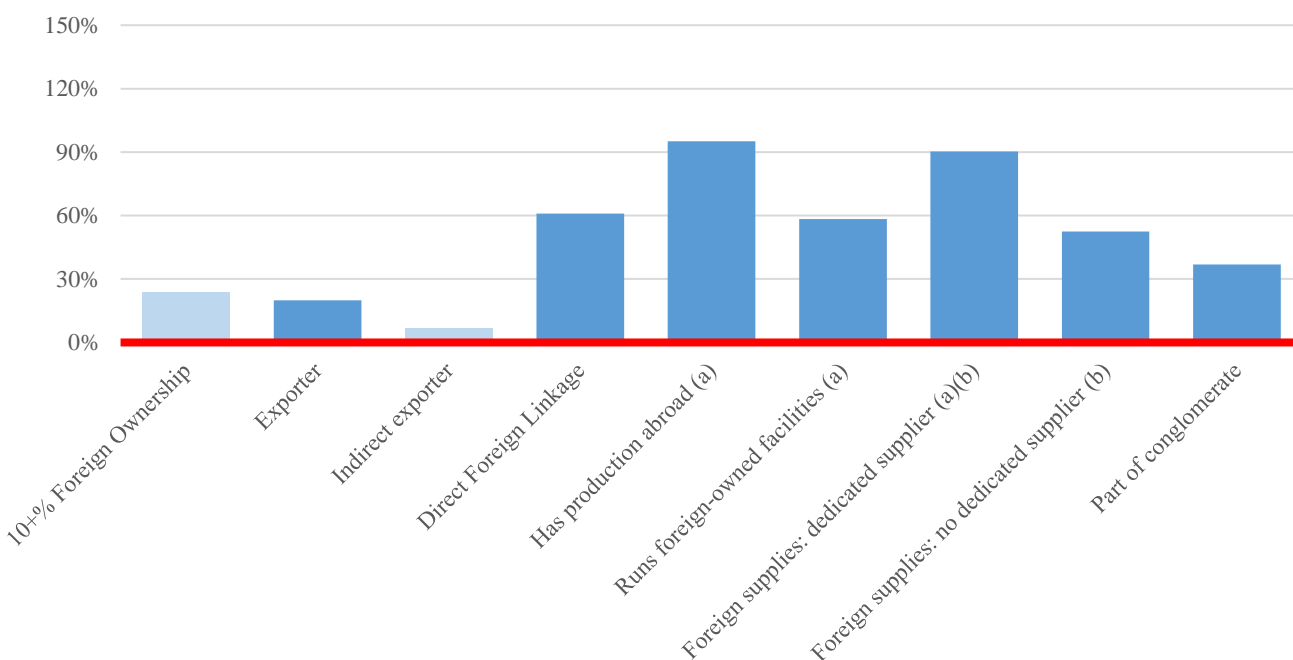
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. All cuts shown are compared to those firms that do not satisfy the cut category (i.e., comparing exporters to non-exporters). (a) "Direct foreign linkage" is equal to 1 if any of these sub-cuts are satisfied. (b) These two sub-cuts are compared to firms with no supplies/inputs of foreign origin.

In line with previous results, an outward orientation tends to correlate strongly with higher labor productivity, as measured by sales per worker. In fact, firms with direct foreign linkages—i.e., those that have production facilities abroad, operate a foreign-owned facility or have a dedicated foreign supplier—enjoy notably higher labor productivity (over 60 percent higher) compared with those firms that do not. This result holds looking at the sales-to-total-labor-costs ratio (Figure 1.14). Productivity is highest when looking at firms with production facilities abroad; however, all other measures of

outward orientation (including being part of a conglomerate) are also significantly higher compared to those without that measure of orientation (though only those firms linked externally via the use of foreign supplies have significantly higher sales-to-labor-costs ratios).

Figure 1.14: Ratio of Sales to Total Labor Costs
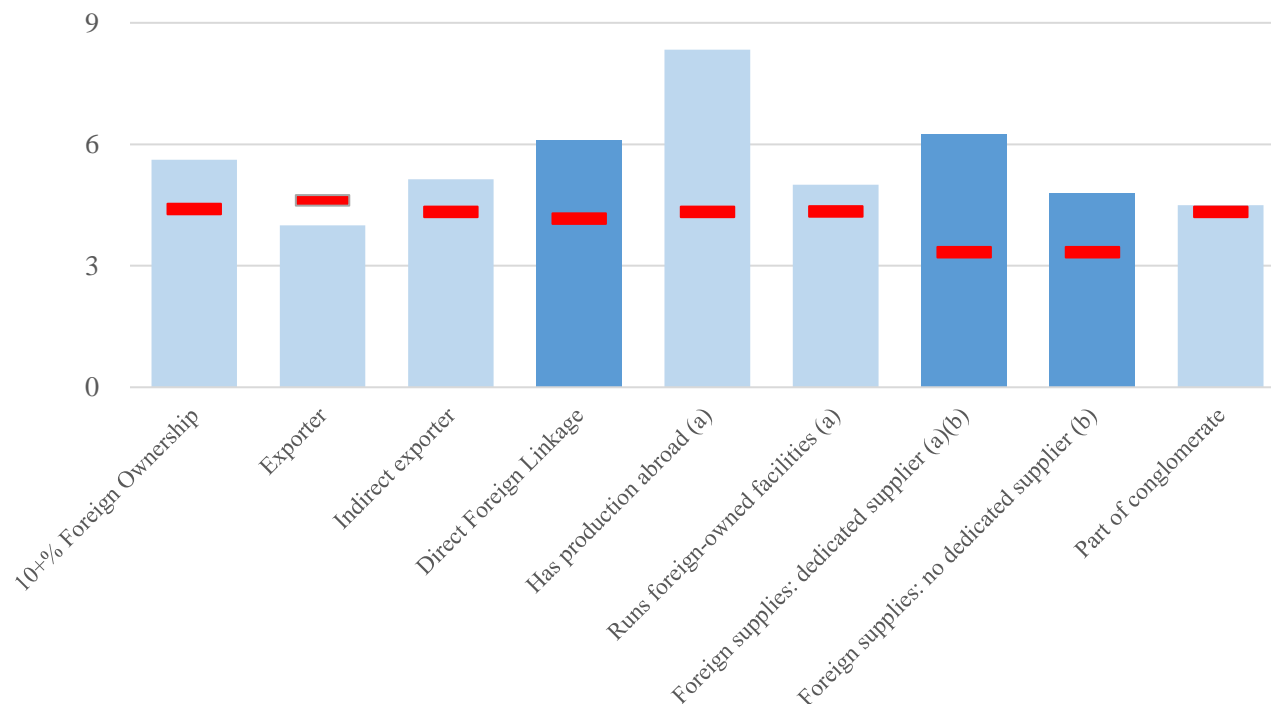
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparisons of medians are not significant at a confidence level of at least 90%. All cuts shown are compared to those firms that do not satisfy the cut category (i.e., comparing exporters to non-exporters); this comparator value is shown by the thick red line. (a) "Direct foreign linkage" is equal to 1 if any of these sub-cuts are satisfied. (b) These two sub-cuts are compared to firms with no supplies/inputs of foreign origin.

A natural extension of the above analysis is to examine how each of these additional measures of outward orientation relate to 2 primary ones: namely direct exporting and foreign ownership (each with a 10 percent threshold). Looking first at how these other measures correlate with foreign ownership, Figure 1.15 shows that these practices of outward orientation are highly correlated: for each indicator, a positive value is also positively correlated with the likelihood of foreign ownership (though this is not significant for indirect exporters or those firms with production abroad, the latter likely due to a small number of observations).

Figure 1.15: Foreign Ownership, by Outward Orientation
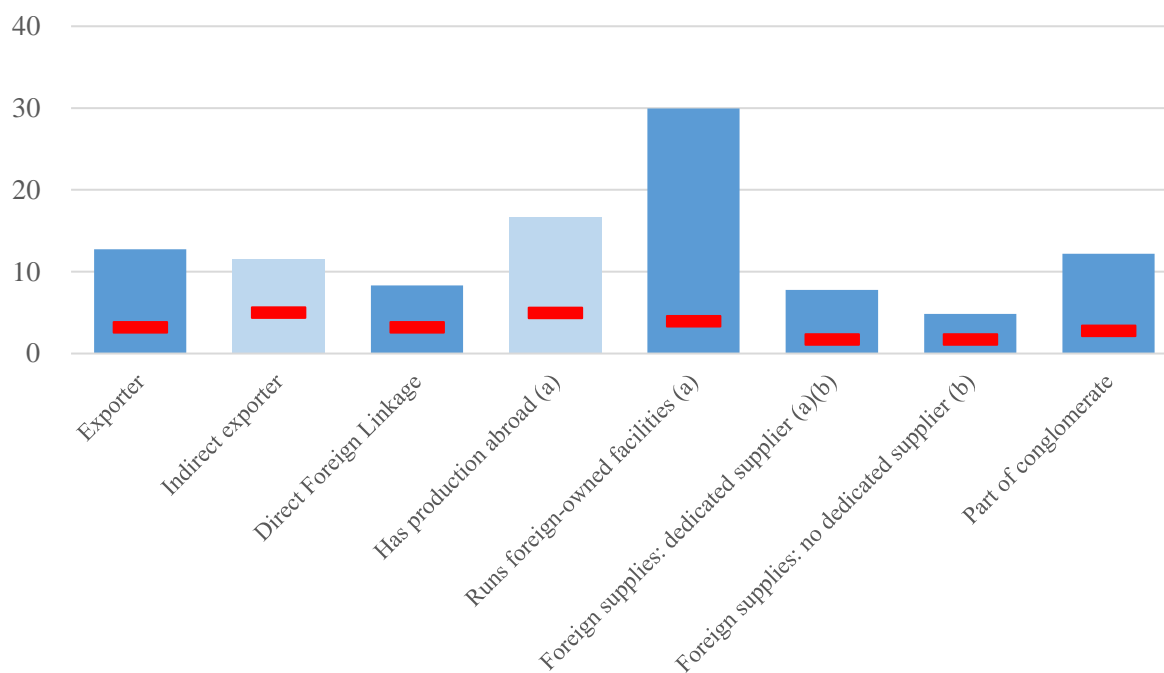
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. All cuts shown are compared to those firms that do not satisfy the cut category (i.e., comparing exporters to non-exporters); this comparator value is shown by the thick red line. (a) "Direct foreign linkage" is equal to 1 if any of these sub-cuts are satisfied. (b) These two sub-cuts are compared to firms with no supplies/inputs of foreign origin.

Likewise, Figure 1.16 shows the same patterns holds for direct exporting. What is quite notable, however, is the scale of these differences. For instance, foreign-owned firms are direct exporters (53 percent) more than twice as often as those without at least 10 percent foreign ownership. Similar patterns exist for other cuts: 3 in 10 firms with direct foreign linkages are direct exporters, compared to 2 in 10 for those without. Firms that belong to conglomerates have a 32 percent likelihood of exporting directly, compared to 18 percent for those that are not part of such ownership structures.

Figure 1.16: Direct Exporting, by Outward Orientation
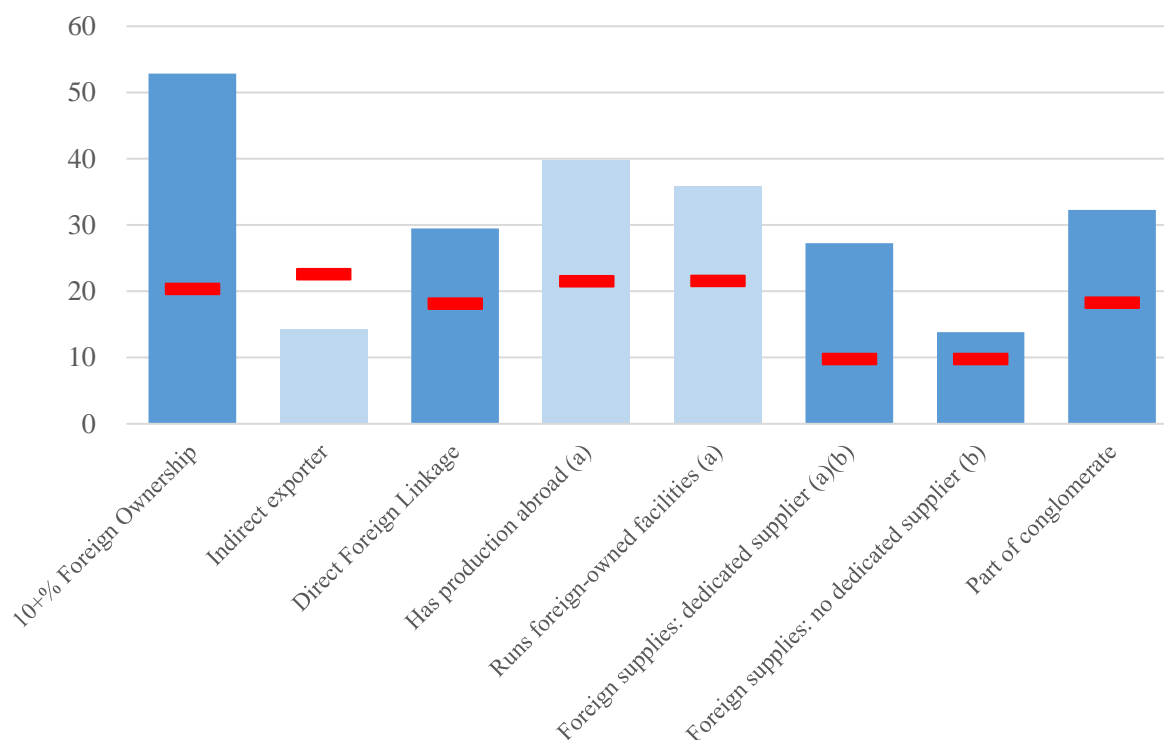
Note: Authors' calculations based on Enterprise Surveys data. Lighter shades indicate the comparison of medians are not significant at a confidence level of at least 90%. All cuts shown are compared to those firms that do not satisfy the cut category (i.e., comparing exporters to non-exporters); this comparator value is shown by the thick red line. (a) "Direct foreign linkage" is equal to 1 if any of these sub-cuts are satisfied. (b) These two sub-cuts are compared to firms with no supplies/inputs of foreign origin.

1.8 Productivity findings and recommendations

While the story of the Mauritian economy over the last several decades has been one of growth and productive structural transformation, recent years have seen that growth flatten or even decline. This dynamic arrived at a moment when Mauritian firms were still trailing their high-income competitors in terms of many productivity measures in key sectors. Such was the background immediately prior to the global COVID-19 outbreak, when the economy found itself in a vulnerable place relative to external demand and global shocks. In fact, it appears that the outward-oriented firms in Mauritius (exporters and foreign-owned) are drivers of productivity growth and investment; such firms may also feel widespread shocks from COVID-19, accentuating the risk of slowed productivity growth.

Logistically, first, tracking such growth and trends will require continued estimates of firm-level productivity, including heterogeneous inputs. Such measures can be produced by detailed, firm-level surveys such as the Enterprise Survey (ES), which can be regularly implemented to monitor dynamic changes over time. Annex A.1 elaborates on these measures in more detail.

Also, more broadly, in sectors where Mauritius does stand out in terms of several productivity measures (such as food manufacturing), there remain other issues for policymakers to address. Such sectors continue to produce low value-added goods, with productivity measures raised through lower unit labor costs, a balance that may be unsustainable. Simultaneously, foreign investment has penetrated key sectors unevenly: It is higher in some services sectors, but low in construction. Within manufacturing, food manufacturing also has notably low levels of foreign ownership, compared to the "other manufacturing" group.[25] Meanwhile, another plausible reason for low value-added products is a lack of linkages between the manufacturing (mainly food processing) and services sectors. Growth[26] in the services sector[27] often has a positive impact on the growth of manufacturing products with higher value added when those services act as inputs in a country's manufacturing. For instance, a study by Deloitte[28] (2006) involving 80 multinational manufacturing companies (ranging from aerospace and defense and automotive to high technology and diversified manufacturing) concluded that higher performing and profit-making manufacturing companies are those that incorporate more services into their manufacturing operations. The study also makes reference to IBM as a model enterprise championing the services revolution to stimulate performance. OECD (2017) also confirms that "services are part of a 'business ecosystem' where collaboration with customers, partners and contractors is the key to innovation and productivity."[29]

To drive productivity growth upward, opening these linkages should be a priority, as well as fostering outward orientation across all sectors in the economy. While these steps may bring investment, innovation, and R&D spending, the country's services and manufacturing sectors should also look to increase R&D spending domestically, bring new products and services to the market, and invest in capital accumulation. These issues are discussed more in depth in the next chapter. Taking these steps can increase international competitiveness, creating a cycle whereby Mauritian firms can export, further incorporate international standards and products, and boost productivity even more.

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[25] For instance, no food manufacturers covered in the survey met the threshold of 10% foreign ownership.
[26] https://www.etsg.org/ETSG2018/papers/286.pdf
[27] Particularly those aimed at invigorating business-supporting service industries, such as accounting advice, advertising, bookkeeping, communication services and legal advice.
[28] Deloitte Research Global Manufacturing Study, 2006, *The Service Revolution in Global Manufacturing Industries*, available at http://www.apec.org.au/docs/2011-11_training/deloitte2006.pdf.
[29] OECD-WTO Initiative, *Measuring Trade in Value-Added*, available at http://www.oecd.org/sti/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm.

Annex A.1: Chapter 1

Estimating Total Factor Productivity

TFP estimations require assumptions about firms' production function. Most begin with a Cobb-Douglas production function $Y_i = A_i K_i^{\beta_k} L_i^{\beta_l}$ where firm-level output (Y_i) is a function of inputs of capital (K_i) and labor (L_i). Firms' efficiency of production is measured by the term A_i; this is firm-level TFP.

A Cobb-Douglas production function can be estimated by $y_i = \beta_0 + \beta_k k_i + \beta_l l_i + \epsilon_i$, where lower-case letters denote the log of variables. The residual terms is composed of an average TFP intercept β_0 and firm-level error term, ϵ_i, so that $\beta_0 + \epsilon_i = A_i$. The two-input case can also easily include materials m_i, giving: $(Eq1)\ y_i = \beta_0 + \beta_k k_i + \beta_l l_i + \beta_m m_i + \epsilon_i$.

While simple, the Cobb-Douglas function assumes that the elasticities of inputs are constant across firms. In a Cobb-Douglas specification, these elasticities are denoted by β and give the percentage change in output for a 1 percent increase in inputs. However, there may be reason to believe that these elasticities vary by firms' uses of inputs. A more flexible functional form is given by the 'trans-log' production function: $(Eq2)\ y_i = \beta_0 + \beta_k k_i + \beta_l l_i + \beta_m m_i + \beta_{kk} k_i^2 + \beta_{ll} l_i^2 + \beta_{mm} m_i^2 + \beta_{kl} k_i l_i + \beta_{km} k_i m_i + \beta_{lm} l_i m_i + \beta_{klm} k_i l_i m_i + \epsilon_i$.

The trans-log form allows the elasticities of inputs (such as labor) to vary with the underlying use of other inputs (such as capital). This is a second-order Taylor polynomial around the Cobb-Douglas production function. If the additional interaction and square terms are jointly different from zero, then there may be reasons to use the trans-log function rather than Cobb-Douglas.

The PICS-3 data, as well as the Enterprise Surveys (ES), include estimates for capital, k_i **[n7a]**, given by the replacement value of machinery and equipment; labor inputs l_i **[n2a]** are represented by the total wage bill (total labor costs); and materials m_i **[n2e]** are measured as the cost of raw materials and intermediate goods used in production. y_i **[d2]** is proxied by total annual sales of the establishment.[30]

Since variables are collected as monetary values, any production function also incorporates market dynamics, including price levels. Such revenue-based TFP is often referred to as the TFPR. TFPR differs from quantity-based TFP (TFPQ) in that it does not reflect physical productivity, but also incorporates information on the prices firms can demand for their goods, and the prices they can negotiate to pay for inputs, neither of which necessarily represent efficient productivity. Globally, however, only TFPR estimates are available using the ES data. TFPR can also be estimated using two models of output: value-added (VALK) and gross output (YKLM). Gross-output (YKLM) specification was preferred for two reasons. First, the VAKL specification relies on a very restrictive assumption that gross output production functions are Leontief in the intermediate input (Gandhi et al., 2020). Hence the VAKL is not generally appropriate for estimating productivity when a fixed proportion of materials is not used for producing a unit of output. In addition, the VAKL specification may lead to an upward bias of coefficients of production function if firms have market power (Basu and Fernald, 1997).

All variables used are collected in local currency units (LCUs) which are specific to the survey and year. To estimate TFP, all variables therefore had to first be converted into U.S. dollars (USD) using the official exchange rate (period average) from the World Development Indicators (WDI). The data are then deflated to 2009 using the GDP deflator for the United States from the relevant reference fiscal

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[30] Variable names in the data are given in brackets and are in bold.

year. To minimize sensitivity to extreme values, outlier procedures were run as well. All input variables (x) were transformed to ln(x+1), and observations that are more than 3 standard deviations away from the mean are then marked as outliers and turned into missing. To find outliers in ratios, the log of the ratio is taken, and the same rule is applied, but within the 10 industries. To compare, other procedures (such as Winsorizing) were performed with no consequential effect.

To produce TFP values, both equations (1) and (2) were estimated. Since average levels of productivity can change by country, or year, fixed effects for each were included. To allow for underlying production functions to vary, these estimations were run separately for each sector based on the 10 identified manufacturing sectors.

To test whether the trans-log or Cobb-Douglas form was more appropriate, the joint significance of all interaction terms and square terms (i.e., $\beta_{kk}, \beta_{ll}, \beta_{mm}, \beta_{kl}, \beta_{km}, \beta_{lm}, \beta_{klm}$) was tested; in all cases, these terms were significantly different from zero, and so the more flexible trans-log specifications were used for all industries.

TFPR is then estimated as: $\widehat{TFPR}_{ict} = \hat{\epsilon}_{ict} + \hat{c} + \widehat{FE}_c + \widehat{FE}_t$. It is the sum of the establishment-level residual $\hat{\epsilon}_{ict}$, constant term ($\hat{c}$) which are common across establishment within each industry; country-fixed effects $\hat{F}_c$ and year fixed effects ($\hat{F}_t$) which are common across establishments within industry-country and industry-year, respectively.

Future Data Collection and Productivity Metrics

There is no doubt that productivity metrics are powerful tools for data-driven decisions particularly in assessing competitiveness, innovation and progress against global benchmarks, such as the Sustainable Development Goals (SDGs). Policymakers often require several different metrics, used in conjunction. In addition to the labor productivity measures used in this chapter, additional and robust multi- or total factor productivity measures are often required (MFP and TFP respectively). Such MFP and TFP measures are more encompassing of several diverse inputs, but also require complex estimations: these benefit from regular and frequent data collection.

Additional expansions of such survey and data collection efforts may be valuable. First, future data collection could be expanded to also include smaller (micro) firms, with fewer than 5 employees. These firms form a substantial part of the Mauritian economy and would include several firms that largely consist of, for example, self-employed or own-account businesses. Secondly—noting that workers tend to be heterogeneous in terms of skills, professional experience and education—future data collection may want to differentiate labor inputs (especially in terms of cost) along these dimensions, including relative hours worked and labor costs. Such explicit differentiation of labor input tends to be data-, research- and cost-intensive. One simpler approach to the labor quality-adjusted measure can be learned from the OECD[31] and Lavoie and Roy (1998)[32] who, assuming a direct linkage between occupations and skills, rank occupations by their skill intensity and generate differentiated measures of labor input by using information on the occupational distribution of hours worked. Other examples of quality-

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[31] OECD Productivity Manual (OECD, 2001a).

[32] Lavoie, Marie and Richard Roy (1998), "Employment in the Knowledge-Based Economy: A Growth Accounting Exercise for Canada," Human Resources Development Canada Research Paper R-98-8E.

adjusted labor input include: i) the method applied by the U.S. Bureau of Labor Statistics[33] which cross-classified hours worked by educational attainment and work experience and ii) the approach adopted by Denmark which cross-classify individuals by: 124 industries; gender; 8 age groups; 29 types of educational attainment; 4 employment classes and hours worked.

Lastly, acknowledging that productivity has drivers other than labor input measures, such as trade openness, capital intensity and innovation, productivity trends in this chapter have been analyzed by attributing the due importance to these drivers. Nevertheless, there is still some additional information, like organization operation or implementation of new management personnel, which may impact labor productivity. These measures are available for analysis in this report and will surely be important for future data collection as well.

Overall, it must be noted that the usefulness of any productivity measure depends on its objectives. The measures used in this chapter have, to a considerable extent, served their purpose by displaying the sectoral disaggregation of labor productivity trends in Mauritius as well as the position of the country's productivity compared with its peer economies.

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[33] Bureau of Labor Statistics (1993), Labor Composition and U.S. Productivity Growth, 1948-90, US Government Printing Office.

Chapter 2: Business Environment and Government Support

Key Findings: Chapter 2

- In the most recent Enterprise Survey (ES), Mauritian firms identified the top 3 business-environment areas that created the most constraints for their operations. They were (in descending order): access to finance, competition from unregistered, informal businesses, and tax rates. In most other areas, improvements are perceptible since the 2009 ES, consistent with trends observed in the Doing Business *(DB) report and other indices of the investment climate. It should be noted that both access to finance and tax rates are often identified as top constraints by firms even in countries with very low tax rates and highly functional financial markets. This finding likely reflects general attitudes toward taxation rather than a serious constraint.*

- Most Mauritian firms rely on internal resources to finance their working capital as well as long-term investment needs. Credit constraints are concentrated among firms that are young, small and medium-sized, and in the garments, manufacturing industries and accommodation sectors. Establishments with high productivity are less prone to financing constraints, as are those that belong to a Mauritian conglomerate or a multinational.

- Many firms operate in product/service markets with significant numbers of competitors—60 percent of the firms reported having 25+ competitors. Larger firms and firms in the textiles and garments, retail, transport and storage, and accommodation sectors face more competition.

- The informal sector is the main competitor for 1 in 10 firms, although more than half of the firms reported some competition from unregistered businesses. In line with global trends, informality in Mauritius is concentrated in the construction, transport, and food sectors. Lower productivity, younger and smaller firms are more likely to see unregistered businesses as their main competition.

- Around 42 percent of firms introduced a new product or service, of which half report that the innovation was new to the market. At 17 percent, process innovation is less prevalent than product innovation. Only 9 percent of firms invest in R&D and less than 10 percent of firms have ever been granted a patent and trademark. Firms that are export oriented and invest in R&D or fixed capital show a higher propensity for innovation.

- The data suggests an inverted-U shaped relationship between competition and innovation: The propensity for innovation increases when a firm has between 2 and 24 competitors (instead of being a monopoly) and then the propensity declines when the firm has 25 competitors or more.

- Higher productivity is associated with product innovation that is new to the firm as well as process innovation. Firms that export, receive FDI, license technology from a foreign firm, and invest in fixed capital exhibit higher productivity. Smaller firms are also more productive. In the sample, Government programs promoting innovation had low uptake (only around 6 percent) and did not have a significant association with productivity.

2.1. Introduction

Why are some of Mauritius's firms more productive than others, and how do they compare with firms in the rest of the world? A large and growing body of economic literature has shown that the

determinants of productivity growth include internal factors, such as innovation, physical capital investment and investment in human capital, as well as the broader business environment within which firms operate. The relationships are complex and not easy to disentangle, as many different institutions and regulations influence firm productivity, including via incentives to invest in human and physical capital, and to acquire technology (Bartelsman and Doms 2000; Kouamé and Tapsoba 2018)[34].

In this chapter, we draw on ES data to better understand how managers of Mauritian companies perceive their business environment constraints and the extent to which these perceived constraints changed over the last decade. Mauritius has made strides in developing a more enabling business environment as measured by the World Bank's *Doing Business* (DB) and the World Economic Forum's Global Competitiveness Index (GCI) reports.[35] Drawing on the ES data, we will confirm some of these long-term trends and also delve deeper to examine how various business environment constraints are seen by different types of companies. The survey data captures responses from the perspectives of different companies and combines subjective and objective measures that can shed light on a range of interesting policy questions.

The survey will also be used to assess the extent to which specific firm- and sector-level characteristics may be shaping companies' competitive environments, their incentives to innovate and their final productivity outcomes. As seen in Chapter 1, the ES data enables us to benchmark Mauritius against peer countries and aspirational countries in our analysis of its productivity trends. In addition, the ES data enables us to understand how the business constraints affect a company according to sector and important firm characteristics—such as size, market orientation and ownership structure. It also allows us to perform more robust statistical analyses, such as regression models.

Importantly, the survey makes it possible to ask some interesting questions that are specific to the Mauritian economy. There are a number of important features that are unique to Mauritius that may affect productivity at the firm level. These features include the following:

- **The important role of conglomerates:** Conglomerates have a large presence across sectors in the Mauritian economy—in the survey, 27 percent of firms are part of a conglomerate. Some were established as far back as the 1800s in the sugarcane sector and, over the years, extended their operations into agribusiness, apparel manufacturing, tourism, retail and logistics, etc. There are benefits to this level of integration, such as reduction in transaction costs, more financial muscle, supply security and quality assurance (World Bank, 2020b&c)[36]. At the same time, vertical integration within key sectors and the extension of market power from one sector to another are known to pose negative effects for competition. In some instances, benefits may outweigh the costs, leading to a more resilient and diversified industry. In others, the reverse may be true: conglomerates may blunt incentives to create jobs and invest in new products and technologies.

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[34] Bartelsman, E. J., & Doms, M. (2000). "Understanding productivity: Lessons from longitudinal microdata." Journal of Economic literature, 38(3), 569-594; Kouamé, W., & Tapsoba, S. (2018). "Structural Reforms and Firms' Productivity: Evidence from Developing Countries". World Bank Policy Research Working Paper, (8308).

[35] In *Doing Business*, Mauritius has a rank of 13 out of 190 countries globally. Two of its best performance areas are: starting a business, where it takes 4 procedures and less than 5 days to start a business (compared to 5 procedures and 9 days in OECD high-income countries) and paying taxes, where the time spent paying taxes is 140 hours (even lower than the OECD high-income average of 159 hours). The 2 indicators where Mauritius lags behind are getting credit and trading across borders. Under the 2019 GCI, Mauritius is ranked 28th out of 140 countries for the administrative requirements of doing a business. World Bank. (2019). *Doing Business 2020*. The World Bank.

[36] World Bank (2020b) Mauritius Country Economic Memorandum – Competition Policy. World Bank (2020c) Mauritius Country Economic Memorandum – Innovation and technology adaption.

The survey contains data about the links between the establishments that responded and their parent companies which can help to test these hypotheses.

- **Export markets as a stepping stone to build competitiveness:** As illustrated in literature on productivity in emerging market and developing economies (EMDEs), participation in global value chains plays a key role in transferring know-how and supporting productivity growth in small open economies, such as Mauritius. It has been argued that exporting companies have been important conduits for "new to the country" and "new to the firm" innovations, working in tandem with the rapid economic diversification and integration into global value chains. A quarter of all the firms in the survey directly or indirectly export to obtain at least 10 percent of sales.

- **FDI as a conduit for technology transfer and innovation:** Foreign investors have been most active in the finance, real estate, accommodation and construction sectors—together, these account for 85 percent of gross direct investment flows from 2016 to 2018, or 47.8 billion Mauritian rupees out of the total Rs 56.7 billion (Bank of Mauritius). While only a small share of the FDI inflows goes into economic sectors that are known to be strong conduits for international technology transfer and have higher R&D spending as a share of revenue, the inflows could have wider impacts on the behavior of companies in the sectors that need to innovate to retain and grow market share. The companies in the survey report on foreign ownership, so this can be examined to some extent.

- **How competition rules affect the behavior of companies:** Market contestability has been improving since the Government enacted its Competition Act in 2007 and it has been argued that improving market contestability can foster innovation. At the same time, limits to enforcement, combined with an overly regulated environment, can lead to informality, which can undermine the profitability and growth of the formal sector. These questions are included in the survey and help to complement what we know from other sources of data.

- **Entrepreneurs and young enterprises as a catalyst for change:** Young companies tend to be active in "new to the country" and even "new to the world" innovations, in new industries such as fintech, creative media and internet and communications technologies (ICT). Entrepreneurs and start-ups (including from abroad) are attracted to Mauritius by the Government's attractive tax regime and a favorable business environment. A fifth of the firms included in the ES have been established within the past 10 years and this chapter analyzes some of the trends for this group of firms.

The chapter is organized as follows: The first section reviews the business environment constraints. The second section looks at competition faced by firms, including from the informal sector. The third section analyzes the incentives to innovate and invest in R&D. The fourth section looks at how these various factors correlate with productivity differences seen between companies using a simple regression model. Policy considerations are discussed in the final section.

2.2. Business-enabling environment

This section first presents descriptive results about how firms perceive their business environment and then looks in more detail at some of the individual constraints. The section reports on questions in the survey that ask companies whether specific business environment areas are a constraint for their operations. Then the section looks in more detail at access to finance, which is the top constraint highlighted by firms, and customs and trade regulation, an indicator where Mauritius lags behind many of its peers in the DB report. Constraints related to skills and the labor market in Mauritius are further reviewed in Chapter 3.

The starting point for the study is that Mauritius has been a regional front runner on DB for more than a decade, with regular improvements during this period (see Figure 2.1 below). Even when compared

to high-income small island states such as Taiwan (ranked 15th globally), Mauritius ranks well and only lags behind Singapore and Hong Kong (ranked 2nd and 3rd globally respectively) by a few points. The country also ranks favorably in the region under the Global Competitiveness Index of 2019, with high scores under measures such as the cost of starting a business and the time to start a business. These improvements have translated into lower risk perceptions by investors. In 2021, Coface rated the country at A3 for business climate with effective governance as one of the key strengths.[37]

Figure 2.1. Mauritius on the Doing Business 2020 indicators
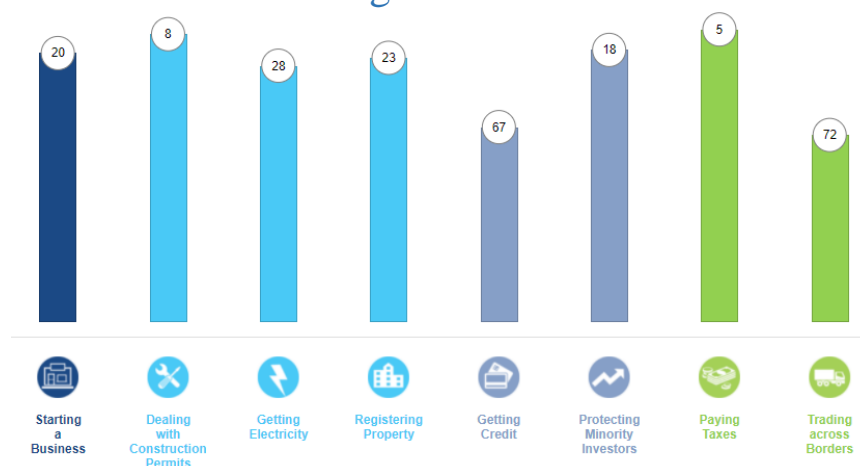
When asked in what business environment areas they face constraints, Mauritian firms report that:

- **Access to finance and competition from informal sector are the 2 most pressing areas, a result that changed little over the last decade.** As reported in Figure 2.1, about 40 percent of firms identify access to finance and competition from informal firms as posing a major or very severe obstacle.[38] When the 2009 ES was conducted, the share of firms reporting these constraints was very similar to what it is today. It is also consistent with the 2020 DB report and 2020 DB index, where the nation was ranked 67th in the "getting credit" indicator.

- **While tax administration has improved, tax rates became a more significant constraint over time.** Around 20 percent of firms were visited or required to meet with tax officials, comparing favorably with high-income average of 23 percent and Africa's average of 70 percent. The average number of visits or required meetings with tax officials is 0.44 which is similar to high-income countries and much lower than the Africa average of 2.33. On the other hand, the share of firms reporting tax rates as a major or very severe constraint increased from about 25 to 33 percent in this ES[39]. When asked what is the top constraint, tax rates are also mentioned by 10 percent of firms, a percentage that grew since 2009 ES.

- **The private sector's perception about other areas—including on the governance and infrastructure fronts—generally improved compared with the 2009 ES.** There was a drop in the share of firms seeing crime, corruption, transportation and access to land as major or severe constraints. This confirms that companies feel the impact on the ground of reforms tracked by the

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[37] https://www.coface.com/Economic-Studies-and-Country-Risks/Mauritius

[38] This is similar to what firms replied in other parts of the survey that asked what their top obstacle is (see Annex).

[39] It should be noted that both access to finance and tax rates are often identified as top constraints by firms even in countries with very low tax rates and highly functional financial markets. This finding likely reflects general attitudes toward taxation rather than a serious constraint.

DB report and infrastructure improvements. While transport and electricity are less of an obstacle, they still concern around 25 to 30 percent of companies. Less than 20 percent of firms have major concerns in other areas, although customs and trade regulations shows limited improvement over time.

- **Over the past decade, the share of firms identifying business licensing and permits as a major constraint decreased from 18.6 to 10.4 percent.** In Mauritius, senior management spends 12.4 percent of their time dealing with requirements of Government regulation. While this is a slight increase from the 2009 figure of 9.4 percent, it compares well with the high-income average of 10.6 percent. One area of concern is that the time required to obtain an operating license increased from 19.1 to around 2 months according to respondents—recent reforms such as the introduction of a digital platform for applying to all types of licenses (the National Electronic Licensing System) should improve this metric.

Figure 2.2. Share of firms identifying the constraint as major or very severe
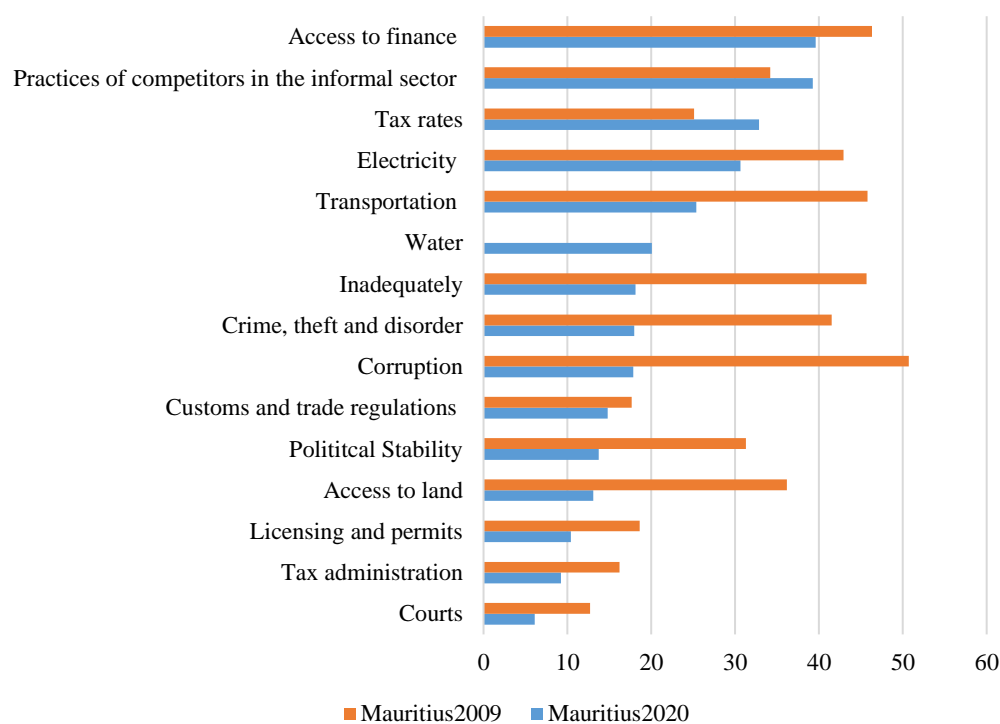
The results regarding business environment constraints are quite consistent across different types of companies, although larger and higher-productivity firms tend to be more concerned with electricity and transport. Table 2.1 shows the top 3 areas flagged by different types of companies[40]. The heightened concerns around electricity likely reflects both reliability and tariff issues and, as could be expected, tend to be more pronounced in energy-intensive firms[41]. The questions about reliability suggest that there is a relatively high cost of sales lost due to power outages (in high income countries, losses are around 0.7 percent of annual sales whereas they are 5 percent in Mauritius), and as a response, 81 percent of large firms have a generator compared to 65 percent of medium firms and 38 percent of small firms.

Table 2.1: Top 3 constraints according to firm characteristics

(Share of firms in each subgroup that report the area as a major or very severe constraint)

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[40] The ranking of constraints in the table is similar to the ranking of top 3 constraints by firms (See Figure A.2.1. in the Annex).
[41] The ES survey asked firms to report their annual total cost of electricity and the responses showed there is a statistically significant association between a firm's electricity cost and the likelihood of reporting access to electricity as a constraint, with the firms having electricity costs in the top 25th percentile more likely to be concerned about electricity.

Part of a conglomerate	**Majority female onwership**	**Exporting firms**		**Small firms**	**Large firms**	**High producttivity firms**
#1 Access to finance	#1Access to finance	#1Access to finance		#1 Informal competitors	#1Electricity	#1Transport
#2 Electricity	#2 Electricity	#2 Electricity		#2 Access to finance	#2 Transport	#2 Electricity
#3 Informal competitors	#3 Informal competitors	#3 Informal competitors		#3 Tax rates	#3 Access to finance	#3 Access to finance

Access to finance

Despite the strong growth of financial services in Mauritius, the survey results indicate that there are selected segments of the real sector that continue to experience access to finance (A2F) constraints. As discussed in the IMF (2019)[42] selected issues paper, Mauritius has become more financially integrated economy during its transition and is on the way to becoming a global financial center. But as seen in some other upper middle-income and high-income countries, well developed financial markets do not guarantee adequate access to finance for all types of firms. In Mauritius, the data suggests that:

- **Financing constraints affect around 25 percent of companies**. When using a perception variable whereby firms are asked to describe the extent to which access to finance is a constraint (see Figure 2.3a), about 45 percent see this as a major or severe constraint. But when objective questions about a firm's use of finance products are used, the share of partially or fully financially constrained firms is 23 percent (Figure 2.3b and 2.3c)[43]. These constraints seem to have worsened slightly since the 2009 ES as shown in the figures.

- **Small and medium-sized firms are much more likely to face financing constraints**. More specifically, 30 percent of small firms report credit constraints vs. 20 percent of medium firms and less than 10 percent of large firms. This finding is not unexpected as similar gaps exist in medium- and high-income economies.

- **Higher productivity firms are less likely to report binding financing constraints.** Of course, there could also be an element of reverse causality, as companies with credit availability (which could be because of better collateral) are better able to make productivity enhancing investments.

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[42] IMF (2019) "Mauritius: Selected Issues", Country Report No. 19/109. This finding correlates with the significant increase in domestic credit to the private sector as a share of GDP that Mauritius sustained over the past decades and which reached 80% in 2019. This remains lower than the upper-middle income average (123%) or the high-income average (147%), World Bank Development Indicators.
[43] The measure of partially or fully credit constrained firms uses hard data and not perception data to measure various degrees of access to finance constraints. It is based on the methodology of Kuntchev, V., Ramalho, R., Rodríguez-Meza, J., & Yang, J. S. (2013). *What have we learned from the enterprise surveys regarding access to credit by SMEs?*. The World Bank.

- **The gender of the owner does not make a significant difference for access to finance.** This result is consistent with the Global Findex 2017 survey,[44] which showed that Mauritius has a low gender gap, the lowest in the Africa region.

- **As expected, affiliations with a conglomerate or multinational are associated with less financing constraints, and this is also true of companies that received FDI or made outward investments (See Figure 2.3.c).** These relationships can be explained by the deeper resources that companies with these characteristics can mobilize, internally as well as externally.

- **At the sector level, companies in garments, manufacturing industries and accommodation are more likely to report financing constraints than they are in other sectors**. There could be several explanations for this, including that firms in some manufacturing sectors operate with low margins and have high working capital needs, and as wages increase and costs are driven up, access to bank credit is becoming more difficult.

Figure 2.3a. Firms that identify access to finance as a major or severe constraint (percentage of total firms)

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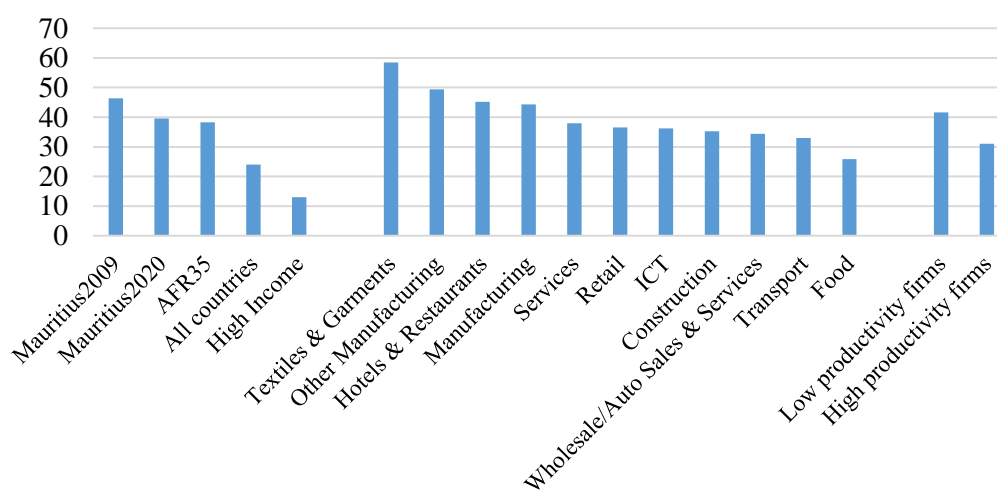
[44] IFC and MasterCard Foundation (2017), Field Note 10 Women and Digital Financial Services in Sub-Saharan Africa: Understanding the Challenges and Harnessing the Opportunities.

Figure 2.3b. Firms that are partially or fully credit constrained (percentage of total firms)
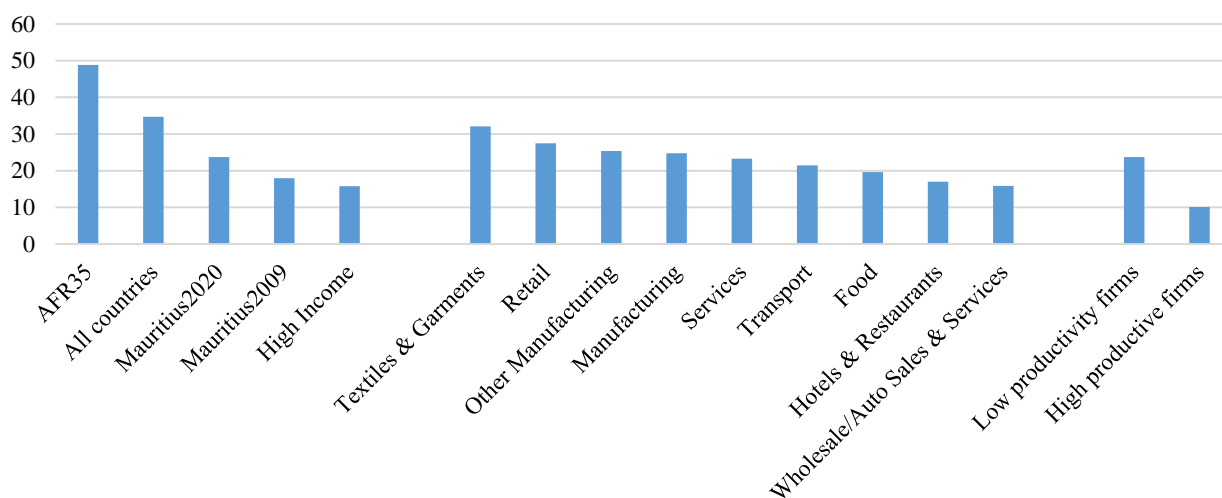
Figure 2.3.c. Firms that are partially or fully constrained according to outward orientation (percentage of total firms)
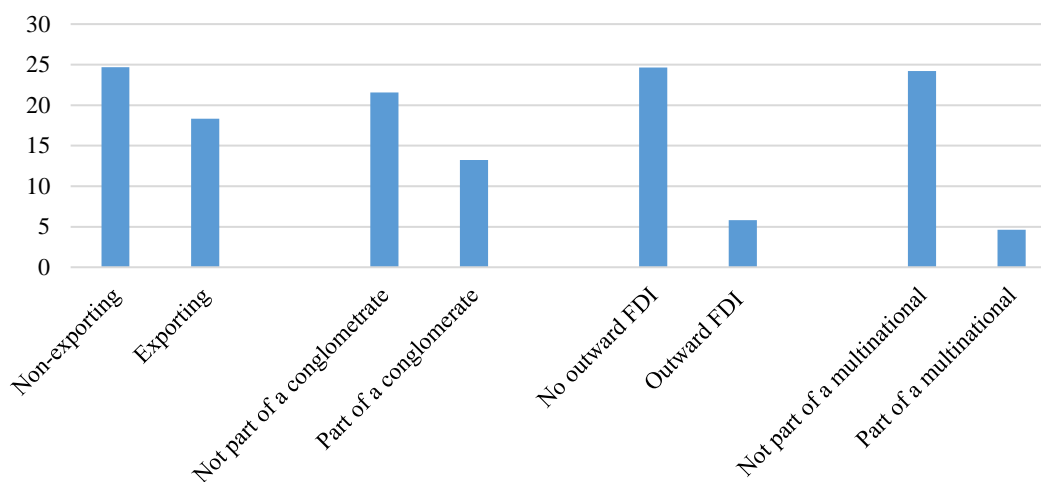
Looking to the sources of financing, most firms rely on internal resources for working capital as well as fixed assets, with the remainder largely drawing on bank credit and purchases on credit or advances from customers. Figures 2.4a and 2.4b shows the source of financing for working capital and fixed assets in the year before the survey, which was prior to the COVID-19 pandemic. Banks are a more important source when it comes to investment in fixed assets which are on longer maturities than working capital. Most of the external financing came from private commercial banks (94 percent).

Figures 2.4a and 2.4b.

Figure 2.3a. The source of firms' working capital by source type over the past fiscal year (in average percentage for all firms)
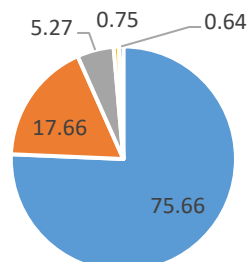
- Internal funds or retained earnings
- Borrowed from banks: private and state-owned
- Purchases on credit from suppliers and advances from customers
- Other, moneylenders, friends, relatives, etc.
- Borrowed from non-bank financial institutions

Figure 2.3b. The source of funds for a firms' fixed assets over the past fiscal year (in average percentage for all firms)
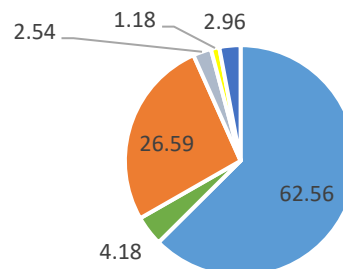
- Internal funds or retained earnings
- Owners' contribution or issued new equity shares
- Borrowed from banks: private and state-owned
- Purchases on credit from suppliers and advances from customers
- Other, moneylenders, friends, relatives, etc.
- Borrowed from non-bank financial institutions

According to the survey, 26.5 percent of firms applied for a new loan or line of credit in the past fiscal year. While about 96 percent of the loan applications were approved (which compares favorably against the high-income countries' average of 92 percent and the African average of 75 percent), Mauritian firms have become increasingly reliant on internal funds[45]. Over the past decade, the share of firms using banks to finance investment has declined from 30.8 percent to 22.7 percent. The proportion of firms using external sources to finance working capital also declined from 35.6 percent to 23.8 percent and slightly lags behind the high-income average of 26.3 percent. Also, it is worth noting that about half of the firms had a line of credit or a loan from a financial institution at the time of the survey. Of those that did not apply, 70 percent did not do so because they had sufficient capital, the remainder reported that collateral requirements or interest rates were deemed too high, among other reasons (see Figure 2.5). Challenges related to high collateral costs have been highlighted in other consultations between the World Bank and private sector stakeholders and there is planned action from the GoM to review the legislation and institutional framework regarding secured transactions.

Figure 2.5. The main reason the firm did not apply for any line of credit or loan

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[45] Loan rejection rates are higher for firms that report access to finance as a binding constrain - smaller firms and firms in the construction, textile and garments, food and other manufacturing sectors (see Figure A.2.2. in the Annex).
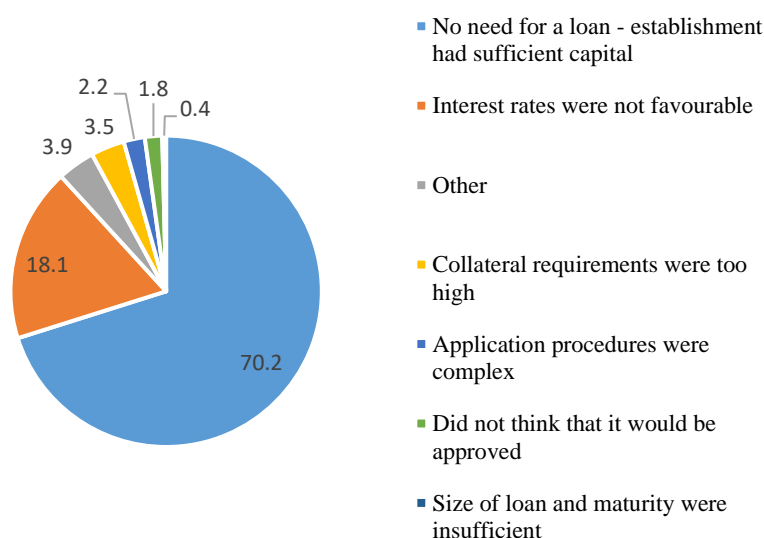
To respond to financing constraints, the Government of Mauritius has introduced a range of support programs for SMEs and other companies that face constraints (see Box 2.1). The survey responses indicate limited take-up of existing instruments; for example, state-owned banks and Government agencies account for a small share (5 percent) of external financing. This is an area that merits more research, to understand whether the programs are targeting the types of companies that report having binding credit constraints, and what is the additionality relative to the fiscal costs and the administration costs of such programs. This area will continue to be important for policy as an extensive body of literature that shows that access to finance will have impacts across a range of outcomes.[46]

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[46] World Bank (2020) Global Productivity: Trends, Drivers, and Policies. Advance Edition. Washington, DC. This study indicates that for countries with a given level of initial productivity, greater financial depth is associated with faster subsequent productivity growth. Well-developed financial markets that enhance access to finance can improve the efficiency of capital allocation and enable firms to make productivity-enhancing investments (Fisman and Love 2003; Levine 1997). They may also allow firms to diversify investment risk and increase liquidity, and stimulate entrepreneurship (Beck, Levine, and Loayza 2000a, 2000b; Demirgüç-Kunt and Levine 1996) Fisman, R., & Love, I. (2003). "Trade credit, financial intermediary development, and industry growth." The Journal of finance, 58(1), 353-374.; Levine, R. (1997). "Financial development and economic growth: views and agenda." Journal of economic literature, 35(2), 688-726. Beck, T., R. Levine, and N. Loayza. 2000a. "Finance and the Sources of Growth." Journal of Financial Economics 58 (1–2): 261–300.; Beck, T., R. Levine, and N. Loayza. 2000b. "Financial Intermediation and Growth: Causality and Causes." Journal of Monetary Economics 46 (1): 31–77.; Demirgüç-Kunt, A., & Levine, R. (1996). "Stock markets, corporate finance, and economic growth: an overview." The World Bank Economic Review, 10(2), 223-239.

Box 2.1: Supporting access to finance for SMEs

The Government of Mauritius, through various structures, has put up several mechanisms and financial products to assist SMEs and companies in financial difficulties. The table below provides some of the schemes in place.

No.	Institution	Facilities
1.	Development Bank of Mauritius Ltd	Micro Credit Scheme, Women Entrepreneur, Multi-Purpose Loan Scheme, Revolving Credit Fund, Enterprise Modernisation Scheme (EMS), New Agricultural Loan, Mechanisation, Agro Industry, MSME Financing, Business Loan, DBM Factoring Scheme
2.	Investment Support Programme (ISP) Ltd	Leasing Equipment Modernisation Scheme (LEMS) I, SME Factoring Scheme, Export Factoring Scheme, Leasing Equipment Modernisation Scheme (LEMS) FOREX.
3.	SME Equity Fund (SEF) Ltd	Crowdlending, Innovation and Technology Fund, Equity/Quasi Equity Financing Scheme
4.	Bank of Mauritius (BOM)	Special Relief Fund, Special Foreign Currency (USD) Line of Credit

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<u>Trade and customs regulations</u>

Fifteen percent of firms identify trade and customs regulation as a major or severe constraint, about twice the share in high income countries. This is a slight improvement since the 2009 ES (Figure 2.6). These results are consistent with previous studies where trade in Mauritius is on par with Africa but behind high income countries and may reflect the relatively high cost of trade.[47] The results are also consistent with the Logistic Performance Index (LPI) where Mauritius scored 2.73 out of 5 in 2018. Customs was among the weakest areas in the LPI. The World Bank (2021) also reports that Port Louis is roughly average in comparison with 1O Eastern African Ports (including, for example, Dar es Salaam, Durban, and Mombasa) for vessel turnaround time and quay productivity for general cargo, and slightly above average for containers (TEU) per meter of quay, waiting time, and vessel turnaround time, but falls in a range of 44 to 53 percent of the best performing comparable ports. Looking at the differences for firm characteristics and sectors reveals the following insights (see Figure 2.6):

- **Firms with a higher share of direct exports and medium-sized firms see more significant constraints from trade and customs regulations**.

- **Trade and customs regulations are flagged as a constraint by wholesale retail and manufacturing industries**. The companies that are in industries that would require more frequent

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[47] While the nation scored 81 out of 100 for its ease of trading across borders in the *Doing Business* report and had a ranking of 2 in the Sub-Saharan Africa region, after Botswana, the relative cost of trade remains high. The cost to export is $303, much higher than the OECD average of $136.8, and the cost to import is $372, compared with the OECD high income average of $98.1. The fluidity of trade may also be undermined by the complexity of tariffs, where the nation has a ranking of 56 in the 2019 Global Competitiveness Index (GCI). Clearance customs costs have been included as one of the key areas of focus under the World Bank Action Plan for Trade Facilitation in Mauritius.

import and export for their operations are more concerned by this area, consistent with the findings regarding exporters.

- **Firms reported a median wait of 3 days for customs to clear when they were exporting and a median wait of just over 6 days for imports.** Looking in more depth shows that the number of days for exporting and importing have distributions with "long tails," implying that there are some outlier firms that have to wait much longer for customs to clear. These may be firms that possibly do not trade very often and are not completely familiar with procedures that deal with products subject to additional inspections.[48] The Government has introduced several reforms to facilitate trade (See Box 2.2).

Figure 2.6. Firms identifying customs and trade as a major or severe constraint (percentage of total firms)
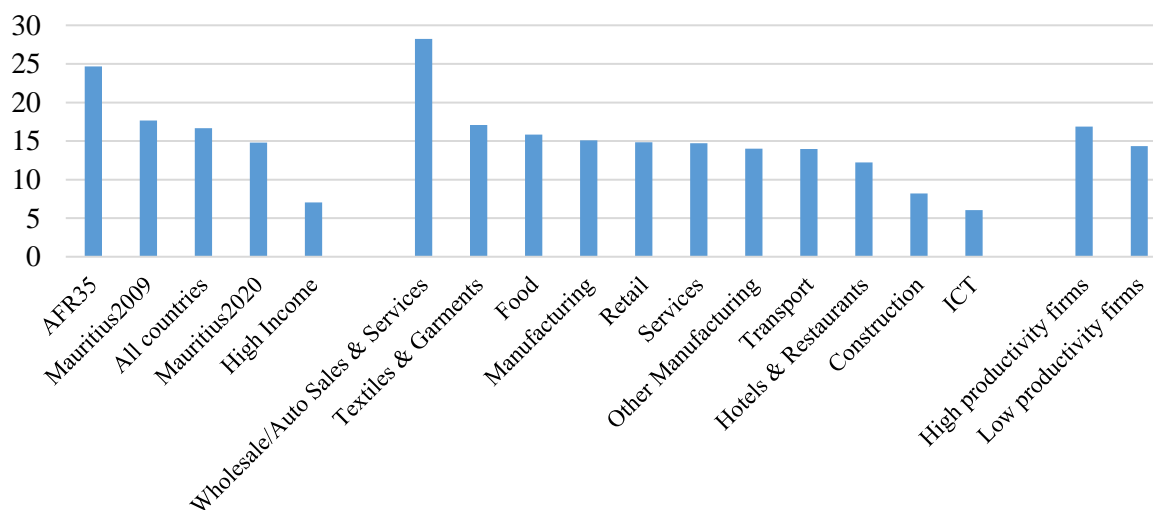
Box 2.2: Making cross-border trade easier

- The Mauritius Revenue Authority (MRA) Customs uses a Customs Management System (CMS) for the processing of import and export declarations and the clearance of goods, including transshipments and Freeport activities.
- An automated filtering of declarations is made by the CMS, according to sensitivity/risk of goods which assigns declarations to the appropriate channels: Green, Yellow, Red and Blue (Authorized Economic Operators).
- Inspections are conducted on a risk-based basis and 95 percent of goods are cleared without inspections.
- Clearances with respect to controlled goods are processed through an online system, the TradeNet. At the time of this report,12 agencies are giving their clearances electronically via the system.

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[48] The tails push the average number of days waiting for exports to clear to 17 days and the average for imports to clear to over 9 days.

2.3. Competitive landscape and the informal sector

The survey includes several questions on competition. These questions focus on the number and type of competitors as well as on the practices of the informal sector. The section outlines the descriptive results, including some results that are specific to the manufacturing sector, and then looks in more detail at what could explain the differences in the number of competitors across firms.

The survey suggests that most firms operate in product/service markets with significant competition, with only around 6 percent having a monopoly position (Figure 2.7). The figure also shows that between 2009 and 2020, the share of firms who had monopoly in their main markets declined from 24 percent to 6 percent. On the other hand, the share of firms with more than 5 competitors increased from 39 percent to 71 percent.[49] Of course, the question of how much effective competition there is at product/service market level is not just about the number of competitors, but also about their relative size and the behavior of dominant players. Administrative data from income tax returns that was analyzed in the World Bank's Country Economic Memorandum (CEM) suggest that of 672 sectors, nearly 70 percent would be considered highly concentrated by conventional measures (including subsectors in ICT, financial services, transport and tourism).

Figure 2.7. Number of competitors in the main market, 2009 vs 2020 (percentage of firms)
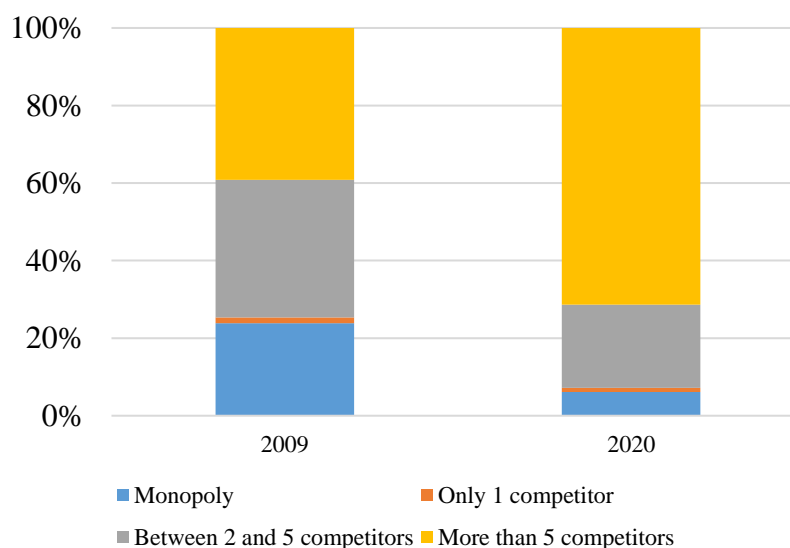
Firm size and the sector of operation are the main factors associated with the number of competitors. The variation in the number of competitors was analyzed through a linear regression, and this suggests

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[49] This is consistent with the increase in the market and competition score under the Bertelsmann Transformation Index (See Figures A.2.3 (a) and (b) in the Annex), where Mauritius has been improving and ranks higher than peer countries (see Annex). The improvement in the contestability of markets may be partly attributed to the introduction of the Competition Act in 2007. A longitudinal study by Coothoopermal and Hemat (2019), covering 2001 to 2014, found some evidence for the hypothesis that that enactment of the Mauritius Competition Act improved enforcement and penalty in matters of uncompetitive behavior.
Coothoopermal, S., & Chittoo, H. (2019). Assessing the Significance of Competition Law in Mauritius: A Quantitative Study. Available at SSRN 3325685.

that there is a weak positive association between the number of competitors and firm size as captured by the number of full-time workers. Other firm-level characteristics are not significant. Several sectors stand out for having a higher degree of competition--these include textiles and garments, retail, transport and storage, and accommodation.

Generally, companies report that their main competitors are formal firms and the majority of these are domestic private firms. As illustrated in the pie chart in Figure 2.8 below, formal Mauritian private firms are the most common competitor for firms in the survey (around 61 percent, counting both firms that are part of a conglomerate and those that are not), whereas formal foreign-owned firms are in second position (27 percent). Informal businesses are the main competitor for 12 percent of the firms. State owned enterprises (SOEs) are rarely the main competitor (this is because SOEs tend to be present in telecommunications, energy and parts of the transportation value chain, such as airport and airline services, and port cargo handling services, but not in the industries covered by the ES).

Figure 2.8. Main competitor for firms (percentage of total firms)

- Formal Mauritian private firms linked NOT to an industrial conglomerate
- Formal foreign firms operating in Mauritius
- Formal Mauritian private firms linked to an industrial conglomerate
- Informal sector (unregistered) firms
- Government Linked Corporations or State owned enterprises
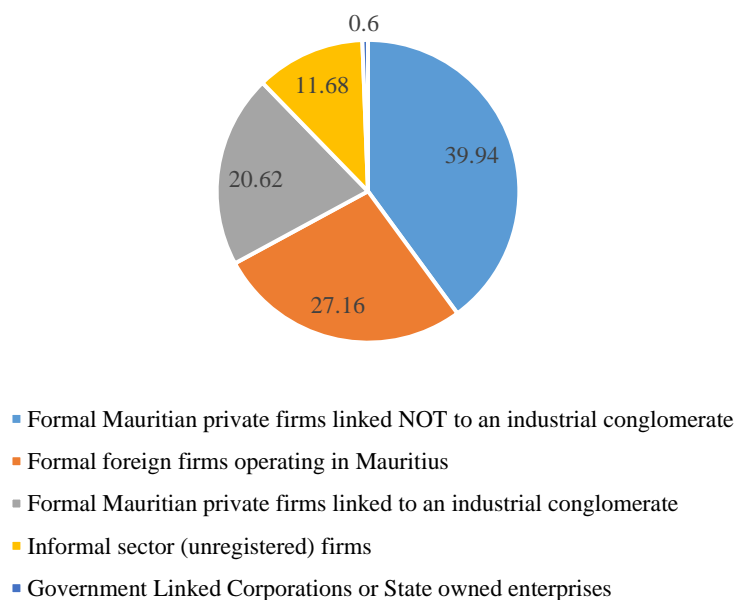
The group of firms that identifies informal businesses as the main source of competition is mainly made up of smaller, younger and lower productivity firms. Among the firms that say that their main competitors are from the informal sector, 80.3 percent are small, and 87.8 percent are in the lower 75th percentile by number of employees. Around 20 percent of the firms in the sample had been in operation for fewer than 10 years, yet these firms account for 28.5 percent of firms who report informal firms as their main source of competition. The regressions results are reported in Table 2.1.

Table 2.1. Logistic regression for the likelihood of identifying informal firms as the main source of competition

VARIABLES	Main competitor is from the informal sector
Number of competitors	0.0022

	(0.0014)*
Age—years since establishment	-0.0345***
	(0.0131)
Part of a conglomerate	0.0097
	(0.4052)
Size—no. full-time permanent employees	-0.0312***
	(0.0063)
Exporting firms	0.5070
	(0.3260)
High productive firms	-0.6662*
	(0.3817)
Textiles & garments	-
Wood products & furniture	-0.0992
	(0.9013)
Chemicals & chemical products	2.0458
	(1.4668)
Rubber & plastic products	-
Other manufacturing	-0.0083
	(0.5800)
Retail	-0.3628
	(0.4549)
Transport & storage	0.3099
	(0.6013)
Accommodation	-0.2930
	(0.5568)
IT & telecommunications	-1.3043
	(1.0204)
Other services	0.1873
	(0.5440)
Constant	-0.7204
	(0.5195)
Observations	550

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

While the informal sector is the *main* competitor for only 1 in 10 firms, over half the firms reported facing competition from unregistered or informal firms (Figure 2.9). This statistic has remained largely unchanged over the past decade and is significantly higher than the average in high-income countries. In line with global trends, informality in Mauritius is concentrated in the construction, transport and food sectors. The share of firms competing with unregistered or informal companies was also disaggregated according to different firm characteristics and as expected, competition from informal business is more acute for domestically focused firms, relative to firms that export. Firms that receive FDI and those that are part of a conglomerate also seem to be partially shielded from informal competitors.

The survey suggests that a gradual process of formalization is underway, with some firms starting off as informal and then registering some years after launching their businesses. Around 9 percent of firms

started informally, comparing favorably to the high-income average of 4 percent and the African average of 15 percent. This figure has declined from 16 percent in 2009. This may reflect the impact of ongoing reforms in Government-to-business services (particularly leveraging digital platforms) that made it easier to start and run a business in Mauritius, including company registration, construction permitting and payment of taxes. The declining rate of informal businesses has also been reported in studies such as Makochekanwa (2020)[50]. High productivity firms are slightly more likely to start off formally. In line with high-income countries, Mauritian firms operate informally for a year, on average, regardless of the gender composition of the ownership. Firms in the food sector tend to take longer to register.

Figure 2.9. Firms that compete against unregistered or informal firms (percentage of total firms)

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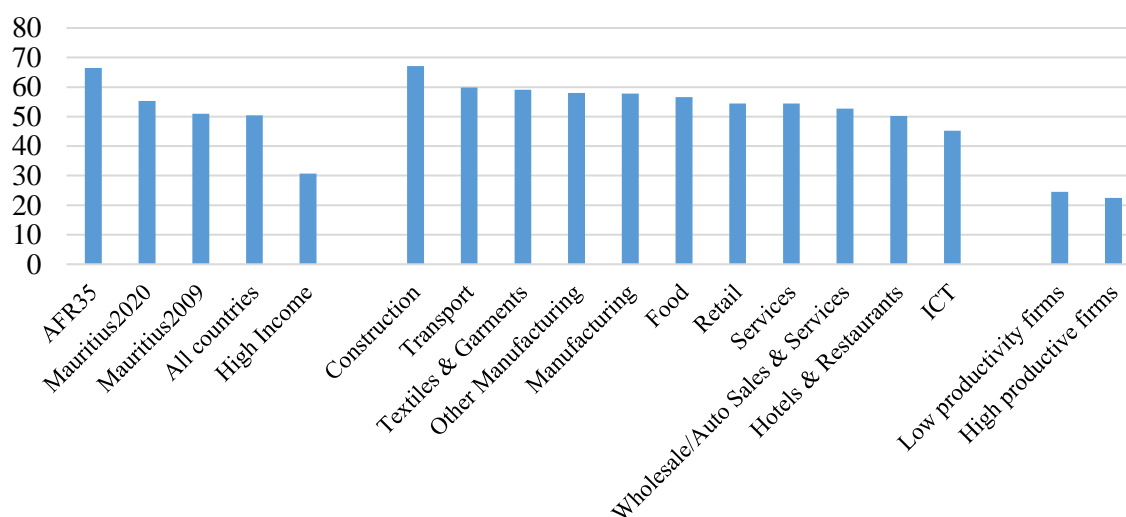
[50] According to Makochekanwa (2020), Mauritius is one the countries in Sub Saharan Africa with low rates of business informality. On average informal activities contribution towards GPD declined from 26 percent to 19 percent between 1991 and 2015. Makochekanwa, Albert, 2020. "Informal Economy in SSA: Characteristics, size and tax potential," MPRA Paper 98644, University Library of Munich, Germany.

Box 2.3. Competition in the manufacturing sector

While the textiles sector is export-oriented, most manufacturing firms in Mauritius tend to be domestically focused or export indirectly (sold to a domestic business for export). When asked about the market for the firm's main product, over 80% of manufacturing firms reported that their products were destined for the local (same municipality as the firm's location) and the national market. Around 13% of firms are focused on the global market—these firms are mostly in the textiles sector, where half of the firms are export oriented (i.e., export at least 10% of their sales).

Despite Mauritius being part of the Southern African Development Community SADC and the Common Market for Eastern and Southern Africa (COMESA), only 5% of its manufacturing firms reported the regional market as their main market. Exporting technical textiles to the region has been identified as one area of opportunity for Mauritian textile firms.

Domestically focused manufacturing firms are more likely to face competition from the informal sector. There is a marked difference depending on the main market served, as illustrated in the figure below.

Figure 2.10. Manufacturing firms competing with unregistered or informal business by market orientation (percentage of manufacturing firms)
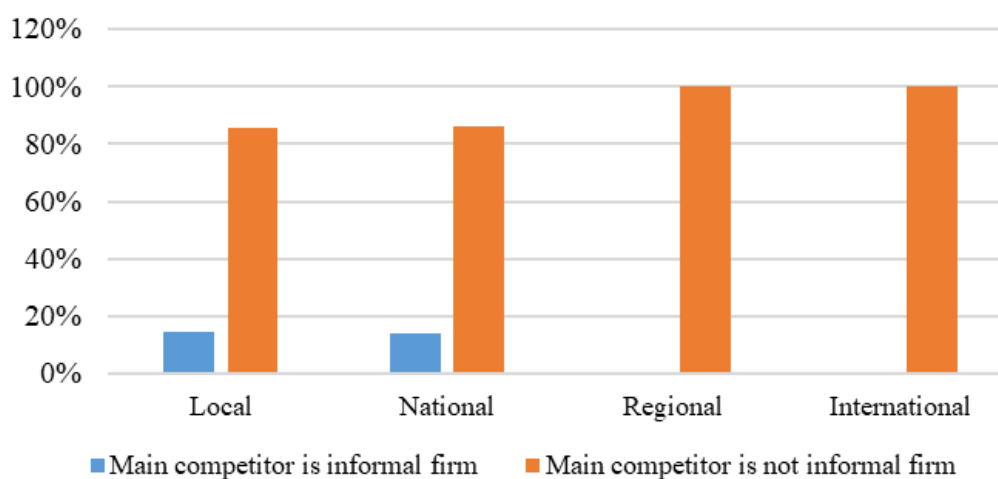
The limited export orientation of Mauritian manufacturing firms, despite the strong investment climate, has been tied to the limited product variety, low complexity and poor connectivity to markets. As discussed in the WB diagnosis of the manufacturing sector conducted for the Economic Development Board of Madagascar (EDBM) in 2020, there is a need to upgrade and deepen integration into regional and global value chains for products outside of textiles and garments. This is particularly urgent as graduation from the African Growth and Opportunity Act (AGOA) preferences to the U.S. market would put at risk $142 million worth of exports of manufactured goods. Jewelry, medical devices, pharmaceutical and automotive products have been identified by the government as having higher potential based on the FDI and exports in these subsectors.

2.4. Innovation

This section focuses on the types of innovation undertaken by Mauritian firms, an area where there are significant knowledge gaps that limit policy design as well as monitoring and evaluation. The CEM reviewed the state of innovation in Mauritius. The report concluded that the country generally performs in line with its peers in terms of innovation as measured by the Global Innovation Index, but there are weaknesses in regards to private innovation (for example, the low R&D intensity), and policymaking is hindered by the absence of data on private innovation. There is no comprehensive survey or database on R&D spending or types of innovation activities within companies. The latest ES can provide helpful insights while the Mauritius Research and Innovation Council (MRIC) rolls out regular enterprise surveys.

The survey suggests that product innovation is far more widespread than process innovation, which, in turn, is more prevalent than R&D spending. When asked if the establishment had introduced any new or improved product over the past 3 years, around 42 percent of firms responded affirmatively, and of this group, 52 percent saw this as being not just new to the firm but also new to their market (this could be new to the country or new to the world, depending on the company). In contrast, only 17 percent have introduced a process innovation, which is consistent with other survey questions that point to the low uptake of automated manufacturing (about 20 percent of companies, with the remainder using mostly manual processes or machines controlled without computers). Around 9.3 percent of the firms invest in R&D compared to 13.5 percent in high-income countries. [51]

As shown in Figure 2.11, companies in Mauritius seem to do well on product innovation when compared to high-income peers, but lag behind for process innovation, which can be critical for productivity. See figure A.2.4 - A.2.6. in Annex for more details.

Figure 2.11. Firms that roll-out innovation (percentage of total firms)
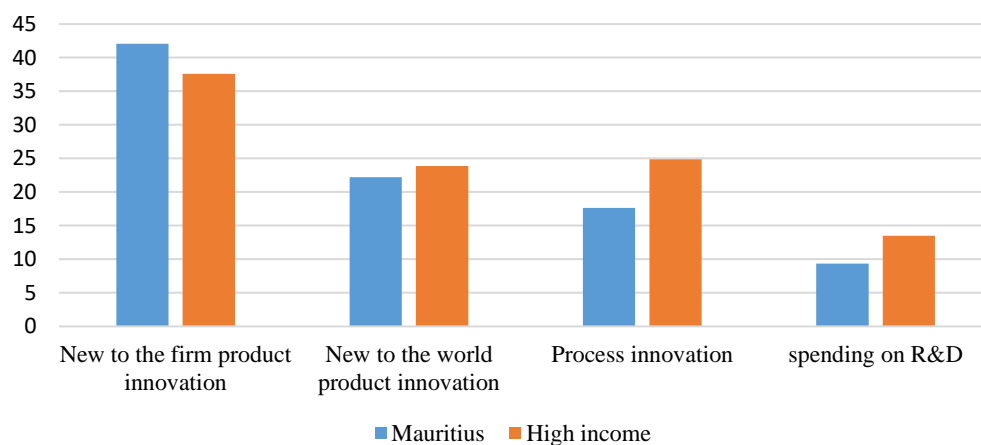
The low rate of process innovation is also reflected in low uptake of automated manufacturing and automated inventory management systems (about 20 percent of companies), with the remainder using mostly manual processes or machines controlled without computers. When asked about the main technology used to organize inventory, 26.8 percent responded that it was handwritten management of information while 60.8 percent reported that it was manually updated using computers. Only 12.4 percent of the firms use Warehouse Management System software (WMS). This is further illustrated in the low usage of online channels for purchases and sales as discussed in Box 2.4 below.

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[51] This firm-level result correlates well with the low R&D expenditure at the national level, as R&D expenditure is only 0.2% of GDP; or also the 2019 GCI, where Mauritius ranks at 95th place for R&D spending. As argued in World Bank (2020), R&D is critical in driving innovation and productivity in EMDEs. R&D activity can enhance the absorptive capacities of firms and their ability to assimilate new technology (Cohen and Levinthal 1989, 1990).

Box 2.4: A spotlight on e-commerce in Mauritius

Before COVID19, an overwhelming majority of firms did not have any online purchases or sales. Around 84.7 percent of the firms did not make any online purchases and 86 percent of the firms did not have any online sales. For firms making purchases with online channels, the online purchases represented 33 percent of total purchases. On the other hand, 86 percent of firms did not have any online sales before COVID19. For firms selling online, online sales represent 30.9 percent of total sales. These firms use a mix of online platforms with 71.4 percent using a web-based platform designed for sales, 37.3 percent using social media platforms, 56.4 percent using the establishment's website and 13.4 percent using a smartphone app. It is also important to note that while COVID19 led to an increase or introduction of online sales for 34 percent of firms worldwide, in Mauritius only a quarter of the firms experienced this boost (World Bank, 2020d).

Encouragingly, Mauritius has a high adoption rate of non-cash payments. When asked about main technology to make payments to suppliers or vendors, 3.8 percent reported that they use cash while 94 percent use check, bank transfer, or voucher. With regards to the main technology for receiving payments for sales, 17.8 percent of the firms reported that it was cash, 61.9 percent used check, bank transfer and voucher, and 20 percent used prepaid card, debit card or credit card.

As expected, process innovation is more likely in the manufacturing sector, but there is a group of companies that systematically innovates in products, process and spends on R&D. Figure 2.12 below shows a radar chart for the different kinds of innovations according to sector. Firms that invest in R&D and process innovation tend to also undertake product innovation. These firms make up around 7.9 percent of the sample and are mostly concentrated in the manufacturing sector with food processing standing out. On the other hand, services sectors, along with the textiles and garments sector, have a high rate of consumer-oriented product innovation and less efficiency-oriented process innovation.

Figure 2.12. Firms rolling out different types of innovations by sector (percentage of total firms)
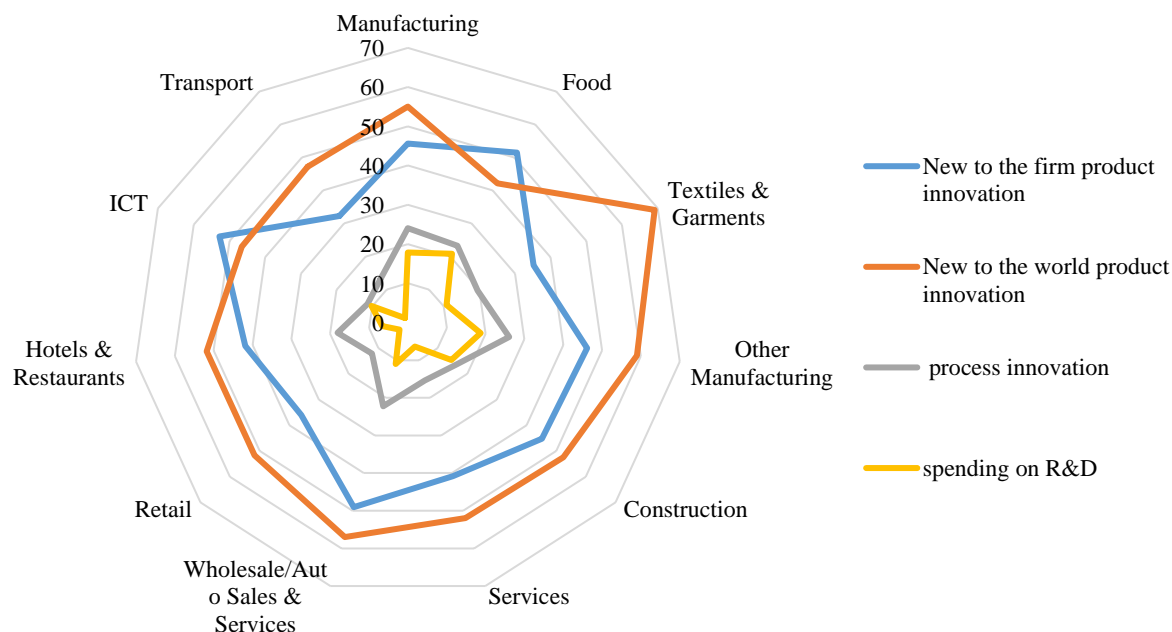
A review of the product and process innovations mentioned during the survey interviews provides interesting results about companies' objectives and how novel the innovations are. Product innovation is mostly improved quality, variety and aesthetics. Firms also showed a tendency to adapt products from other segments and introduce them to new segments. In terms of process innovation, firms seem to focus more on the absorption of technology. Firms that introduced new machinery typically purchased the machinery instead of developing it in-house. Many firms introduced digital platforms for inventory and processing orders and payments. Figure 2.13 displays the tops responses from firms.

Figure 2.13: What types of innovation are undertaken by Mauritian companies?

```
                        Improved                      More eco-
                        efficiency                    friendly



            Improved logistics                    Digital tools for
                                                   inventory and


                            What did the process
                             innovation entail?
                                                            Digital
        Digital tools for                                   payments
         remote work
                              New machinery (but not
                              internally developed)
```
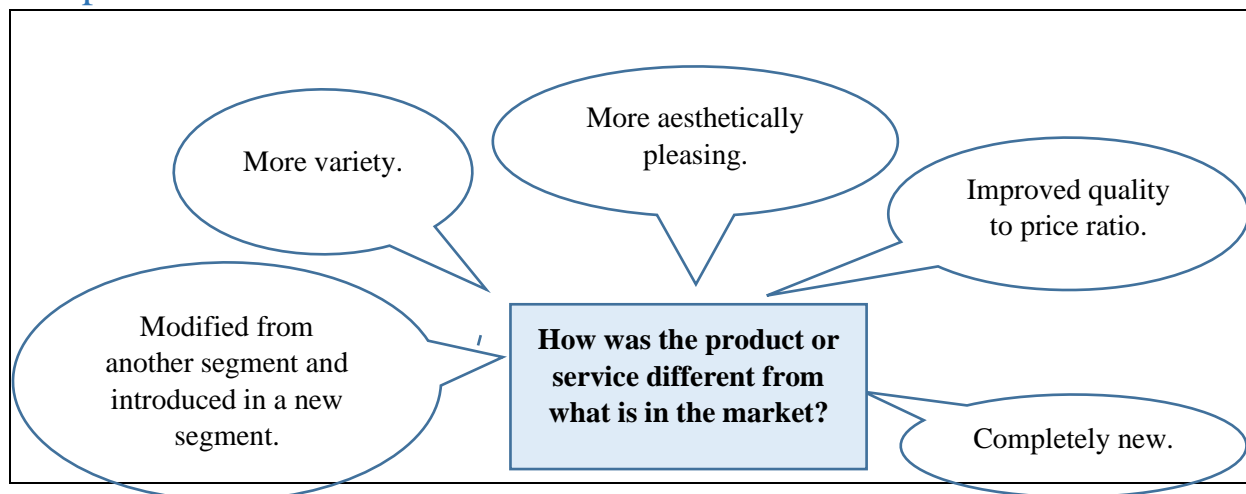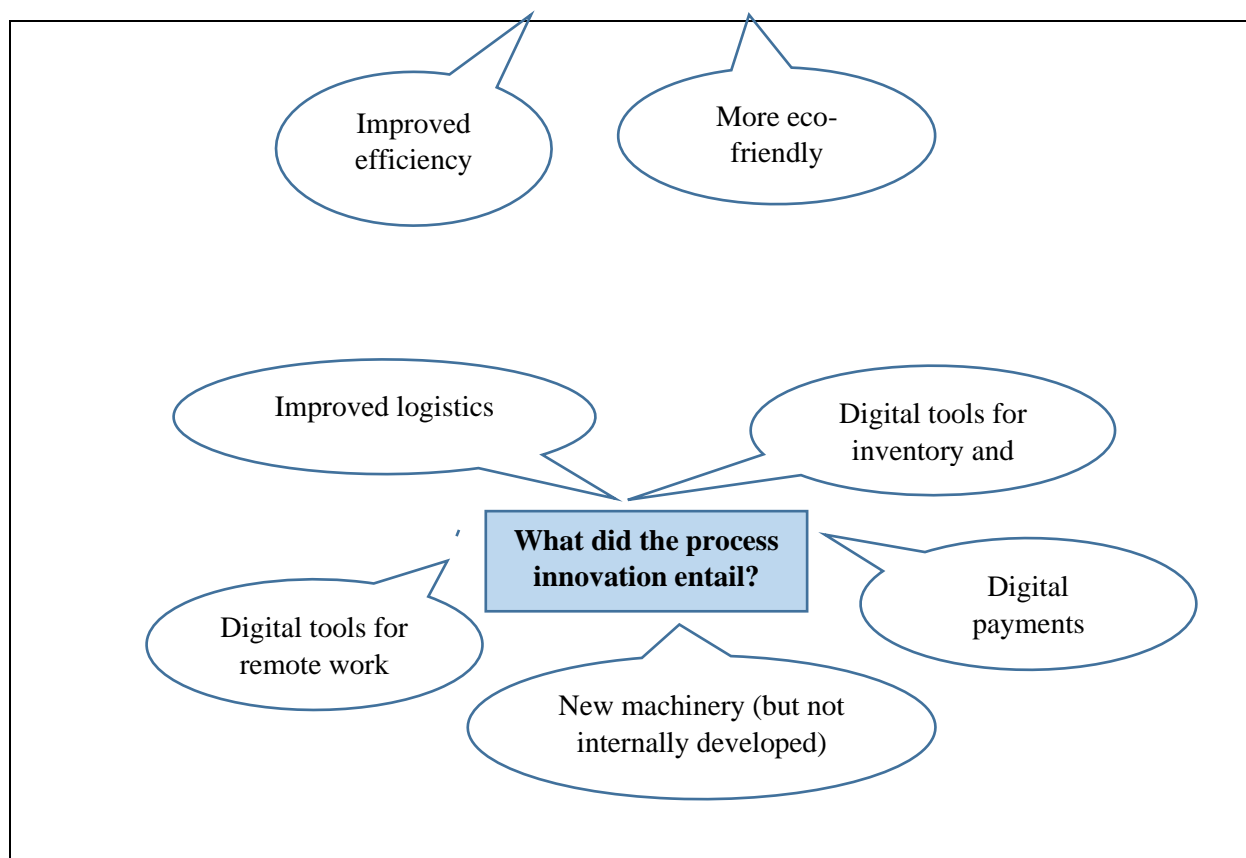
The propensity to innovate varies widely depending on firm characteristics and sectors (see Figure 2.14):

- **Larger firm have a higher propensity to introduce product and process innovations and spend substantially more on R&D.** Indeed, R&D expenditure in Mauritius is mostly driven by medium-sized and large firms. This is true of other middle-income and high-income countries and has implications for the structuring of R&D fiscal incentives.

- **There are large sectoral differences**. ICT and services have a higher propensity to introduce product innovations. Manufacturing firms are more likely to introduce "new to the market" product innovation and process innovation. Manufacturing firms have a higher propensity for investing in R&D. Firms in food manufacturing in particular have a high share investing in R&D and this may explain why they have higher productivity, as discussed in Chapter 1. The services sectors, particularly retail and transport, are less likely to invest in R&D.

- **Further analysis according to firm characteristics showed that exporting firms, firms in a conglomerate and those undertaking outward FDI are more likely to introduce new products or services, process innovation or spend on R&D.**

Figure 2.14. Firms that spend on R&D (percentage of total firms)
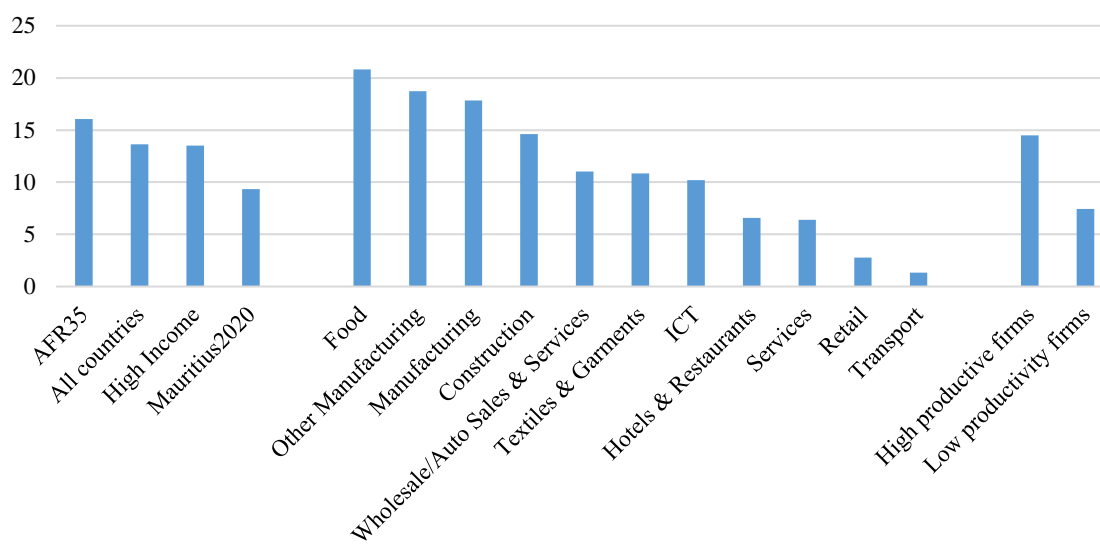
Regarding the intellectual property (IP) resulting from these innovation efforts, less than 10 percent of firms were granted patents or trademarks (see Figure A.2.9 in the Annex). The relatively low rate of innovation outputs is consistent with other indices. These trends are concerning since, as illustrated in World Bank (2020a)[52], innovation and experience with economic complexity, related to participation in global value chains and cross-border technology transfer, are key drivers of productivity. To address this shortfall, a range of programs has been put in place (see Box 2.5).

Box 2.5: Innovation support instruments

The Mauritius Research and Innovation Council (MRIC) offers several programs to boost creativity, innovation and research within Mauritian firms. Funds have been earmarked to finance innovative ventures and grow innovative ideas. Some of the initiatives include:
•   The National Research and Innovation Fund
•   The National SME Incubator Scheme
•   The Technology and Innovation Fund
The Government provides several financial and other incentives, including tax breaks, for modernization and support to micro, small and medium enterprises (MSMEs).

Among the factors that spur firms to innovate, the degree of competition stands out in the economic literature, and the ES data suggests a significant relationship, with an inverted-U shape. As shown in Figure 2.15, the propensity to innovate or spend on R&D increases when the firm has between 2 and 24 competitors and then declines when the firm has 25 competitors or more. This trend holds for the 3 measures of innovation used in the survey. The inverted-U relationship between innovation and competition was formalized by Aghion et al (2005)[53], following Schumpeter's influential hypothesis: starting from a monopoly position, more competition leads to stronger incentives to innovate to gain

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[52] World Bank (2020a) Global Productivity: Trends, Drivers, and Policies. Advance Edition. Washington, DC.

[53] Aghion, Philippe & Bloom, Nicholas & Blundell, Richard & Griffith, Rachel & Howitt, Peter. (2005). Competition and Innovation: An Inverted-U Relationship. *Quarterly Journal of Economics* 120(2).

and retain market share, but these taper off as the profit margins are eroded when competition intensifies.

Figure 2.15. Propensity for innovation against degree of competition

- New to the firm product innovation
- New to the world product innovation
- Process innovation
- Spending on R&D
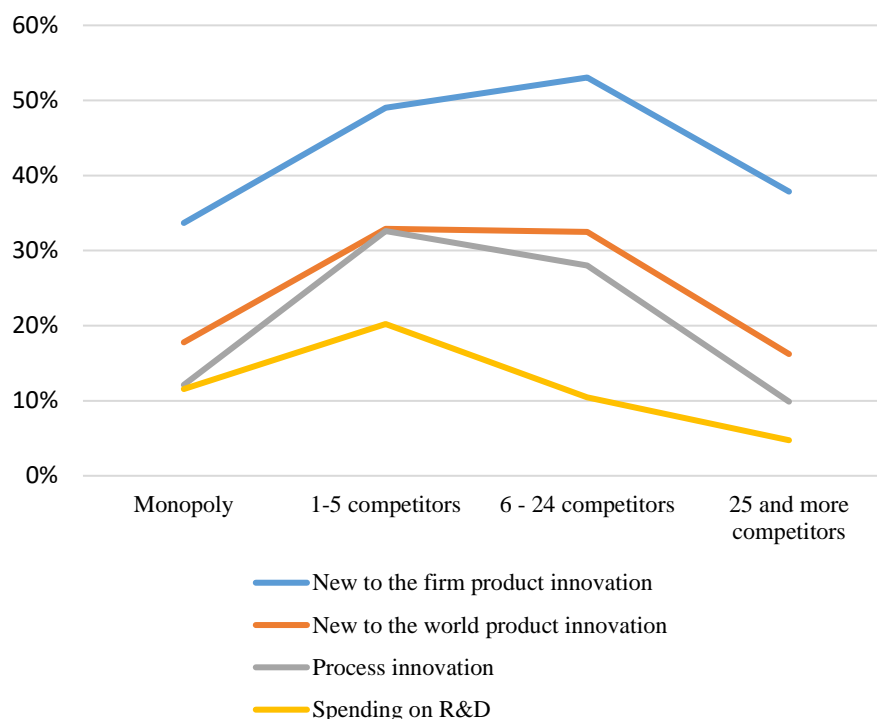
A regression was employed to test this hypothesis further and to better understand what other factors are associated with innovation. In the logistic regression model, the dependent variable is one of four measures of innovation in the ES.[54] The results are shown in Table 2.2 and confirm the following:

- **The relationship between competition and innovation follows an inverted-U shape**. The coefficients for the square of the number of competitors squared is negative and significant for new-to-the-market product innovation and for process innovation.
- **As expected, firms investing in R&D or fixed capital are associated with higher likelihood of innovation.** Across all 3 definitions of innovation, the coefficients for the variables capturing whether a firm invests in R&D or capital accumulation are positive, significant and relatively large.
- **There is some sectoral variation but it is not robust, and other characteristics, such as size and age of the firm, are not significant.**

Table 2.2. Propensity to innovate

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[54] Whether or not a firm has been granted a patent is a robust measure of innovation, but this variable could not be used because of a low response rate.

VARIABLES	New to the firm product innovation	New to the world product innovation	Process innovation	Spending on R&D
Number of competitors squared	-0.0001	-0.0004**	-0.0002**	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of competitors	0.0123	0.0683**	0.0320**	-0.0265
	(0.0151)	(0.0302)	(0.0162)	(0.0254)
Age—years since establishment	0.0044	0.0061	-0.0083	0.0047
	(0.0054)	(0.0078)	(0.0079)	(0.0075)
Size—no. full-time permanent employees	0.1170	0.2166	0.2710	1.0195
	(0.1759)	(0.3260)	(0.2623)	(0.3035)
Main source of competition from informal firms	0.3942	-0.4042	0.8356	0.9666
	(0.3005)	(0.4690)	(0.3517)	(0.4224)
Spending on R&D	2.7077***	1.7531***	1.2687***	
	(0.4277)	(0.4435)	(0.3012)	
Textiles & garments	-0.3011	1.7346	0.5194	-0.5611
	(0.5401)	(1.2566)	(0.7046)	(0.8543)
Wood products & furniture	-0.3722	0.0317	-0.0792	0.6960
	(0.4756)	(1.0311)	(0.6538)	(0.6078)
Chemicals & chemical products	1.7742*	0.2104	1.3895*	-0.1912
	(1.0517)	(0.6737)	(0.8144)	(0.8420)
Rubber & plastic products	-0.0885		0.6332	
	(0.5954)		(0.5986)	
Other manufacturing	-0.2004	0.5760	0.1460	0.2808
	(0.4584)	(0.7332)	(0.6114)	(0.5731)
Retail	-0.0083	1.0609*	-0.0783	-1.1261**
	(0.3860)	(0.6176)	(0.5351)	(0.4804)
Transport & storage	-0.3457	0.8847	-0.3048	-2.5742***
	(0.4732)	(0.8321)	(0.6822)	(0.8593)
Accommodation	-0.0873	1.4404*	0.7210	-0.6058
	(0.4729)	(0.7510)	(0.6097)	(0.7017)
IT & telecommunications	0.2425	0.8360	-0.4485	-0.7587
	(0.6653)	(0.8179)	(0.8556)	(0.7887)
Other services	-0.0093	1.1155	-0.5858	-0.3651
	(0.4797)	(0.7474)	(0.6993)	(0.6733)
Constant	-0.6223	-1.1654*	-1.3809**	-1.8531***
	(0.4037)	(0.6755)	(0.5790)	(0.5106)
Observations	695	279	692	688

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2.5. How are these factors associated with firm-level productivity?

In this final section, regression analysis is used to pull together the various elements to explain what factors could be behind productivity differences between firms. The analysis takes the productivity

measures presented in Chapter 1 as a dependent variable, and then brings in the variables that we have reported on as explanatory variables to give a sense of which ones could have more significant relationships. As with the other regressions, it is important to note that these are preliminary results and do not allow us to say anything about the causality—i.e., the relationships can be two-way, as higher productivity firms will normally enjoy higher profitability, enabling more investment in fixed assets or higher R&D.

Business environment, firm-level and sectoral variables show up as significant in a regression analysis of productivity.[55] The results of the logistic regression of productivity against various explanatory variables is presented in Table 2.3. This used the two measures of labor productivity as the dependent variable—namely, sales per worker and value added per worker. The explanatory variables encompass business environment variables that have been discussed above and have been showed in literature to be important determinants of productivity in EMDEs, as well as firm level and sectoral controls. The results suggest that:

- Business environment constraints, such as limited access to finance, have a negative relationship with productivity.
- Process innovation and investing in R&D are positively associated with productivity.
- Firms that face unregistered firms as their main source of competition tend to be less productive.
- Firms that have been established for longer periods are more productive.
- Smaller firms are more productive than large firms. [56]
- Sectoral differences are significant, with the most robust result being the higher productivity of the rubber and plastic products sector, and lower productivity of both the textiles and garments and the wood products and furniture sectors.
- Other regressions undertaken suggest that firms that export, receive FDI, license technology from a foreign firm, and invest in fixed capital exhibit higher productivity.

In other models, Government programs were included as an explanatory variable, but these were not significant. Neither tax incentives nor the innovation program implemented by MRIC had a statistically significant relation with productivity. This may be a result of the low uptake of the programs. In the ES survey, only around 6 percent of firms had applied for the MRIC grant and a similar percentage accessed the tax incentive (See Figures A.2.7 and A.2.8 in the Annex).[57] When asked for reasons, around 58.6 percent of firms responded that the programs were not relevant to the operations of their establishments, 7.2 percent responded that application procedures were difficult, while 34.3 percent responded that they had little or no knowledge about the MRIC grant.

Table 2.3. Possible factors underlying productivity differences between firms

	(1)	(2)

[55] Several other specifications were used and these suggest that firms that are part of conglomerates do not exhibit higher rates of productivity, but that productivity growth is positively correlated with measures related to external openness— namely exporting, receiving FDI and licensing technology from a foreign firm.
[56] When the regression is performed with size included as a categorial variable instead of a discrete variable, the analysis shows that this result is driven by the fact that medium sized firms are statistically more productive than larger firms as discussed in Chapter 1.
[57] However, responses to the question on the uptake of the MRIC grant was low at 63 firms. Subsequent questions on why the firm did not apply for the grant or tax incentive also had a low response rate (55 firms).

VARIABLES	Log of sales per worker (in USD 2009)	Log of sales per labour cost (in USD 2009) ln_lp1
New to the world product innovation	-0.0916	0.0260
	(0.1010)	(0.1029)
Process innovation	0.3480***	0.1328
	(0.1177)	(0.1125)
Investing in R&D	0.3490**	0.2607**
	(0.1472)	(0.1319)
Number of competitors squared	-0.0001	-0.0001
	(0.0000)	(0.0000)
Number of competitors	0.0108	0.0105
	(0.0097)	(0.0100)
Main source of competitors from informal firms	-0.4184***	-0.1172
	(0.1348)	(0.1175)
Partially or fully financially constrained	-0.1987*	-0.0807
	(0.1125)	(0.1061)
Tax rates	-0.1876**	-0.1410
	(0.0951)	(0.0987)
Age—years since establishment	0.0098***	0.0016
	(0.0028)	(0.0029)
Size—no. full-time permanent employees	-0.1284*	-0.2188*
	(0.1417)	(0.1326)
Textiles & garments	-1.1300***	-1.0781***
	(0.2648)	(0.2113)
Wood products & furniture	-0.7759**	-0.7078***
	(0.3088)	(0.2381)
Chemicals & chemical products	0.3776**	0.9163
	(0.2557)	(0.7497)
Rubber & plastic products	0.3545*	0.3263*
	(0.2428)	(0.1997)
Other manufacturing	-0.3486	-0.6835***
	(0.2230)	(0.1949)
Retail	0.2308	-0.1061
	(0.2062)	(0.1902)
Transport & storage	0.3239	-0.3591
	(0.2495)	(0.2333)
Accommodation	-0.1438	-0.4834**
	(0.2248)	(0.2156)
IT & telecommunications	-0.3700	-0.7888***
	(0.2846)	(0.2673)
Other services	-0.4059*	-0.6628***
	(0.2311)	(0.2046)
Constant	10.1923***	1.9689***
	(0.2314)	(0.2030)
Observations	574	528
R-squared	0.2206	0.1490

Standard errors in parentheses

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

2.6. Business Environment Policy Considerations

This chapter's results point to a number of positive changes in the business sector's perception of the investment climate since the 2009 ES, inline with the goals that Mauritius has set out in Vision 2030. Positive changes in the nation's investment climate include improvements on the governance front (e.g., crime, corruption, political instability), in infrastructure areas (e.g., transportation, electricity), and on access to land. These results correlate well with the performance over the last decade on global indices such as the DB report, where Mauritius remains a regional leader, and the WEF GCR.

At the same time, firms continue to identify constraints in A2F, the practices of the informal sector and tax rates. These are areas where a growing share of private sector respondents report major or severe constraints. This is the case despite major reforms and programs introduced in recent years. For example, various new concessional lending and grant instruments introduced to address A2F gaps for MSMEs; barriers to starting a formal business were already low and there have been further reductions in required time and costs compared to 2009[58]; in the tax domain, the corporate income tax rate is a flat 15 percent, a figure that is already at the lower bound agreed in the June 2021 G7- OECD summit, and VAT is 15 percent, below the regional and global average and well-below that of EU countries. The issues around taxes were not discussed in this chapter as this area is not covered by the ES questionnaire.

Unpacking the results helps to explain the divergence between the perceptions of Mauritian business community and recent improvements in these areas according to various sources. Specifically, disaggregating by firm-level characteristics shows A2F constraints are affecting smaller companies and those with lower productivity, and conversely, the establishments that are part of a conglomerate or a MNE face less constraints than the average firm in high-income countries. The results are consistent with the CEM, which pointed out that, while Mauritius has a well-developed banking sector, there is a reliance on property and fixed assets for collateral. The planned legal and regulatory reforms in the secured transactions area would allow for a wide range of movable assets to be used as collateral (e.g., inventory, accounts receivable, equipment, etc.), which could help to address remaining gaps in A2F for MSMEs. In this regard, the GoM could also consider reviving the Stakeholder's Committee and the National Coordination Committee to give stakeholders an opportunity to provide insight into these reviews of "eligible securities'' as well as the institutional arrangements regarding secured transactions. Digital finance is another entry point towards addressing the gaps.[59]

The other reason behind this divergence could be lack of awareness about recent investment climate reforms. For example, the Government introduced recent reforms in the area of trade

[58] In DB 2009, entrepreneurs who wanted to start a business in Mauritius faced 5 procedures, which took 6 days to complete, and incurred a cost of 5 percent of income per capita with 0 minimum paid-in capital. By DB 2020, there were 4 procedures taking 4.5 days, and the cost had dropped to 0.8 percent of income per capita.
[59] Leveraging digital financial services to foster financial inclusion among SMEs is a low hanging fruit. The survey suggests smaller and younger firms and firms in the manufacturing sector tend to have more limited access to digital financial services. As the country has high internet penetration rates, FinTech solutions could play a bigger role in enlarging access to finance. For example, digital technologies such as automated credit scoring can partially address the issue of screening and processing MSME loans which incur relatively high administration costs.

facilitation to reduce the time taken for customs clearances and for processing import permit applications and clearances, but the changes may not yet be felt on the ground.[60] Another example is in innovation, as MRIC has revamped and launched new programs, and as a result there is limited track record about the results to date; additionally, the fragmentation of available instruments could be reducing their impact as discussed in the CEM review of support instruments for innovation.

Indeed, an area that deserves further study is the additionality of Government programs to support finance and innovation, as the survey indicates fairly low take-up—whether this concerns credit from state-owned banks and Government agencies, or the specific support programs set up for startups and innovators under MRIC. The nation has a number of financing schemes targeted at SMEs at the level of key agencies such as the Development Bank of Mauritius, SME Equity Fund (SEF), Investment Support Program Limited (ISP), State Investment Corporation (SIC) and dedicated SME loans from commercial banks. The Government could consider interventions to encourage larger players to integrate smaller firms more into supply chains, to leverage existing strengths. In-depth evaluations based on solid M&E systems (and ideally rolling out impact evaluations) would be needed to see why these programs are not being accessed by the segments of the private sector that are facing a more constrained environment.

The role of informality is another area where more data collection could help to explain the gap between the small share of companies that perceive informal sector as their main competitor and the much larger share that see the practices of informal sector as a major or severe constraint— a perception shared across sectors, including those without a major informal presence like ICT. Since it is the smaller, younger, and lower productivity firms that highlight this issue, it could be interesting to undertake a dedicated survey of unregistered firms to go deeper, a segment that is not part of the sampling frame in the ES. In small high-income countries where the standard of living is rising, informality is typically non-parasitic and is driven by the need to supplement incomes by more vulnerable population groups.[61] The particular subsectors in which informality is concentrated could benefit from targeted interventions to boost formalization, particularly to drive awareness about registration requirements and the various digital platforms that the Government has put in place for easy registration and licensing such as Companies and Business Registration Integrated System and the National Electronic Licensing System. Better knowledge of the characteristics of the informal businesses can also help to target crisis response policies to the COVID-19 shocks, as well as to increase productivity of informal firms.

Lastly, a key takeaway for policymakers has to do with the importance of strengthening business innovation capabilities. Companies operating in more competitive product markets were seen to have much sharper incentives to undertake all types of innovation, whether product or process innovation, new-to-the-firm or new-to-the country. At this point in time, the majority of firms focus on absorption of technology via the introduction of improved product lines and investment in imported machinery & equipment, with digital tools playing an increasing role. R&D is mainly conducted by medium and large firms that have a strong international orientation via exports and/or outward FDI. Further awareness building and retargeting of innovation programs may be necessary to achieve stronger

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[60] The reforms included the introduction of a Coordinated Border Management Unit at the Customs House to expedite clearance of controlled goods requiring physical inspection by relevant ministries and agencies; and amendments in regulations to harmonize and fast-track the administration of imports permits, export permits and clearances for controlled goods across agencies.
[61] A 2020 WBG survey in Seychelles suggested that these companies fill in gaps in value chains that are not served by the formal sector (e.g., informal taxis that are oriented on the domestic market, as registered taxis are too expensive and mainly serve tourists) or where the burden of regulation is higher (e.g., informal food manufacture as obtaining a license requires significant upfront costs).

economic impacts.[62] This and other measures proposed in this section have the potential to further boost the doing business and investment climate in Mauritius and fast-track the nation's path to Vision 2030.

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[62] For example, the World Bank (2020) Manufacturing Diagnostic suggested setting up a domestic fund to finance innovation and regional development of manufacturing sector, which has been losing competitiveness in its core segments. The vehicle could provide funded and non-funded support to firms seeking to implement modern/more efficient/green technology. It could also contribute to technology upgrading, innovation and working capital financing.
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Annex A.2: Chapter 2

Table A.2.1: Top 3 constraints according to firm characteristics

(Share of firms in each subgroup that report the area as a major or very severe constraint)

Part of a conglomerate	Majority female ownership	Exporting firms	Small firms	Medium firms	Large firms	Young firms (<5 years old)	High productivity firms
Access to finance (33.7%)	Access to finance (44.1%)	Access to finance (42.2%)	Practices of informal competitors (46.1%)	Access to finance (40.7%)	Electricity (35.8%)	Tax rates (52.1%)	Transport (31.9%)
Electricity (33%)	Electricity (40,56)	Electricity (37.7%)	Access to finance (43.5%)	Practices of informal competitors (36.4%)	Transport (30.7%)	Access to finance (45.7%)	Electricity (31.7%)
Practices of informal competitors (28.5%)	Practices of informal competitors (42.6%)	Transport (34.8%)	Tax rates (38.2%)	Electricity (32.8%)	Access to finance (27.7%)	Electricity (38.1%)	Access to finance (31%)

Figure A.2.1. What is the top constraint reported by firms
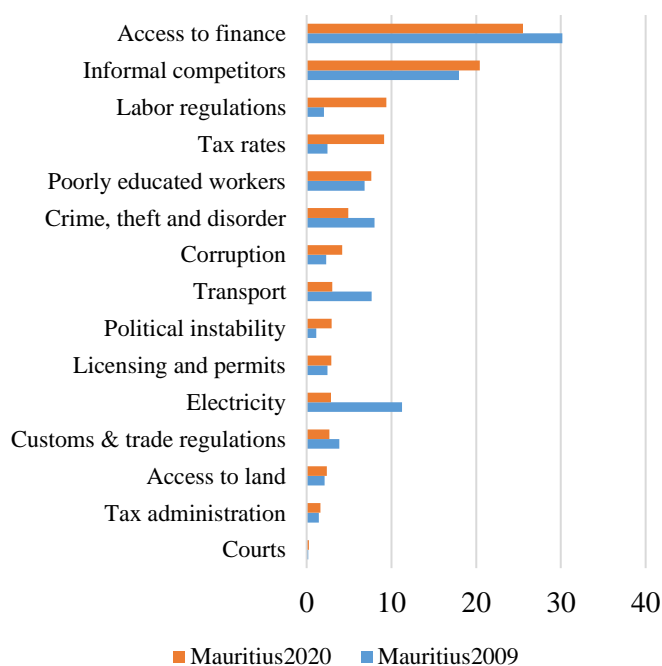
Figure A.2.2. Firms whose recent loan application was rejected (percentage of total firms)
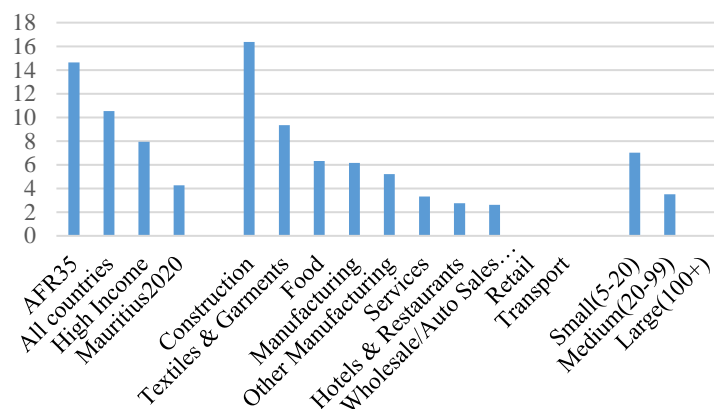
Taxation overview

Since 2006, the corporate tax rate applicable in Mauritius has remained unchanged at 15 percent.

In addition, there are several tax exemptions for specific activities, including:

- o Innovation-driven activities for IP assets developed in Mauritius.
- o Manufacturing pharmaceutical products, medical devices and high-tech products.
- o Food processing and meeting a minimum value-addition and export requirement.
- o Operating global and regional headquarters, family offices, and certain other businesses in the global business sector.

Recent legislation changes require employees earning more than Rs 3 million annually to pay a solidarity levy. Employers should deduct the solidarity levy at the rate of 25 percent on the leviable income in excess of Rs 3 million. However, the levy deducted must not exceed 10 percent of the total emoluments.

The Government also introduced the Contribution Sociale Généralisée (CSG) starting in September 2020 to replace the National Pension Fund (NPF) contribution system.

Figure A.2.3.(a) and (b) Organization of the market and competition score

Figure A.2.2.(a) Organization of the Market and Competition Score in 2020
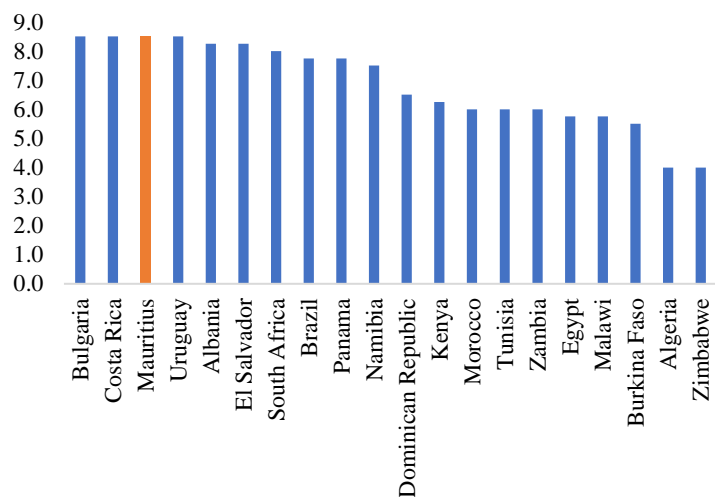
Figure A.2.2.(b) Mauritius Organization of the Market and Competition Score 2006-2018
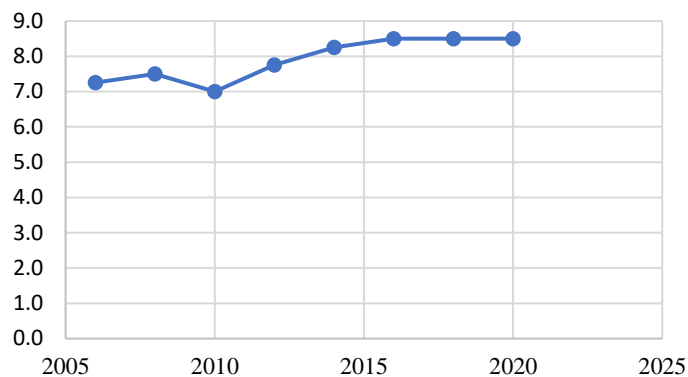
Source: www.bti-project.org

Figure A.2.4. Firms that introduced a new product or service over the past 3 years (percentage of firms)
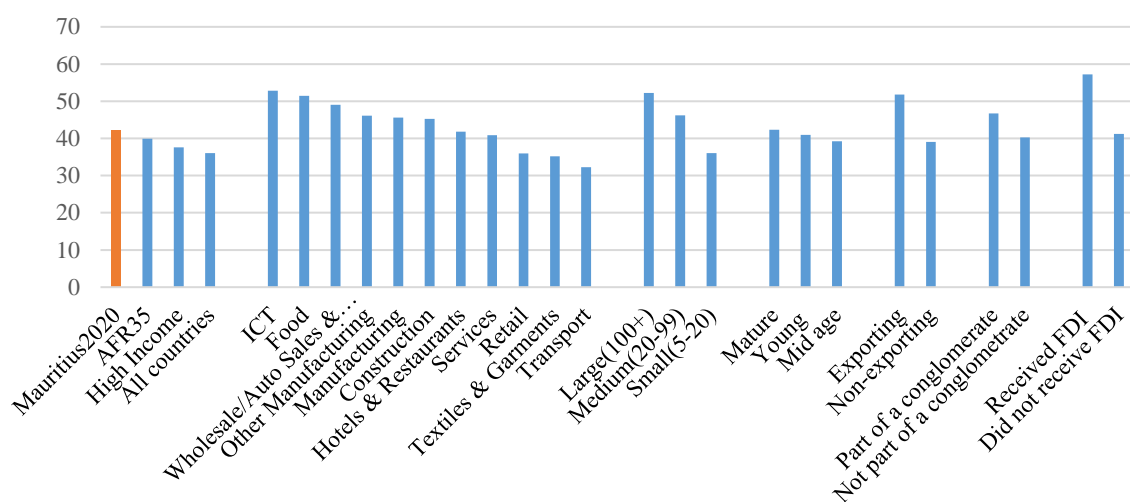
Figure A.2.5. Firms that introduced a new product or service that is also new for the main market over the past 3 years (percentage of firms)
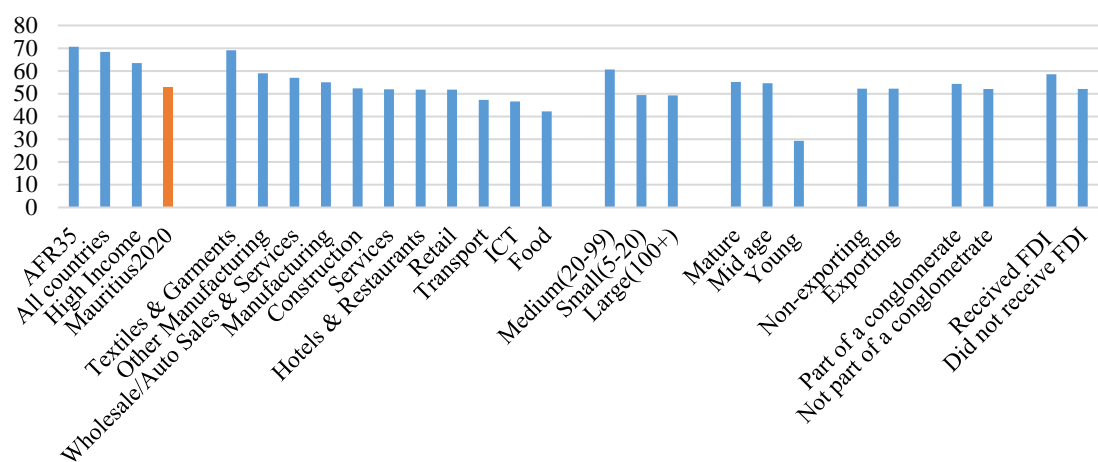
Figure A.2.6. Firms that introduced a new process over the past 3 years (percentage of firms)
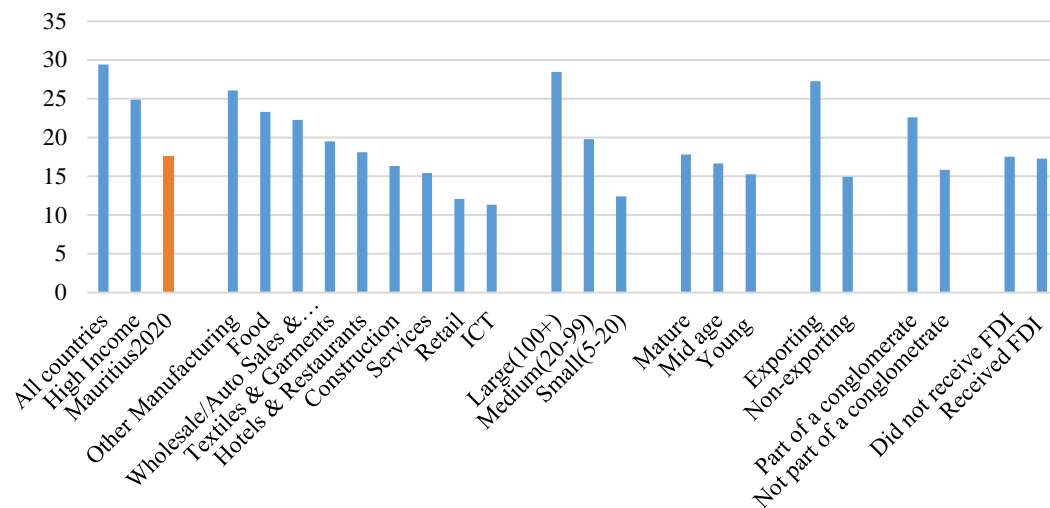
Figure A.2.7. Firms that received tax incentive in the past fiscal year (percentage of firms)
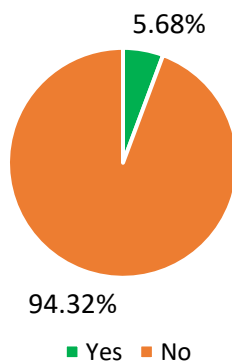
Figure A.2.8. Firms participating in innovation support programs in the past fiscal year (percentage of firms)

6.42%

93.58%

■ No ■ Yes
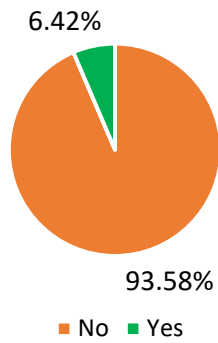
Figure A.2.9. Firms that have filed for a trademark or patent (percentage of firms)

14.29%

9.52%

76.19%

■ Yes, for a trademark only

■ for both a patent and a trademark

■ No
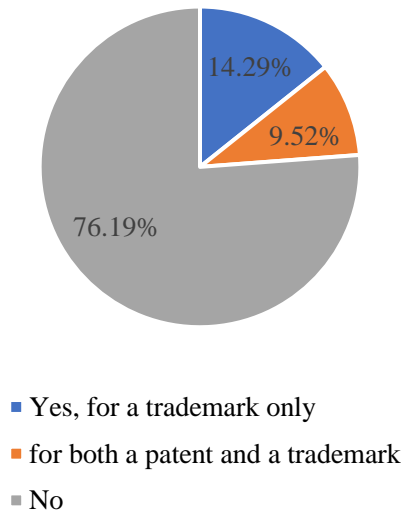
Chapter 3: Skills and the Labor Market in Mauritius

Key Findings: Chapter 3

- Over half of enterprises in the textile and garments sector reported that "inadequately educated workers" are an obstacle to their operations, with less than a third of workers having completed secondary school and less than a fifth of workers having completed a degree program. This may be a deterrent to enterprises trying to upgrade their production processes or improve their productivity and competitiveness. The ICT sector seems to have the highest proportion of full-time workers who completed secondary education or have a degree.

- Some businesses can get by with basic language and IT competencies, whereas "interpersonal," "work ethic," "problem solving," "job-specific," and other more nebulous skills are desired at higher levels.

- In general, between 80 percent and 94 percent of survey respondents rated the level of current skills in their establishments as "as required and above requirement" in terms of their needs. The simplest interpretation of this implies a skills shortage ranging from 6 percent to 20 percent for specific skills and sectors.

- For most of the occupational groups, vacancies were filled at a rate of approximately 80 percent. However, firms across various sectors faced challenges filling vacancies for "skilled manual workers" and "plant and machine operators," with fill rates hovering around 10 percent and 29 percent, respectively.

- Mauritians are less inclined to work as skilled manual laborers, hence firms fill these vacancies with expatriates working on time-bound work permits. In the reference period, 21 percent of firms had recourse to foreign labor, with the textiles and garments sector being by far the most foreign-labor-intensive one.

- Over 70 percent of respondents claimed that they faced difficulty in finding new employees with appropriate work ethics, English language, problem-solving and managerial skills.

- Only 19 percent of firms have provided formal training to their permanent full-time workers during the reference period. The primary focus of formal training was "job-specific technical skills," followed by "problem solving/critical thinking." Firms tend to match training to reported shortages, with a more significant focus on job-specific training. The only discrepancy is for language training, where there is a mismatch between reported need and the focus of training.

- There is little investment in training by small firms.

- The ICT sector paid the highest for those workers with high and medium skills. The wholesale and auto sales sector comes in second position for its wages for skilled workers.

- Female participation in the workforce is hampered by a lack of support mechanisms, like on-site and alternative childcare. Addressing obstacles to female labor participation might help firms attract new talent as firms that provide some support mechanisms report fewer skills shortages. Further, having female management is associated with both fewer skill shortages and with increased support mechanisms for female employees suggesting that encouragement and support of female entrepreneurs may lead to increased female labor market participation rates as well.

3.1. Introduction

The notion of skills encompasses a broad set of socio-emotional, cognitive and technical competencies necessary to perform optimally. According to human capital theory, skills are formed via education, pre-employment and training post-employment. Therefore, skill formation is the responsibility of both education providers and enterprises.

This chapter investigates the demand for various skills at the firm level, the skill shortages that firms face and the mechanisms to address shortages. It is hypothesized that there is a relationship between a firm's skill level and its productivity. A review of literature in Mauritius did not reveal any evidence at the firm level, and so another objective of this chapter is to investigate this link. Data is analyzed through descriptive, cross-tabulation and econometric models.

The following sections are organized as follows: Section 3.2 delves into firm characteristics and labor at the sectoral level. Section 3.3 looks into the demand for skills, whereas section 3.4 reports on skills shortages. Section 3.5 looks into the strategies and mechanisms adopted by firms to tackle skills shortage. Section 3.6 attempts to investigate the relationship between skills and productivity. The last section summarizes the main findings and some policy recommendations. Throughout these sections, findings and analyses from econometrics models are presented.

3.2. Firm characteristics, labor and skills

Employment at firm level

A firm's human capital, its workers, are a fundamental resource. Larger firms can generally draw on a more diverse pool of laborers and thus more varied types of skills. One of the proxies for the size of enterprises is the total number of full-time employees, categorized as small (up to 19 employees), medium (between 20 and 99 employees) and large (more than 99 employees). In the ES, 52.9 percent of enterprises are categorized as small, 27.3 percent as medium and 20 percent as large.

A sectoral breakdown shows that firms are generally small, apart from those in the textiles and garments sector where 73.5 percent of them are medium to large (Figure A.3.1, in Annex). Interestingly, the ICT sector shows a different picture, as 62.7 percent of firms are medium to large. The sector with the most small firms is retail sales.

Occasionally, a firm may not be able to meet its labor demands with its regular workforce. In these situations, it might have recourse to temporary labor to fulfill its requirements. In the survey, 18.6 percent of respondents have recourse to temporary labor and in 80 percent of those cases, the average length of employment was under 6 months. The accommodation and food services and retail sales sectors relied more on temporary workers than other sectors did. This might be an indication of less stable demand for the services provided by these businesses—for example, due to the cyclical nature of tourism.

Firm ownership

It is hypothesized that the gender composition of ownership matters for firms' performances. Findings show that 56.4 percent of responding firms are males' sole proprietorships, with the remaining firms having mixed-gender ownership. Only 7.9 percent of firms have females owning more than 50 percent of the firm.

3.3. Firm characteristics and demand for skills

Impact of inadequately educated workforce

There is a well-established link between education and skills formation, thus an educated workforce is a general prerequisite for growth and productivity for firms. In the ES, 62.4 percent of enterprises reported that an inadequately educated workforce was *not* an obstacle to the current operations of their firms, whereas 17 percent claimed that it was a major obstacle. This evidence seems to point in the direction of inadequate education playing some role in hampering firm's operations. As highlighted in the preceding chapters, there are a number of other obstacles to operations (regulatory, business environment, etc.) that might be more salient for business leaders, overshadowing concerns about workforce education.

A sectoral breakdown gives a more granular picture. In the textiles and garments sector, 53.2 percent of respondents responded that inadequately educated workers are a moderate to major obstacle to their current operations (Figure 3.1). One underlying reason is that less educated individuals join the sector to perform labor-intensive tasks and their education levels are not necessarily upgraded through skills development programs. Due to the economic necessity to reduce production costs and increase competitiveness, enterprises are striving to upgrade their production processes; the low education level of some of their employees can be a constraint. The "other manufacturing" sector shares similar characteristics. Meanwhile, 23.6 percent and 24.2 percent of firms from the accommodation and food services and ICT sectors, respectively, reported that an inadequately educated workforce is a major to very severe obstacle to their operations.

The number of workers with secondary and tertiary education completed are indicative of the human capital stock at the enterprise level. Figure 3.2 gives a sectoral breakdown. With respect to the share of employees with high school education, there is a clear sectoral gradient, with manufacturing sectors generally having a lower share than service sectors. This relationship is likely due to the skills requirements of the individual sectors and how well these are served by formal secondary education. Even more striking is the difference with respect to tertiary education. Sectors, on average, report a share of 25 percent of workers with university education, whereas the ICT sector reports that 51.8 percent of its employees have obtained a degree, hinting that this sector relies on very high levels of human capital compared with other sectors. This finding should be contrasted with the finding above, which suggested that around a quarter of firms in the ICT sector find an inadequately educated workforce to be a major obstacle, suggesting that the sector is still struggling to find the required skills, despite its relatively high share of formally educated workers.

Figure 3.1: Degree to which an inadequately educated workforce is an obstacle to the operations of the firm at sector level
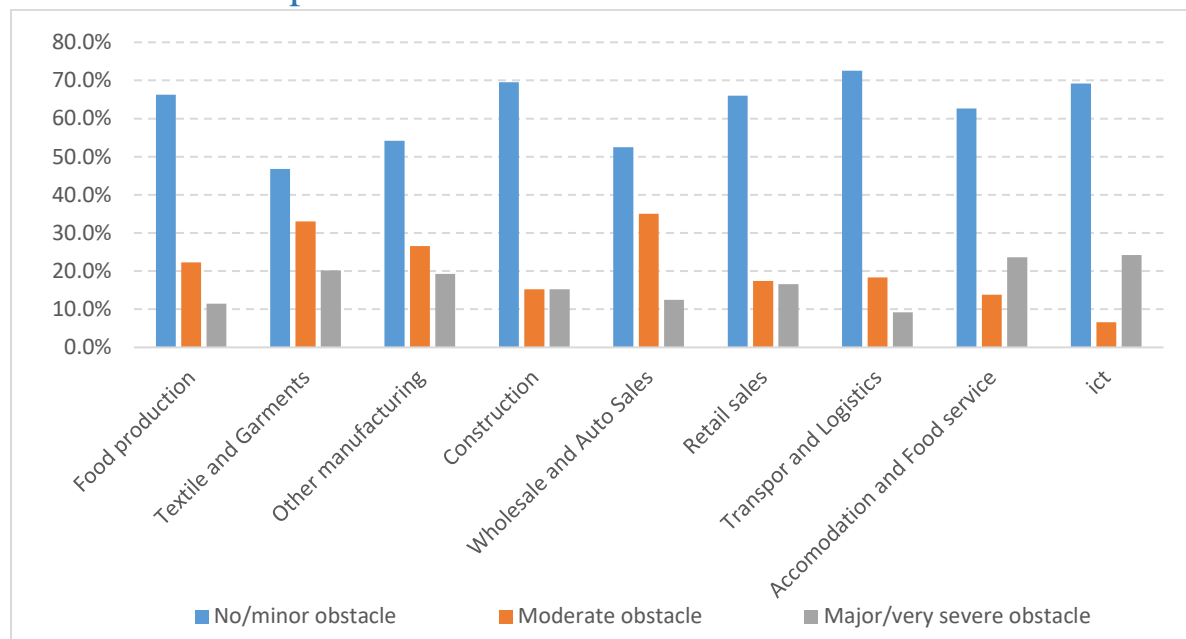
Figure 3.2: A sectoral breakdown of respondents for percentage of full-time workers with complete secondary education and having a university degree.
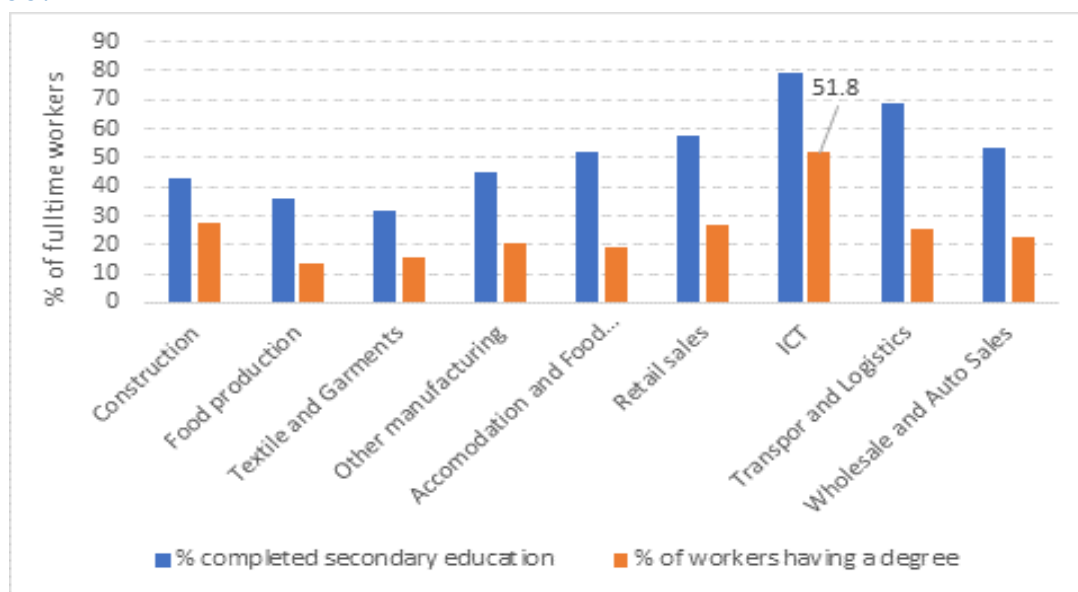
Skills requirement at firm level

The concept of skills captured in the ES goes beyond the traditional understanding of skills as measured by the educational attainment of the workforce and includes proxies for socio-emotional (interpersonal and work ethic), cognitive (problem-solving, English and French languages) and technical (managerial,

computer and IT skills, and job-specific and technical) skills. Skill requirements are captured by the firms' responses to the relevant survey question. In each of the 8 skill categories, firms can indicate that they require "none," "basic," "proficient" or "advanced" levels of a specific skill.

Figure 3.4 gives an overview of the types of skills and their level of proficiency required at the firm level. English and French languages, and general IT skills are required at a basic level, whereas the remaining skills—like interpersonal, work ethic, problem solving and job-specific skills—are needed at proficient to advanced levels. The findings also highlight the need for socio-emotional and technical at proficient and advanced levels and the remaining cognitive skills at a more basic level.

Figure 3.4: Types of skills required by enterprises at various proficiency levels
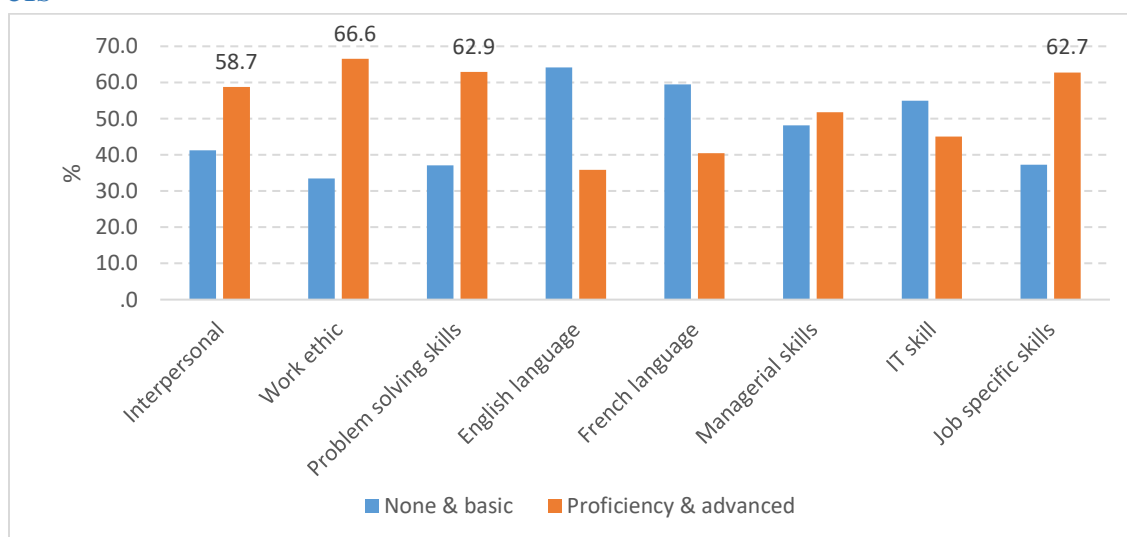
The various skill requirements are cross-tabulated for the industrial sectors covered in the survey. Figure A.3.2 (see Annex) gives the percentage of firms with their requirement for various skills types at proficient and advanced levels. In general, it can be seen that the ICT sector requires most of the skills set to be at proficient and advanced levels, with more than 80 percent of sector respondents laying particular emphasis on interpersonal, work ethic, problem solving and general IT skills. Respective respondents (above 70 percent) have also reported, requiring job-specific skills in the manufacturing sector; work ethic and job-specific skills in the wholesale and auto sales sector; work ethic in the retail sales sector; general IT, problem solving and managerial skills in the transport and logistics sector. The econometric analysis in section 3.3 generally supports these findings, while accounting for other control variables.

Modelling Analysis of Skill Requirements

Skill requirements (demand) are captured by the firms' responses to the relevant survey question. In each of these 8 categories, firms can indicate that they require "none," "basic," "proficient" or "advanced" levels of a specific skill. A linear probability model, where the dependent variable is coded to 0 if firms indicate none, or only basic requirements, and 1 otherwise. The model controls for a number of relevant covariates, such as firm size and industry, in order to uncover partial correlations. Table A.3.1(see Annex) summarizes the findings.

Among firms' general attributes, being an exporter, having above median productivity and being medium sized appear to be the most significant drivers of firms' demand for the various skills dimensions across the various industrial sectors. The positive correlation between higher productivity firms and demand for higher skills can be explained by the fact that firms have acknowledged the benefits of higher labor productivity and higher skill as a strong determinant. Medium-sized firms might have the willingness to grow where higher levels of skill (especially communications, work ethic, problem solving and other technical skills) are requisites. Foreign consumers value quality goods and services and are willing to pay for them, but quality is generally intensive in skilled labor. The findings confirm the general hypothesis that exporters tend to demand more skilled workers.

The ICT sector seem to generally have higher requirements for all 8 skills dimensions, with the exception of other technical and managerial skills. The demand for proficient to advanced skills level shows that the sector needs to deliver quality service and that it is also transitioning into a higher value-addition one, where higher skills levels are important requisites. The findings also reveal that the transport and logistics and the wholesale sectors have higher requirement for work ethics.

The current findings also corroborate those from previous studies[63] where medium- and large-sized firms have a higher demand for managerial skills. Larger firms require these skills to augment their management processes to deliver on strategic aims.

3.4. Skills and Productivity

Modelling Analysis of Skills and Productivity

Traditionally, skills and productivity have been closely related in economic analyses. Higher level skills act as superior inputs into the production process and enable higher productivity. Education is a prerequisite to skills formation. The two sections that follow investigate the impact of education and skills attainment on productivity.

Education

Formal education has always been a traditional route to acquiring skills, and in many contexts, workers who have completed secondary, or even tertiary education are referred to as "skilled," in recognition of the skills they develop throughout their education. We investigate the relationship between formal education and labor productivity by regressing a measure of labor productivity on the share of workers with a certain level of formal education, as well as a number of control variables, such as firm size, sector and capital per worker. The results are robust to including a large number of control and interaction variables.

We find that the share of workers who have completed secondary education is closely linked with higher labor productivity as measured by sales per worker, suggesting that firms with more educated workers are more productive as a result of their more skilled labor force.

Columns (1) and (2) of Table 3.1 show that in the sample, a higher share of workers with higher levels of formal education is associated with higher levels of labor productivity. Both coefficients are positive; however, only the coefficient for secondary education is significant. In column 3 we include both shares of workers and an indicator of training. The coefficient on training is positive and significant, and the coefficient on university educated workers now turns negative even though the result is not significant.

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63 Skills studies (2018) from the Human Resource Development Council.

The final column presents the model with sectoral and firm-size controls to account for additional drivers of productivity. The coefficient on secondary educated workers shrinks somewhat but remains large and positive, while the coefficient on training provision increases and becomes more significant.

Table 3.1: Regression of labor productivity on education level of workers

	(1) Log(Sales per Worker)	(2) Log(Sales per Worker)	(3) Log(Sales per Worker)	(4) Log(Sales per Worker)
Share of Workers with Secondary Education	0.0108*** (0.00168)		0.0123*** (0.00255)	0.0111*** (0.00238)
Share of Workers with University Education		0.00427 (0.00344)	-0.00446 (0.00436)	-0.00344 (0.00388)
Provides Training to Full-Time Employees			0.270* (0.130)	0.329** (0.121)
Constant	9.742*** (0.0895)	10.35*** (0.0854)	9.819*** (0.111)	10.16*** (0.238)
Sector Controls	No	No	No	Yes
Firm Size Controls	No	No	No	Yes
R squared	0.0719	0.00614	0.0804	0.241
N	569	466	451	451

Standard errors in parentheses
* $p<0.05$ **$p<0.01$ ***$p<0.001$

<u>Skills</u>

Education endows workers with a variety of skills, and while the analysis in the previous paragraph has shown us that secondary education is closely associated with productivity enhancing skills, we do not yet know which ones are most relevant to the context. Below, we use the survey to associate labor productivity with the use of specific skills dimensions.

Productivity at the firm level depends on actual inputs, namely the amount of skills. We therefore regress labor productivity on the share of workers who satisfy firm requirements for each skill category. Table A.3.2 (see Annex) column 1 presents the base model with controls added in column 2. Columns 3 and 4 add the share of workers with specific levels of education. The coefficient on the share of the workforce that meets the required IT skills is large and significant in the base and first control specifications. It remains positive but loses significance after the share of high school educated workers is included in the regression, suggesting that high school educated workers add to labor productivity by supplying IT skills.

3.5. Firm characteristics and skills gaps
<u>Current skills at firm level</u>

Respondents were asked to rate the level of skills present in their workforce compared with their needs. Findings give an indication of the actual shortage of respective skills at the firm level. In general, between 80 percent and 94 percent of respondents rated the level of current skills in their establishments as satisfactory—i.e., "as required" or "above requirement"—as is shown in Figure 3.5.

Firms' responses regarding the current skills that are "below requirement" are a proxy for a skills shortage. Reported shortage levels for most skills range from 6 percent to 10 percent, apart from English language and general IT skills where firms report a shortage of around 20 percent.

Figure 3.5: Rating of current skills with respect to needs of establishments
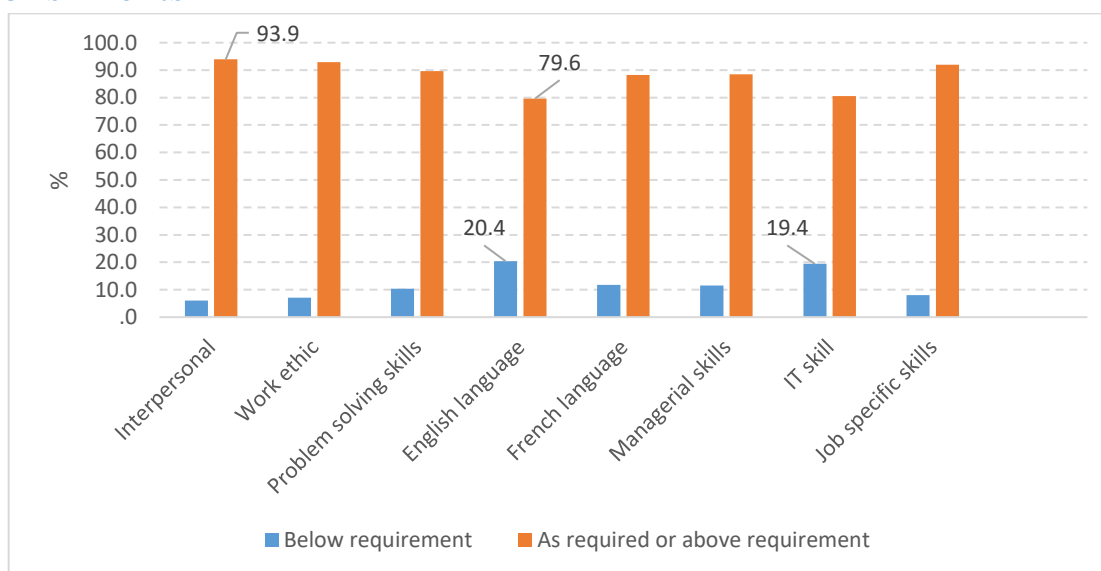
Below-requirement responses are further broken down into the various industrial sectors (Figure A.3.3, in Annex). All sectors reported a shortage for English language skills, with peaks of 37.8 percent and 35 percent for food production and construction sectors, respectively. Higher shortages are also reported for general IT skills across most sectors, with values of 30.8 percent and 27.9 percent for textiles and garments and accommodation and food services sectors, respectively. This can be explained by the increased interest in digitalization across sectors, coupled with a restricted supply of IT skills. Food production and textiles and garments sectors both report shortages of around 25 percent for problem-solving skills. In general, ICT, transport and logistics, and retail sales sectors all report small shortfalls in the various categories. ICT firms report a shortage of 12.8 percent for job-specific and technical skills. This can be explained by the high competition for higher skilled workers in the sector. The accommodation and food services sector also reported a 14.7 percent shortage for job-specific skills. The underlying reason is a relatively high staff turnover in the sector's service and sales occupational group.

Modelling Analysis of Current Skills

Skill shortages are captured by the percentage of the workforce having the required level of the various skills categories, as reported by the firm. An OLS regression is run, where the dependent variable is the percentage of workers meeting the firm requirements with respect to a specific skill. The specification controls for a number of relevant covariates, such as firm size and industry, in order to uncover partial

correlations. Since it is arguably easier to meet lower requirements, each model uses nonlinear controls for the required level of skill. The results are presented in Table A.3.3 in the Annex.

Higher requirements with respect to a skill seems to increase the share of the workforce that meets the skill requirements in that dimension. This might have to do with firms paying particular attention to these areas when making hiring decisions, or alternatively focusing their training programs on the specific required skills.

The findings show that medium-sized firms seem to experience shortfalls in most of the skills dimensions. Particularly pertinent areas are languages, technical and managerial skills. Exporters seem to have more qualified workers with respect to English language and IT, presumably due to the exigencies of servicing an export market.

There is a stark distinction between the manufacturing sectors (particularly food production and textiles) and the services sectors (particularly ICT, accommodation, transport and retail sales). The services sectors seem to have a lot more qualified workers meeting their requirements across all dimensions compared with manufacturing. Construction and wholesale services and other manufacturing sectors appear to be somewhere in between, having more qualified workers in problem-solving and IT skills as well as, to a degree, management.

<u>Vacancies at firm level</u>

The hiring of new workers is one way a firm can address a skill shortage. However, this strategy will only be successful if a firm is able to hire the right kind of workers. Unfilled vacancies can be a sign that a firm is unable to attract the desired talent or of a general shortage of specific skills in the labor market as a whole. Job vacancies were reported by 30.1 percent of respondents for up to 2 years preceding the reference period. Figure 3.6 below shows the vacancies and the proportion of them that were filled. For most of the occupational groups, around 70 percent to 80 percent of vacancies were filled; but within searches for skilled manual workers, the rate was only 8.9 percent. This low fill rate suggests that skilled manual workers cannot be found in sufficient numbers.[64]

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[64] The dataset here does not allow disaggregation of whether vacancies have been filled by local or foreign labor. Note that vacancies for plant and machine operators may be filled by foreign labor, as around 50% of work permits delivered in Mauritius are accounted for by this occupational group. Also note that firms tend to 'keep their vacancies' to justify the need to bring in foreign workers and thus these vacancies may not necessarily mean that skills/labor needs are unmet in the local labor market.

Figure 3.6: Vacancies and proportion of vacancies filled for various occupational groups
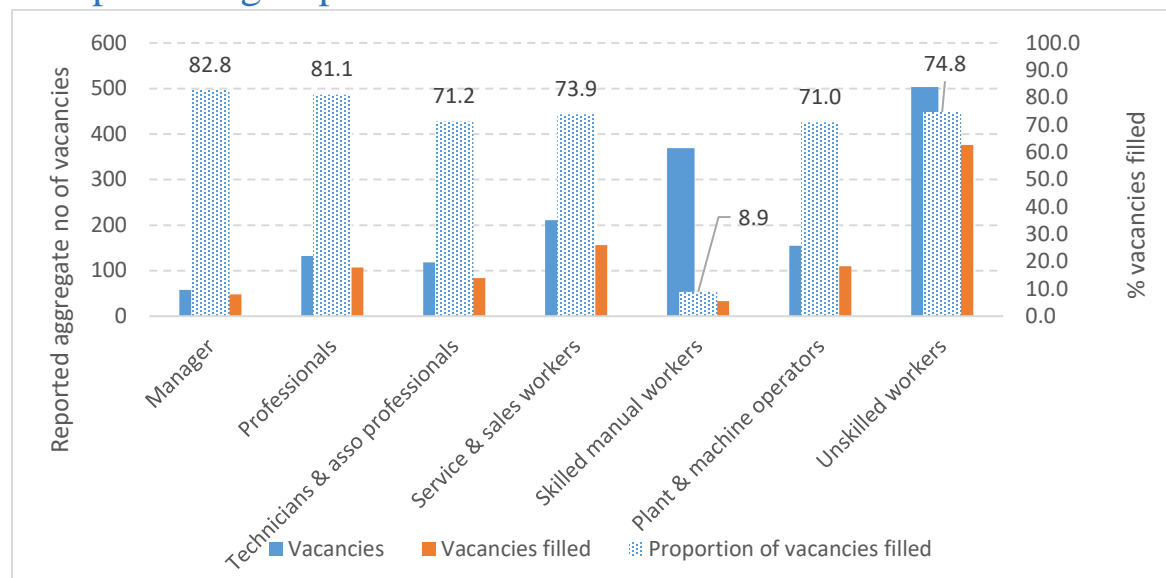
A sectoral breakdown shows where vacancies have been filled by occupational group (Figure A.3.4, in Annex). The accommodation and food services sector seemed to find talent relatively easily, with 70.1 percent of vacancies filled, on average. The wholesale and auto sales and the retail sales sectors also filled up their vacancies for most occupational groups—apart from skilled manual workers. The remaining sectors also had difficulties filling vacancies for this occupational group, with the construction sector filling none (0 percent).

3.5. Dealing with skills shortages

Changing workforce's structure takes time and skill deficits usually arise in the short- to medium-term when the existing skill mix is not adequate to meet firms' demands. Firms need to respond quickly so that the deficit does not impact operations. Responses to skills gaps include recruitment, in-house and external training, foreign labor and the use of Government programs for skills upgrading.

Recruitment

The sources from which enterprises recruit, gives an indication of the skills supply chain. The principal source is the general labor market via listings and ads (51.6 percent), with 21.8 percent relying on personal networks (Figure 3.7).

Figure 3.7: Main recruitment sources to fill vacancies (%)

- University of Mauritius
- Foreign university
- Open-market ads and job listings
- Personal networks
- Other Mauritian university
- Employment Information Centre
- Employees of competitors or other companies
- Other
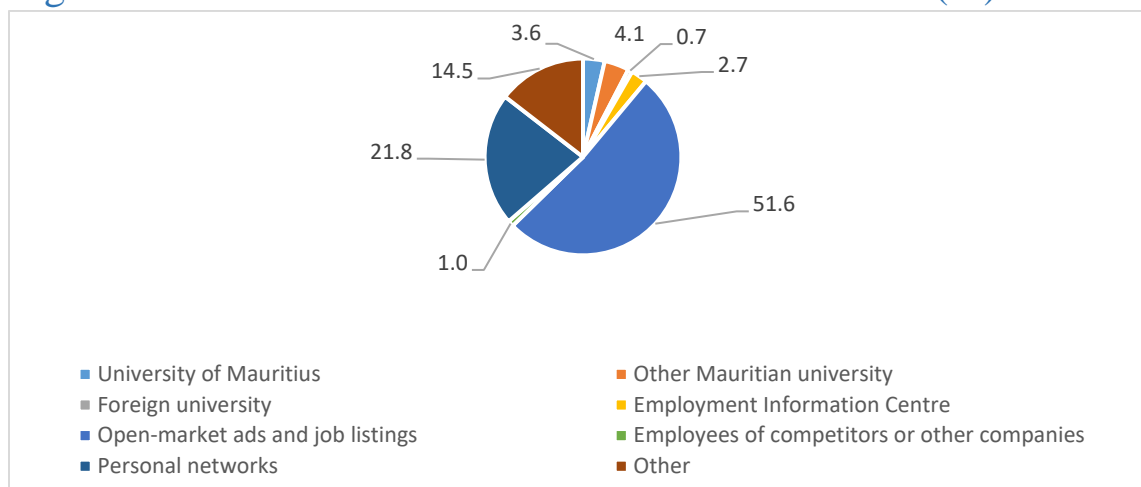
The Government, through its Ministry of Labor, implements support programs to facilitate the employment of diploma holders and graduates as well as women wishing to enter or re-enter the labor force. Respondents who hired some workers through the Youth Employment Program (YEP) and the Women Back to Work Program (WBTW) were 24.4 percent and 6.2 percent of the total surveyed, respectively.[65]

In general, at least 70 percent of firms reported that they faced difficulty hiring employees with work ethic, English language, problem-solving and managerial skills (Figure 3.8 below). Looking at sectors, almost all of them found it difficult to find new employees with interpersonal, work ethic, problem-solving, managerial and job-specific skills. Some sectors, namely food production, textiles and garments, accommodation and food services and ICT found it harder to access necessary skills (Figure A.3.5, in Annex).

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65 The questionnaire did not include 2 employer-led programs, namely the National Skills Development Program and the Graduate for Employment Scheme. These are implemented by the Human Resource Development Council and seek to train, place and potentially foster employment of unemployed youths, including graduates.

Figure 3.8: Difficulty finding employees with respective skill

Figure 3.8: Difficulty finding employees with respective skill

Legend: very easy & easy; difficult & very difficult

Values shown: 72.2, 84.6, 84.6, 81.5

Y-axis: %e (0.0 to 90.0)

Categories: Interpersonal skills, Work ethics, French language, English language, Problem solving skills, Job specific skills, IT skills, Managerial skills
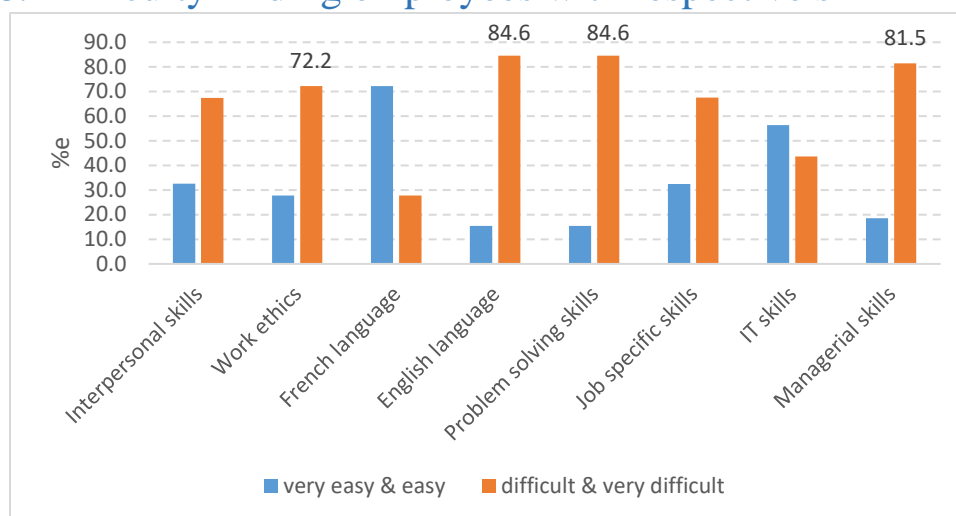
Modelling Analysis of Skill Shortage – Difficulty in Attracting Skills

The level of difficulty a firm faces when trying to attract workers in 8 skill categories is measured by the survey. In each category, firms can indicate the ease of attracting workers with 4 possible answers: very easy, easy, difficult or very difficult. A linear probability model is used with the dependent variable coded as 0 if firms indicate that they find it very easy or easy to attract workers with certain skills and 1 otherwise. In each case, we control for a number of relevant covariates, including firm size and industry, in order to uncover partial correlations. The model controls for the level of required skill in each dimension. The results are presented in Table A.3.4 in the Annex.

Enterprise size seems very significant in terms of how difficult it is to attract new employees. Medium- and, to a lesser degree, larger-sized firms report finding it easier to attract employees for most skill dimensions. Employers generally tend to look for recruits with an optimal mix of skills; thus, larger firms are better resourced and have better selling points (in terms of attractive salaries and professional-development opportunities) to attract such talent. Hence smaller firms find it increasingly difficult to compete for talent with more complete skills sets.

The regression results also appear to show that ICT firms find it slightly easier to attract workers with a variety of skills, suggesting that the sector is particularly attractive to high skilled workers. This might also be due to the relatively high salaries in the sector as analyzed below.

Training and skills

Training is fundamental to human capital formation, as it is a prerequisite to reskill and upskill current employees. However, only 19.1 percent of firms provided formal training to their permanent full-time workers during the reference period. The definition of formal training does not include informal, on-the-job training activities which might take place within a firm.

Of the firms in the manufacturing sector which provided formal training to their full-time workers, 29.7 percent provided training for more than 75 percent of their production staff, whereas 55 percent provided training to less than 25 percent of their production staff. Of the firms in the manufacturing sector which provided formal training to their full-time workers, 33.2 percent provided training for more than 75 percent of their non-production workers, whereas 46.1 percent provided training to less

than 25 percent of workers in the same category. A comparison of the 2 sets of findings shows that firms in manufacturing tend to train production workers more often than non-production ones. This suggests that production activities tend to be firm specific, while non-production tasks may be more similar across firms.

Out of the firms in the non-retail services and hotel sectors that provided formal training to their full-time workers, 56.2 percent provided training for more than 75 percent of staff, whereas 13.7 percent provided training to less than 25 percent of staff. It seems that firms in the services sector tend to formally train more of their full-time workers.

Figure 3.9 shows that 34.7 percent of respondents reported that the primary focus of formal training was job-specific technical skills, with problem solving/critical thinking coming next with 20.3 percent of respondents.

Figure 3.9: Primary focus of formal training programs (in %)
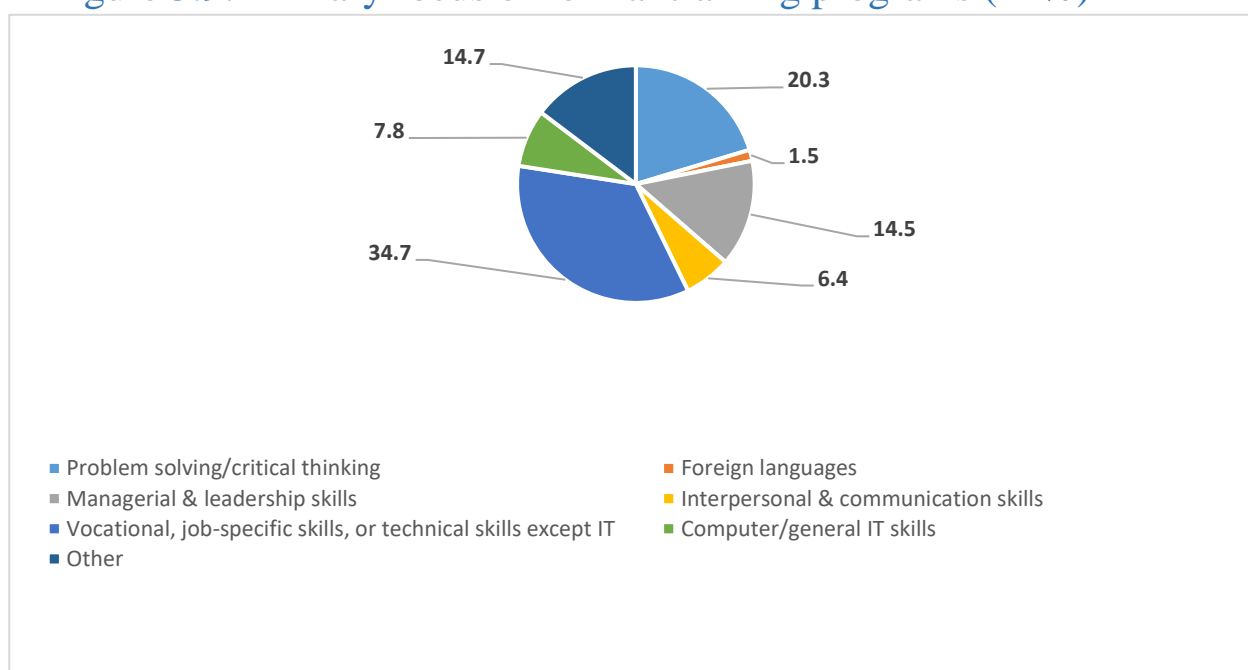
The primary focus of formal training is a function of sectoral activity. Almost all sectors spread their formal training to generally cover the various skills dimensions, with certain sectoral specificities (see Figure 3.10). Firms in the food production, textiles and garments, and "other manufacturing" sectors—that is, those that are involved in the production of goods—tend to focus more on jobs-specific technical, managerial and problem-solving training. There is barely any training in ICT skills. The accommodation and food services sector focused 38.4 percent of training on job-specific technical content and is the only sector that train employees in languages. The retail sales sector unilaterally focused on interpersonal and communications skills, indicating a more short-term training strategy. ICT centered 54.3 percent of training on computer and general ICT content.

Figure 3.10: Primary focus of formal training programs across various industrial sectors
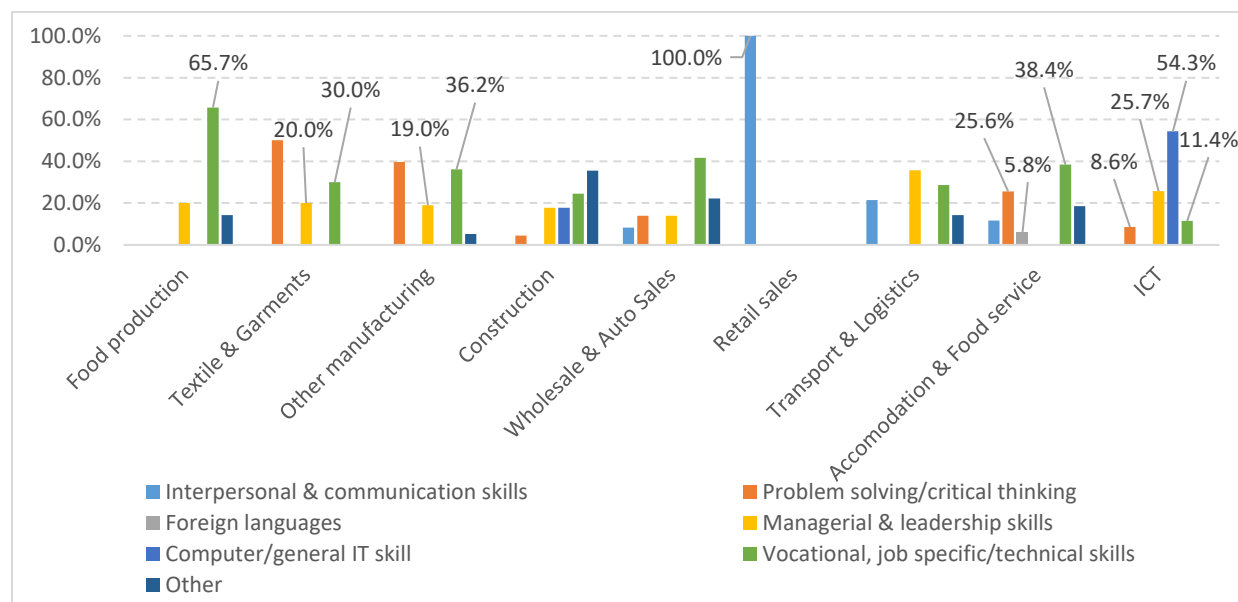
Matching skill needs and the focus of training

Training presents employees with an opportunity to expand their knowledge and skills base to become more effective workers. If training is relevant and of a sufficiently high quality, it can instill competencies and self-confidence in workers and allow them to better perform their tasks. It is expected that training programs would be designed and offered to help fulfill the current and forthcoming needs of enterprises. Skills that were deemed "below requirement" are used as a proxy for a skill shortage and are graphed along with the focus of training by firms (Figure 3.11). In general, firms tend to match training to reported shortages, with a more significant focus on job-specific training. The discrepancies seen are for language training, where there is a mismatch between reported need and the focus of training, and for general ICT skills, where there is a deficit. Figure 3.11 also graphs the difficulty in finding employees with a respective skill set. This can give an indication of shortages[66] in the labor market and how firms are focusing their training programs to address this gap. The disparity again is seen for language and general ICT training.

Matching skills shortage with training is highly contingent on sectors. Figure A.3.6, in Annex gives a comparison within the ICT sector. While most (65.7 percent) of its training is concentrated on the skills necessary for these firms to operate (IT and job-specific), firms do not report experiencing a shortage of workers with general IT skills.

Figure 3.8: A comparison of skills shortages, difficulty in finding employees, and primary focus of formal training across skills categories

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[66] It is important to qualify the shortage here; it is a mix of skills, labor and the capability of respective firms to attract required skills.
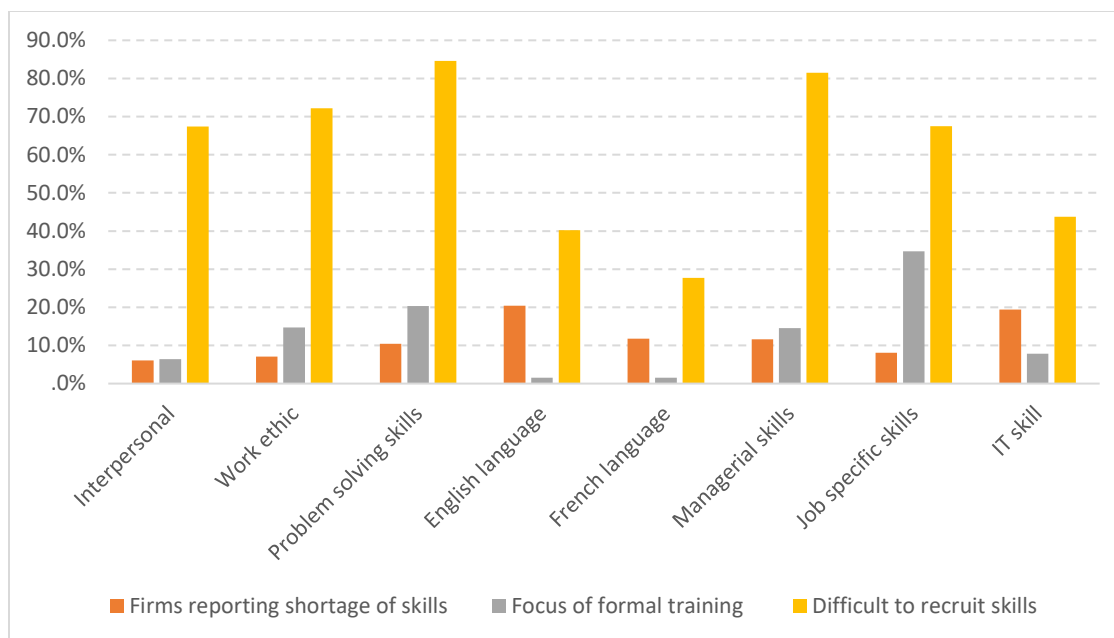
(percentages for shortage of skills do not add up to 100 percent, whereas those for focus of training do)

<u>Training expenditure</u>

Training expenditure determines a firms' dedication to human capital formation. Of those firms that spend on training, 32.5 percent spent less than Rs 50,000 and 21.5 percent spend between Rs 200,000 and Rs 500,000 on aggregate.

Training expenditure per worker gives a better indication of a firm's investment in training. Of those firms that invested on formal training, 2.4 percent spent between Rs 50,000 and Rs 1,000,000 per worker. Findings show that 37.3 percent of firms that invested on formal training spent up to Rs 5,000 per worker in the reference year. At the same time, 27.1 percent of them conducted formal training without incurring any direct expenditure (Figure A.3.7, in Annex). Such training was likely conducted by in-house staff with respective firms incurring only the opportunity costs.

The above finding cannot be interpreted in isolation but should be cross-tabulated with the number of workers in respective firms. It is here hypothesized that firms with more employees would tend to spend less on training per worker. Figure 18 shows that 57.3 percent of firms employing more than 99 employees spend less than Rs 5,000 per worker on training.

The highest per head training expenditures (between Rs 25,000 and Rs 100,000) tend to occur in 27.4 percent of firms with less than 20 employees. These cases would likely pertain to firms with high salaries—e.g., small ICT firms with high revenues and corresponding high salaries looking to train their staff externally in high order skills. Of the small firms that conduct training, 37 percent of them do not spend (Figure 3.9 below). One explanation is that many of these firms are small enterprises that focus on on-the-job training by necessity; they, therefore, do not directly benefit from the schemes under the training levy.

Figure 3.9: Categories of training expenditure per full-time worker, cross-tabulated against size of firms
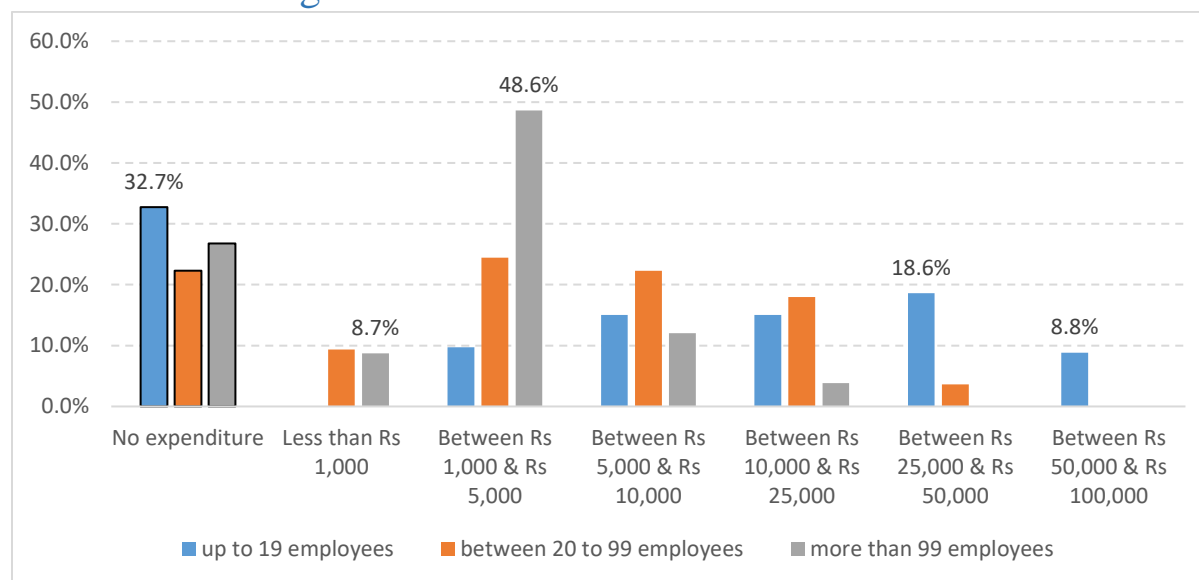
A sectoral breakdown of training expenditure per head (Figure A.3.8, in Annex) provides some interesting insights. Firms from most sectors (apart from food production) train their employees via in-house trainers, and thus do not incur any direct costs. One reason could be that these firms prefer to save their training levy credits to invest in paid training that is conducted by external trainers. An associated explanation for the ICT sector (40 percent of training is in-house) is that job-related and specialized training is not available in the local market, and firms use in-house expertise to deliver training.

Foreign labor

Foreign labor is a substitute for local labor in certain sectors and occupational groups. The majority of foreign labor comes under work permits, and the rest, with higher order skills, work under occupational permits. 20.8 percent of responding firms have had recourse to foreign labor during the reference period.

A sectoral disaggregation indicates which sectors are more foreign labor-intensive (Figure 3.10). The construction and the textiles and garments sectors depend quite extensively on foreign workers, accounting for 30.6 percent and 52.6 percent of their total workforces, respectively. The relative low number of sampled firms for these 2 sectors also indicate this.

The responses were further disaggregated into skills levels (Figure A.3.9, in Annex). The textiles and garments sector is the biggest recruiter of foreign labor, looking for skilled, semi-skilled and low-skilled workers in similar quantities. Foreign labor with low skills, in both the textiles and construction sectors, indicate that generally Mauritians are not willing to do low-skilled tasks in those sectors.

Figure 3.10: Foreigners as a percentage of total full-time permanent workers in various levels of skilled jobs (%)
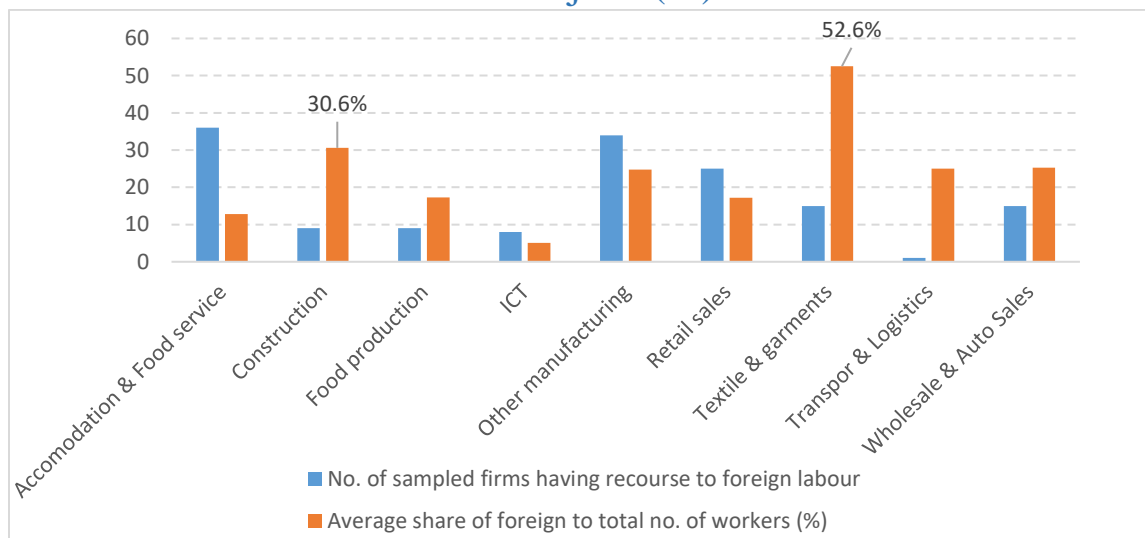
Improving Female Participation in the Labor Market

Women provide valuable skills for all sorts of firms. However, due to a combination of societal and gender norms, female participation in the labor market is low. In 2018 female labor market participation stood at 48 percent (CEM, 2021), and in the sample the average share of full-time, permanent workers who were female was 37.9 percent, which is comparable to the average amongst high-income comparator countries (37.5 percent). Women are however underrepresented as business owners and decision makers. Approximately half of all firms in the sample (333 out of 715) have some form of female ownership, but only 9.4 percent of these firms are also majority female owned. This is about a third lower than the 11.8 percent majority female ownership exhibited by the set of rich comparator countries, and even lower than the average among a number of upper middle-income economies (12.1 percent). Only 29 firms are fully female owned. 99 firms (13.6 percent) have a female top manager, which again is a lower than the 17.5 percent among high-income comparators, and even upper-middle income economies (17.0 percent). Out of the 29 fully female owned businesses, 22 also have a female top manager.

Encouraging female participation might be an effective and equitable way of addressing skill shortages. In Table A.3.5, in Annex skills-shortage regressions are run to include a number of additional explanatory variables: i) the share of a firm's full-time permanent workforce that is female, and ii) an indicator of whether the top manager is female. Generally, female participation both as workers and in decision-making positions seems to be associated with smaller skill shortages. The coefficient on the share of female workers is positive and significant in the case of interpersonal and French language skills, suggesting that female workers might bring these skills with them at relatively higher levels.

Support mechanisms can help facilitate the inclusion or the re-entering of women in the workplace, given their traditional role in the family as care providers. However, less than 5 percent of firms provide for on-site childcare, alternative childcare and elderly care. The provision of alternative working structures ranged from 22.2 percent offering the chance to work from home to 47.9 percent offering alternative working schedules. On the other hand, 82 percent of firms provide paid leave. (Figure 3.11)

Figure 3.11: Measures favoring inclusion of females in the workplace
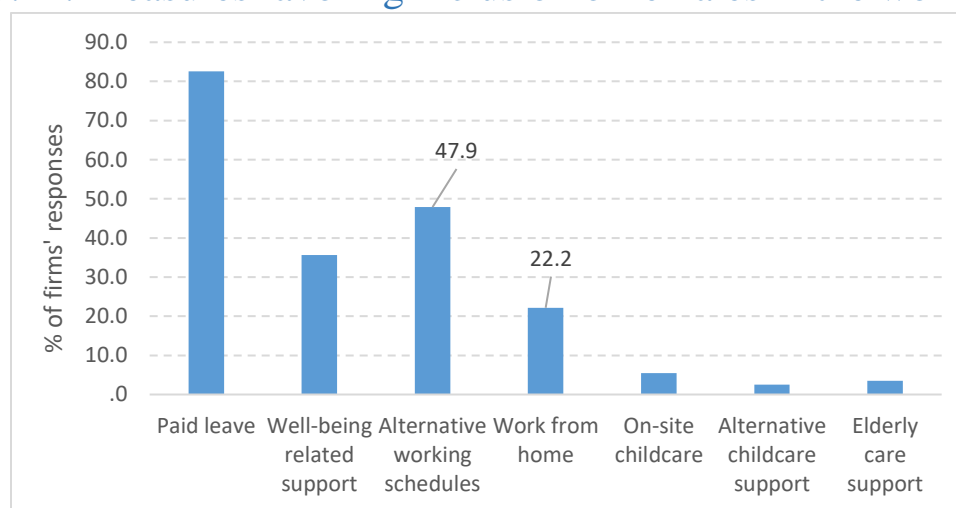
Addressing obstacles to female labor participation might help firms attract new talent. Table A.3.6, in Annex refines the recruitment model regressions by adding a number of indicators for whether the enterprise provides different types of support for those workers with caring responsibilities.

The results indicate that providing any form of support is generally associated with having an easier time attracting workers with specific skills. Particularly, providing flexible working arrangements is associated with a greater ease of attracting workers with suitable skillsets. On-site childcare and childcare support are broadly associated with greater ease of skill attraction, even though the coefficients are not consistently significant. This might be due to the small number of firms that offer these support systems. However, the general direction of these results seems to suggest that they are attractive for potential workers. Since childcare services are most likely beneficial to women, this suggests that providing suitable support mechanisms might be effective in attracting qualified female workers which, in turn, reduces skill shortages.

Wages and skills

Wages are related to skill levels, and both are determinants of productivity. The majority (94.8 percent) of workers in low-skilled jobs earn less than Rs 15,000 per month, whereas 67.6 percent of those in semi-skilled jobs earn a monthly wage between Rs 10,000 and Rs 20,000. 52.7 percent of those in skilled jobs earned a wage varying between Rs 20,000 and Rs 50,000 in the reference year (Figure A.3.10, in Annex). Skill levels are strong wage determinants.

A sectoral breakdown gives the wages differential for the various skills levels. On average, ICT paid the highest salaries to skilled workers, and also to those considered semi-skilled. The wholesale and auto sales sector paid the second highest monthly wages for skilled workers (Figure A.3.11, in Annex). Higher wages indicate two things: first, that firms need higher order skills and need to remunerate accordingly, and, second, more competition exists which raises the price to retain existing talent. The foreseeable development of the ICT and ICT-enabled sectors will likely compound the pressure on the existing ICT skills supply chain resulting in wage increases.

3.7. Skills findings and policy recommendations

<u>Salient Findings</u>

The level of education of a company's workforce is strongly indicative of the company's ability to develop and utilize new technologies, processes or business practices. As is often pointed out, the lack of a well-educated workforce can be a major obstacle to a firm's growth and productivity. 53.2 percent of enterprises in the textiles and garments sector reported that inadequately educated workers are a moderate to major obstacle to their operations. This finding is supported by survey data showing that only 31.9 percent of the sector's workers have completed secondary education and only 15.4 percent have received a degree. These education levels are below the values seen for other sectors, particularly for more service-oriented firms. A general lack of formal education may be an obstacle to enterprises trying to upgrade their production processes and to improve their productivity and competitiveness.

In contrast, ICT has the highest proportion of full-time workers with completed secondary education and degrees, and it seems to be among the most dynamic and productive sectors of the economy. Despite this, the sector still experiences some obstacles from an insufficiently educated workforce, suggesting there is still need for an increased share of higher/highly educated workers in the sector.

Moving beyond a unidimensional model of skill, the ES provides measures of firms' skill requirements across 8 dimensions. This multidimensional model allows a more granular view of the skills requirements of firms. Overall, the types of skills that firms require depend on a firms' business model, but a particularly salient finding is that a high proportion of firms that emphasize the need for proficient or advanced interpersonal skills (58.7 percent) and work ethic (66.6 percent), suggesting that these socio-emotional skills are important for many businesses, as well as problem-solving skills (62.9 percent) and job-specific technical skills (62.7 percent).

In general, the ICT sector[67] requires most of the 8 skill dimensions at proficient or advanced levels, with more than 80 percent of ICT respondents emphasizing interpersonal, work ethic, problem solving and general IT skills. This analysis rounds off the characterization described above: the ICT sector appears to be operating at a high level of complexity, requiring advanced skillsets and employing a highly educated workforce.

Skill gaps arise when workers' capacities do not suffice to meet the firm's requirements, potentially leading to low productivity and other impediments to business growth and development. On average, most firms (90 percent) rated the level of current skills in their establishments as sufficient (or higher). Two important exceptions are English language and basic IT skills, where around a fifth of firms responded that their general requirements were not met by their workforce, suggesting that these skills might be in relatively short supply.

Of particular relevance is a noticeable dichotomy between manufacturing and service-oriented sectors of the economy, with the latter seeing a much better skill fit, despite having higher requirements. This points to an important differential in terms of the ability to attract and retain

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[67] Given that the economy is moving towards services, the financial services and the professional services sectors would have also required skills at 'proficient to advanced' levels but, these sectors are not covered in this survey.

talented workers across sectors. Over 70 percent of respondents claimed that they faced difficulty in finding new employees with appropriate work ethic, English language, problem solving and managerial skills, but there remains significant sectoral heterogeneity.

To attract talented workers, wages are important. In line with the narrative developed throughout this analysis, the ICT sector pays the highest average wages for workers with high and medium skills and, as a result, ICT firms generally find it easier to attract workers with the requisite skills. In contrast, the textiles and garments sector pays the lowest wages across all skill levels and struggles to attract skilled workers as a result of this low-wage model.

In the medium to long term, paying higher wages in exchange for more skilled workers might benefit firms. The share of workers who have completed secondary education and who have benefitted from some relevant training, is closely linked with higher labor productivity, as measured by sales per worker, suggesting that either firms with more educated workers are more productive as a result of their more skilled labor force, or that more productive firms generally hire more skilled workers. Further, firms that are more endowed with computer and general IT skills experience higher productivity, suggesting a special role for these skills in boosting labor productivity.

Vacancies are a strong indicator of a firm's desire to hire a specific type of worker, and unfilled vacancies might point to an underlying shortage of a specific type of labor. Across 7 general occupational categories, around 75 percent of vacancies are filled, suggesting that there is generally a reasonable supply of these type of workers. The main exception is the skilled manual workers category, where less than 9 percent of vacancies are filled, suggesting a strong mismatch of supply and demand with potentially adverse consequences. For plant and machine operators as well as technicians and associate professionals, the rates are, respectively, 71 percent and 71.2 percent, also suggesting that firms find it challenging to fill vacancies for middle-skilled professions. Mauritians are less inclined to work as skilled manual laborers, hence firms fill these vacancies with expatriates working on time-bound work permits. 20.8 percent of firms stated that they had recourse to foreign labor in the reference period, with the textiles and garments sector being by far the most foreign labor-intensive one.

To address skill deficits, firms have to recruit new workers from the local or foreign labor market and/or train existing staff. Only 19.1 percent of firms have provided formal training to permanent full-time workers during the reference period. The primary focus of formal training is job-specific technical skills, followed by problem solving/critical thinking. Generally, firms tend to match training with reported shortages, with a more significant focus on job-specific training; but a deficit is noted for language and ICT training. This suggests that companies try to remedy perceived skill shortages through training programs. The only noticeable discrepancy here is for language training, where there is a mismatch between reported need and focus of training. This might be due to the particular nature of language skills, where teaching new languages to workers might be particularly cost and time intensive. Most small firms do not train their employees formally or, if they do, do not–spend any significant amount of money on this training, suggesting this is a long-term investment firms expect to be publicly provided.

Finally, female workers could provide more human capital, yet female participation in the labor market is hampered by a lack of support mechanisms, like on-site and alternative childcare.

Policy recommendations

TVET, polytechnics, secondary and tertiary education institutions should also emphasize digital and computational skills in their curriculum to better support digitalization and the further

development of the ICT sector. Skills are closely linked with higher labor productivity and are an integral component to business transformation and growth. Skills are initially acquired during education and are fine-tuned and made job-specific through on-the-job experience and training. A stronger stock of technical and vocational education and training (TVET) as well as secondary and tertiary qualifications all provide a better bedrock for subsequent skills formation.

Efforts to improve skill supply should consider industry-specific needs. Skills requirement across all industrial sectors cover socio-emotional, cognitive and technical skills. There is, nonetheless, a slight distinction between manufacturing and service sectors. Manufacturing sectors tend to look for skillsets that are specifically linked to productive activities, whereas more service-related sectors tend to also look for more general skillsets and more cognitive skills, leading to enhanced creativity, innovation in enterprise. To foster industry-specific skills needs, respective industry associations should collaborate more with Government education and training institutions to mainstream specific skills initiatives

Skills provision by polytechnics has a fundamental role to play to support increased automation at the industry level. The ICT sector increasingly tends to look for higher order job-specific technical and problem-solving skills. The textiles and garments and other manufacturing-focused sectors should, if practical, increase the level of computer and general IT skills, either through recruitment or training, to provide a basis for increased automation.

At any time, a firm's current skills mix may diverge from its requirements. Often it is difficult for the current skills mix to meet needs because employers (especially smaller ones) have limited flexibility to replace incumbent workers with new recruits with the new required skills. The agility of the existing workforce, resourcefulness of the firm and the relevance of the recruitment process are all critical factors in this regard.

Digital skills provide a crucial foundation for further technological upgrading and growth. A particularly important finding is the relative shortage of basic IT knowhow. Given the importance of digital skills for labor productivity, but also further technological upgrading and development, this is a key area where policy can step in to provide necessary training as early as the primary school level, complemented with national digital proficiency programs. This would provide a better foundation for firms to train their workers. Building on these foundations would be an important step toward addressing the digital skill shortage in the future.

Foreign workers can be a short-term solution to skill shortages, but long-term domestic alternatives should be developed as well. Foreign workers contribute significantly to labor productivity and firms' growth, both in manufacturing and service-oriented sectors. Reliance on imported labor will likely have a substituting effect in manufacturing sectors and a complementary one in higher value service sectors, where higher order skills are strong prerequisites for operation and growth. The occupational permit system could be further streamlined to incentivize firms to bring foreign labor from skilled occupational groups to remedy deficits in respective sectors. However, to develop a long-term strategy to address skill shortages, domestic alternatives relying on quality vocational education and training should be fostered.

As a domestic alternative to foreign labor, it is crucial to integrate more women in the workplace. The set of support mechanism to mainstreaming women's labor market participation must be strengthened through a joint effort by the public and private sectors. The report suggests that policies providing adequate childcare for female employees might be particularly effective. Further, actors at all levels of government and civil society should aim to improve technical education by all means possible.

Training programs are underutilized; to deliver potential benefits, programs should be reorganized and targeted to the needs of firms. The skills base and training needs should be geared towards improving productivity. Training is an underutilized instrument to improve the adequacy of the workforce. More specifically, in-house training is the best instrument to impart productivity-related job-specific skills, with internal trainers where the expertise is in-house and external trainers when the required skills are not found within the firm. Socio-emotional and cognitive skills could be developed through external training. Matching training and training outcomes with current and prospective needs has to be embedded into HR functions to improve the rate of return for firms. Firms requiring highly technical skills should also increasingly embrace online learning. Existing training schemes should also be adapted to dis-incentivize non-relevant training and incentivize more job-related training. Enterprises must also judiciously use Government-supported programs in their skills-development strategies. The report also found a strong discrepancy between the demand for English language skills and the training provided by firms on this count. **Given the particulars of language acquisition, education policy might be able to address this area in the context of formal education. The same recommendation extends to French language and IT skills, which might benefit pupils in secondary or even primary education**.

Smaller firms did not regard the training grant as a sufficient incentive to compensate for all implicit costs that they incur in the training of their workers. They are not necessarily structured to optimally benefit from the existing training levy scheme. They tend not to offer formal training for their employees, and if they do, this training is mostly low cost.

An alternative business development and training mechanism should be proposed around third-party identification of training and non-training needs, clustering of needs and in-situ delivering of training and coaching on targeted production needs. Medium firms are more productive and generally show a propensity to grow. Support packages could target such firms.

Encourage cross-sectoral and cross-institutional cooperation in skills development. Skills development can benefit from collaboration between the private and public sector. Formal education plays a role in laying the foundations required for developing advanced skillsets, encompassing areas such as languages and literacy, but also socioemotional skills. However, given the diverse and changing needs of different sectors of the economy, care should be taken to align further skills development with the needs of private enterprise. Encouraging cooperation between stakeholders in the public education sector and business leaders could go a long way in addressing skill shortages and contributing to sustainable growth and development in Mauritius. One particularly salient area are language and basic IT skills, where exposure at an early age might pay large dividends in the future.

However, skills alone will not drive productivity improvements. Wherever possible, skills should be developed in tandem with other productivity drivers like investment, competition and innovation. Ultimately, human capital requires an environment of healthy competition, institutional support and a forward-looking business culture to deliver growth and prosperity.

Annex A.3: Chapter 3

Figure A.3.1: Cross tabulation between various categories of number of permanent workers and industrial sector
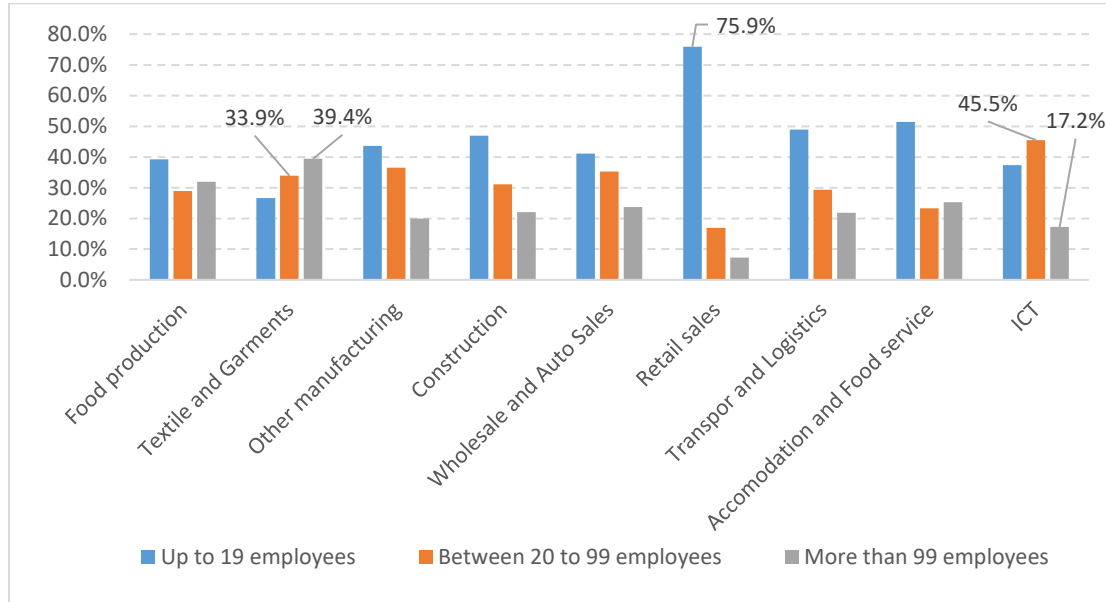
Figure A.3.2: Types of skills that are required at 'proficient and advanced' levels across sectors
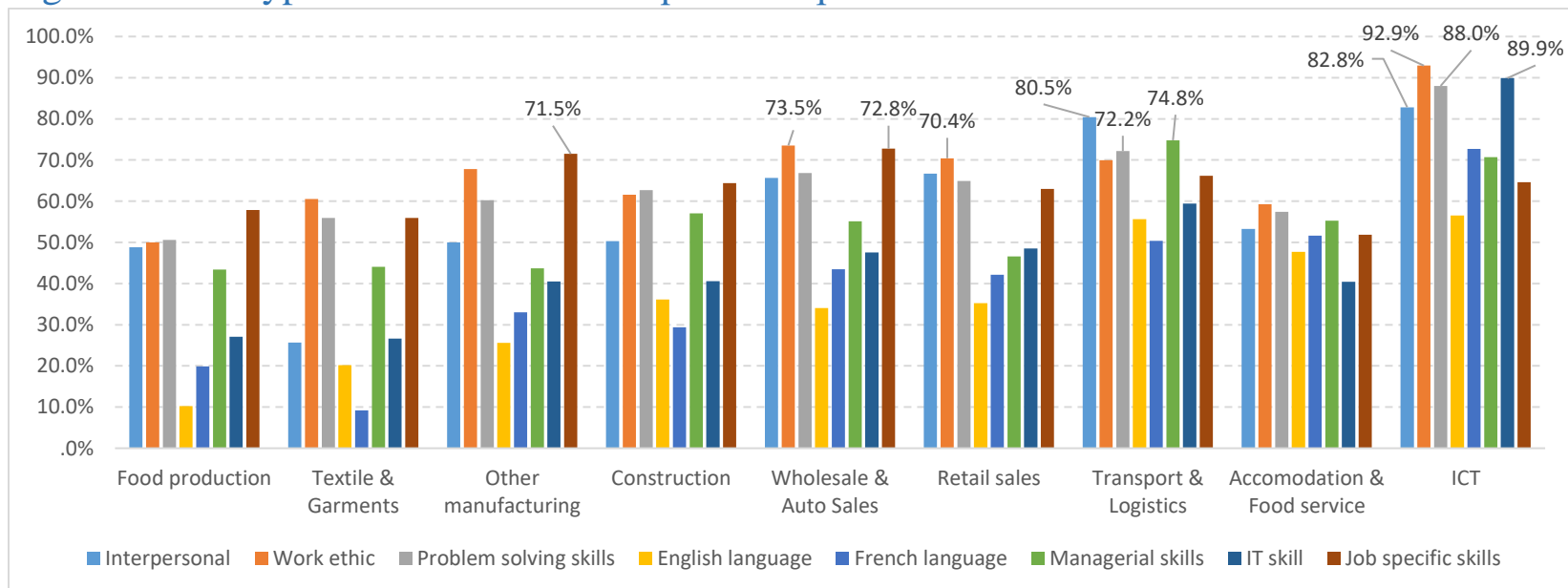
Table A.3.1: Summary of findings from linear probability model, with dependent variable 'level of skills proficiency required' for all skills categories

Variables	(1) Communication Skills	(2) Work Ethic	(3) English	(4) French	(5) Problem Solving	(6) other Technical	(7) IT	(8) Management
Textile and Garments	-0.265*	0.131	-0.00240	-0.166	-0.0205	-0.0834	-0.164	-0.0631
	(0.117)	(0.134)	(0.0951)	(0.0890)	(0.117)	(0.139)	(0.107)	(0.132)
Other manufacturing	-0.0284	0.147	0.126	0.0899	0.0557	0.0955	0.0786	-0.00905
	(0.0978)	(0.0993)	(0.0668)	(0.0768)	(0.101)	(0.0935)	(0.0843)	(0.0958)
Construction	0.0774	0.148	0.288**	0.176	0.142	0.111	0.0994	0.136
	(0.112)	(0.109)	(0.0899)	(0.0920)	(0.109)	(0.109)	(0.101)	(0.106)
Wholesale & Related	0.174	0.234*	0.200**	0.232**	0.149	0.167	0.143	0.121
	(0.0993)	(0.100)	(0.0700)	(0.0762)	(0.101)	(0.0939)	(0.0861)	(0.0960)
Retail sales	0.207*	0.229*	0.238***	0.266***	0.191*	0.105	0.209**	0.115
	(0.0919)	(0.0936)	(0.0654)	(0.0709)	(0.0938)	(0.0904)	(0.0791)	(0.0893)
Transport and Logistics	0.303**	0.229*	0.451***	0.324***	0.232*	0.0672	0.214*	0.313***
	(0.0961)	(0.103)	(0.0821)	(0.0879)	(0.101)	(0.104)	(0.0970)	(0.0933)
Accommodation and Food Service	0.0645	0.105	0.354***	0.311***	0.0834	-0.0395	0.0788	0.108
	(0.0929)	(0.0946)	(0.0665)	(0.0703)	(0.0955)	(0.0894)	(0.0801)	(0.0904)
ICT	0.321**	0.435***	0.415**	0.547***	0.379**	0.0364	0.589***	0.260
	(0.111)	(0.101)	(0.135)	(0.0898)	(0.131)	(0.148)	(0.0942)	(0.146)
Medium (20-99)	0.139***	0.121**	0.0523	0.0553	0.180***	0.107**	-0.0271	0.152***
	(0.0379)	(0.0370)	(0.0372)	(0.0363)	(0.0359)	(0.0381)	(0.0369)	(0.0383)
Large (100 or more)	0.0348	0.0126	-0.0163	-0.00129	0.00982	0.0769	0.0130	0.159*
	(0.0598)	(0.0606)	(0.0563)	(0.0563)	(0.0629)	(0.0633)	(0.0597)	(0.0644)
Majority Female Owned	-0.0688	-0.0336	-0.0475	-0.0604	-0.0324	-0.0183	-0.111**	-0.0906*
	(0.0461)	(0.0447)	(0.0408)	(0.0418)	(0.0444)	(0.0458)	(0.0424)	(0.0441)
Exporter	0.0867*	0.100*	0.159***	0.234***	0.0718	0.128**	0.186***	0.117*
	(0.0423)	(0.0428)	(0.0446)	(0.0410)	(0.0448)	(0.0445)	(0.0437)	(0.0465)
High Productivity Firm	0.0826*	0.0578	0.0939*	0.106**	0.0983**	0.0472	0.115**	0.0249

	(0.0378)	(0.0368)	(0.0367)	(0.0365)	(0.0375)	(0.0374)	(0.0375)	(0.0376)
Years in Operation	0.000134**	0.000169***	-0.000285***	-0.00000664	-0.0000912	-0.0000441	0.000281***	-0.000338***
	(0.0000473)	(0.0000351)	(0.0000421)	(0.000148)	(0.000166)	(0.000136)	(0.0000571)	(0.0000500)
Constant	0.370***	0.376***	0.0408	0.0672	0.360***	0.452***	0.217**	0.329***
	(0.0860)	(0.0871)	(0.0569)	(0.0626)	(0.0881)	(0.0846)	(0.0726)	(0.0820)
R squared	0.0951	0.0647	0.100	0.133	0.0756	0.0488	0.119	0.0771
N	647	647	647	647	647	647	647	647

Standard errors in parentheses

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

Table A.3.2 Regression of labor productivity on share of workforce meeting required levels of different skills categories

	(1) Log(Sales per Worker)	(2) Log(Sales per Worker)	(3) Log(Sales per Worker)	(4) Log(Sales per Worker)
Percentage of Workforce that Meets Interpersonal and Communication Skill Required	-0.00336	-0.00161	-0.00209	-0.00107
	(0.00248)	(0.00215)	(0.00319)	(0.00285)
Percentage of Workforce that Meets Work Ethic Required	-0.00119	-0.00259	-0.00241	-0.00225
	(0.00239)	(0.00204)	(0.00309)	(0.00278)
Percentage of Workforce that Meets English Required	0.00122	-0.000929	-0.000754	-0.00342
	(0.00243)	(0.00213)	(0.00318)	(0.00274)
Percentage of Workforce that Meets French Required	0.00247	0.00579**	0.000934	0.00431
	(0.00221)	(0.00193)	(0.00280)	(0.00252)
Percentage of Workforce that Meets Problem Solving Skills Required	0.000810	0.000876	0.00133	0.00144
	(0.00214)	(0.00197)	(0.00293)	(0.00265)
Percentage of Workforce that Meets Other technical Skills Required	-0.00152	-0.00209	0.000413	-0.000520
	(0.00243)	(0.00226)	(0.00311)	(0.00282)
Percentage of Workforce that Meets IT Skills Required	0.0105***	0.00703***	0.00491	0.00373
	(0.00210)	(0.00195)	(0.00297)	(0.00270)
Percentage of Workforce that Meets Management and Leadership Skills Required	-0.00526**	-0.00250	-0.00368	-0.00120

	(0.00180)	(0.00167)	(0.00231)	(0.00216)
Provides Training to Full-Time Employees		0.329**		0.274*
		(0.100)		(0.127)
Share of Workers with Secondary Education			0.0120***	0.0100***
			(0.00264)	(0.00240)
Share of Workers with University Education			-0.00549	-0.00362
			(0.00434)	(0.00395)
Constant	10.15***	10.12***	10.03***	10.27***
	(0.132)	(0.198)	(0.188)	(0.294)
Sector Controls	No	Yes	No	Yes
Firm Size Controls	No	Yes	No	Yes
R squared	0.0683	0.263	0.0843	0.249
N	611	611	440	440

Standard errors in parentheses

* p<0.05 **p<0.01 ***p<0.001

Figure A.3.3: Shortage of different skills categories per industrial sector

Figure A.3.3: Shortage of different skills categories per industrial sector
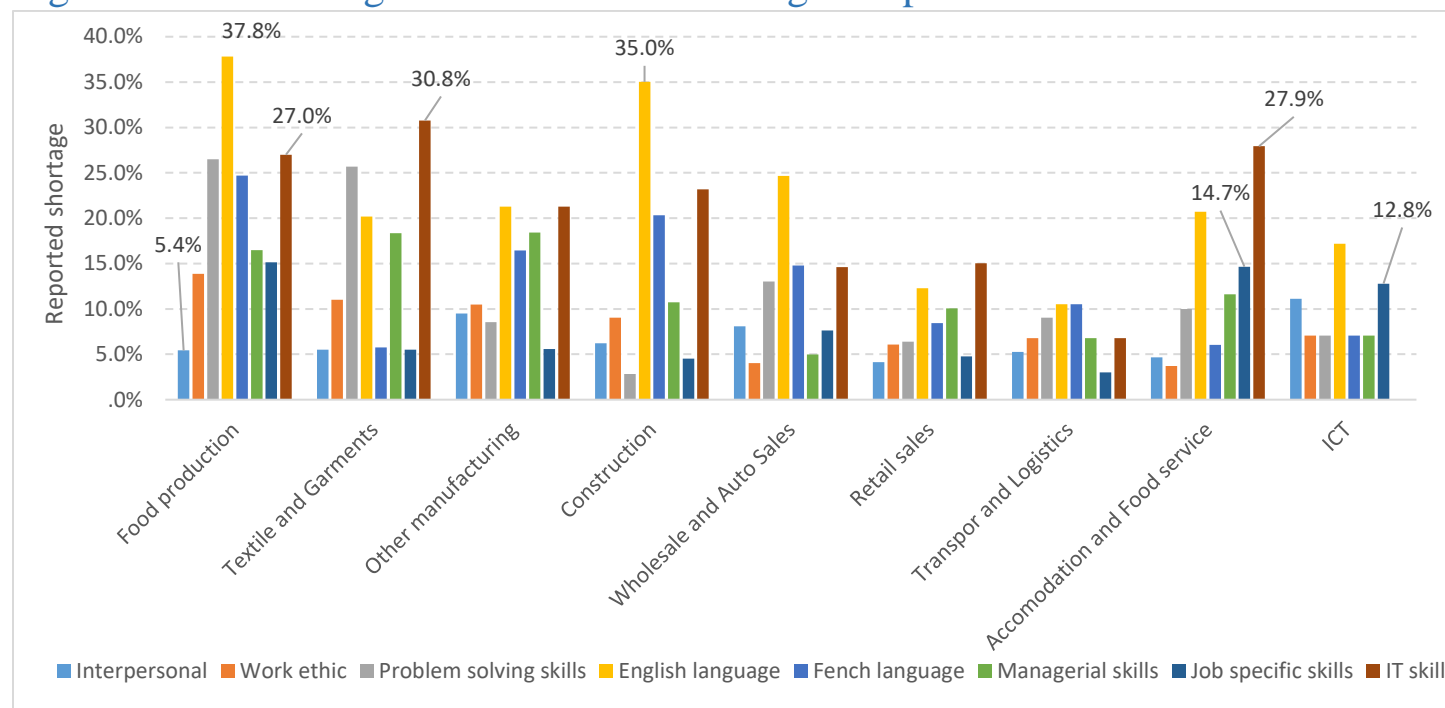
Table A.3.3: Summary of findings from OLS regression models with 'share of workforce meeting skills requirements' as dependent variable for all skills categories

	(1) Communication Skills	(2) Work Ethic	(3) English	(4) French	(5) Problem Solving	(6) other Technical	(7) IT	(8) Management
Textile and Garments	-0.00241	-0.0557	-0.118	-0.0426	-0.0733	-0.0382	-0.0644	-0.114
	(0.0806)	(0.101)	(0.0743)	(0.0899)	(0.0733)	(0.0894)	(0.0561)	(0.0696)
Other manufacturing	0.109	0.0161	0.0362	0.0392	0.125*	0.0888	0.143***	0.107*
	(0.0582)	(0.0588)	(0.0457)	(0.0564)	(0.0610)	(0.0577)	(0.0388)	(0.0500)
Construction	0.0377	0.0152	0.0565	0.0415	0.128*	0.0926	0.117**	0.126*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.0698)	(0.0626)	(0.0455)	(0.0615)	(0.0652)	(0.0641)	(0.0393)	(0.0499)
Wholesale & Related	0.0303	0.0252	0.0797	0.0585	0.0832	0.0438	0.149***	0.0694
	(0.0626)	(0.0585)	(0.0479)	(0.0575)	(0.0595)	(0.0602)	(0.0413)	(0.0475)
Retail sales	0.124*	0.115*	0.182***	0.169**	0.166**	0.0936	0.268***	0.122**
	(0.0559)	(0.0531)	(0.0433)	(0.0528)	(0.0567)	(0.0552)	(0.0379)	(0.0448)
Transport and Logistics	0.0475	0.0565	0.177**	0.153*	0.117	0.0321	0.213***	0.153**
	(0.0634)	(0.0618)	(0.0543)	(0.0624)	(0.0635)	(0.0629)	(0.0478)	(0.0548)
Accommodation and Food Service	0.126*	0.0784	0.127**	0.211***	0.120*	0.0600	0.162***	0.160***
	(0.0550)	(0.0533)	(0.0419)	(0.0528)	(0.0577)	(0.0564)	(0.0385)	(0.0465)
ICT	0.148*	0.0853	0.207***	0.151*	0.215**	0.124	0.402***	0.218***
	(0.0753)	(0.0695)	(0.0586)	(0.0668)	(0.0761)	(0.0977)	(0.0548)	(0.0623)
Medium (20-99)	-0.0338	-0.0200	-0.0418*	-0.0543*	-0.0808***	-0.0533*	-0.0448*	-0.0756***
	(0.0237)	(0.0225)	(0.0210)	(0.0222)	(0.0244)	(0.0249)	(0.0201)	(0.0216)
Large (100 or more)	-0.0251	0.0213	-0.0641	-0.0430	-0.120**	-0.101*	-0.0442	-0.0599
	(0.0390)	(0.0343)	(0.0341)	(0.0346)	(0.0401)	(0.0401)	(0.0305)	(0.0354)
Exporter	-0.0117	-0.0252	0.0841***	0.0240	0.0308	-0.0270	0.0692**	0.0600*
	(0.0263)	(0.0249)	(0.0245)	(0.0249)	(0.0295)	(0.0306)	(0.0246)	(0.0280)
High Productivity Firm	-0.00927	-0.0298	0.00756	0.0236	-0.0376	-0.0295	0.0343	-0.0436*
	(0.0223)	(0.0203)	(0.0217)	(0.0211)	(0.0232)	(0.0231)	(0.0210)	(0.0221)
Years in Operation	-0.0000727*	-0.0000272	0.0000280	-0.000188	0.0000707	-0.0000575	-0.000117	-0.0000508
	(0.0000285)	(0.0000647)	(0.0000605)	(0.0000975)	(0.0000581)	(0.0000713)	(0.0000933)	(0.0000782)
Basic	0.181*	0.223*	0.175***	0.235***	0.289***	0.184*	0.166***	0.114**
	(0.0903)	(0.0887)	(0.0390)	(0.0433)	(0.0814)	(0.0738)	(0.0287)	(0.0412)
Proficiency	0.203*	0.277**	0.261***	0.274***	0.355***	0.324***	0.250***	0.195***
	(0.0908)	(0.0875)	(0.0423)	(0.0460)	(0.0816)	(0.0731)	(0.0322)	(0.0452)
Advanced	0.219*	0.312***	0.282***	0.330***	0.418***	0.269***	0.281***	0.193***
	(0.0931)	(0.0887)	(0.0504)	(0.0486)	(0.0850)	(0.0747)	(0.0407)	(0.0478)
Constant	0.452***	0.467***	0.297***	0.348***	0.219**	0.397***	0.140***	0.241***
	(0.0992)	(0.0977)	(0.0430)	(0.0596)	(0.0801)	(0.0809)	(0.0351)	(0.0473)
R squared	0.0496	0.0714	0.199	0.198	0.134	0.107	0.262	0.118
N	641	641	639	641	641	628	614	640

Figure A.3.4: Proportion of vacancies filled for various occupational groups across sectors
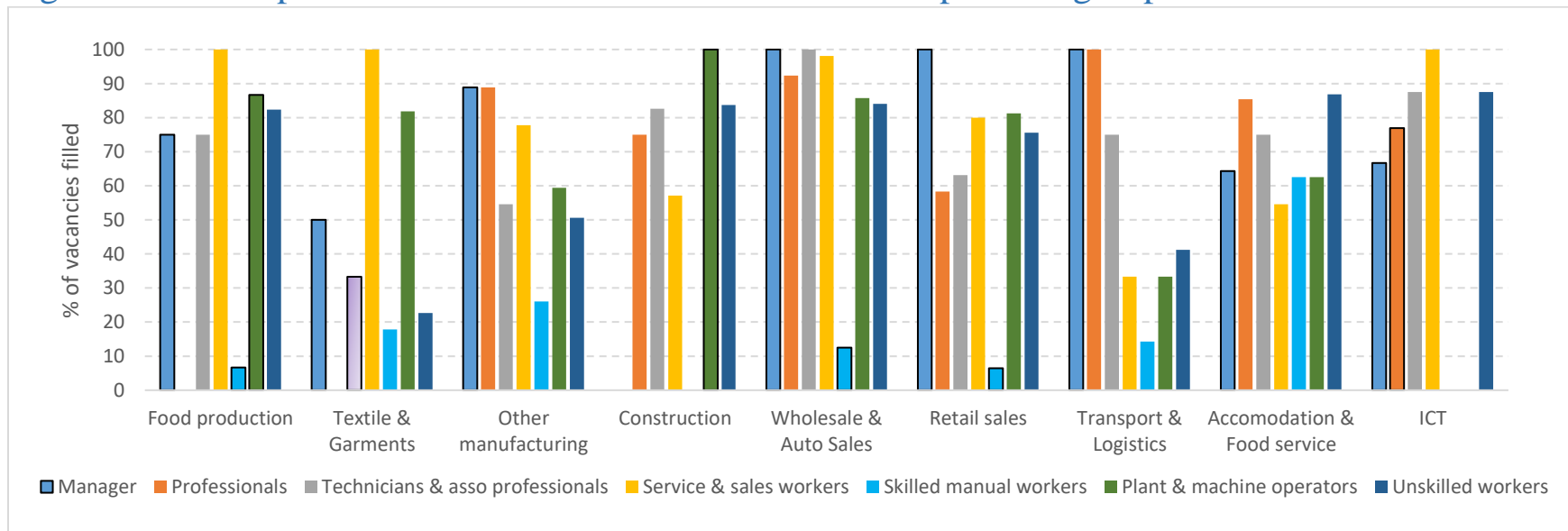
Figure A.3.5: Difficulty (difficult and very difficult) of firms in finding employees with specific skills across sectors
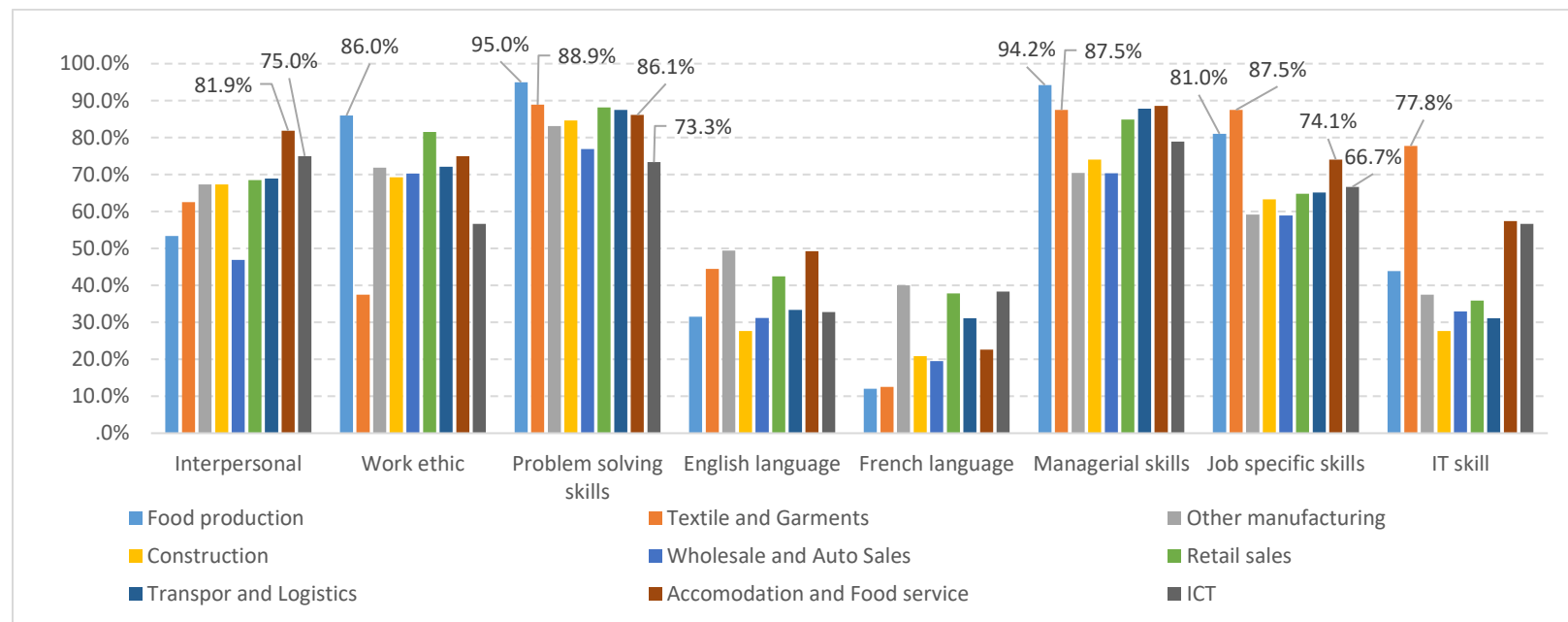
Table A.3.4: Summary of findings from LPM model with 'difficulty of finding employees with respective skills' as dependent variable

	(1) Difficulty attracting Communication Skills	(2) Difficulty attracting Work Ethic	(3) Difficulty attracting English	(4) Difficulty attracting French	(5) Difficulty attracting Problem Solving	(6) Difficulty attracting other Technical	(7) Difficulty attracting IT	(8) Difficulty attracting Management
Textile and Garments	0.0486	-0.0772	0.148	0.131	-0.0272	0.0222	0.109	-0.0207
	(0.113)	(0.0946)	(0.0932)	(0.128)	(0.0427)	(0.0570)	(0.0869)	(0.0390)
Other manufacturing	0.0746	-0.0556	0.0980	0.148	-0.0460	-0.0822	0.0621	-0.0651
	(0.0759)	(0.0379)	(0.0860)	(0.0873)	(0.0299)	(0.0570)	(0.0824)	(0.0346)

Construction	0.105	-0.0415	0.0686	0.111	-0.00316	-0.0363	0.000716	-0.0341
	(0.0738)	(0.0620)	(0.101)	(0.104)	(0.0272)	(0.0685)	(0.0983)	(0.0304)
Wholesale & Related	0.00663	-0.0353	0.0531	0.101	-0.0596*	-0.0696	0.00684	-0.0545
	(0.0779)	(0.0361)	(0.0906)	(0.0920)	(0.0288)	(0.0507)	(0.0833)	(0.0293)
Retail sales	0.120	0.00671	0.132	0.203*	0.00168	-0.00237	0.0834	-0.00797
	(0.0690)	(0.0351)	(0.0820)	(0.0823)	(0.0224)	(0.0452)	(0.0748)	(0.0230)
Transport and Logistics	0.104	-0.0240	0.129	0.136	0.00315	-0.0122	0.0527	0.0000328
	(0.0837)	(0.0505)	(0.0983)	(0.101)	(0.0347)	(0.0590)	(0.0932)	(0.0324)
Accommodation and Food Service	0.123	-0.0361	0.105	0.0939	-0.0326	0.00157	0.0747	-0.0191
	(0.0711)	(0.0361)	(0.0857)	(0.0873)	(0.0253)	(0.0449)	(0.0777)	(0.0233)
ICT	0.0515	-0.206*	-0.132	-0.0214	-0.162*	-0.115	-0.0104	-0.106*
	(0.0859)	(0.0845)	(0.154)	(0.117)	(0.0698)	(0.0799)	(0.109)	(0.0532)
Medium (20-99)	-0.0493	-0.0592*	-0.0787*	-0.102**	-0.0211	-0.0535*	-0.0532	-0.0490*
	(0.0263)	(0.0256)	(0.0321)	(0.0344)	(0.0176)	(0.0255)	(0.0306)	(0.0193)
Large (100 or more)	0.0170	0.00261	-0.0394	-0.0197	0.0262	0.00780	-0.0521	0.00473
	(0.0368)	(0.0383)	(0.0582)	(0.0553)	(0.0221)	(0.0395)	(0.0530)	(0.0235)
Exporter	0.0212	0.0384	-0.0332	-0.0280	0.0324	0.0222	-0.0178	0.0119
	(0.0283)	(0.0232)	(0.0418)	(0.0409)	(0.0176)	(0.0297)	(0.0404)	(0.0217)
High Productivity Firm	-0.0284	0.00334	-0.0304	-0.0659*	0.0145	-0.0152	-0.0581*	-0.0195
	(0.0218)	(0.0202)	(0.0298)	(0.0295)	(0.0164)	(0.0225)	(0.0285)	(0.0177)
Years in Operation	-0.000198	-0.000440***	-0.000180	-0.000355***	-0.000221	-0.000229	-0.000365***	-0.00000493
	(0.000156)	(0.0000236)	(0.000162)	(0.0000341)	(0.000130)	(0.000158)	(0.0000348)	(0.0000207)
Basic	0.0521	0.0319	-0.0397	0.0295	0.0325	0.00215	-0.0399	0.0101
	(0.101)	(0.0679)	(0.0460)	(0.0543)	(0.0418)	(0.0464)	(0.0306)	(0.0217)
Proficiency	0.0241	0.0184	-0.0918	-0.0563	-0.0219	-0.0303	-0.142***	-0.0362
	(0.101)	(0.0676)	(0.0548)	(0.0616)	(0.0423)	(0.0480)	(0.0387)	(0.0257)
Advanced	0.0543	0.0121	-0.154*	-0.0130	0.0146	-0.0190	-0.0457	-0.00524
	(0.104)	(0.0687)	(0.0737)	(0.0747)	(0.0432)	(0.0507)	(0.0522)	(0.0313)
Constant	0.801***	0.948***	0.856***	0.746***	0.965***	0.969***	0.920***	1.006***
	(0.109)	(0.0714)	(0.0698)	(0.0848)	(0.0393)	(0.0603)	(0.0676)	(0.0225)
R squared	0.0441	0.0745	0.0622	0.0774	0.0617	0.0393	0.0684	0.0418

Standard errors in parentheses

* p<0.05 **p<0.01 ***p<0.001

Figure A.3.6: A comparison of skills shortage and primary focus of formal training across skills categories for the ICT sector
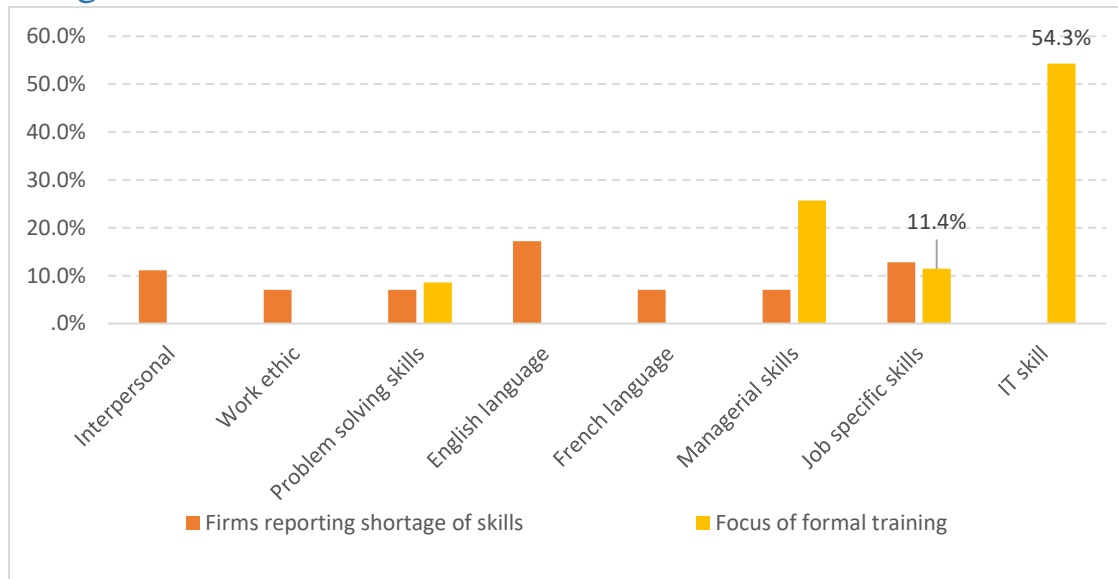
Figure A.3.7: Categories of training expenditure per full-time worker (%)

- no expenditure
- between 1 and 1000
- between 1000 and 5000
- between 5000 and 10000
- between 10000 and 25000
- between 25000 and 50000
- between 50000 and 100000
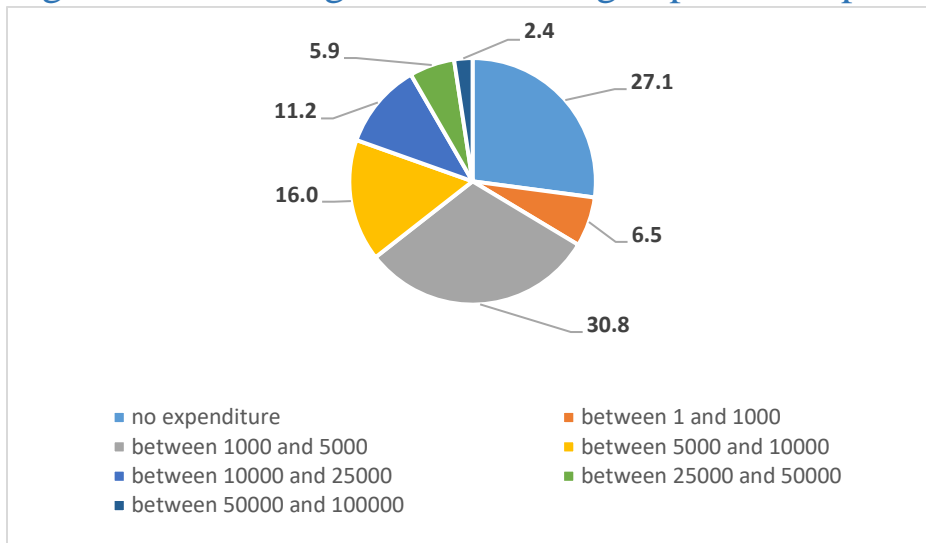
Figure A.3.8: Categories of training expenditure per full-time worker, cross-tabulated against industrial sector (%)
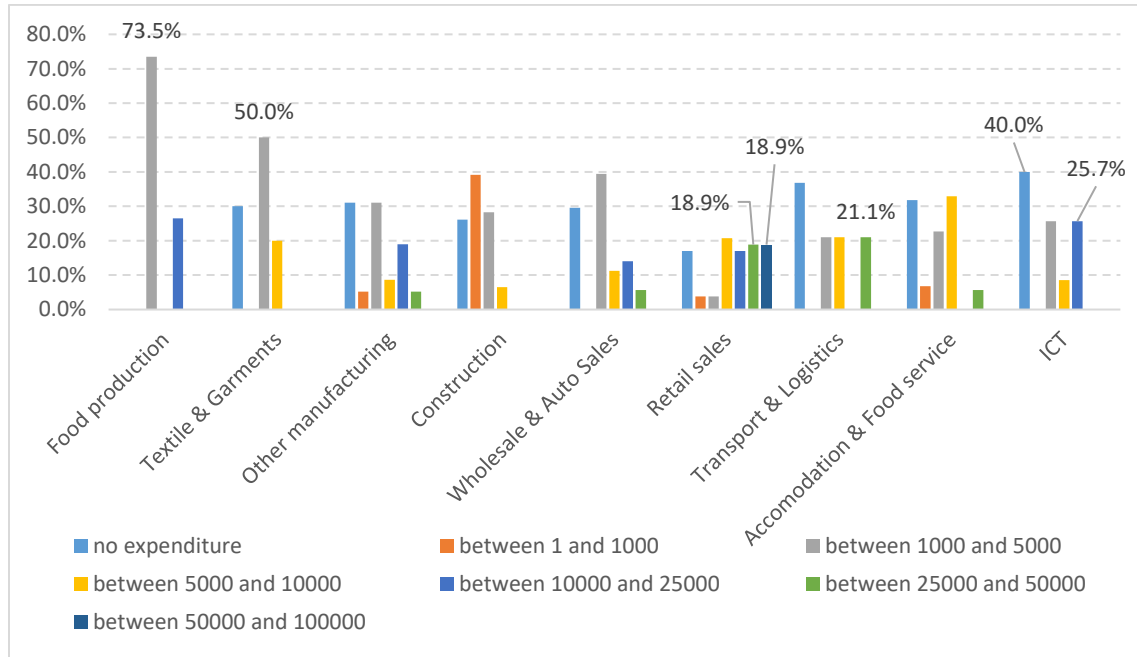
Figure A.3.9: Foreign as a % of total full-time permanent workers in various levels of skilled
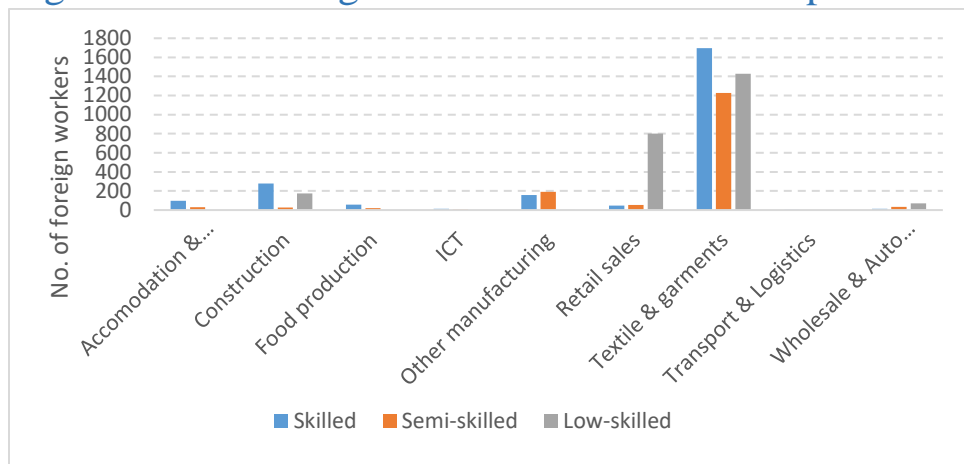
Table A.3.5: Summary of findings from OLS regression models with 'share of workforce meeting skills requirements' as dependent variable for all skills categories including indicators for female participation.

	(1) Communication Skills	(2) Work Ethic	(3) English	(4) French	(5) Problem Solving	(6) other Technical	(7) IT	(8) Management
Share of Female full time Employees	0.148**	0.0602	0.0983	0.118*	0.0751	0.0293	0.0471	-0.0284
	-0.0566	-0.0489	-0.0611	-0.0488	-0.0587	-0.0563	-0.0663	-0.0686
Female Top Manager	0.00313	0.00674	0.0255	0.0442	0.0162	0.0194	-0.00222	-0.02
	-0.0369	-0.0298	-0.0316	-0.0255	-0.0307	-0.0408	-0.0323	-0.0361
Construction	0.314***	0.659***	0.503***	0.593***	0.336**	0.645***	0.240***	0.543***
	-0.0894	-0.038	-0.0322	-0.0376	-0.113	-0.0426	-0.0428	-0.0432
Wholesale & Related	0.280***	0.656***	0.507***	0.584***	0.278*	0.573***	0.253***	0.474***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	-0.0826	-0.0396	-0.0377	-0.0341	-0.115	-0.0418	-0.0462	-0.0481
Retail sales	0.366***	0.749***	0.588***	0.681***	0.363**	0.643***	0.382***	0.549***
	-0.0809	-0.0332	-0.0345	-0.0294	-0.119	-0.0355	-0.0473	-0.0467
Transport and Logistics	0.295***	0.676***	0.588***	0.667***	0.321**	0.561***	0.329***	0.563***
	-0.0826	-0.0422	-0.0434	-0.0396	-0.116	-0.0401	-0.0498	-0.0487
Accommodation and Food Service	0.351***	0.693***	0.529***	0.707***	0.303**	0.600***	0.265***	0.582***
	-0.0812	-0.029	-0.033	-0.0288	-0.116	-0.0352	-0.0477	-0.0478
ICT	0.381***	0.700***	0.610***	0.652***	0.413**	0.662***	0.510***	0.619***
	-0.0954	-0.0569	-0.0499	-0.0484	-0.127	-0.0773	-0.0649	-0.061
Medium (20-99)	-0.00687	0.00296	-0.0277	-0.0291	-0.0485	-0.0178	-0.0155	-0.0413
	-0.0236	-0.0216	-0.0218	-0.022	-0.0259	-0.026	-0.0223	-0.0238
Large (100 or more)	-0.00705	0.0434	-0.0928*	-0.039	-0.0886	-0.101*	-0.0496	-0.0616
	-0.047	-0.0363	-0.0375	-0.0386	-0.046	-0.0479	-0.0369	-0.0381
Exporter	0.035	0.0124	0.117***	0.0569*	0.0487	0.0139	0.0993***	0.112***
	-0.0294	-0.0244	-0.0253	-0.0251	-0.0326	-0.0337	-0.0281	-0.0317
High Productivity Firm	0.00757	-0.0162	0.0149	0.0237	-0.0168	-0.00086	0.0495*	-0.0500*
	-0.0237	-0.0208	-0.023	-0.0218	-0.0245	-0.025	-0.0238	-0.0233
Years in Operation	-5.2E-05	-8.4E-06	3.76E-05	-0.000177*	0.000076	-3.6E-05	-0.0001	-3E-05
	-2.8E-05	-5.7E-05	-7.2E-05	-7.7E-05	-5.2E-05	-7.3E-05	-8.8E-05	-8.3E-05
Basic	0.307***	0.199	0.237***	0.342***	0.282*	0.249**	0.169***	0.182***
	-0.0784	-0.124	-0.0538	-0.0424	-0.116	-0.0772	-0.0415	-0.0493
Proficiency	0.322***	0.221	0.313***	0.349***	0.323**	0.380***	0.227***	0.234***
	-0.078	-0.124	-0.0549	-0.0453	-0.116	-0.0768	-0.0431	-0.0504
Advanced	0.313***	0.296*	0.361***	0.453***	0.371**	0.331***	0.269***	0.253***
	-0.0806	-0.123	-0.0618	-0.0465	-0.119	-0.0791	-0.0517	-0.0546
Constant	0.0114**	-0.173	-0.224***	-0.326***	-0.00691	-0.250**	-0.00062	-0.230***
	-0.004	-0.124	-0.0535	-0.0425	-0.0042	-0.0779	-0.0051	-0.0538
R squared	0.072	0.0787	0.169	0.195	0.0877	0.114	0.2	0.0993
N	492	492	490	493	492	480	471	491

Standard errors in parentheses

Table A.3.6: Summary of findings from LPM model with 'difficulty of finding employees with respective skills' as dependent variable, including care support indicators.

	(1) Difficulty attracting Communication Skills	(2) Difficulty attracting Work Ethic	(3) Difficulty attracting English	(4) Difficulty attracting French	(5) Difficulty attracting Problem Solving	(6) Difficulty attracting other Technical	(7) Difficulty attracting IT	(8) Difficulty attracting Management
On-site Childcare	-0.0839	-0.0606	0.0691	-0.0604	-0.0844	-0.0593	-0.103	-0.0310
	(0.0665)	(0.0617)	(0.0764)	(0.0794)	(0.0582)	(0.0650)	(0.0769)	(0.0558)
Childcare Support	0.159***	-0.0247	-0.278*	-0.280*	0.0205	-0.191	0.0545	-0.00395
	(0.0477)	(0.0771)	(0.121)	(0.128)	(0.0587)	(0.118)	(0.129)	(0.0563)
Flexible Work Schedules	-0.0619**	-0.0460*	-0.0680*	-0.108**	-0.0125	-0.0463*	-0.0753*	-0.00362
	(0.0231)	(0.0210)	(0.0305)	(0.0327)	(0.0142)	(0.0226)	(0.0299)	(0.0153)
Textile and Garments	0.0409	-0.0892	0.121	0.0977	-0.0296	0.00256	0.0959	-0.0218
	(0.113)	(0.0952)	(0.0907)	(0.126)	(0.0435)	(0.0570)	(0.0849)	(0.0388)
Other manufacturing	0.0749	-0.0579	0.0904	0.138	-0.0467	-0.0879	0.0604	-0.0652
	(0.0750)	(0.0380)	(0.0823)	(0.0840)	(0.0302)	(0.0568)	(0.0790)	(0.0347)
Construction	0.110	-0.0418	0.0627	0.102	-0.00513	-0.0426	0.00226	-0.0351
	(0.0735)	(0.0642)	(0.0990)	(0.103)	(0.0275)	(0.0676)	(0.0974)	(0.0306)
Wholesale & Related	0.00892	-0.0373	0.0437	0.0866	-0.0615*	-0.0767	0.00309	-0.0552
	(0.0775)	(0.0369)	(0.0877)	(0.0902)	(0.0293)	(0.0509)	(0.0807)	(0.0293)
Retail sales	0.127	0.00903	0.124	0.195*	0.00320	-0.00425	0.0874	-0.00740
	(0.0684)	(0.0357)	(0.0789)	(0.0805)	(0.0229)	(0.0459)	(0.0727)	(0.0231)
Transport and Logistics	0.109	-0.0187	0.135	0.145	0.00280	-0.00518	0.0578	-0.000660
	(0.0833)	(0.0486)	(0.0976)	(0.0992)	(0.0353)	(0.0560)	(0.0909)	(0.0327)
Accommodation and Food Service	0.136	-0.0248	0.114	0.113	-0.0277	0.0141	0.0915	-0.0170
	(0.0706)	(0.0366)	(0.0825)	(0.0853)	(0.0256)	(0.0448)	(0.0749)	(0.0219)
ICT	0.0587	-0.205*	-0.139	-0.0358	-0.165*	-0.123	-0.0204	-0.108*
	(0.0859)	(0.0850)	(0.157)	(0.118)	(0.0700)	(0.0804)	(0.107)	(0.0534)

Medium (20-99)	-0.0491	-0.0588*	-0.0780*	-0.103**	-0.0212	-0.0530*	-0.0529	-0.0491*
	(0.0260)	(0.0254)	(0.0319)	(0.0336)	(0.0175)	(0.0249)	(0.0302)	(0.0194)
Large (100 or more)	0.0246	0.00614	-0.0450	-0.0186	0.0295	0.00871	-0.0446	0.00563
	(0.0374)	(0.0395)	(0.0582)	(0.0544)	(0.0230)	(0.0390)	(0.0526)	(0.0225)
Exporter	0.0240	0.0434	-0.0208	-0.0133	0.0325	0.0305	-0.0137	0.0117
	(0.0284)	(0.0234)	(0.0424)	(0.0409)	(0.0179)	(0.0296)	(0.0405)	(0.0220)
High Productivity Firm	-0.0304	0.00196	-0.0338	-0.0709*	0.0138	-0.0165	-0.0618*	-0.0196
	(0.0216)	(0.0203)	(0.0296)	(0.0289)	(0.0161)	(0.0219)	(0.0282)	(0.0173)
Years in Operation	-0.000182	-0.000431***	-0.000201	-0.000355***	-0.000205	-0.000225	-0.000348***	0.000000889
	(0.000135)	(0.0000354)	(0.000160)	(0.0000421)	(0.000116)	(0.000172)	(0.0000397)	(0.0000260)
Basic	0.0553	0.0223	-0.0275	0.0544	0.0276	0.000689	-0.0347	0.00869
	(0.104)	(0.0696)	(0.0453)	(0.0539)	(0.0429)	(0.0466)	(0.0310)	(0.0221)
Proficiency	0.0253	0.00651	-0.0853	-0.0256	-0.0244	-0.0342	-0.139***	-0.0363
	(0.105)	(0.0697)	(0.0538)	(0.0603)	(0.0430)	(0.0479)	(0.0387)	(0.0258)
Advanced	0.0582	-0.000573	-0.121	0.0220	0.0127	-0.0218	-0.0188	-0.00325
	(0.107)	(0.0706)	(0.0726)	(0.0720)	(0.0443)	(0.0508)	(0.0513)	(0.0330)
Constant	0.824***	0.982***	0.885***	0.786***	0.977***	1.001***	0.951***	1.009***
	(0.114)	(0.0756)	(0.0659)	(0.0837)	(0.0401)	(0.0617)	(0.0648)	(0.0232)
R squared	0.0606	0.0852	0.0797	0.110	0.0696	0.0614	0.0824	0.0429
N	646	644	646	645	645	644	645	644

Standard errors in parentheses

* p<0.05 **p<0.01 ***p<0.001

Figure A.3.10: Categories for average monthly gross wage for workers in different skilled jobs (%)
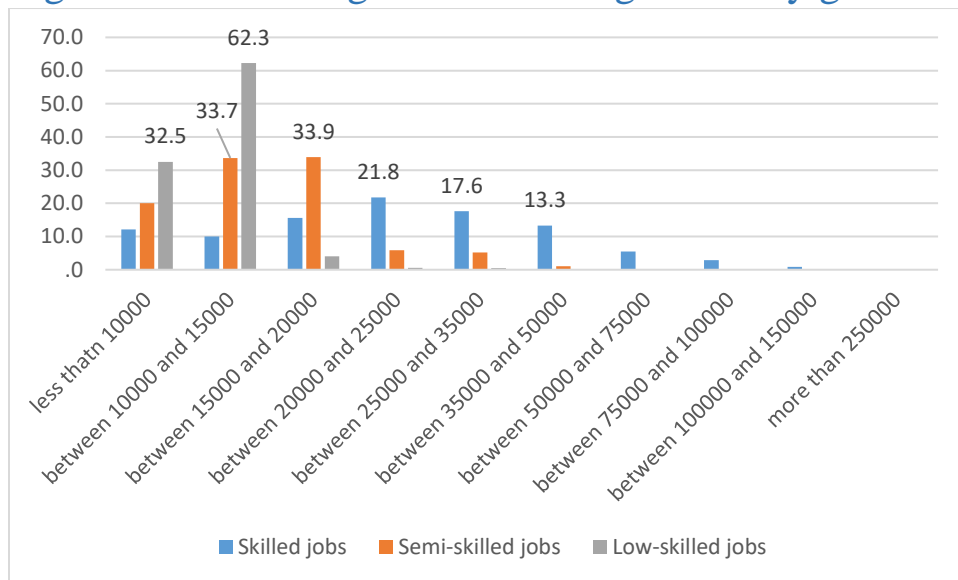
Figure A.3.11 Average monthly gross wage for workers in different skilled jobs (Rs)