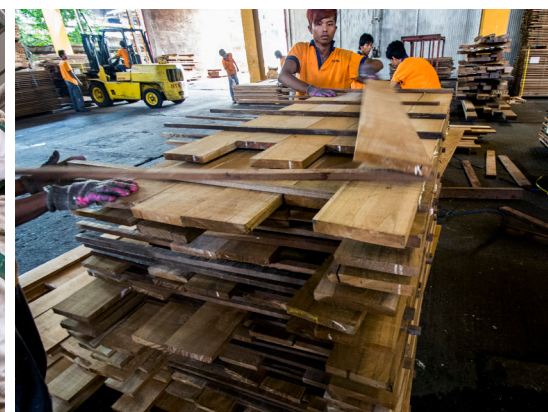Descriptive Report

Myanmar Micro, Small and Medium Enterprise Survey 2017

May 2018
Nay Pyi Taw, Myanmar

Myanmar Micro, Small, and Medium Enterprise Survey 2017

Descriptive Report

Central Statistical Organization

Ministry of Planning and Finance

and

UNU-WIDER

Foreword by Minister of Planning and Finance

Ministry of Planning and Finance is a leading ministry of Myanmar to generate the driving force for economic development of the country by laying down proper policies, plans and monitoring and evaluation mechanism of development projects. Besides, we are overseeing economic activities of the country to response the changing global economic trends with insight observations on the needs and requirements of domestic businesses. In order toaccelerate the economic development of the country, the 12 points economic policy was already laid down since August 2016. The policy highlighted the need of supports on the emergence, sustainability and development of small and median enterprises towards inclusive development in Myanmar. We truly acknowledge that only better data and better statistics can bring better life of the people through realistic policy implementation in Myanmar.

Knowing that, the Central Statistical Organization (CSO) under the Ministry of Planning and Finance of Myanmar started the implementation of a project to support the establishment of "Myanmar Enterprise Monitoring System" (MEMS) since 2017. The project is financed by the Government of Denmark with the technical cooperation with United Nations University World Institute for Development Economics Research (UNU-WIDER) and University of Copenhagen.

The project aims to strengthen the evidence-based policy-making and analysis to support the country's move through a challenging structural transformation and development process. The cornerstone of the project is a rigorous Myanmar Micro, Small, and Medium Enterprise Survey focused on private manufacturing enterprises. Through comprehensive data collection efforts that include quantitative surveys (to be implemented in 2017 and 2019), qualitative and experimental approaches (to be implemented in 2018 and 2020), the survey aims to provide evidence that will support the government in its efforts to assess and implement relevant industrial policies for the future.

According to the project component, the first round survey of quantitative survey on Myanmar Micro, Small, and Medium Enterprises was done in 2017.I strongly believed that the finding of the survey which was expressed in this report will contribute to the ongoing improvement of the quality of economic policy discussions in Myanmar.The results of the survey will lead a way to match employer–employee dataset also includes information on informal firms, which gives a more accurate presentation of the conditions in the private enterprise sector in Myanmar.

Being a developing one, we highly concern about the status of informal businesses in Myanmar and always find ways and means to support those businesses in transforming them into formal ones. I,here, would like to encourage readers and data users to explore the result of the survey in depth to see and find possible solutions for better ways for all the issues needs we are facing now for private sector development of the country. On top of that, I deeply appreciate the emergence to more data and information on uncover and minority businessesin Myanmar. To conclude, I really appreciate the hard work of CSO and UNU-WIDER to come up with this very informative report for several users from policy maker, planners, decision makers, researchers to businessmen but not limited to potential investors and general public.

Union Minister
Ministry of Planning and Finance

Ministry of Planning and Finance
Office No.32, Nay Pyi Taw, Myanmar
Phone   : +95 67 406325, +95 67 406328
Fax   : + 95 67 406151
Email   : dgcsomopf@gmail.com
               wwmaung@gmail.com
Website : https://www.csostat.gov.mm
               http://www.mmsis.gov.mm

Acknowledgements

This report happened with the great support from Government of Demark and technical cooperation with UNU-WIDER. The report is the result of one serial survey on Myanmar Micro Small and Medium Enterprises Survey (MSMES) in Myanmar which are envisioned to be collected as four qualitative and quantitative surveys to support the setting up of "Myanmar Enterprise Monitoring System" (MEMS). The surveys are just starting points for the emergence of MEMS in Myanmar and they are anticipated to be conducted from 2017 to 2020: two quantitative surveys in 2017 and 2019 and two qualitative surveys in 2018 and 2020. The required funds for those surveys would come from the government of Denmark-Myanmar Country Programme (2016-2020).

The report is the result of quantitative Micro Small and Medium Enterprises Survey only focus on manufacturing sector of the country.In other words, the survey is the first nationally representative survey focusing exclusively on manufacturing enterprises and their employees. The data were collected in 35 townships in all regions and states of the country in 2017. The sample comprises 2,496 enterprises and 6,722 employees and is statistically representative of more than 71,000 manufacturing firms in Myanmar.

Since the private sector development is the pivotal of the country, the availability of data on privately owned business are very important to emerge the evidence-based policy, planning and plan implementation in Myanmar. Realizing the needs of it, Central Statistical Organization (CSO) is striving to be an assistance of realistic policy emerging for private sector development by generation necessary data and statistics. The data and result derived from this report would allow various users to study enterprise performance and the business environment in Myanmar in depth, including dimensions such as: regulatory framework, firm performance, labour force, technology and management characteristics, innovation, investment, sales, access to finance, and perceptions about the constraints and potentials of the business environment.

In conclusion, I hope this report would meet the expectations of multi-users in some extends and also hope to use the best of it in full utilizing to fill their various data requirements. Taking this opportunity, I would like to thanks my team who are really devoted their outstanding

efforts to launching this report from beginning of doing survey to the end of emerging this report. And I also would like to express my most sincere gratitude to the government of Denmark for providing required budget for this and upcoming surveys. Last but not least, I really would like to emphasize my heartfelt thanks to UNU-WIDWER for their outstanding technical assistance and cooperation with CSO.

(Dr. Wah Wah Maung)
Director General
Central Statistical Organization

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Acronyms and abbreviations

ASEAN	Association of Southeast Asian Nations
CSO	Central Statistical Organisation
DAO	Development Affairs Organisations
DICA	Directorate of Investment and Company Administration
DISI	Directorate of Industrial Supervision and Inspection
FDI	Foreign Direct Investment
GAD	General Administration Department
GDP	Gross Domestic Product
ILO	International Labour Organisation
ISIC	International Standard Industrial Classification
MIC	Myanmar Investment Commission
MOALI	Ministry of Agriculture, Livestock and Irrigation
MSIC	Myanmar Standard Industrial Classification
MSME	Micro, Small, and Medium Enterprise
OLS	Ordinary Least Squares
PPS	Probability Proportional to Size
SD	Standard Deviation
SOEP	Socio-Economic Panel
SME	Small and Medium-Sized Enterprise
SSID	Small Scale Industry Department
UNDP	United Nations Development Programme
VAT	Value-added tax

Executive summary

Myanmar's transition to a market-based economy is accompanied by rapid development of the private manufacturing sector, which has large potential for improving economic growth. The overall success of the sector, however, should not be taken for granted. Future advances will greatly depend on the policy and business environment in which manufacturing activities take place. It is, therefore, important to better understand the business environment and help inform policies conducive to sustainable economic growth.

The Central Statistical Organisation (CSO) of the Ministry of Planning and Finance of Myanmar, the United Nations University World Institute for Development Economics Research (UNU-WIDER), and the University of Copenhagen, supported financially by Denmark, have initiated the project 'Towards Inclusive Development in Myanmar'. The project aims to strengthen evidence-based policy-making and analysis through a rigorous 'Myanmar Micro, Small, and Medium Enterprise Survey' of private manufacturing enterprises.

The survey is the first nationally representative survey focusing exclusively on manufacturing enterprises and their employees. The data were collected in 35 townships in all regions and states of the country in 2017. The sample comprises 2,496 enterprises and 6,722 employees and is statistically representative of more than 71,000 manufacturing firms in Myanmar. The resulting matched employer–employee dataset is unique in its ability to provide estimates of individual-level outcomes, alongside company averages and results for both informal and formal businesses. The breadth of information is unprecedented, and it will allow analysts to study enterprise performance and the business environment in Myanmar in depth, including dimensions such as: regulatory framework (e.g. formalization), firm performance, labour force, technology and management characteristics, innovation, investment, sales, access to finance, and perceptions about the constraints and potentials of the business environment. The survey results are briefly summarized below.

Manufacturing activity in Myanmar follows the topographical circumstances of the country. Most of economic activity is concentrated in the central lowland strip down to the coast in the south. The foundation of the sector is the food industry, accompanied by textiles and apparel in the centre, wood in the north, and non-metallic mineral products in the south. These sectors, however, have limited growth potential as they are generally the least innovative and rely on low levels of technology. Enterprises appear to be taking advantage of agglomeration benefits in the form of industrial zones and clusters, but the

infrastructure conditions could be improved. Not all firms have access to electricity and public water (13 and 80 per cent, respectively, are without access), and only 5 per cent of firms have access to the internet. The regulatory environment is complex and dispersed among several institutions, which results in non-compliance in different areas of enterprise activity. While the rate of formalization defined as obtaining a licence or registration with any government authority is high (81 per cent), the rate of registration with the Directorate of Investment and Company Administration, expected to be the only institution responsible for the registration of enterprises, is very low (3.5 per cent). The adherence to tax regulation appears to be weak, as only one-third of enterprises pay the corporate income tax. A comparison of wage and productivity levels of informal firms indicates their lower performance compared to formal firms.

Technology-wise, enterprises in Myanmar tend to rely on hand tools and old, second-hand machinery. Fewer than 20 per cent of the enterprises have acquired technology through imports. This suggests that financial constraints are high and that direct contact with the producers of technology is limited, which may negatively affect productivity through limited knowledge transfer. Enterprises tend to specialize in producing a single product. The innovation rates are low, both in terms of introducing new products (3 per cent) and improving the existing ones (12 per cent). Certification based on international standards, which could facilitate market access, is very low as well, the exception being a handful of larger firms.

The surveyed manufacturing enterprises tend to be overwhelmingly owned and managed by men (about 80 per cent). Females display lower willingness to take risks than males, which translates into lower performance of their enterprises. Business practices, measured as a combination of marketing, buying, record keeping, and financial planning practices, are found to positively affect firm productivity. Female entrepreneurs tend not to apply as many beneficial business practices as men.

Enterprises tend to rely on local trade opportunities. We observe a moderate to low customer base, mostly within-township trade and other enterprises, as main customers. Participation in international value chains is limited. Direct import of raw materials is low (2 per cent) and so is direct export (4 per cent), which is entirely led by larger enterprises from the food and beverages sector located in the industrial hubs of Yangon and Mandalay. Complex and imprecise procedures and the fact that foreign trade mainly takes place through intermediaries could help explain the low degree in internationalization.

The labour market structure shows, on average, low levels of education and skills of the labour force and a high premium for post-secondary education. Micro and informal enterprises tend to hire less-skilled

employees and to replace them more frequently than other enterprises. Providing training to employees is rare (only 2.6 per cent of firms normally train workers). Wage levels vary widely by region and firm size. The highest wage level for production workers is detected for Mon State. The industrial centres Mandalay and Yangon come next, while Chin and Rakhine states have the lowest wages. Non-monetary employment benefits such as pensions, health, and social insurance are not encountered frequently. In all dimensions of the working environment, larger firms show clear advantages.

The circumstances under which private manufacturing enterprises in Myanmar operate are beset by constraints, including poor access to finance, infrastructure, skilled labour, and technical knowledge. Around 40 per cent of firms are credit rationed or constrained. While a larger share of small and medium firms (12 per cent), as compared to micro firms (6 per cent) apply for credit, all firms share similar challenges in terms of getting formal loans: difficulties in assuring collateral, providing appropriate land titles, and too-short loan maturity times. Only part of the demand for finance is met through informal loans. This implies that new investments need to be made from retained earnings, which limits the level of enterprise growth.

The report reveals the need for a radical change in industrial, financial, and educational policies for increasing economic growth. Some direct steps that could be taken include:

1. Reduce bureaucratic obstacles and improve coherence among different government authorities.
- Streamline procedures for business registration, which requires great coordination effort of different line ministries.
- Have different licensing and registration services under one or as few government authorities as possible with 'one-window' offices in all townships to facilitate business registration.
- Where not available, establish at least movable offices to assist businesses with registration and tax payment.
- Create a culture of trust in the government by showing a return for taxes paid.

2. Improve access to services.
- Improve access to credit, including to firms considered informal, for example by simplifying procedures and conditions for obtaining loans, introducing longer-term loan options, cutting the loan-processing time, establishing micro-credit institutions, activating more loan programmes aimed at small and medium enterprises (SMEs), and opening additional bank branches in smaller

townships. Commercial financial institutions should be partners in this process, supported by a reform of lending rules.

- Increase efforts related to disseminating information about loan opportunities and requirements throughout the country to improve equality of opportunity.

- Strengthen the formalization of property rights, such as in relation to private property ownership and land titles, which would improve both access to formal loans and investment security.

- Scale up investments and improve access to public goods, such as electricity, water, and transport infrastructure. Infrastructure should be improved and distributed throughout the country.

3. Support technical and innovative capacity of firms to improve growth and foreign market access.

- Improve access to modern technology by streamlining import procedures or opening special lines of credit or grants for this purpose to yield more efficient production processes.

- Subsidize research and development efforts or provide tax deductions for purchases of new technology, new product development, and certification according to international standards.

- Support development of industry clubs or associations that could link more and less-successful entrepreneurs in sharing knowledge and market information.

- Simplify export procedures related to registration, licensing, and customs requirements, preferably by relaxing existing product-specific restrictions and opening a 'single-window' service.

- Improve dissemination of information about export and import procedures, permits, and licences through local authorities, specific training organized throughout the country, or media outlets.

- Support the upgrade of logistics services and infrastructure, as well as better use of the internet and online commerce platforms through public investment, service-sharing initiatives, and training.

- Overcome geographic dispersion and language barriers by establishing an intermediary body between international customers and producers within Myanmar, or support regional associations and events devoted to the task of linking producers and buyers in international markets.

4. Facilitate development of better working conditions.

- Support for better working conditions, education, and employee training should become a key part of policies for improving enterprise performance.

- Continue the expansion of social security, public health insurance, and pension programmes, as well as the enforcement of the minimum wage regulation.

- Improve efforts for disseminating information about social protection, insurance programmes, and labour laws, so both employees and employers become better informed about their rights and obligations.
- Increase support for higher education, vocational programmes, and off-the-job training targeted at developing industry-relevant skills and more general management and public administration knowledge.
- Introduce tax exemptions for firms that pay for the education and training of their employees.
- Develop and support gender-based training initiatives to address the challenge that female-owned firms are less productive.

1   Introduction

Myanmar is in the midst of economic and policy reform. Military governance and a controlled economy are transitioning into a democracy system and market-based economy through institutional and regulatory restructuring. The economy has traditionally depended on natural resources for revenue, and the abundant labour force is still mainly employed in agriculture. The process of structural transformation and integration in global markets is increasing the intensity of industrial activity, as well as the number of jobs in manufacturing. Between 1990 and 2015, the industrial sector grew from 10 to 34 per cent of gross domestic product (GDP), while the agricultural sector fell from 60 to 27 per cent of GDP (CSO 2017). Private manufacturing activity has been identified as having a large potential for improving Myanmar's economic growth. There is, however, a lack of information about the performance and the conditions in the sector, preventing the design of efficient industrial policy.

Only a handful of surveys of the private business sector have been done in Myanmar. A business survey of agricultural, manufacturing, and services establishments was conducted on a convenient sample in 2014 by the United Nations Economic and Social Commission for Asia and the Pacific and the Mekong Institute (Soans and Abe 2015). In the same year, the CSO and United Nations Development Programme (UNDP) conducted the Myanmar Business Survey, which included around 15,000 business entities from manufacturing, trade, and services. The World Bank conducted its two enterprise surveys in 2014 and 2016 on a sample of around 600 registered small, medium, and large enterprises, mostly in manufacturing and services (World Bank 2016).

The Myanmar Micro, Small, and Medium Enterprise (MSME) Survey is the first nationally representative survey focusing exclusively on manufacturing enterprises in Myanmar and their employees. To accurately illustrate the status of the private manufacturing sector, the data were collected in 35 townships in all 14 regions and states of the country as well as the Nay Pyi Taw Union Council in June and July 2017. The sample comprises 2,496 enterprises and their 6,722 employees, which are statistically representative of more than 71,000 manufacturing firms in Myanmar. The resulting matched employer–employee dataset is unique in its ability to provide estimates of individual outcomes alongside company averages, and outcomes of informal alongside formal businesses, which none of the previous datasets allow. Moreover, the breadth of information is unprecedented, allowing for the analysis of several dimensions and dynamics of enterprise performance and the business environment in Myanmar. We touch upon several dimensions of the business environment: the regulatory framework (e.g. formalization), labour force, and access to

services such as finance, which relate to the key aspects of firm performance, such as labour productivity, investment, and sales.[1]

1.1   Definitions

According to the Law on the Development of Small and Medium Businesses (Pyidaungsu Hluttaw Law No. 23/2015), small and medium enterprises (SMEs) are defined based on their number of employees, type of activity, capital invested, or level of turnover. The classification is illustrated in Table 1.1. Compared to the 1990 version of the law, the maximum number of employees has been increased for labour-intensive activities, as have the limit values for capital and turnover.

Table 1.1: Legal definition of SMEs according to the 2015 SME Development Law

CLASSIFICATION	Number of employees	Capital (mil. Kyats)	Turnover (mil. Kyats)
SMALL			
Manufacturing	Up to 50	Up to 500	
Labour-intensive manufacturing	Up to 300	Up to 500	
Wholesale	Up to 30		Up to 100
Retail	Up to 30		Up to 50
Service	Up to 30		Up to 100
Other	Up to 30		Up to 50
MEDIUM			
Manufacturing	51–300	500–1,000	
Labour-intensive manufacturing	301–600	500–1,000	
Wholesale	31–60		100–300
Retail	31–60		50–100
Service	31–100		100–200
Other	31–60		50–100

Source: Authors' illustration based on the 2015 SME Development Law (Government of Myanmar 2015).

Unlike the Myanmar SME Development Law, international definitions of SMEs also specify the characteristics of micro-sized enterprises. For instance, the World Bank's SME Department defines micro enterprises as those with 1–9 employees, small-scale enterprises as those with 10–49 employees, medium-sized enterprises as those with 50–299 employees, and large enterprises as those with more than 300

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[1] The report is not exhaustive in all the aspects of the business environment that are important for firms, policy-makers, and the overall economy. For example, we do not attempt to capture the indicators of macroeconomic stability or the direct effect of specific government policies, or compare the competitiveness of Myanmar with neighbouring countries.

employees.[2] A common feature of various SME definitions is a recognition that number of employees is the simplest indicator of whether a business is an SME (Bowman 2017). In line with this recognition, we abstain from including the level of capital and turnover in the definition of enterprise size categories, and base them solely on the number of full-time and part-time workers, following the cut-off points proposed by the World Bank.

According to the SME law, all SMEs with total private capital investment must register; this, in turn, brings benefits such as possibilities for submitting grievances, access to business knowledge, training courses, applying for loans, etc. (OECD 2016). The issue of enterprise registration in Myanmar is not straightforward due to the unclear distribution of responsibilities among governmental agencies. Companies to be classified as SMEs may be registered with any of the following authorities:

- The Directorate of Investment and Company Administration (DICA),
- The Small Scale Industrial Department (SSID), or
- The Directorate of Industrial Supervision and Inspection (DISI).

In practice, municipal offices are the dominant authorities conducting the registration of industrial enterprises (CSO and UNDP 2016). According to DISI (2016), the process of registration starts by filing an application to the respective state or regional office, for example for an Electrical Inspection Sector permit, Boiler certificate, Saw Mill licence, Good Manufacturing Practice certificate, etc. After the site is inspected, the state or regional officer-in-charge, with the approval of the Director General, grants or refuses registration. The enterprises approved for registration pay the fee and obtain the registration certificate.

The choice of registration option depends on the type of activity. The enterprises operating in mining and quarrying, manufacturing, electricity, gas, steam, and air conditioning supply are required to register with the DISI, while non-industrial enterprises must apply for their licences to city and township development committees, which only cover a limited number of sectors (OECD 2016). An enterprise can, in principle, register with multiple governmental agencies, and duplicate registrations sometimes cannot be avoided. Duplicate registrations happen for specific purposes. For example, enterprises need to register with the DISI for the main benefit of being eligible to obtain an SME loan, implying that a company that has already registered, for example with the DICA, would still need to re-register to be able to apply for a loan. For the

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[2] The EU's and OECD's definitions assume that large firms have more than 250 employees, while the United States assume 500 employees as the threshold between medium and large firms.

purpose of this report, we define a formal firm as a firm that at minimum possesses a municipal or any other relevant licence or registration document.

The classification of firm legal ownership categories follows several legal documents. The 1990 Myanmar Private Industrial Enterprise Law defines private industrial enterprises as any individual, partnership, or company that produces finished goods from raw materials, using any form of power in any building. This definition does not include cottage industries or joint ventures with the government. Further, the 1991 Promotion of Cottage Industries Law defines cottage industry as small-scale production, repair, maintenance, or service activities performed by family members or jointly between family members, with up to nine workers. The number of workers is not limited in the case of production of handicrafts. Finally, the 1914 Myanmar Companies Act establishes the legal foundation for incorporated business in Myanmar and recognizes the following kinds of companies: sole proprietorships, joint ventures between local and foreign business partners, joint ventures with relevant government departments and organizations, and foreign companies. We focus on the following types of formal non-state enterprises: family businesses, private firms, partnerships, cooperatives, private limited companies, and joint venture companies. Family businesses are recognized by law as cottage industries. Private enterprises are defined in accordance with the Private Industrial Enterprise Law and other types of enterprises in accordance with the Myanmar Companies Act.

1.2   Structure of the report and summary of main findings

We start by describing the sampling procedure, survey implementation, and sample characteristics in Chapter 2. Chapter 3 presents differences in the Myanmar economy among the different regions and townships that were sampled, including sectors, infrastructure, firm size, and performance. This chapter also looks at agglomeration of firms in industrial zones and industrial clusters and their relevance for industrial development. Chapter 4 looks at formalization in terms of enterprise ownership of business registrations or licences, tax-paying behaviour, and informal employment.

Chapter 5 examines the production characteristics and performance of Myanmar enterprises, focusing on differences in the type of technology, innovation, and firm performance for firms in different sectors, regions, firm size categories, and legal ownership types. Being relevant for firm performance, owner and management characteristics such as age, gender, educational level, ethnicity, and risk preference levels are investigated in Chapter 6, which also constructs a business practices index to investigate how management practices affect firm performance.

Chapter 7 takes a closer look at the investment behaviour of the surveyed firms, their current debt situation, as well as their access to formal and informal credit. Chapter 8 focuses on the sales structure in terms of sub-sector and market segmentation, as well as internationalization and competition between firms to gain more general insights on the business position of Myanmar's enterprises. Chapter 9 considers the labour market structure, such as workforce composition, wage level, working conditions, hiring methods, education, and training of the workforce, while Chapter 10 investigates gender gaps in wages and firm productivity. Finally, Chapter 11 presents firm owners' experiences of the main constraints and potentials that characterize the business environment in Myanmar.

The survey data reveal a high concentration of the manufacturing sector around a handful of industries: food, textiles, and wood, which is understandable given the availability of inputs into these industries. These sectors have limited growth potential as they are generally the least innovative and rely on a comparably low level of technology. Poor access to finance, infrastructure, skilled labour, and technical knowledge are challenging even for the best performing firms.

The findings reveal the need for a radical change in industrial policies if the manufacturing sector is to continue contributing to increasing economic growth. Manufacturing enterprises would benefit from simpler procedures for business registration, which would lower transaction costs. They would also benefit from better access to infrastructure and finance, which is only possible with a massive influx of industry-oriented investments in infrastructure and a reform of lending policies. Historically low participation of enterprises in foreign markets could be changed with support for increasing productivity, innovation, and competitiveness. Achieving better working conditions is not possible without public support for health and social security insurance schemes. Nor is enterprise growth possible without support for employee education and skills training.

2 Data description and sampling

Due to the fragmented practices for enterprise registration, which are divided between the DISI, relevant ministries, and city and township development committees, no institution provides complete sectoral coverage of enterprise activities. The SME Development Centre only conducts censuses in the major cities in the states and regions of Myanmar, thereby excluding the SMEs in countryside cities and towns, which are thus not reflected in datasets (OECD 2016). Similarly, the dissolution or termination of activities is rarely reflected in the enterprise lists.

Following the UNDP background document for the Myanmar Business Survey 2015 (CSO and UNDP 2016), we relied on data from municipal offices to create the sampling frame. Municipal offices' data are most likely to provide high coverage and up-to-date information on enterprise activities. City Development Committees and Development Affairs Organizations (DAOs) are the most relevant authorities for most firms in Myanmar, as they provide business-operating licences and construction permits, and ensure water, sewage, and trash collection services for the firms. Moreover, they are often responsible for urban road maintenance and electricity, and they are the relevant property tax collection entities.

Licence registration at the municipal level is a legal requirement for all manufacturing businesses, and the municipal data should be relatively up to date, given that registrations remain valid for only one year. In most cases, an application for a registration licence can be made online, and if the business manager/owner does not have internet access, local township staff can file it on behalf of the enterprise.

The CSO initiated the collection of municipal lists in August 2016. The collected lists were reviewed in collaboration between CSO and UNU-WIDER in November 2016 and in March 2017. The final sampling frame was compiled in April 2017.

2.1 Sampling approach

The municipal lists provide the following information about firms: name, address, township, region/state, and sector (Myanmar Standard Industrial Classification (MSIC) 4-digit codes). The sampling frame is restricted to the manufacturing sector (MSIC 2 digit 10–33). Since 28% of registered firms were listed as rice mills (MSIC sector 1063) we stratified the population of firms into (i) rice mills and (ii) other manufacturing. This has resulted in a stratified sampling frame of 19,783 rice mills and 51,443 other manufacturing firms.

2.1.1 Manufacturing excluding rice mills

Following Cochran (1977) and Levy and Lemeshow (1999), we use standard formulas for the determination of the sample size n for firms in other manufacturing (in multi-purpose surveys) for a different combination of levels of precision, confidence, and variability. Moreover, as some states have quite small enterprise populations we invoke the finite sample correction in the sample size determination. Hence, starting from an initial theoretically desired minimum sample size, n_0, we deflate this minimum sample, using the formula:

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

(1)

where N is the population size and n is the 'corrected' sample size.

Assuming that a margin of error d (for example 15 per cent) has been specified, n_0 may be determined as follows:

$$n_0 = \frac{z^2 p(1-p)}{d^2} = \frac{(1.645 + 0.842)^2 \cdot 0.5 \cdot (1-0.5)}{0.15^2} = 68.7 \Rightarrow n = 61.2$$

(2)

where p is the estimated proportion of an attribute that is present in the population (set to 0.5), and z is the sum of the normal deviates corresponding to the decided level of confidence (for example, 10 per cent) and decided level of power (for example, 80 per cent).

As we wish to ensure representativeness at the state/region level for other manufacturing firms, we ideally aim at estimating the sample size for the smallest group and subsequently determining the sample sizes for the remaining states/regions. However, given the limited number of other manufacturing firms in Chin State (total of 149) we group Chin State together with one of the neighbouring states/regions (Rakhine). This results in using Kayin (with a total number of other manufacturing firms equal to 549) as a point of departure for the sampling and, assuming maximum variability ($p = 0.5$), a 90 per cent confidence level and ±15 per cent precision. This results in a sample size of 61 for Kayin. Using the sample-to-population ratio for Kayin and applying a square root rule to scale the other states/regions, we are able to calculate the number of firms needed in each state/region.

For reasons of implementation, the survey has to be limited to a selected number of townships within each state/region. Firm selection is therefore carried out following a two-step sampling procedure. In the first step, townships within each state/region are selected using probability proportional to size (PPS) sampling, in which the number of firms in each township is used as the size variable. The number of selected townships in each state/region is determined proportionally to the number of townships in each state/region, meaning that five townships are chosen randomly in Shan (largest number of townships) and only one township is chosen in Chin, Kayah, and Nay Pyi Taw (fewest number of townships). As some townships in Rakhine and Shan are listed as so-called 'black' townships, these are given a selection

probability of zero. In the second step, firms within the selected townships are randomly selected from the population list.

The results of this stratified two-step sampling approach are reported in Table 2.1 with corresponding weights (and sum of weights equal to the firm population) for manufacturing firms excluding rice mills. Table 2.2 provides the township codes within each state/region selected through PPS sampling. It also shows the number of firms sampled within each township. Exact locations of townships are shown in Figure 3.1 in Chapter 3.

Table 2.1: Sample size of formal firms by state/region

	Sample	Interviewed	Weight	Sum of weights
Kachin	94	94	13.8	1,300
Kayah	69	67	10.3	691
Kayin	61	61	9.0	549
Chin*	6	5	29.80	149
Sagaing	192	195	27.7	5,411
Tanintharyi	97	87	15.8	1,373
Bago	163	162	24.1	3,900
Magway	141	141	20.8	2,927
Mandalay	267	267	39.3	10,491
Mon	130	110	22.4	2,466
Rakhine*	79	78	11.6	907
Yangon	298	297	43.8	13,007
Shan	155	156	22.5	3,508
Ayeyarwady	159	157	23.5	3,697
Nay Pyi Taw	85	63	16.9	1,067
Total	1,996	1,940		51,443

Note: *Chin and Rakhine are grouped together for sampling purposes given the limited number of other manufacturing firms in Chin State.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 2.2: List of sampled townships and the number of firms sampled within each township

State/region	Township code (number of firms)				
Kachin	10201 (31)	10404 (63)			
Kayah	20204 (69)				
Kayin	30301 (39)	30302 (22)			
Chin	40102 (6)				
Sagaing	50202 (39)	50501 (57)	50803 (96)		
Tanintharyi	60201 (97)				
Bago	70102 (43)	70205 (81)	70306 (39)		
Magway	80202 (89)	80301 (17)	80306 (35)		
Mandalay	90302 (49)	90503 (146)	90604 (72)		
Mon	100102 (130)				
Rakhine	110402 (29)	110502 (50)			
Yangon	120105 (72)	120106 (116)	120204 (88)	120214 (22)	
Shan	130104 (14)	130404 (73)	130409 (22)	130904 (36)	131001 (10)
Ayeyarwady	140105 (81)	140401 (45)	140603 (33)		
Nay Pyi Taw	150202 (85)				

Note: Number of sampled firms in each township in parentheses.

Source: Authors' calculations based on Myanmar MSME 2017 data.

2.1.2 Rice mills

Rice mills are selected following the same sample-to-population ratio and square root rule as above within the selected townships. This results in a total sample of 159 rice mills, as documented in Table 2.3.

2.1.3 Identification of informal manufacturing firms

During the pilot surveys it became clear that information on informal manufacturing firms could be obtained through snowballing techniques. Within each township, local CSO officers were asked to identify, on site, firms not represented in the sampling frame but visually identifiable within the township. Within each township, the enumerators were asked to find an additional 25 per cent of informal firms proportional to the number of interviews carried out with registered firms in the township. The resulting number of informal firms to be interviewed is documented in Table 2.3.

This means that a total of 2,688 manufacturing SMEs were approached for interview under the Myanmar MSME survey 2017, comprising: (i) 1,996 registered manufacturing (non-rice mill) firms, (ii) 159 rice mills, and (iii) 533 unregistered (informal) firms. A sample of back-up firms comprising 15 per cent of the total in each township was created with the intention of used them where sampled firms listed in the municipal records were not operating when the location was visited by survey teams. More detail is provided in what follows.

Table 2.3: Sample size of rice mills and informal firms by state/region

	Rice mills	Interviewed	Weight	Sum of weights	Informal firms	Interviewed
Kachin	10	10	95.4	954	26	18
Kayah	4	4	43.8	175	18	4
Kayin	4	4	54.3	217	16	12
Chin	7	7	80.7	565	3	1
Sagaing	15	11	201.1	2,212	51	46
Tanintharyi	9	9	90.7	816	26	22
Bago	18	19	164.3	3,121	45	11
Magway	9	5	149.8	749	37	29
Mandalay	9	8	98.5	788	69	64
Mon	9	28	31.5	882	34	25
Rakhine	14	15	131.9	1,978	23	23
Yangon	11	11	100.4	1,104	77	50
Shan	12	13	103.5	1,346	41	12
Ayeyarwady	22	25	181.9	4,547	45	44
Nay Pyi Taw	6	7	47.0	329	22	19
Total	159	176		19,783	533	380

Note: Informal firms are assigned 0 weights.

Source: Authors' calculations based on Myanmar MSME 2017 data.

2.2   Implementation

As described above, the main part of the sample was drawn randomly from a list of registered enterprises based on the population of small and medium manufacturing firms. As no records exist on informal firms in Myanmar, these were sought through on-site identification. To ease implementation, the survey took place in confined areas in each state/region. This helped reduce survey costs but also posed some challenges.

In some areas, municipal lists of formally registered firms turned out to be less reliable than in other areas, which in some of the sampled townships resulted in a collection method resembling a block enumeration strategy. For these townships (especially in Nay Pyi Taw, Mon, and Tanintharyi), we conclude that municipal firm-level data overestimated the number of manufacturing SMEs in operation, and we are unfortunately left with far fewer formal manufacturing firm interviews than initially planned (see Table 2.4 for details).

The enumerator teams also struggled with on-site identification of firms not registered but in operation (informal firms). In Bago, Kayah, and Shan, in particular, the number of interviewed informal firms deviated from the expected number of informal firms in the sampling strategy. As can be seen from Table 2.5, the number of informal firms interviewed is only 70 per cent of that intended.

Table 2.4: Number of sampled and interviewed formal (non-rice mill) firms

	Sampled	Interviewed	Interviewed/sampled share
Kachin	94	94	1.0
Kayah	69	67	1.0
Kayin	61	61	1.0
Chin	6	5	0.8
Sagaing	192	195	1.0
Tanintharyi	97	87	0.9
Bago	163	162	1.0
Magway	141	141	1.0
Mandalay	267	267	1.0
Mon	130	110	0.8
Rakhine	79	78	1.0
Yangon	298	297	1.0
Shan	155	156	1.0
Ayeyarwady	159	157	1.0
Nay Pyi Taw	85	63	0.7
Total	1,996	1,940	1.0

Source: Authors' illustration based on Myanmar MSME 2017 data.

During implementation, it also became clear that in some states/regions firms often produced in a different line of business to the one listed as their main industry (4-digit MSIC) in the municipal records. In Mon State, for example, some of the firms sampled as non-rice mills (20 firms in total) had, in fact, rice milling as their main line of business, hence the over-representation in the number of rice millers interviewed in Mon State.

Overall, the main reasons for the discrepancies between the firms sampled and those that were finally interviewed can be summarized as follows: (i) there are significantly fewer formal manufacturing firms in some townships than recorded in municipal lists, (ii) the main sector (MSIC 4 digit) municipal lists are not in accordance with observed sector choices, and (iii) there are difficulties in finding informal manufacturing firms operating alongside (within the same townships) registered enterprises.

Table 2.5: Number of sampled rice mills and informal firms

	Rice mills			Informal firms		
	Sampled	Interviewed	Interviewed/sampled share	Sampled	Interviewed	Interviewed/sampled share
Kachin	10	10	1.0	26	18	0.7
Kayah	4	4	1.0	18	4	0.2
Kayin	4	4	1.0	16	12	0.8
Chin	7	7	1.0	3	1	0.3
Sagaing	15	11	0.7	51	46	0.9
Tanintharyi	9	9	1.0	26	22	0.8
Bago	18	19	1.1	45	11	0.2
Magway	9	5	0.6	37	29	0.8
Mandalay	9	8	0.9	69	64	0.9
Mon	9	28	3.1	34	25	0.7
Rakhine	14	15	1.1	23	23	1.0
Yangon	11	11	1.0	77	50	0.6
Shan	12	13	1.1	41	12	0.3
Ayeyarwady	22	25	1.1	45	44	1.0
Nay Pyi Taw	6	7	1.2	22	19	0.9
Total	159	176	1.1	533	380	0.7

Source: Authors' illustration based on Myanmar MSME 2017 data.

2.2.1 Employee sample

In addition to the main enterprise survey, an employee survey module was administered in all of the surveyed firms. The employee questionnaire was administered to between one and six production workers, depending on firm size. The goal was to interview five employees in all enterprises wherever possible. Fewer employees were interviewed in firms that employ fewer than five employees. In family firms that do not employ external workers, family members working in the enterprise were interviewed. The rule was to interview only production workers, not office or professional workers. Employee interviews were for the most part conducted without the presence of the firm owner/manager for objectivity purposes.

Table 2.6 shows the distribution of interviewed employees by enterprise type and state. A total of 6,722 employees are available in the sample, distributed as follows: 854 in informal firms, 379 in rice mills, and 5,489 in all other manufacturing firms. The highest number of employees were interviewed in Yangon and Mandalay regions, indicating that the largest firms can be found in these two regions.

Table 2.6: Number of interviewed employees by state

	Formal	Rice mill	Informal	Total interviewed
Kachin	261	11	54	326
Kayah	125	5	9	139
Kayin	84	4	16	104
Chin	6	7	1	14
Sagaing	635	40	127	802
Tanintharyi	259	18	39	316
Bago	392	54	23	469
Magway	504	13	67	584
Mandalay	839	25	160	1,024
Mon	294	53	61	408
Rakhine	183	28	39	250
Yangon	956	23	117	1,096
Shan	520	29	32	581
Ayeyarwady	266	45	59	370
Nay Pyi Taw	165	24	50	239
Total	5,489	379	854	6,722

Note: Matched employer–employee sample.

Source: Authors' illustration based on Myanmar MSME 2017 data.

2.2.2 Preparation of the survey and data collection process

The questionnaire draft was designed following the experience of enterprise surveys in other South-East Asian countries (e.g. CIEM et al. 2016). The adaptations were made through technical group discussions and a number of consultations between collaborating parties. The final version was agreed upon after three pilot tests of the questionnaire in April, May, and June 2017. The questionnaire used in the survey contained questions on: business practices, owner characteristics, production and technology characteristics, sales and cost structure, access to finance, taxes, employment, networks, and economic constraints and potentials. The reference period for all questions was the financial year 2016/17, running from 1 April 2016 to 31 March 2017. The survey instrument was accompanied by the field operations manual and supervisor's monitoring sheet, which were prepared before the survey implementation started.

The initial training of supervisors for the pilot test was conducted over two days in Nay Pyi Taw. Supervisors from all 15 regional CSO branch offices were trained by UNU-WIDER experts on the methods of data collection through quantitative survey. Two further rounds of training of enumerators by supervisors, lasting two days each, were also conducted in Nay Pyi Taw.

The first two pilot tests of the questionnaire were focused on building supervisor capabilities. The first pilot test involving a joint team of eight UNU-WIDER and CSO staff took place in Yangon and Mandalay. The

second test with a joint team of nine staff took place in Nay Pyi Taw, and the final one, focused on enumerator practice, took place in Pyay. In total, 90 officials from CSO and three UNU-WIDER staff participated in all phases of the questionnaire development and testing.

The core survey team comprised 15 supervisors from CSO regional offices and 76 enumerators. The enumerators responsible for data collection were all employed by CSO, working for the township office, regional office, or at the headquarters in Nay Pyi Taw. Their work was supervised by officers from CSO regional offices. Independent supervision teams comprising the CSO Director, Daw Khin Swe Latt, and UNU-WIDER staff, as well as CSO officers from headquarters, visited several enumeration areas during the survey to ensure consistent data collection quality throughout the country.

The interviews were conducted face to face in June and July 2017 in Myanmar language, using a paper version of the survey instrument. The average interview time was 80 minutes, lasting from around 30 to a maximum of 168 minutes.

As agreed in the programme, CSO was responsible for data entry. The data entry and initial validation were conducted in Microsoft Access (2007). Further review of data quality and validation using statistical software Stata (version 15) was conducted by CSO and UNU-WIDER staff, who finalized the data set and weights.

To assess compliance and data accuracy, a joint CSO and UNU-WIDER team engaged in detailed data verification in August and September 2017. The verification took place in seven townships of six regions in the country. The verification method comprised visiting a sample of firms and verifying the answer to some of the questions asked during the survey, such as establishment year, sector, form of legal ownership, labour, licence (registration), owner information, sales and buyer relations, investments, borrowing, taxes, and business challenges. The sample size for validation was determined based on the initial number of surveyed firms. The selection of firms for verification interviews was partly purposeful and partly random. The purposeful part consisted of firms with data deficiencies, such as missing or inconsistent information. The remaining firms were added by random sampling stratified by formality. A total of 106 were visited during the validation trip.

2.3   Sample characteristics

Enterprise performance depends on a multitude of factors such as location, type of activity, legal ownership, and firm size, which represent variations in market characteristics and/or enterprise organization. Tables 2.7 to 2.11 provide an insight into the distribution of key enterprise characteristics by state/region.

Table 2.7 shows locations and enterprise sizes. Micro firms with between one and nine employees comprise 74 per cent of the sample and 68 per cent of the manufacturing enterprise population in Myanmar. Small firms comprise 20 per cent of the sample and 24 per cent of the population. Medium-sized firms account for 5 and 7 per cent of the sample and the population, respectively, while large firms comprise 0.7 per cent of the population. The regions with the highest prevalence of micro firms are Chin State, Kayin State, and Magway Region. The smallest proportion of micro firms can be found in Yangon Region, where there are more small and medium firm sizes. About one-quarter of firms in Mandalay and Ayeyarwady regions are small. Large firms are found in only two locations: Yangon Region and Shan State.

Table 2.7: Number of interviewed enterprises by state/region and firm size category

State/region	Micro		Small		Medium		Large		Total	
	Sample	Population	Sample	Population	Sample	Population	Sample	Population	Sample	Population
Kachin	96	1,991	21	194	5	69	0	0	122	2,254
Kayah	66	773	9	93	0	0	0	0	75	866
Kayin	74	739	3	27	0	0	0	0	77	766
Chin	12	714	0	0	1	0	0	0	13	714
Sagaing	201	5,743	47	1,769	4	111	0	0	252	7,623
Tanintharyi	92	1,704	21	406	5	79	0	0	118	2,189
Bago	158	5,970	30	954	4	96	0	0	192	7,021
Magway	162	3,406	12	249	1	21	0	0	175	3,676
Mandalay	238	7,468	94	3,536	7	275	0	0	339	11,279
Mon	138	2,788	21	471	4	90	0	0	163	3,348
Rakhine	100	2,590	16	295	0	0	0	0	116	2,885
Yangon	127	4,732	139	5,337	81	3,560	11	482	358	14,111
Shan	146	4,067	30	675	4	90	1	22	181	4,854
Ayeyarwady	167	4,527	52	3,077	7	640	0	0	226	8,244
Nay Pyi Taw	74	1,193	15	203	0	0	0	0	89	1,396
Total	1,851	48,405	510	17,286	123	5,031	12	504	2,496	71,226

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 2.8 shows the number of enterprises interviewed in each category of legal ownership. The most common are family businesses (68 per cent in the sample and 67 per cent in the population). Around 30 per cent are private firms. The remaining two percentages are shared between partnerships and limited liability companies (1 per cent each), which are more numerous than joint ventures and cooperatives.

Table 2.8: Distribution of different legal ownership types in the sample and the population

State/region	Sample					Population			
	Non-rice mills	Rice mills	Informal	Total	%	Non-rice mills	Rice mills	Total	%
Family business	1,303	123	271	1,697	68.0	33,873	13,581	47,454	66.6
Private firm	589	51	106	746	29.9	15,964	5,838	21,802	30.6
Partnership	21	2	3	26	1.0	636	364	1,000	1.4
Cooperative	2	0	0	2	0.1	86	0	86	0.1
Limited company	21	0	0	21	0.8	735	0	735	1.0
Joint venture company	4	0	0	4	0.2	147	0	147	0.2
Total	1,940	176	380	2,496	100.0	51,443	19,783	71,226	100.0

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 2.9 shows the distribution of different firm ownership types across regions and states in Myanmar. Around 90 per cent of enterprises in Shan and Mon states are family businesses. In contrast, all firms in Chin State are registered as private businesses. Yangon Region has the same prevalence of family businesses and private firms (46 per cent each). Mandalay and Nay Pyi Taw, as other important economic centres, have three and five times higher shares of family businesses than private firms.

Table 2.9: Number of interviewed enterprises by state/region and legal structure

State/region	Family business	Private firm	Partnership	Cooperative	Limited company	Joint venture company	Total
Kachin	86	34	1	0	1	0	122
Kayah	64	10	0	0	1	0	75
Kayin	10	66	1	0	0	0	77
Chin	0	13	0	0	0	0	13
Sagaing	125	125	1	0	1	0	252
Tanintharyi	85	25	4	0	3	1	118
Bago	174	18	0	0	0	0	192
Magway	110	63	2	0	0	0	175
Mandalay	264	75	0	0	0	0	339
Mon	149	14	0	0	0	0	163
Rakhine	35	80	1	0	0	0	116
Yangon	164	164	11	2	14	3	358
Shan	170	10	0	0	1	0	181
Ayeyarwady	186	36	4	0	0	0	226
Nay Pyi Taw	75	13	1	0	0	0	89
Total	1,697	746	26	2	21	4	2,496

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 2.10 shows the main activity of enterprises. Sector codes are based on the Myanmar Standard Industrial Classification (MSIC) codes. It is immediately noticeable that the three largest sectors in terms of

the number of enterprises are food (MSIC 10), textiles (MSIC 13), and wood and wood products (MSIC 16). Informal firms also operate mainly in the food and textiles industry. Proportionally fewer informal firms can be found in the wood industry, perhaps due to stringent regulation and more intensive government monitoring in that type of production.

Table 2.10: Distribution of different sectors in the sample and the population

MSIC code	Sector name	Sample				Population	
		Formal	Informal	Total	Per cent	Number	Per cent
10	Food	882	125	1,007	40.3	39,307	55.2
11	Beverages	67	12	79	3.2	1,756	2.5
12	Tobacco	52	2	54	2.2	1,487	2.1
13	Textiles	183	93	276	11.1	6,301	8.8
14	Wearing apparel	53	11	64	2.6	1,903	2.7
15	Leather and related products	17	7	24	1.0	589	0.8
16	Wood and wood products	189	14	203	8.1	4,378	6.1
17	Paper and paper products	8	2	10	0.4	247	0.3
18	Printing and recorded media	13	4	17	0.7	298	0.4
19	Coke and refined petroleum	5	1	6	0.2	137	0.2
20	Chemical products	19	1	20	0.8	603	0.8
21	Pharmaceuticals	7	1	8	0.3	282	0.4
22	Rubber and plastic products	28	5	33	1.3	770	1.1
23	Non-metallic mineral products	113	39	152	6.1	2,448	3.4
24	Basic metals	58	9	67	2.7	1,290	1.8
25	Fabricated metal products	120	18	138	5.5	2,528	3.5
26	Computers, electronic and optical products	4	4	8	0.3	118	0.2
28	Machinery and equipment n.e.c. [a]	141	12	153	6.1	3,363	4.7
29	Motor vehicles etc.	4	1	5	0.2	90	0.1
30	Other transport equipment	6	3	9	0.4	174	0.2
31	Furniture	103	6	109	4.4	2,141	3.0
32	Other manufacturing	41	10	51	2.0	884	1.2
33	Repair and installation of machinery and equipment	3		3	0.1	131	0.2
Total		2,116	380	2,496	100.0	71,226	100.0

Note: [a] n.e.c. stands for 'not elsewhere classified'.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Finally, Table 2.11 shows an overview of enterprise size across sectors. Micro firms comprise 100 per cent of the motor vehicles sector in Myanmar, 90 per cent of the fabricated metal products sector, and 89 per cent of the furniture and transport equipment sector. In fact, more than 80 per cent of firms in 11 different sectors are micro. The sectors with the lowest share of micro firms include: repair and installation, apparel, and beverages. It is more common to find small firms in these and the tobacco sectors. About 20 per cent

of firms in the apparel and paper sectors are medium-sized, while 9 per cent of firms in the apparel sector are large.

Table 2.11: Number of enterprises by sector and size

MSIC code	Sector name	Sample				Population			
		Micro	Small	Medium	Large	Micro	Small	Medium	Large
10	Food	739	204	60	4	27,117	9,137	2,899	154
11	Beverages	31	40	8	0	547	944	265	0
12	Tobacco	32	21	1	0	876	588	24	0
13	Textiles	195	74	7	0	3,894	2,118	289	0
14	Wearing apparel	23	22	13	6	509	587	544	263
15	Leather and related products	21	3	0	0	457	131	0	0
16	Wood and wood products	175	25	3	0	3,644	659	75	0
17	Paper and paper products	5	3	2	0	99	77	72	0
18	Printing and recorded media	15	1	0	1	231	24	0	44
19	Coke and refined petroleum	5	1	0	0	116	21	0	0
20	Chemical products	12	5	3	0	322	179	103	0
21	Pharmaceuticals	5	2	1	0	171	83	28	0
22	Rubber and plastic products	20	9	3	1	379	216	131	44
23	Non-metallic mineral products	102	40	10	0	1,409	846	193	0
24	Basic metals	56	9	2	0	954	264	72	0
25	Fabricated metal products	125	12	1	0	2,121	385	22	0
26	Computers, electronic and optical products	5	2	1	0	44	46	28	0
28	Machinery and equipment n.e.c. [a]	132	21	0	0	2,781	582	0	0
29	Motor vehicles etc.	5	0	0	0	90	0	0	0
30	Other transport equipment	8	1	0	0	158	16	0	0
31	Furniture	97	9	3	0	1,806	204	131	0
32	Other manufacturing	42	4	5	0	636	93	155	0
33	Repair and installation of machinery and equipment	1	2	0	0	44	88	0	0
Total		1,851	510	123	12	48,405	17,286	5,031	504

Note: [a] n.e.c. stands for 'not elsewhere classified'.

Source: Authors' illustration based on Myanmar MSME 2017 data.

3 Economic geography

As in most countries, there are regional differences in the structure of the economy within Myanmar. The causes for that can be historical or geographical, but can also be the result of political and economic decisions. This chapter will identify differences in the Myanmar economy among the different regions and townships that were sampled, including sectors, infrastructure, firm size, and performance. This chapter will also analyse another important component of Myanmar's economic geography, namely industrial zones and industrial clusters. Like many other developing countries in Southeast Asia, Myanmar implemented a number of industrial zones to attract foreign direct investment (FDI) and to foster industrial

development and industrial agglomeration. This chapter will evaluate the actual situation in the industrial zones and present the characteristics of firms within them. Further, it will try to identify economic clusters.

3.1 Topography

As pointed out in the previous chapter, firms drawn from 35 different townships from all of Myanmar's 14 states and regions, as well as of the Nay Pyi Taw Union Territory, were sampled. Figure 3.1 shows an overview of the sampled townships and the number of interviewed firms located in these townships. The number of firms is based on the total number of firms in the respective townships, and also indicates regional differences in manufacturing activity across the country. The figure shows that a higher number of firms were surveyed in the central strip of Myanmar, while fewer were surveyed in the border regions with Bangladesh, India, China, Laos, and Thailand.

This allocation follows Myanmar's geography. The border regions are to a great extent covered by mountains and highlands. In the west, bordering Bangladesh and India, the landscape is characterized by several mountain chains running from north to south and separating the Rakhine coast strip from the inner part of the country. This area is mainly covered by rainforest and is scarcely populated and rather less developed (Kraas et al. 2017). The townships of Tonzang, Minbya, and Toungup from that area are included in the sample.

The southern coastal strip of the Thanintharyi Region (with the sampled township of Dawei) and, at its northern tail, Kayah and Mon States (with the sampled townships of Hlaingbwe, Hpa-an, and Chaungzon), bordering Thailand, have similar topography, with forest-covered mountains and high precipitation (Kraas et al. 2017). However, economic activity appears to be higher, especially in Chaungzon (located at the coast and close to Yangon) and Dawei (located at the Thai border and relatively close to Bangkok).

The mountainous Shan highlands range from the borders to Thailand, Laos, and China in the east, to the beginning of the lowland valley in central Myanmar and close to the cities of Nay Pyi Taw and Mandalay in the west. These highlands are home to extensive agricultural activity, including fruit, vegetable, tea, and coffee plantations, explaining the rather low share of manufacturing activity there (Kraas et al. 2017). The townships of Lashio, Taunggyi, Loikaw, Yatsauk, and Moegnai in the middle of the highlands, and Nawnghkio and Pyin Oo Lwin in the mountains close to neighbouring Mandalay are included in the sample.

In the northernmost region where the mountains reach heights of almost 6,000 meters, population and development are scarce (Kraas et al. 2017), but the sample nevertheless includes firms from Myitkyina, Bhamo, and Kawlin townships .

Finally, surrounded by the mountains in the west north, and east, and by the sea in the west and south, the central area of Myanmar is a long valley with extensive agricultural areas and densely populated cities (Kraas et al. 2017). The majority of the economic activity is located in this valley, particularly in the very central part around Nay Pyi Taw and Mandalay, but also in the southern coastal area, including Myanmar's largest city, Yangon. Yangon, Mandalay, and Nay Pyi Taw are not only the largest cities and the economic centres, but also the political centres, with Nay Pyi Taw being the capital, Yangon the former capital until 2005, and Mandalay the last capital before British colonization (Kraas et al. 2017).

Figure 3.1: Geographical distribution of surveyed firms by township
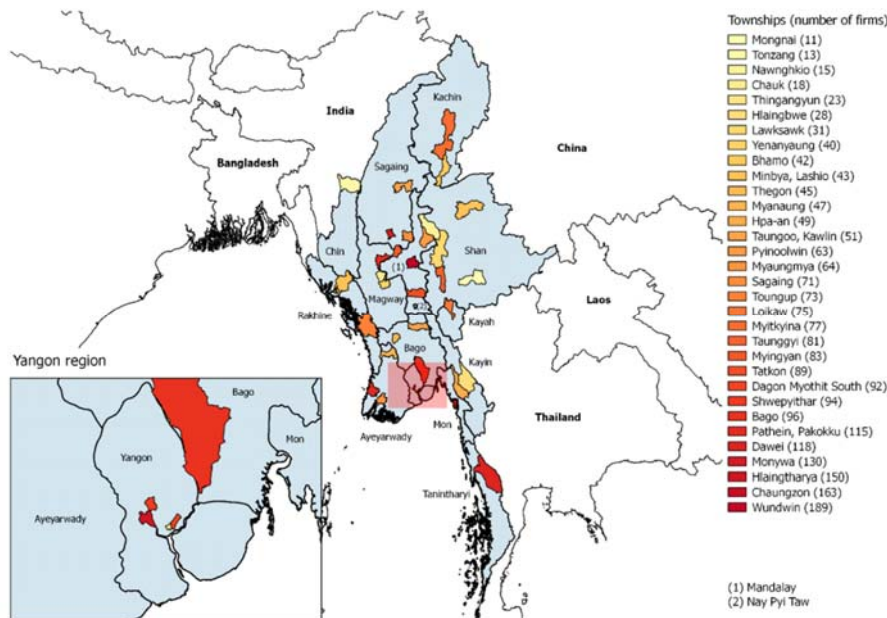
Source: Authors' illustration based on Myanmar MSME 2017 data.

The geographical conditions, namely the more favourable central lowland areas compared to the mountainous border areas, have served Myanmar as a historical source of settlement and economic activity. As in many developing countries, growth in population and economic activity follow a historical path dependency and are concentrated in and around a few large cities (Deichmann et al. 2008).

3.2 Regions and states

While the previous section gave an insight into the differences in the intensity of manufacturing activity across Myanmar's regions and how these differences are shaped by the country's topography, this section will further explore the ways in which the manufacturing sector differs across the different regions and states of Myanmar. Table 3.1 shows the most important sector in each state or region, by showing the share of firms in the different sectors (given by MSIC 2-digit classification). It can be seen that the food sector is the most important in the vast majority of states and regions, and is dominant in small and medium-sized manufacturing. In each state and region apart from Mandalay, the food sector contains the most firms, ranging from comparably moderate shares of 24 per cent in Kachin and 26 per cent in Mon, and up to 58 per cent in Yangon Region and 61 per cent in Nay Pyi Taw. In Mandalay Region, the textiles sector is the most important with 48 per cent of the firms operating in it.

Table 3.1: Most important sectors by state/region

State/region	Most important sector (share of firms in per cent)			
	Full sample	Population	Excluding rice mills	Population, excluding rice mills
Ayeyarwady Region	Food (42)	Food (71)	Food (35)	Food (35)
Bago Region	Food (45)	Food (66)	Food (38)	Food (39)
Chin State	Food (54)	Food (79)	Apparel (83)	Apparel (100)
Kachin State	Food (24)	Food (52)	Food (17)	Food, Wood (17)
Kayah State	Food (31)	Food (42)	Food (27)	Food (27)
Kayin State	Food (34)	Food (52)	Food (30)	Food (33)
Magway Region	Food (51)	Food (61)	Food (50)	Food (51)
Mandalay Region	Textiles (48)	Textiles (43)	Textiles (49)	Textiles (47)
Mon State	Food (26)	Food (30)	Wood (22)	Non-metallic mineral products (25)
Nay Pyi Taw Union	Food (61)	Food (67)	Food (57)	Food (57)
Rakhine State	Food (47)	Food (81)	Food (34)	Food (38)
Sagaing Region	Food (39)	Food (58)	Food (36)	Food (41)
Shan State	Food (41)	Food (53)	Food (37)	Food (35)
Tanintharyi Region	Food (47)	Food (60)	Food (43)	Food (37)
Yangon Region	Food (58)	Food (63)	Food (56)	Food (60)
Total number of firms	2,496	71,226	2,310	51,443

Source: Authors' illustration based on Myanmar MSME 2017 data.

Using population weights (column 2), the countrywide dominance of food in manufacturing increases further due to the disproportionately high number of rice mills, as explained in Chapter 2. The percentage shares in the food sector rise in each of the states, reaching values of 79 per cent in Chin and even 81 per

cent in Rakhine. When rice mills are excluded from the sample, the dominance of the food sector decreases slightly. In three of the 15 states, a sector other than food appears to be the most important (apparel in Chin State, textiles in Mandalay Region, wood in Mon State). Using weights also adds Kachin (wood and food) to this list, and changes Mon's most important sector to non-metallic mineral products (column 4). Notably, for Chin State, the predominant role of the food sector (79 per cent in the weighted sample) is completely replaced by the apparel sector if rice mills are excluded. This is attributed to the fact that all of the sampled firms in the food sector in Chin State (7 in total) are rice mills. This finding, as well as the overall reduction of shares in the food sector in columns 3 and 4, illustrates the central role that rice mills play in Myanmar's food manufacturing.

Table 3.2: Second most important sectors by state/region (share of firms in per cent)

State/region	Full sample	Population	Excluding rice mills	Population, excluding rice mills
Ayeyarwady Region	Wood (14)	Wood (9)	Wood (16)	Wood (19)
Bago Region	Wood (16)	Wood (10)	Wood (17)	Wood (19)
Chin State	Apparel (38)	Apparel (21)	Beverages (17)	-
Kachin State	Textiles, Wood (13)	Wood (10)	Textiles, Wood (14)	Fabricated metal products (13)
Kayah State	Furniture (15)	Furniture (13)	Furniture (15)	Furniture (16)
Kayin State	Basic metals (14)	Fabricated metal products, Machinery and equipment (12)	Basic metals (15)	Fabricated metal products, Machinery and equipment (16)
Magway Region	Textiles (9)	Wood (9)	Wood (9)	Wood (11)
Mandalay Region	Food (19)	Food (23)	Food (17)	Food (17)
Mon State	Wood (18)	Non-metallic mineral products (18)	Non-metallic mineral products (20)	Wood (23)
Nay Pyi Taw Union	Fabricated metal products (10)	Fabricated metal products (8)	Fabricated metal products (11)	Fabricated metal products (11)
Rakhine State	Other manufacturing (14)	Furniture, Other manufacturing (5)	Other manufacturing (17)	Furniture, Other manufacturing (15)
Sagaing Region	Textiles (17)	Textiles (10)	Textiles (17)	Textiles (14)
Shan State	Machinery and equipment (17)	Machinery and equipment (14)	Machinery and equipment (18)	Machinery and equipment (19)
Tanintharyi Region	Fabricated metal products (18)	Fabricated metal products (14)	Fabricated metal products (19)	Fabricated metal products (22)
Yangon Region	Apparel (10)	Apparel (10)	Apparel (11)	Apparel (11)
Total number of firms	2,496	71,226	2,310	51,443

Source: Authors' illustration based on Myanmar MSME 2017 data.

To provide some more detail of the sectoral distribution across regions, Table 3.2 shows the second most important sector in each state or region. Wood appears to be the second most important sector in four

regions: Ayeyarwady, Bago, Kachin, Magway, and Mon. A concentration of firms operating in basic metals, fabricated metal products, and non-metallic mineral products can be found in the very southern strip of Myanmar in Kayin, Mon, and Tanintharyi, where there are large reservoirs of minerals such as iron, tungsten, antimony, tin, and rare earth elements (Kraas et al. 2017). Finally, it can be seen that textiles and apparel play an important role in several states and regions such as Chin, Kachin, Magway, Sagaing, and Yangon, with a concentration towards the north-western area bordering India.

Table 3.3 provides an overview of different infrastructure indicators across states and regions. Column 1 shows an overall low internet dispersion, with only 5 per cent of the firms in the sample and 6 per cent in the population having internet access. This might be surprising given the earlier evidence of general increase in ICT dispersion in Myanmar (Robertson and Taung 2015). However, most of the sampled firms are small and micro manufacturing firms in the food or textiles sector where an internet connection might not be needed. Yangon Region, with a share of 21 per cent (22 per cent in the population), stands out compared to the other states and regions. Access to paved roads (column 2) is overall very high for MSMEs. With an overall average of 91 per cent, the vast majority of firms have access to a paved road. Kayah, located in the mountainous area bordering Thailand, is the only state where fewer than 80 per cent sampled firms have access to a paved road. However, this impression might be driven by the fact that no firms were interviewed in the mountainous townships in the far east of Shan State and in the far north of Kachin State.

Rail access is more diverse across regions (column 3). The shares of firms reporting easy rail access range from 0 per cent in Kachin and Kayin to 94 per cent in Nay Pyi Taw, with an overall average of 57 per cent. However, a clear pattern cannot be identified. While Mandalay and Nay Pyi Taw, two of the economic centres, have high values with more than 70 and more than 90 per cent, Yangon Region as the largest urban area only reaches 41 per cent. It is also notable that Tanintharyi has one of the highest access values at 87 per cent, while its two northern neighbours, Mon and Kayin, which connect Tanintharyi and its railroads to the rest of the country, reported that rail access is not at all easy. Only 1 per cent of firms in Mon and 0 per cent of firms in Kayin reported easy rail access. This suggests that the existing railroads are not sufficiently connected to all townships and to all areas within townships for firms to benefit from them (Kraas et al. 2017).

Column 4 shows overall high electricity grid access, with 87 per cent of the firms having access. Regions with the best access to the public electricity grid are Mandalay, Nay Pyi Taw, and Yangon, where 97–98 per

cent of firms reported having access to this service. In contrast, less than 60 per cent of firms in Rakhine and Kachin have access. A clear outlier in this distribution are firms from Chin State, where only 8 per cent have access to the electricity grid. Interestingly, firms from this state do not report insufficient power for production (column 5). Similarly, firms in Mon State, which is one of the states with lower electricity grid access (67 per cent), do not report weekly production problems due to power shortages. However, those states with the most frequent power insufficiencies, namely Tanintharyi (56 per cent), Yangon (58 per cent), Kayah (30 per cent), Sagaing (27 per cent), and Magway (23 per cent), all have electricity grid access rates above the average. Using population weights, even 60 per cent of the firms in Yangon report weekly power insufficiencies.

Table 3.3: Infrastructure by state/region (per cent)

	(1)		(2)		(3)		(4)		(5)		(6)	
State/region	Internet access		Paved road access		Easy rail access		Electricity grid access		Insufficient power for production at least once a week		Number of firms	
											Sample	Population
Ayeyarwady Region	1	(1)	95	(94)	62	(60)	87	(84)	16	(21)	226	8,244
Bago Region	1	(1)	87	(90)	81	(86)	90	(94)	9	(7)	192	7,021
Chin State	0	(0)	100	(100)	0	(0)	8	(4)	0	(0)	13	714
Kachin State	0	(0)	89	(91)	66	(69)	57	(49)	12	(12)	122	2,254
Kayah State	3	(2)	69	(69)	88	(85)	88	(74)	30	(28)	75	866
Kayin State	3	(2)	94	(92)	0	(0)	74	(74)	16	(14)	77	766
Magway Region	0	(0)	83	(80)	30	(29)	96	(93)	23	(20)	174	3,655
Mandalay Region	8	(9)	92	(92)	72	(72)	97	(97)	17	(17)	338	11,240
Mon State	1	(1)	98	(97)	1	(1)	67	(67)	0	(0)	163	3,348
Nay Pyi Taw Union	0	(0)	93	(95)	94	(96)	98	(99)	9	(12)	89	1,396
Rakhine State	2	(0)	85	(81)	1	(5)	56	(49)	11	(13)	116	2,885
Sagaing Region	1	(1)	85	(88)	79	(86)	93	(93)	27	(30)	252	7,623
Shan State	3	(2)	96	(98)	42	(44)	80	(81)	17	(21)	181	4,854
Tanintharyi Region	1	(1)	98	(99)	87	(89)	94	(92)	56	(57)	118	2,189
Yangon Region	21	(22)	92	(93)	41	(42)	98	(99)	58	(60)	360	14,171
Total	5	(6)	90	(91)	54	(57)	87	(87)	24	(27)	2,496	71,226

Note: Population percentages in parentheses. The numbers for excluding rice mills only differ slightly and are therefore omitted.

Source: Authors' illustration based on Myanmar MSME 2017 data.

There are several possible explanations for this situation. First, high access rates to the electricity grid do not necessarily guarantee a stable power supply. Due to high demand, the electricity grid tends to be easily

overloaded, especially within industrial and urban agglomerations (Robertson and Taung 2015). Accordingly, township-level data show that despite having a 98 per cent access rate to the electricity grid, 96 per cent of firms in Dagon Myothit South Township in Yangon have insufficient power for production at least once a week. Second, the electricity demand for certain types of firms is very limited, for instance for small, home-based weavers. And third, firms possess or have access to private generators, which seem to produce electricity at a stable rate.

3.3   Industrial zones

Structural transformation from an agricultural to a more industrialized economy comes with a number of challenges. One of these challenges is agglomeration and the concentration of economic areas, and how to handle these phenomena properly. Industrial hubs are desirable as they provide many benefits such as backward and forward linkages, which means that firms who produce intermediate goods locate close to those firms that buy their product, thereby minimizing transportation costs. Similarly, firms locate close to their suppliers to reduce transportation costs. Another potential benefit is knowledge spillovers in terms of observing other firms or sharing knowledge with them. However, agglomeration can also come with some risks and problems. Congestion and other negative effects for citizens have to be taken into account. Moreover, economic concentration tends to increase within-country inequality (Deichmann et al. 2008). Dealing with these issues requires government intervention, for instance by creating incentives for the desired localization of firms and investments in the required infrastructure and business environment.

A common way to do this is by establishing industrial zones. As well as tackling the above-mentioned issues, industrial zones are an instrument for attracting FDI, by providing areas with favourable business conditions. In Myanmar, the first industrial zones were established in the mid-1990s. However, unlike in other Southeast Asian countries such as China or Viet Nam, firms in Myanmar were initially forced to locate in the industrial zones, rather than being given financial incentives such as tax cuts to locate there (Tsuji et al. 2007; Robertson and Taung 2015). There are now 20 industrial zones operating and several more planned (Abe and Dutta 2014). However, for years now the industrial zones have been criticized for a lack of infrastructure, investment, regulation, and efficiency. A lack of sufficient infrastructure and, more precisely, of stable electricity supply have been identified, in particular, as major problems in related literature (Min and Kudo 2013; Robertson and Taung 2015). As mentioned above, these power shortages mainly stem from high electricity demand in the densely populated areas around Mandalay and Yangon, where the majority of industrial zones are also located. A further often-cited problem is that many of the industrial zones run significantly below their full capacity. Many plots are vacant or used for warehouses

rather than for production sites, indicating a lack of incentives for firms to produce in them, but also stemming from high land prices due to land speculation (Min and Kudo 2013; Wai 2018).

Figure 3.2 gives an overview of the shares of firms in industrial zones, by township. Two areas with high concentrations of industrial zones can be identified: Yangon Region and the western area around Mandalay Region. In the townships of Shwepyitha, South Dagon, and Hlaingthaya in Yangon Region, 57, 71, and 77 per cent, respectively, of sampled firms are located within an industrial zone. Also Taunggyi (56 per cent) in Shan State and Yenanyoung (83 per cent) in Magway Region have high shares of firms within industrial zones.

Figure 3.2: Proportion of firms located in industrial zones by township
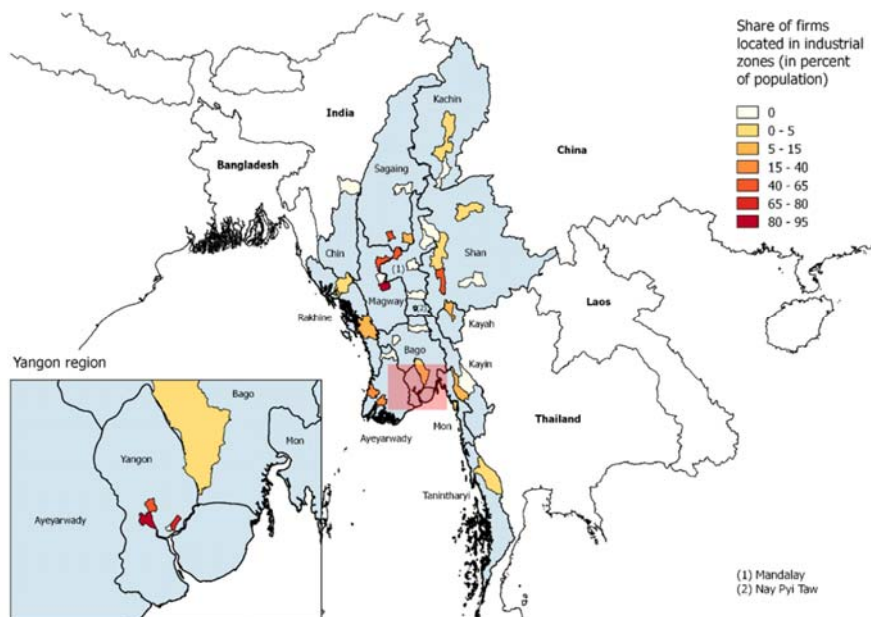
Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 3.4 compares a number of characteristics of firms that are located within and outside industrial zones. The upper part of the table shows different infrastructure variables. Infrastructure is identified as one of the most crucial conditions for gaining the intended positive effects within industrial zones (Min and Kudo 2013). Comparing columns 1 and 2, we can see that firms within industrial zones report better access to infrastructure than firms outside. While only 3 per cent of the firms outside of industrial zones have internet access, 11 per cent of the firms within these zones do have internet access. For the whole population (columns 3 and 4), 13 per cent of firms inside industrial zones have internet access. Similarly, firms within industrial zones more often have access to paved roads and to the electricity grid. Eighty-nine

per cent of the surveyed firms outside and 94 per cent of those inside industrial zones have access to paved roads (90 per cent and 95 per cent, respectively, in the population). The difference is even larger for access to the electricity grid, with 84 per cent of firms outside and 98 per cent of firms inside having access (83 and 98 per cent for the in the population). Rail access, on the other hand, shows a reverse pattern. Firms within industrial zones believe they have less easy access to rail (48 per cent compared to 56 per cent for the full sample, and 50 per cent compared to 59 per cent in the population). Notably, and confirming what has already been shown in the regional comparison, higher access to the electricity grid does not correspond to more stable power supply. The data show that firms inside industrial zones are twice as likely to face insufficient power for production at least once a week as firms outside of industrial zones (40 per cent compared to 20 per cent). Looking at the population levels, this gap increases to 44 and 20 per cent. For the samples excluding rice mills (columns 5–8), as for the other infrastructure variables, the shares only change slightly. These results support earlier findings that electricity shortages appear to be a major problem within industrial zones. Policy intervention should therefore aim at improving stable electricity access. It is important to improve the electrical infrastructure so that it can satisfy the high demand in industrial zones and other agglomeration areas, particularly as access to the electricity grid does not appear to be sufficient to guarantee a stable supply. This will be crucial for industrial zones to become more productive and more attractive for domestic firms and for FDI.

The second part of Table 3.4 shows different economic performance indicators. The two rows show indicators of labour productivity, measured as revenue per employee and the natural logarithm of revenue per employee. On both scales, it can be seen that firms within industrial zones perform better. Of the interviewed firms, those located inside an industrial zone make almost double the amount of revenue per employee of that of firms outside of industrial zones (about 31.1 million Kyats compared to 16.8 million Kyats). In the weighted sample, the difference decreases but persists (34.3 million Kyats compared to 23.7 million Kyats). When rice mills are excluded, the gap widens even for both the weighted and the unweighted samples. Despite all the criticisms and shortcomings of industrial zones, these results suggest either a positive effect on firms' economic performance, or that more productive firms choose to locate in the industrial zones.

The third part of the table displays different firm size measures. It clearly shows that firms within an industrial zone are, on average, larger than those located outside. The mean size is 33 employees inside the zones compared to eight employees outside. The median firm size is twice as large inside, with eight employees compared to four. Also, the maximum firm size shows a remarkable difference. The largest firm

sampled outside an industrial zone has 361 employees, while the largest firm inside has 540. The differences vary slightly over the different samples in the remaining columns, without changing the overall pattern.

Table 3.4: Characteristics of firms located outside and within industrial zones

State/region	Sample		Population		Sample, excluding rice mills		Population, excluding rice mills	
	Outside	Inside	Outside	Inside	Outside	Inside	Outside	Inside
Infrastructure								
Internet access	3	11	4	13	3	11	5	13
Paved road access	89	94	90	95	89	94	91	95
Rail access	56	48	59	50	57	47	62	48
Electricity grid access	84	98	83	98	85	98	89	98
Power insufficiency	20	40	21	44	20	40	22	46
Performance								
Revenue per employee (mil. Ky.)	16.84	31.08	23.68	34.27	15.48	30.95	19.15	32.39
Log of revenue per employee	15.68	16.13	15.94	16.22	15.62	16.13	15.71	16.14
Firm size								
Firm size (mean)	8	33	9	40	8	34	10	43
Firm size (median)	4	8	4	10	4	8	5	12
Firm size (min)	1	1	1	1	1	1	1	1
Firm size (max)	361	540	361	540	361	540	361	540
Sectors and technology								
Most important sector	Food (37)	Food (52)	Food (53)	Food (61)	Food (31)	Food (50)	Food (30)	Food (55)
2nd most important sector	Textiles (13)	Machinery and equipment (9)	Textiles (11)	Machinery and equipment (7)	Textiles (14)	Machinery and equipment (10)	Textiles (17)	Machinery and equipment (8)
3rd most important sector	Wood (9)	Apparel (5)	Wood (7)	Apparel (6)	Wood (10)	Apparel (5)	Wood (11)	Apparel (7)
Low technology level	77	74	84	81	74	73	77	78
Medium-low technology level	17	13	10	10	18	14	15	11
Medium-high and high-technology level	7	13	5	9	8	13	8	11
Total number of firms	1,972	524	52,555	18,671	1,805	505	35,271	16,172

Source: Authors' illustration based on Myanmar MSME 2017 data.

Finally, the bottom part of Table 3.4 shows the sectors and technology levels. The first row shows that both within and outside industrial zones, most firms are operating in the food sector. This finding is not surprising, given the overall dominance of the food sector in the small and medium-sized manufacturing sector. However, the share of firms operating in the food sector is remarkably higher within industrial zones, with 52 per cent compared to 37 per cent for the full sample. This gap decreases significantly in the

weighted sample (61 per cent compared to 53 per cent), but widens again when rice mills are excluded. The table also shows the second and third most important sectors inside and outside industrial zones. For firms located outside, these are textiles (13 per cent) and wood (9 per cent); for firms located inside, these are machinery and equipment (9 per cent) and apparel (5 per cent). This suggests that firms within industrial zones are producing goods that require higher skills and add higher value. This trend can be confirmed to a certain extent when classifying the firms into different technology levels. Firms inside industrial zones have slightly lower shares of low technology and medium-low technology level production (74 and 13 per cent compared to 77 and 17 per cent), but a higher share of medium-high and high-technology level production (13 per cent compared to 7 per cent).

To further explore whether industrial zones have the desired positive impact on firms' performance, Table 3.5 shows the results of simple ordinary least squares (OLS) regressions with the natural logarithm of revenue per employee as the dependent variable, and industrial zones, different infrastructure indicators, and a number of other firm characteristics as independent variables. It can be seen that being located within an industrial zone is positively correlated with firms' revenue per employee, with a statistically significant coefficient size of 0.09. This corresponds, on average, to 9.5 per cent higher revenue per employee for firms located in an industrial zone, thereby confirming what was shown in Table 3.4. This positive relationship persists for the population (column 2), but loses it statistical significance. Columns 3 and 4 include sector and region fixed effects for both the sample and the population. In both specifications, the positive relationship between industrial zones and revenue per employee persists and is highly significant. Moreover, the magnitude of the correlation increases, with 16.6 per cent in the full sample (column 3) and 17.8 per cent in the whole population (column 4).

The correlations between different infrastructure variables and labour productivity indicate that internet access does not appear to have a statistically significant relationship with revenue per employee. This finding reflects the low importance the internet appears to have in micro and small size manufacturing, which accounts for more than 94 per cent of the sample. Running the same regressions only on medium and large firms results in a positive correlation between internet access and labour productivity, which is, however, only statistically significant in the specification of column 2 (population without region and sector fixed effects). Paved road access is positively correlated with labour productivity, with a coefficient of 0.122, corresponding to 12.9 per cent higher revenue per employee. This correlation is statistically significant at the 1 per cent level. However, it loses in magnitude and significance when population weights and region and sector fixed effects are included. Surprisingly, easy rail access is negatively correlated with

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labour productivity (statistically significant at least at the 5 per cent level in all four specifications). Electricity grid access, on the other hand, does not appear to affect labour productivity. The coefficient is negative in all four specifications and only slightly significant in the first one. This matches what has been found earlier in this chapter, that access to the electricity grid does not guarantee a stable power supply. Firm size, similarly, does not show a significant relationship with revenue per employee either. It has a negative coefficient in all four specifications. However, firm size is only significant in the population model without fixed effects. Finally, both the assets value and the input costs are strongly positively correlated with labour productivity, with high statistical significance in all specifications.

Table 3.5: Labour productivity, infrastructure, and industrial zones

Dependent variable: Revenue per employee (ln)	(1) Sample	(2) Population	(3) Sample	(4) Population
Located in industrial zone	0.091***	0.064	0.154***	0.164***
	(0.032)	(0.042)	(0.037)	(0.051)
Internet access	-0.065	-0.134*	-0.043	-0.106
	(0.059)	(0.077)	(0.062)	(0.079)
Paved road access	0.122***	0.077	0.080*	0.066
	(0.041)	(0.059)	(0.043)	(0.064)
Rail access	-0.092***	-0.092**	-0.077**	-0.115***
	(0.025)	(0.036)	(0.031)	(0.043)
Electricity grid access	-0.060*	-0.072	-0.012	-0.030
	(0.036)	(0.056)	(0.039)	(0.056)
Firm size (ln)	-0.012	-0.030**	-0.008	-0.025
	(0.012)	(0.015)	(0.012)	(0.016)
Total assets (ln)	0.044***	0.049***	0.041***	0.042***
	(0.007)	(0.013)	(0.007)	(0.014)
Input costs (ln)	0.662***	0.681***	0.661***	0.675***
	(0.007)	(0.019)	(0.008)	(0.021)
Constant	5.161***	4.926***	4.962***	5.567***
	(0.142)	(0.280)	(0.308)	(0.635)
Observations	2,432	68,384	2,432	68,384
R-squared	0.798	0.822	0.804	0.831
Region dummies	No	No	Yes	Yes
Sector dummies	No	No	Yes	Yes

Note: Standard errors in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

3.4   Industrial clusters

The final part of this chapter will turn to economic or industrial clusters. An industrial cluster refers to a geographically proximate agglomeration of firms from the same or from a similar sector. The idea behind industrial clusters is very similar to that of industrial zones as explained above. When firms locate close to

other firms from the same sector, they can potentially benefit from backward and forward linkages, knowledge spillovers, low transportation costs, and a thick labour market (Deichmann et al. 2008). While industrial zones are an artificially installed area, clusters often follow as a natural result of industrial growth and transformation. However, in many cases, the installation of industrial zones and industrial clusters overlap, as industrial zones can provide particularly favourable conditions for clustering (Tsuji et al. 2007). It should be noted that geographically clustered firms do not necessarily experience the above-mentioned benefits of industrial clusters. Robertson and Taung (2015) found that firms in industrial zones in Myanmar rarely participate in clustering activities. For instance, due to a lack of trust, business owners in the same sectors barely interact with each other and therefore knowledge spillovers do not unfold.

This section attempts to identify industrial clusters on the basis of geographic proximity. Figure 3.3 shows the locations of all surveyed firms. Using GPS coordinates, accumulations of firms in certain sectors can be identified.
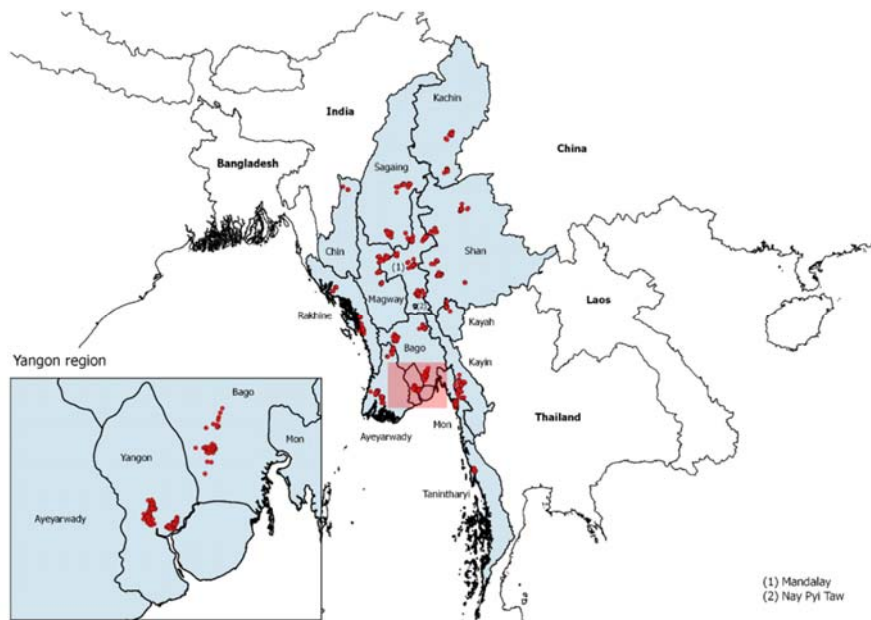
Figure 3.3: Surveyed firms, GPS locations

Note: 199 firms with inaccurate or missing coordinates have been placed in the centre of the township where the respective interviews were conducted.

Source: Authors' illustration based on Myanmar MSME 2017 data.

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Figure 3.4 shows a map of all surveyed firms in Yangon Region, with the four sampled townships of Hlaingthaya (left), Shwepyitha (top), Dagon Myothit South (right), and Thingangyun (bottom). The four panels highlight different specific sectors with a considerable number of firms in the region, allowing us to identify different patterns. Firms operating in the apparel sector are highlighted in the top-left panel. In Dagon Myothit South, a cluster can be identified with a large number of apparel firms concentrated in one area. In Shwepyitha, on the other hand, the highlighted firms are somewhat scattered. The top-right panel highlights firms in the beverages sector. In Dagon Myothit South, there appear to be three firms relatively close to each other, but which cannot yet be seen as a cluster. Moreover, the remaining firms are somewhat scattered, and a cluster with a larger number of firms cannot be identified. Similarly, a cluster cannot be identified in Yangon Region either in the textiles sector (bottom-left panel) or in the wood sector (bottom-right panel).
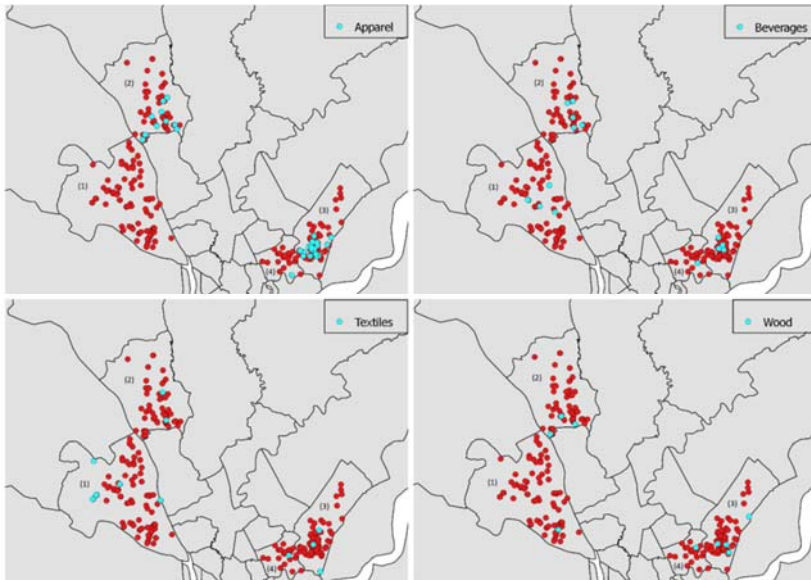
Figure 3.4: Industrial clusters, Yangon Region

Note: The illustrated townships are Hlaingthaya (1), Shwepyitha (2), Dagon Myothit South (3), and Thingangyun (4). The figure excludes 199 firms with inaccurate or missing coordinates.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 3.5 shows a similar map for Monywa Township in Sagaing Region. A cluster in machinery and equipment can clearly be identified in the top-left panel. Unlike in Yangon, two smaller textile clusters can be identified (bottom-left panel). The firms in the wood sector (bottom-right panel), are more scattered. However, a cluster can be identified in the Eastern part of Monywa. Beverage firms, on the other hand, are

scattered (similar to Yangon). However, there is an overall tendency for a higher number of smaller clusters in Monywa compared to the three townships in Yangon.

A shortcoming of the aforementioned approach is that it does not account for potential backward and forward linkages within clusters. A common approach for identifying linkages between industries is to use cross-industry or cross-sector input–output tables, which describe the relationship between industries in terms of sales and purchases of intermediates and final goods. In industries with high interaction, i.e. with high values of between-firm trade, linkages are more likely to form when firms in these industries cluster together (Titze et al. 2011). Using data for 2000 and 2001, Thwin et al. (2010) estimate an input–output table for Myanmar. However, their classification treats manufacturing as one sector. The OECD (2017) provides input–output tables for different manufacturing industries, similar to those that are used in this report. As there is no such table reported for Myanmar, we use reported input–output tables of other Southeast Asian countries with (to a reasonable extent) comparable industrial characteristics (Cambodia, China, Thailand, and Viet Nam). Data for those countries suggests that, unsurprisingly, textiles, apparel, and leather share linkages, as textiles for instance serve as intermediates for apparel. But chemical products, such as dyeing agents, are also linked with textiles, apparel, and leather.
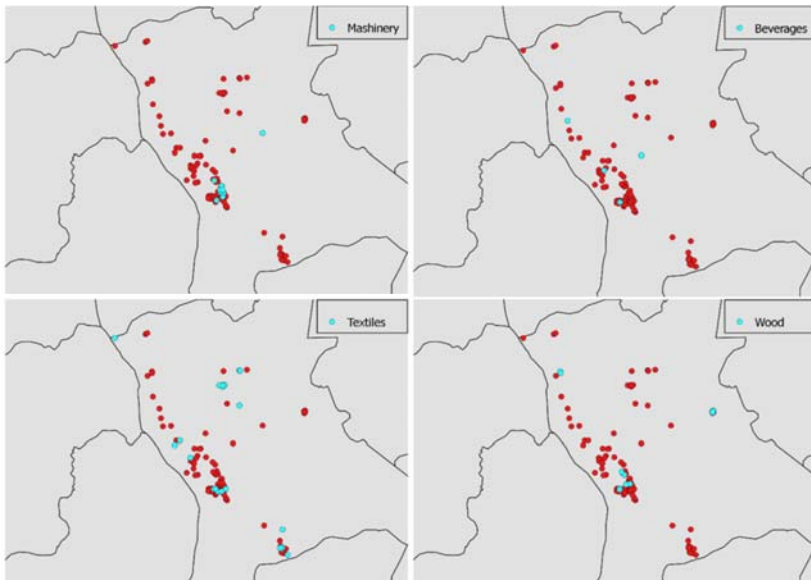
Figure 3.5: Industrial clusters, Monywa Township, Sagaing Region

Note: The figure excludes 199 firms with inaccurate or missing coordinates.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 3.6 shows the firms operating in these four sectors for seven different townships. Panel A shows Monywa Township in Sagaing Region. The smaller textiles clusters that could already be seen in Figure 3.5 appear to grow when leather- and chemical-producing firms are included. Apparel firms, however, are not located in any of these clusters. Panel B shows Wundwin Township in Mandalay Region. Here more than 84 per cent of all surveyed firms produce textiles, and it can be seen that most are located close together in several clusters. However, as in Monywa, no apparel firms are located nearby, and no firms producing leather or chemical products are located there either. Panel C shows Pakokku Township in Magway Region. Even though there are firms in textiles, leather, and chemical products, no distinct cluster can be identified. Again, no apparel firms are located here, despite the considerable number of textiles and leather firms. Finally, panel D shows an opposite trend. In Yangon Region, we can observe (as already seen in Figure 3.4) a cluster of apparel firms in Dagon Myothit South Township, while in the other townships, the firms are somewhat scattered. The inclusion of textiles, leather, and chemical products does not change this picture. Remarkably, neither Dagon Myothit South Township nor Shwepyitha Township, both with considerable numbers of apparel firms, contains many textiles firms.

Thus, it appears hard to find clusters with potential for inter-industrial linkages in the four sectors mentioned. The fact that apparel and textiles firms are rarely located close to each other (usually not even in the same township) particularly stands out. This suggests that local value chains in these sectors are fragmented and that there is some potential for benefits through clustering. One explanation could be a limited range of activities in the garment sector in which enterprises are mostly engaged in a cut-make-pack production system with imported inputs, designs, patterns, and instructions specified by the buyers. The more profitable free-on-board production system, where factories are also involved in other steps of the value chain, such as importing of raw materials, logistics, and warehousing, is less common in Myanmar, often due to a lack of sufficient capital and skills (Business Innovation Facility 2016). Policies aimed at improvement of capabilities and access to capital could improve the extent and the complexity of the textiles sector and increase the incentives and potential benefits for firms to cluster.

Another linkage pattern that becomes clear from looking at the input–output tables for Cambodia, China, Thailand, and Viet Nam is between non-metallic mineral products, basic metals, fabricated metal products, and machinery and equipment. Electrical equipment and motor vehicles also fall into this group of linked industries. However, only a very small number of firms in the sample are from these sectors (eight for electrical equipment and five for motor vehicles).
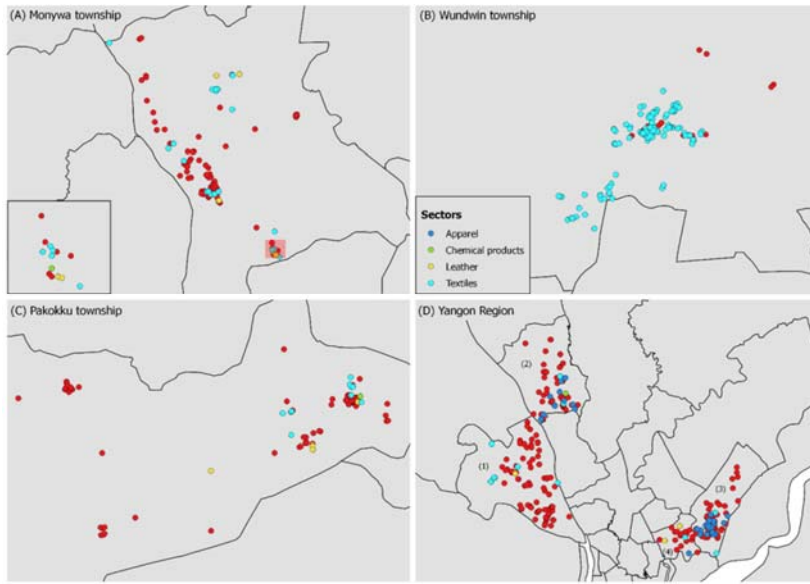
Figure 3.6: Industrial clusters in apparel, leather, textiles, and chemical products

Note: The illustrated townships in panel (D) are Hlaingthaya (1), Shwepyitha (2), Dagon Myothit South (3), and Thingangyun (4). The figure excludes 199 firms with inaccurate or missing coordinates. Scales differ across panels.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 3.7 shows again a number of different townships with firms highlighted in the aforementioned sectors. Panel A shows Monywa Township in Sagaing Region. While firms in fabricated metal products and non-metallic mineral products, as well as one firm in basic metals, are somewhat scattered across the township, a cluster in machinery and equipment can clearly be identified. In panel B (Myingyan township in Mandalay Region), on the other hand, we can actually find a cluster containing firms of five out of the six highlighted sectors. A closer look at the cluster reveals that one of the few sampled firms in the motor vehicles sector is even located there. This cluster is especially interesting, as the number of firms in the highlighted sectors is fairly low in Myingyan Township, but almost all of these few firms (with one exception) are located close to each other. Panel C shows Taunggyi Township in Shan State. Again, an industrial cluster can be identified, with a larger number of firms in fabricated metal products and machinery and equipment sectors. One of the few electrical equipment firms is also located there. Finally, Chaungzon Township in Mon State is illustrated in panel D. First of all, the overall high number of firms in the highlighted sectors stands out. However, proximity between many of these firms can also be seen, especially in the central-eastern part where there are many firms in the non-metallic mineral products and fabricated metal products sectors, and also in the northern part where some basic metal firms are located.

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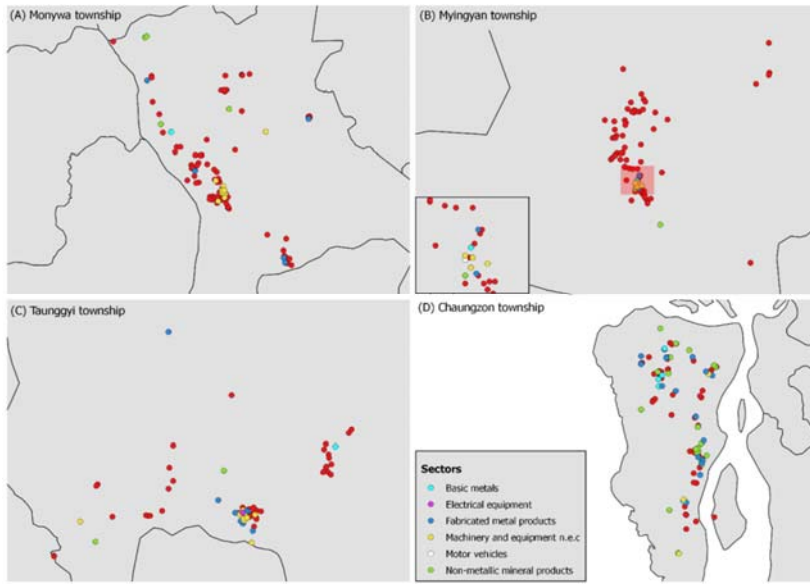
Figure 3.7: Industrial clusters in non-metallic mineral and metallic products

Note: The figure excludes 199 firms with inaccurate or missing coordinates. Scales differ across panels.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Overall, this analysis shows that the sectors surrounding metallic and non-metallic mineral production are more prone to industrial clustering than firms in the textiles, leather, apparel, and chemical sectors. While in the latter, the number of identified clusters was rather limited, in the former, there are quite a number of townships with industrial clusters in addition to those displayed in Figure 3.7. The composition of the clusters also differs. While Figure 3.6 showed that apparel and textiles firms are in most cases not located close to each other (often not even in the same township), the clusters identified in Figure 3.7 contain firms from different sectors that potentially share linkages. This suggests that local value chains in these sectors are more cohesive than in the textiles, apparel, and leather sectors.

In sum, this chapter provided an overview and analysis of the economic geography of Myanmar. It showed that the extent of manufacturing activity follows the topographical circumstances of Myanmar, with the majority of economic activity being concentrated in the central lowland strip down to the coast in the south. This chapter also illustrated the overall dominant role of the food manufacturing sector in Myanmar. However, an analysis of the second most important sectors showed a pattern of basic metals, fabricated metal products, and non-metallic mineral products being concentrated in the southern strip of Myanmar, and textiles and apparel in the north-western area at the border with India.

Section 3.2 further showed differences in infrastructure across regions, thereby highlighting that, despite overall high access to electricity grid, power insufficiencies remain a large problem—especially in those regions with electricity grid access rates above the average. This was further confirmed in Section 3.3, where, despite high electricity grid access rates, power insufficiencies were identified as a major problem within industrial zones. Improvements in stable electricity supply will be crucial to attract domestic and foreign firms to operate within the industrial zones.

Section 3.3 also showed that firms located within industrial zones are, on average, more productive. Finally, this chapter looked more specifically at certain townships and sectors to identify industrial clusters. We found that there are differences between townships when it comes to clustering. More importantly, we found differences in sectors. While apparel and textiles firms are mostly located at a distance from each other, firms producing fabricated metal products, non-metallic mineral products, and machinery and equipment are often clustered together. These findings suggest differences in the characteristics of local value chains and the potential for linkages. However, inference from these clusters remains subject to further analysis.

4   The informal economy and informal payments

Despite a decades-long discussion about (in)formality, there is no universally accepted definition of the term. While several researchers defend the idea of a country having a dual economy, with the existence of an informal sector which is strictly separated from the formal one, others are convinced that the two sectors are tightly connected and interdependent (Potts 2008). While the informal economy is a source of livelihood for thousands who do not have any other employment opportunities, it also makes it possible for entrepreneurs to conveniently circumvent burdensome business regulations and evade taxes. Overall, the academic literature describes the informal economy as a mix of different characteristics, cutting 'across the whole social structure' (Castells and Portes 1989: 12) and depending on each individual country's context (Lindell 2010). In South Asia, around 70 per cent of non-agricultural employment is located in the informal sector (Vanek et al. 2014). If the informal economy is of similar size in Myanmar, it plays a non-negligible part in the national economy. It should therefore be included in the country's policies for achieving economic development and reducing poverty. This chapter takes a closer look at enterprise informality in the Myanmar context.

According to the UN Expert Group on Informal Sector Statistics (Delhi Group 2018), the largest common denominator to be used to measure informality is either employment size or non-registration of a company. With the aim of coherently continuing previous research on the informal SME-sector in Myanmar, we choose the business registration option (OECD 2016; World Bank 2017b). First, we look at business registrations/licences and taxpayers, and subsequently explore informal employment in both formal and informal businesses. We show data on informal payments among Myanmar companies in the final part of this chapter.

4.1   Business registration

There are no detailed data about the number of non-registered/non-licensed companies in Myanmar.[3] The OECD (2013) estimated that around 83 per cent of all businesses were operating informally in the country. The term 'registration' in their report only comprises enterprises registered at national level (OECD 2013). A World Bank enterprise survey only included registered firms but found that, of these, 21 per cent were not registered upon start-up (World Bank 2017b).

In this report, an enterprise is considered to be formal when it is licensed by and/or registered with any government authority responsible for businesses. There are many different Myanmar authorities registering and licensing businesses, and it is common for enterprises to hold multiple permits. Therefore, it is not always clear which is the most relevant authority for firms and what exactly the legal situation in terms of registration/licensing looks like. Oftentimes, an authority is only responsible for a certain sector. In other cases, there are certain benefits for enterprises to enlist with a specific government agency, for example the possibility to obtain a bank loan or access to electricity of higher horsepower.

While we can estimate the overall number of formal manufacturing firms in Myanmar, which we include as 'population' in the analysis (see Table 4.3), we do not know the share of informal firms in the Myanmar enterprise population because of the lack of complete records on informal firms in the country. Therefore, we can analyse the Myanmar informal firms' characteristics of our sample, but cannot estimate for the informal firm population. Estimations for the informal sector populations remain to be made by future research.

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[3] The difference between a company licence and registration is that Myanmar municipalities are solely responsible for licensing, while other authorities execute the task of company registration.

Table 4.1 reports the share of non-registered enterprises by firm size. Around 16 per cent of the sampled establishments do not possess any kind of registration certificate, licence or permit to operate a business. When only looking at the rice mills sample, we see that most of the rice mills are formal, as only 5 per cent are not registered/licensed.

Regarding firm size, we find that micro firms (19 per cent) are most likely to operate informally. Less than 2 per cent of medium enterprises and no large firms indicate that they operate without any business certificate. This observation confirms that enterprises become more formal with size because it is difficult for bigger establishments, which are more visible in public, to operate without, for example, property rights and access to credit (Perry et al. 2007). The bottom part of Table 4.1 shows the higher prevalence of informal firms in rural areas.

Table 4.1: Firm size and rural location by non-registration (sample percentages)

	Informal, non-rice mills	Rice mills	Sample average
All	16.0	5.4	15.2
Micro	19.3	5.7	18.2
Small	8.4	4.3	8.2
Medium	1.7	0.0	1.6
Urban	11.3	5.1	10.9
Rural	41.3	5.9	35.7

Source: Authors' illustration based on Myanmar MSME 2017 data.

A comparison across states in Figure 4.1 shows that the smallest proportion of informal enterprises are in Kayah State (5 per cent of sampled firms), Bago Region (6 per cent), and Shan State (7 per cent), while the highest percentages of informality are identified in Nay Pyi Taw (21 per cent), Rakhine State (20 per cent), and Ayeyarwady Region (19 per cent). Moreover, the only regions where informal rice mills are operating are Rakhine (32 per cent), Bago (5 per cent), Ayeyarwady (4 per cent), and Mon (3 per cent).
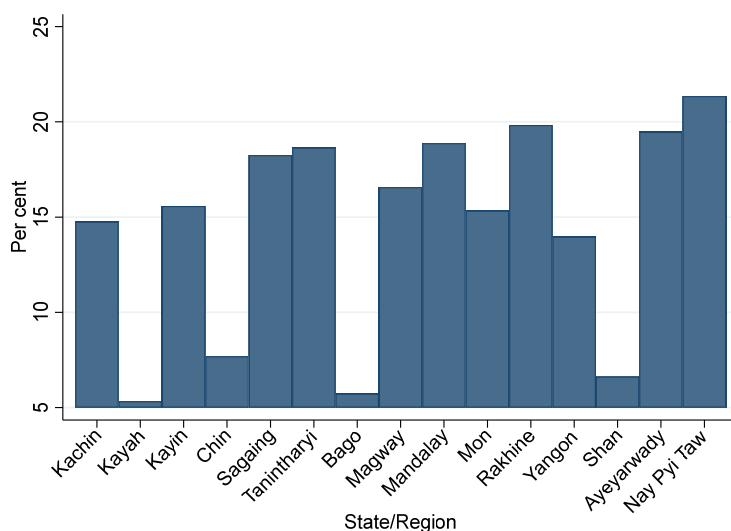
Figure 4.1: Informality by state/region

Source: Authors' illustration based on Myanmar MSME 2017 data.

Among the different sectors, shown in Table 4.2, one-third of textiles enterprises, many of which practice traditional weaving in their own homes, operate informally. One-half of informal firms in the textiles industry are located in rural areas. A similar trend can be seen in the leather industry, where about one-third of firms are informal and two-thirds are located in rural areas. In the non-metallic mineral products sector, one-fourth of the firms are unlicensed and unregistered. The majority of these operate in rural areas. A higher prevalence of informal firms in rural areas could potentially be due to the relatively lower presence of government authorities in charge of business licensing and registration in remote areas. The sectors with the least informal firms are those of tobacco (4 per cent), chemical (5 per cent), furniture (5 per cent), and wood (7 per cent). The cases of the tobacco, chemical, and furniture industries could be explained by the fact that most of the firms in these sectors are located in urban areas, where they are likely to be more visible to the authorities. The high rate of formalization in the wood industry could be due to the fact that the industry is strictly regulated, reflecting the efforts to protect the country's forests and improve sustainability.

Table 4.2: Sectors by non-registration (sample percentages)

Sectors	Per cent	Rural	Urban
Food	12.4	27.3	9.5
Beverages	15.2	20.0	14.9
Tobacco	3.7	0.0	3.8
Textiles	33.7	50.5	22.4
Apparel	17.2	0.0	17.2
Leather	29.2	66.7	23.8
Wood	6.9	20.0	5.1
Paper	20.0	0.0	20.0
Printing and recorded media	23.5	0.0	23.5
Chemical products	5.0	0.0	5.9
Rubber and plastics	15.2	42.9	7.7
Non-metallic mineral products	25.7	55.3	15.8
Basic metals	13.4	45.5	7.1
Fabricated metal products	13.0	35.0	9.3
Machinery and equipment n.e.c. [a]	7.8	21.1	6.0
Furniture	5.5	5.6	5.5
Other manufacturing	19.6	50.0	17.0
Observations	2,496	434	2,062

Note: [a] n.e.c. stands for 'not elsewhere classified'. Showing only industries with more than 10 observations.

Source: Authors' illustration based on Myanmar MSME 2017 data.

4.2   Registration authorities

Table 4.3 illustrates several government authorities at the national and local levels, their respective licensing/registration coverage, and the share of registrations with multiple authorities. Moreover, Figure 4.2 depicts the share of registrations or licences obtained from different registration authorities, by state. Overall, a majority of the firms (85 per cent) are registered with more than one government authority. Each of these authorities is analysed in the following sub-sections.

Table 4.3: Registration authorities

	Sample					Population		
	Formal	Rice mills	All	Rural	Urban	Formal	Rice mills	All
DICA	2.9	0.5	2.5	0.0	3.0	4.4	0.9	3.5
Municipalities	81.7	66.1	69.3	38.7	75.7	84.5	71.1	80.8
DISI	68.0	77.4	57.6	40.3	61.3	67.4	84.7	72.2
GAD	2.8	2.7	2.4	1.2	2.6	2.5	2.7	2.6
SSID	14.8	11.3	12.6	15.0	12.1	13.5	13.0	13.3
Other	12.4	12.9	10.5	5.5	11.6	11.1	16.0	12.5
Multiple registrations	99.7	94.6	84.5	63.8	88.9	99.6	100.0	99.7
Observations	2,116	186	2,496	434	2,062	51,443	19,783	71,226

Note: Formal refers to registered firms that are not rice mills.

Source: Authors' illustration based on Myanmar MSME 2017 data.
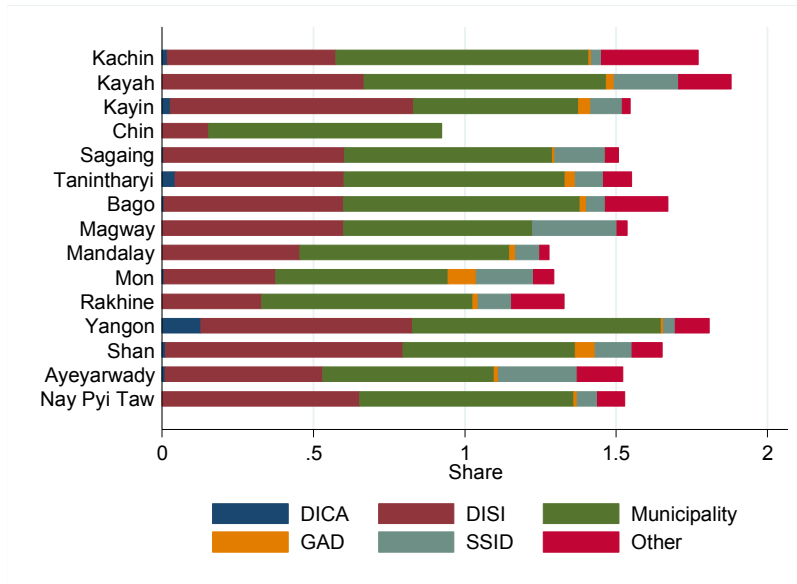
Figure 4.2: Registration obtained from different authorities by state

Source: Authors' illustration based on Myanmar MSME 2017 data.

4.2.1 Directorate of Investment and Company Administration

As mentioned in the introduction, the Law on the Development of Small and Medium Businesses (Pyidaungsu Hluttaw Law No. 23/2015) requires all SMEs with total private capital investment to register. This is said to be beneficial for companies in terms of access to credit and the judicial system, and makes it possible to participate in advanced training (OECD 2016). By the end of 2017, under the new company law, it was established that the Directorate of Investment and Company Administration (DICA), which was founded under the Ministry of National Planning and Economic Development in 1993, would now be the only institution responsible for the registration of enterprises (Government of Myanmar 2017).

However, only 2.5 per cent of the companies in our sample, and 3.5 per cent of the population of Myanmar's manufacturing firms, are registered at DICA. As Table 4.3 shows, DICA is the second least prevalent authority with which the interviewed companies are registered (after GAD). DICA even plays a less important role for rice mills than for all other enterprises, as less than 1 per cent of all Myanmar rice mills being registered there. So far, DICA only seems to have played an important role for medium and large firms, of which 29 and 74 per cent are registered with this authority. Micro and small enterprises may be less likely to register at DICA due to an annual registration fee, which they are not willing to pay.

Yangon is the only region where more than 14 per cent of the sampled enterprises have registered with DICA. This is in line with most medium and all large firms of the sample being located in Yangon, as mentioned in Chapter 2. Therefore, it is not surprising to find that DICA does not seem to be present outside the cities, as only three firms located in rural areas indicated that they were registered with the authority (Table 4.3). DICA could play an important role in the future as a one-stop service centre was established at its headquarters in Yangon in 2013 and a simplified registration system introduced two years later. Moreover, if the New Company Law is enforced and the information that DICA is the only agency responsible for enterprise registration is right, we are likely to see more companies registered with the directorate in the future.

4.2.2 Municipalities

In 2015, the UNDP reported that municipal offices (or city/township development committees/department of development affairs) had the highest registration coverage achieved among government entities, and that around 71 per cent of all Myanmar manufacturing companies were registered with this authority (UNDP 2015). However, municipalities do not actually register businesses but only license them, so most companies who want to obtain certain benefits, such as access to credit and electricity, need to register with additional authorities. It seems to be almost impossible for companies to operate without a municipal licence because municipalities' officials arrive personally at all businesses to collect licence fees. The fees for licences differ across states (Arnold et al. 2015).

Table 4.3 reports that around 70 per cent of the sampled enterprises obtained a licence from the municipal authority, which is almost identical to the figures in UNDP's Myanmar Business Survey (2015). The fact that all the large enterprises interviewed are licensed by the municipality confirms that it is difficult to avoid this level of registration when doing business. About 75 per cent of all micro firms in the sample and an estimated number of 57,521 Myanmar firms are licensed by the municipal authority. Moreover, it is less likely that firms located in rural areas are licensed by this authority (39 per cent) than enterprises in urban locations (76 per cent). This is likely because firms in villages are less visible than in urban areas.

The municipal authorities seem to be highly relevant for the repair and installation sectors (100 per cent), tobacco (89 per cent), and coke and refined petroleum (83 per cent), and least significant for electrical equipment (25 per cent), chemicals (45 per cent), textiles and leather firms (both 54 per cent). The textiles and leather industries are located in rural areas, where they are less likely to be licensed by a municipal office. All states and regions have registration coverage at the municipal level of above 50 per cent, with

Kayin having the lowest (55 per cent) and Kachin the highest (84 per cent). The reasons for this may be the rural location of firms in these states or that not all municipal offices are present in all townships.

4.2.3 Directorate of Industrial Supervision and Inspection

The Directorate of Industrial Supervision and Inspection (DISI) was established under the Ministry of Industry in 2012, and is relevant for Myanmar enterprises for several reasons. First, those firms implementing industrial processes are supposed to register as 'industrial' with DISI. This is of particular importance for firms located in industrial zones, but it also affects establishments outside these zones (Robertson and Seng Taung 2015). Second, if firm owners want to operate under higher electrical horsepower, they have to enlist with DISI. One or both of these reasons seem to be relevant for the sampled firms, as 58 per cent are registered at DISI. As reported in Table 4.3, DISI seems to be of great significance for rice mills because 77 per cent of surveyed rice mills are registered with this agency. Moreover, of the government authorities in Table 4.3, DISI has the second highest coverage of firm registration in rural areas (40 per cent).

Unsurprisingly, the registration coverage increases with firm size as bigger companies are more dependent on high horsepower; 92 per cent of the large enterprises, including rice mills, are covered by DISI, followed by 87 per cent of medium, 67 per cent of small, and 53 per cent of micro companies. Overall, a number of 51,492 Myanmar manufacturing companies are registered at the directorate. It seems to be especially relevant for the repair and installation, machinery and equipment (not elsewhere categorized), and motor vehicles sectors, since 100 per cent, 83 per cent, and 80 per cent of firms, respectively, indicated that they had registered at DISI. In all parts of Myanmar, except for Chin State (15 per cent), Rakhine State (33 per cent), Mon State (37 per cent), and Mandalay Region (45 per cent), more than half of the enterprises indicated that they were registered with DISI. The coverage in Chin is probably so low because many of the interviewed firms there practice traditional weaving for which electricity is not needed.

Of those firms which are located in industrial zones, the majority are registered with DISI (86 per cent). However, half of the DISI-registered firms are not located in industrial zones, so it is difficult to identify if they enrolled with this authority to be an official industrial firm, to obtain higher horsepower, or both.

4.2.4 General Administration Department

The General Administration Department (GAD) is affiliated with the Ministry of Home Affairs, and has the task of managing the country's administrative structure, connecting the different ministries, as well as the

national and the regional levels, with the aim of ensuring coherence. UNDP (2015) reported that registration with GAD does not affect many businesses because its main task is the issuance of licences for shops selling alcoholic beverages. Our data in Table 4.3 partly confirm this, as only 2.4 per cent of the sampled enterprises have a permit from GAD, which appears to be most relevant for large firms (8 per cent coverage). However, it does not seem to play a significant role for manufacturing companies located in the beverages sector, as less than 4 per cent were registered with GAD. Instead, 18 per cent of the printing and recorded media sector, and 14 per cent of the non-metallic products sector, were registered at GAD. This may be explained by the information we found about GAD taking over responsibility for those townships that the municipal offices do not cover.

4.2.5   Small Scale Industry Department

The Small Scale Industry Department (SSID) belongs to the Ministry of Agriculture, Livestock and Irrigation (MOALI), and its name already reveals the kind of companies for which it is responsible. According to the Ministry's homepage, it seems to be especially important for weaving and handicraft enterprises (MOALI 2017). This makes sense if we count the wood and furniture sectors as handicrafts, of which 31 and 39 per cent are registered with the department. However, we also find that all of the computer, electronic, and optical products companies sampled and one-quarter of chemistry companies are registered here. The coverage is especially high for the Magway and Ayeryarwady regions, which report shares of 28 and 26 per cent.

4.2.6   Other authorities

Table 4.3 shows that 11 per cent of the interviewed enterprise owners indicated that they were registered with authorities other than those described above. Most of these are of micro size (9 per cent). Moreover, many of the firms registered with other agencies are located in the pharmaceutical (63 per cent), wood (42 per cent), and furniture (41 per cent) sectors. The respective authorities they are enlisted with are the Ministry of Agriculture and Irrigation and the Ministry of Environmental Conservation and Forestry. Moreover, 21 firms from the food sector are registered at the Trade Promotion Department.

4.3   Taxes

Just because a business is registered at one of the above-mentioned authorities, does not mean that it pays taxes, as tax registration happens separately from company registration in Myanmar (World Bank 2017c). In a strict sense, one could also argue that companies are only formal if they are registered as a business and also pay taxes (de Mel et al. 2011). Using this measure, there would be many more informal firms (68

per cent) in the sample than when based on registration alone (16 per cent). However, just because firms do not pay corporate income tax, does not mean they do not pay anything to the authorities, because more than 80 per cent of the surveyed firms said they pay fees and/or taxes (see Figure 4.3).

It seems that many of these fees are paid at the municipal level. Only 41 per cent of the firms licensed by a municipal authority pay corporate income tax, but 95 per cent indicated they pay fees. These are principally collected by self-funded township DAOs, and can be categorized into three different types: user fees, licence fees, and tender licence fees for certain businesses. User fees include building and land fees, and are also charged for municipal services such as garbage collection, street lighting, and sewage management. Licence fees represent the main revenue stream at the municipal level. Moreover, DAOs 'hold public auctions for the licenses to operate slaughterhouses and ferries and charge for these' (Ahlers et al. 2013: viii).

Figure 4.3 reports that only one-third of companies that indicated they pay fees or taxes pay the 25 per cent corporate income tax, and even fewer (7 per cent) pay value-added tax (VAT). Interestingly, 35 per cent of medium and 25 per cent of large firms do not pay corporate income tax. This means that they formally registered their business with one of the above-mentioned authorities, but have not registered with the tax authority (Internal Revenue Department). Most micro firms do not pay corporate income tax, but instead pay fees at the municipal level.
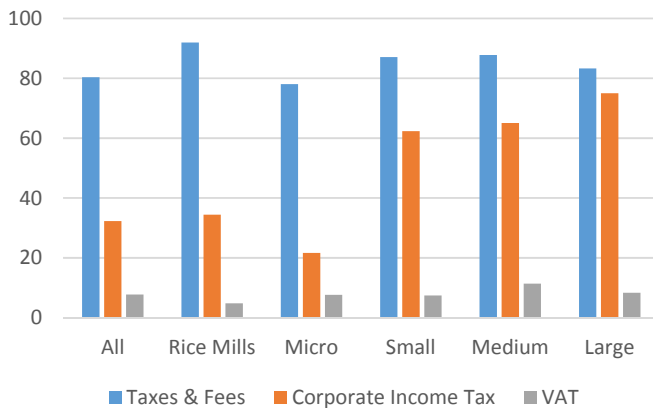
Figure 4.3: Fees and taxes by firm type and size

Source: Authors' illustration based on Myanmar MSME 2017 data.

Overall, Myanmar ranks 125th of 190 countries on the World Bank's ease of paying taxes index which is higher than Lao PDR's rank (156) but lower than those of many other countries in the region (India 119,

Indonesia 114, Malaysia 73) (World Bank 2017c). Moreover, in 2016, 'Myanmar made paying taxes more costly and complicated for companies by increasing the rate paid by employers [...], requiring additional documents for commercial tax returns and introducing quarterly preparation, filing and payment of corporate income tax' (World Bank 2018a).

When asked if company owners were afraid of being fined or shut down by tax inspectors (see Table 4.4) almost all (99 per cent, excluding rice mills) said they were not. More than two-thirds indicated that the main reason for not being afraid was that they comply with all regulations. Other reasons also play an important role, and it seems that as tax inspections are not very common this could be why companies are not afraid.

Table 4.4: Are you afraid of being fined/shut down by tax inspectors? (per cent)

	Sample			Population
	Formal	Informal	Rice Mills	
Afraid of being shut down	1.04	1.84	3.23	1.15
Reason for not being afraid to be fined or shut down by tax authorities				
Possible to pay individuals to avoid problems	0.29	0.27	0.00	0.33
Activity sufficiently difficult for the authorities to verify	1.05	2.95	1.11	0.99
Firm complies with all regulations and laws	71.97	27.88	68.89	72.05
Owner/manager personally knows important people at authorities	0.38	2.68	0.00	0.32
Other	26.31	66.22	30.00	26.31
Observations	2,116	373	186	70,447

Source: Authors' illustration based on Myanmar MSME 2017 data.

4.4 Informal employment

In recent years, the International Labour Organisation (ILO) included the term 'informal employment' in its informal economy definition, referring to self-employed workers in informal companies as well as wage-workers without legal and social protection in both formal and informal enterprises (Chen 2012). We therefore investigate whether full-time workers hold contracts. Table 4.5 illustrates that informal employment seems to be the most common working condition for employees in Myanmar manufacturing enterprises. We estimate that around 95 per cent of workers do not have contracts. Unsurprisingly, the share of workers without contracts in rice mills and informal firms in our sample is particularly high at 98 per cent.

Table 4.5: Share of workers with labour contracts

		0%	1-20%	21-50%	51-99%	100%	Observations
Sample	All	95.99	2.04	0.16	0.24	1.56	2,496
	Rice Mills	97.85	2.15	0.00	0.00	0.00	186
	Informal	97.89	1.32	0.00	0.26	0.53	380
Population	All	95.22	2.87	0.21	0.27	1.44	71,270

Source: Authors' illustration based on Myanmar MSME 2017 data.

4.5   Informal payments

While informal payments help MSMEs to deal with imperfect institutional environments, they can also impede enterprise growth, negatively affecting the whole economy (Mendoza et al. 2013). Bribes seems to be quite common in Myanmar, as the World Bank found in an enterprise survey that 29 per cent of firms had already experienced at least one bribe payment request (World Bank 2017b). As informal payments are a controversial and sensitive issue, we asked in a more indirect way about their occurrence among Myanmar manufacturing enterprises. This means, the first question about informal payments did not concern the interviewee's own company but similar firms of the same sector.

Nevertheless, only 0.4 per cent of firms admitted it was common for an enterprise to execute 'under the table payments' to public officials as part of doing business. As shown in Figure 4.4, the majority (88 per cent) indicated that they did not know if informal payments occurred in similar companies, which probably means they avoided talking about this issue. When asked more directly if the interviewee's firm had made informal payments during the previous two years, they almost all said 'no'.
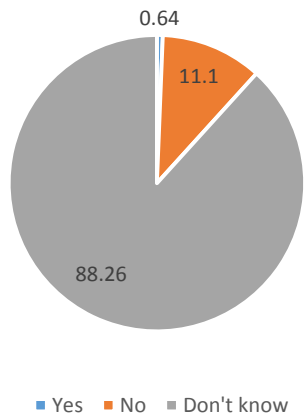
Figure 4.4: Is it common for a firm in your line of business to pay informal fees?

Source: Authors' illustration based on Myanmar MSME 2017 data.

In sum, many different governmental authorities are responsible for business registration and licences in Myanmar. The most relevant agencies for manufacturing companies seem to be the municipalities and DISI. About 80 per cent of the sampled companies pay taxes or fees, but only one-third pay corporate income tax, and very few pay VAT. Informal employment seems to be the norm in Myanmar, as more than 95 per cent are employed without any contract. Finally, yet importantly, informal payments are widespread, but company owners avoid talking about these or do so in indirect ways.

5 Production characteristics

This chapter examines the production characteristics and performance of Myanmar enterprises. The link between technology and sustainable development has been promoted at the highest international governance levels. The Rio Declaration says that states should cooperate '… by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies' (United Nations 1992). The development of a country's innovative and technological capabilities is recognized as being crucially important for developing a competitive edge in a market economy, and the policy tools to facilitate technology transfer cannot be separated from the goals of creating a supportive climate for investment and economic development (CIEM et al. 2015). This chapter therefore illustrates differences in the types of technology, innovation, and firm performance for firms in different sectors, regions, firm size categories, and legal ownership types.

5.1 Technology characteristics

Table 5.1 shows the technology used by the surveyed firms in terms of level, age, and purchase condition. Around 10 per cent of firms use only hand tools in their production, and around one-half combine power-driven machinery and hand tools. On average, enterprises most commonly combine manually and power-driven machinery. Compared to other manufacturing firms, rice mills have a higher rate of usage of power-driven machinery only, while it is much more common to find only hand tools among other manufacturing firms than in rice mills.

Equipment and machinery tend to be fairly old, as only around 35 per cent of firms report using technology under five years old. Informal firms have a significantly higher share of older equipment than formal firms, while rice mills do not differ substantially from other sectors. Less than 20 per cent of enterprises have acquired their technology through imports, practically all of which has been acquired in used condition. These facts likely indicate credit constraints among the private enterprises in Myanmar and very limited direct contact between the producers and the users of technology, which may affect productivity through,

for example, limited customization and assistance with installation and repair. The market for renting or leasing production machinery and equipment is almost non-existent, as only 1 per cent of firms report using rented or leased technology.

Capacity utilization provides information about the difference between current production levels and the maximum possible production level that can be achieved using the existing equipment. The information about capacity utilization is obtained by asking enterprises if they could increase production from the present level using only their existing equipment and machinery. The capacity utilization rate is around 70 per cent (72.5 per cent in the sample and 73.7 per cent in the population). In other words, enterprises, on average, believe that they can increase their production by at most 25–30 per cent.

Firm performance can be improved with the implementation of international standards (Martincus et al. 2010; Beghin et al. 2015). The benefits appear to be particularly high in environments with weak regulatory enforcement where standards substitute for some missing institutions (Goedhuys and Sleuwaegen 2013). The sample shows very low levels of certification. On average, 3 per cent of firms have a domestic certification, while only 0.5 per cent have any international standards certification, such as ISO 9001. However, firm size is very important, as 8 per cent of larger firms possess international certification.

Table 5.1: Technology characteristics (per cent)

		Sample				Population		
		Formal	Rice mills	Informal	All	Formal	Rice mills	Average
Type of technology	Only hand tools, no machinery	11.6	1.1	38.7	15.0	11.0	0.8	8.2
	Manually operated machinery only	20.2	20.5	18.2	19.9	19.8	20.9	20.1
	Power-driven machinery only	20.5	30.1	14.2	20.2	19.9	29.1	22.5
	Both manually and power-driven machinery	47.7	48.3	28.9	44.9	49.3	49.1	49.3
Status of technology	Under 5 years old	35.9	32.1	44.3	36.9	36.5	33.9	35.8
	Acquired through imports	18.3	20.6	10.0	17.2	18.3	23.7	19.8
	Acquired as used	99.0	100.0	98.1	98.9	98.7	100.0	99.0
	Rented/leased	1.0	0.0	1.9	1.1	1.3	0.0	1.0
Capacity	Utilization	72.1	73.2	74.4	72.5	73.8	73.5	73.7
Certification	International	0.6	0.0	0.0	0.5	0.8	0.0	0.5
	Domestic	3.1	0.0	0.0	2.4	3.6	0.0	2.6
New technology	Adoption	5.7	11.4	1.8	5.5	5.3	16.9	8.5
	Technical adaptation	61.6	70.8	57.1	62.3	59.5	69.6	64.1

Note: Proportions for the sample and the population. Technical adaptation rates are for those that have adopted new technology.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Averaging 6 per cent, the rate of new technology adoption among enterprises in Myanmar is low. Formal firms have a higher adoption rate than informal firms. Rice mills have a three times higher adoption rate than formal firms in other sectors. When enterprises acquire new technology, it is necessary to make adaptations in two out of three cases. Kayah State and Sagaing Region have the highest prevalence of new technology adoption, while enterprises from Chin State do not have a positive record of new technology adoption in the past two years. The main reason for adopting new technology is to improve product quality. Rice mills and informal firms emphasize the role of competition to a greater extent than firms from other sectors. As shown in Figure 5.1, new technology adoption and technical adaptation unfortunately appear not to bring productivity improvements.
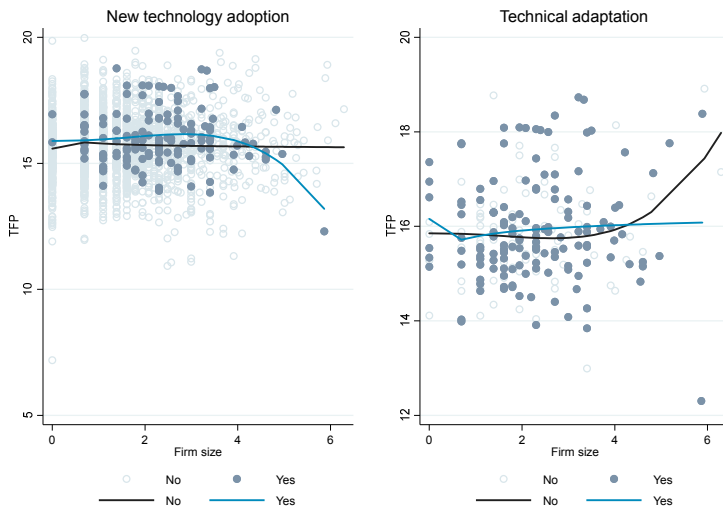
Figure 5.1: Total factor productivity and technology

Note: Sample estimates.

Source: Authors' illustration based on Myanmar MSME 2017 data.

5.2   Labour productivity characteristics

This section investigates four different measures of labour productivity: (i) real revenue per full-time employee, (ii) real value added per full-time employee, (iii) real revenue per hours worked, and (iv) real value added per hours worked. Table 5.2 shows that the average real revenue per full-time employee was 19.3 million Kyats in 2016, whereas real value added per full-time employee was 5.5 million Kyats, indicating that the two performance measures differ by a factor of 3.5. To account for differences in working hours in different firms, we compare productivity levels measured as yearly revenue or value added per total hours worked, which are 8,100 and 2,300 Kyats, respectively, for the sample, and 10,900

and 2,700 Kyats for the population of formal enterprises. Comparing the performance measured in terms of output per employee and output per hours worked gives similar conclusions about the performance of enterprises in Myanmar—the revenue and value added-based measures of performance differ by a factor of 4. This gap is a consequence of different intensity in the use of labour and other inputs in different industries. Sectors in which the intermediate usage tends to be a much higher proportion of gross output will have lower value added-based productivity.

Table 5.2: Labour productivity by firm size and location

		Sample				Population		
		Formal	Rice mills	Informal	Average	Formal	Rice mills	Average
All	LP1 (mil. Ky.)	19.9	32.9	9.7	19.3	22.9	33.7	25.9
	LP2 (mil. Ky.)	5.9	5.9	3.1	5.5	6.2	6.7	6.3
	LP3 (th. Ky.)	8.3	15.4	4.0	8.1	9.2	15.4	10.9
	LP4 (th. Ky.)	2.4	3.0	1.3	2.3	2.5	3.4	2.7
Micro	LP1 (mil. Ky.)	18.9	31.7	9.9	18.3	22.3	31.2	25.1
	LP2 (mil. Ky.)	5.2	5.8	2.9	4.8	5.6	6.7	6.0
	LP3 (th. Ky.)	8.4	15.3	4.2	8.2	9.5	14.8	11.2
	LP4 (th. Ky.)	2.4	3.0	1.3	2.2	2.4	3.5	2.8
Small	LP1 (mil. Ky.)	19.3	39.6	8.4	19.3	21.9	42.4	26.3
	LP2 (mil. Ky.)	6.0	5.5	4.9	5.9	6.4	5.7	6.2
	LP3 (th. Ky.)	7.0	15.4	3.1	7.0	8.1	16.9	9.9
	LP4 (th. Ky.)	2.2	2.3	1.7	2.2	2.4	2.4	2.4
Medium and large	LP1 (mil. Ky.)	32.5	38.4	32.7	32.3	29.7	40.3	31.5
	LP2 (mil. Ky.)	12.7	5.0	3.0	12.5	9.6	7.3	9.7
	LP3 (th. Ky.)	11.0	13.9	11.0	11.1	10.3	16	11.4
	LP4 (th. Ky.)	4.0	2.2	1.1	4.0	3.1	3.7	3.4
Urban	LP1 (mil. Ky.)	21.0	33.1	9.4	20.4	24.1	34.2	26.3
	LP2 (mil. Ky.)	6.2	4.9	3.5	5.9	6.5	5.9	6.4
	LP3 (th. Ky.)	8.6	16.1	3.9	8.5	9.6	16.4	11.1
	LP4 (th. Ky.)	2.5	2.9	1.5	2.4	2.6	3.4	2.8
Rural	LP1 (mil. Ky.)	11.2	32.6	10.1	14	12.2	32.7	24
	LP2 (mil. Ky.)	3.4	7.5	2.5	3.7	3.4	8.0	6.0
	LP3 (th. Ky.)	5.7	14.2	4.2	6.4	5.5	13.6	10.1
	LP4 (th. Ky.)	1.8	3.1	1.1	1.7	1.7	3.3	2.6

Note: LP1 is real revenue per employee; LP2 is real value added per employee in million Kyats; LP3 is real revenue per total hours worked; LP4 is real value added per total hours worked in thousand Kyats.

Source: Authors' calculations based on Myanmar MSME 2017 data.

The difference in productivity between formal and informal firms is substantial, especially in terms of revenue per employee. Across all measures, informal firms, on average, achieve about half of formal firms' productivity. The gap between formal and informal firms is smaller for the value-added productivity measure. Rice mills have significantly higher revenue per employee than firms from other sectors, but do not create more value added. Larger enterprises show advantages over the smaller ones, with higher values of both real revenue and value added per employee. Urban enterprises have comparatively higher revenue and value added per employee than rural enterprises. Limited companies and joint ventures are more productive than private enterprises (t-value = 2.67), which are, in turn, as productive as family businesses (t-value 0.33).

Figure 5.2 shows that the most productive industries in Myanmar are paper and food, which create the highest revenue per employee. However, it is the tobacco industry rather than these industries that has the highest level of value added per employee. Paper has, together with the leather, non-metallic minerals, and electrical equipment industries, some of the lowest levels of value added per employee.

Figure 5.2: Real labour productivity by sector
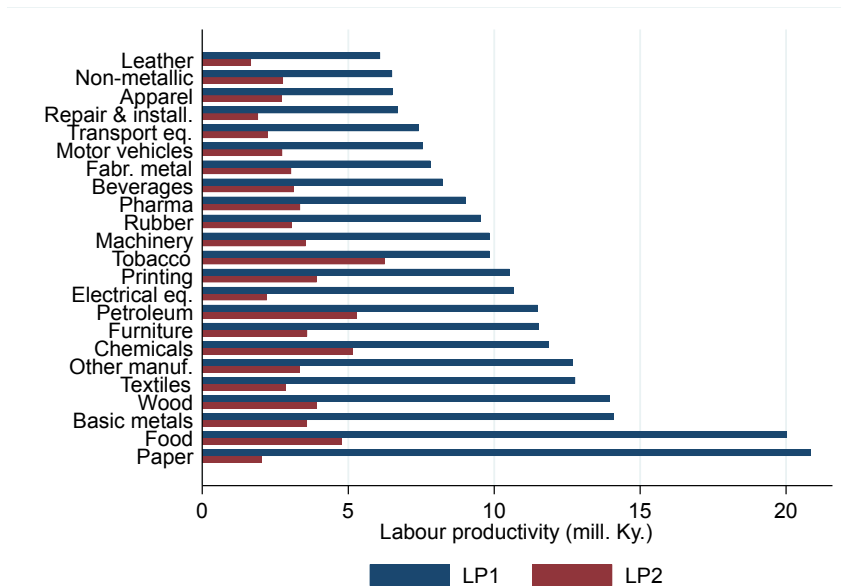
Note: LP1 is real revenue per employee; LP2 is real value added per employee. Sample estimates. Observations above the 99th and below the 1st percentile have been removed to take account of outliers.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 5.3 shows that firms from Mandalay Region have the highest value of revenue per employee, while firms from Bago Region create the highest value added per employee. This difference could be due to

different cost of inputs in different regions. The largest difference in revenue and value added per employee is in Mandalay, Magway, and Yangon regions.
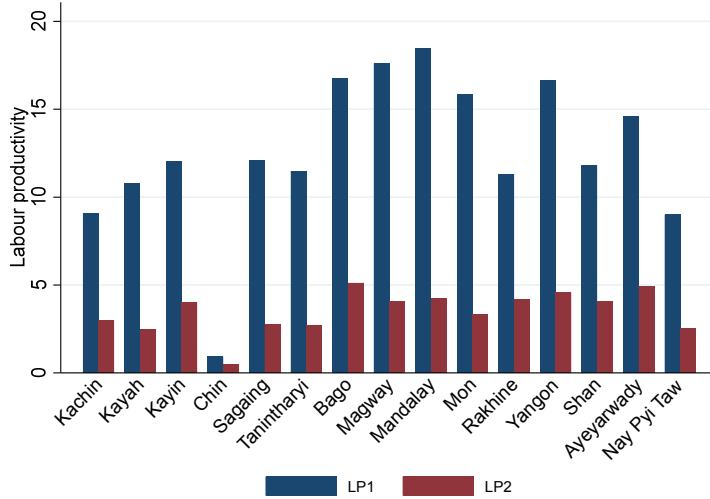
Figure 5.3: Real labour productivity by state/region

Note: LP1 is revenue per employee; LP2 is value added per employee. Sample estimates.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 5.3 shows the contribution of different factors of production to labour productivity. As shown in columns 1, 2, 5, and 6, all factors contribute positively to productivity.[4] The sum of factors is larger than one, indicating increasing returns to scale, which is line with the descriptive evidence from Table 5.2 showing that larger enterprises have higher values of real revenue and value added per employee. This positive relationship between size and productivity of firms is attributed to greater allocative efficiency for the relatively larger firms and the presence of fixed costs that generate economies of scale (Tybout 2000). For example, fixed costs are substantial in developing new products and production methods, exporting, creating or exploring new markets, dealing with government regulations, and attracting talented top managers (Amin and Islam 2015).

We analyse the determinates of productivity growth between 2015 and 2016 in columns 3, 4, 7, and 8. The results show a highly significant positive coefficient estimate on the 2015 productivity level, which indicates that firms with an initially high level of labour productivity may experience higher growth over time. The returns to scale may slow down over time, as indicated from the negative firm size coefficient.

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[4] Recall that as the dependent variable is divided by the number of employees, the coefficient for firm size is calculated as $1 + \beta$.

Table 5.3: Labour productivity characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Sample				Population		
	LP1	LP2	LP1 growth	LP2 growth	LP1	LP2	LP1 growth	LP2 growth
Firm size (ln)	-0.714***	-0.513***	-0.328***	-0.189***	-0.749***	-0.580***	-0.343***	-0.241***
	(0.030)	(0.036)	(0.070)	(0.068)	(0.025)	(0.033)	(0.080)	(0.076)
Capital (ln)	0.053***	0.085***	0.024	-0.011	0.054***	0.104***	0.055	0.051
	(0.012)	(0.019)	(0.028)	(0.035)	(0.017)	(0.028)	(0.036)	(0.038)
Intermediates (ln)	0.661***	0.410***	0.304***	0.136***	0.677***	0.414***	0.289***	0.145***
	(0.024)	(0.023)	(0.058)	(0.037)	(0.023)	(0.023)	(0.060)	(0.046)
Labour productivity level in 2015 (ln)			0.609***	0.806***			0.666***	0.783***
			(0.085)	(0.069)			(0.087)	(0.075)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legal FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,427	2,403	1,349	1,184	68,296	67,308	38,620	32,275
R^2	0.81	0.43	0.59	0.46	0.47	0.66	0.51	0.65

Note: Probability weights. LP1 is revenue per employee; LP2 is value added per employee. All values expressed in real terms, using Yangon city as a base. Firms with missing observations for some of the parameters are excluded. Standard errors clustered at the township level in parentheses. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

5.3 Diversification and innovation

Diversification in this report is defined as a production of more than one 4-digit MSIC product. An insight into diversification levels is important as more diversified production relates to lower enterprise vulnerability to shocks and a higher likelihood of survival. Diversifying production can, however, decrease productivity in the short run. A closer look at innovation levels is also important as innovation remains one of the driving forces of enterprise dynamics. We consider an enterprise to be innovating if it started producing a new product (at the 4-digit MSIC level) during the past two years (denoted 'Innovation 1') or if it made significant improvements of the existing products (denoted 'Innovation 2'). The innovation measures used in this report should thus not be interpreted as innovations in the global market, but rather as firm-level innovations.

Table 5.4 shows that an average enterprise in Myanmar is highly specialized. Only 0.5 per cent of enterprises from the sample (0.4 per cent in the population) produced more than one product defined by a 4-digit MSIC category. This is surprisingly low compared to other countries in Southeast Asia, such as Viet Nam where the diversification rate was 11.6 per cent in 2015 (CIEM et al. 2016). As expected, specialization is declining in enterprise size, but not by much. Larger enterprises have only a slightly higher rate of

diversification. Urban and rural enterprises have the same diversification rate. The rate at which enterprises introduce new products is also low, around 3 per cent on average, but only 0.2 per cent among the enterprises that produce only one product defined by a 4-digit MSIC category.

Table 5.4: Diversification and innovation rates (per cent)

		Sample				Population		
		Formal	Rice mills	Informal	Average	Formal	Rice mills	Average
All	Diversification	0.6	0.0	0.0	0.5	0.5	0.0	0.4
	Innovation 1	3.9	1.7	2.9	3.6	3.6	1.4	3.0
	Innovation 1[a]	0.3	0.0	0.0	0.2	0.2	0.0	0.2
	Innovation 2	11.1	13.1	6.6	10.6	10.4	15.9	12.0
Micro	Diversification	0.7	0.0	0.0	0.5	0.7	0.0	0.5
	Innovation 1	3.8	2.0	2.7	3.5	3.8	1.8	3.1
	Innovation 1[a]	0.2	0.0	0.0	0.2	0.2	0.0	0.1
	Innovation 2	9.6	11.3	6.5	9.2	9.3	14	10.8
Small	Diversification	0.2	0.0	0.0	0.2	0.2	0.0	0.1
	Innovation 1	3.8	0.0	4.8	3.7	3.0	0.0	2.4
	Innovation 1[a]	0.2	0.0	0.0	0.2	0.2	0.0	0.1
	Innovation 2	15.2	22.7	7.1	14.9	12.9	22.0	14.8
Medium and large	Diversification	0.8	0.0	0.0	0.7	0.6	0.0	0.5
	Innovation 1	5.4	0.0	0.0	5.2	3.5	0.0	3.1
	Innovation 1[a]	0.8	0.0	0.0	0.7	0.6	0.0	0.5
	Innovation 2	13.2	18.8	14.3	13.3	11.0	21.6	13.0
Urban	Diversification	0.6	0.0	0.0	0.5	0.5	0.0	0.4
	Innovation 1	3.7	2.7	3.1	3.5	3.3	2.2	3.1
	Innovation 1[a]	0.2	0.0	0.0	0.2	0.2	0.0	0.2
	Innovation 2	11.5	15.2	7.6	11.3	10.8	18.4	12.4
Rural	Diversification	0.9	0.0	0.0	0.5	0.9	0.0	0.4
	Innovation 1	6.0	0.0	2.6	3.9	5.8	0.0	2.5
	Innovation 1[a]	0.5	0.0	0.0	0.2	0.4	0.0	0.2
	Innovation 2	7.9	9.4	5.2	7.1	7.5	11.5	9.8
In an industrial zone	Diversification	1.0	0.0	0.0	1.0	0.7	0.0	0.6
	Innovation 1	4.3	5.3	0.0	4.2	3.0	8.0	3.7
	Innovation 1[a]	0.4	0.0	0.0	0.4	0.3	0.0	0.3
	Innovation 2	12.3	0.0	0.0	11.5	10.2	0.0	8.8
Not in an industrial zone	Diversification	0.5	0.0	0.0	0.4	0.5	0.0	0.3
	Innovation 1	3.8	1.3	3.0	3.4	3.8	0.5	2.7
	Innovation 1[a]	0.2	0.0	0.0	0.2	0.2	0.0	0.1
	Innovation 2	10.7	14.6	6.9	10.3	10.5	18.2	13.1

Note: [a] Innovation rates in single-product firms.

Source: Authors' calculations based on Myanmar MSME 2017 data.

In terms of modifying the existing products, the rate is 10.6 per cent in the sample and 12 per cent in the population, which indicates that informal firms assign much less importance to product modification than formal firms. The highest rate of modification of existing products is observed for small firms. Possibly to account for competition, firms from urban areas innovate more than rural firms. Enterprises located in an industrial zone are statistically not more likely to innovate than enterprises located outside industrial zones, when evaluated for the sample. The population data show the opposite: enterprises located outside industrial zones are more likely to innovate, which is due to rice mills being more innovative than other manufacturing firms.

Figure 5.4 shows the rates of innovation by region and technology level. The values represent innovation defined as either introducing new or modifying existing products. According to this measure, the most innovative enterprises in Myanmar can be found in Shan State, where almost 30 per cent of enterprises declared that they had introduced some form of innovation into their production. Only slightly lower rates of innovation are observed in Kachin State. In terms of sector differences in innovation, the technologically most advanced sectors, such as pharmaceuticals and electronics, are the ones with the highest rates of innovation. The least innovative are the low-technology sectors, such as food, wood, and textiles.
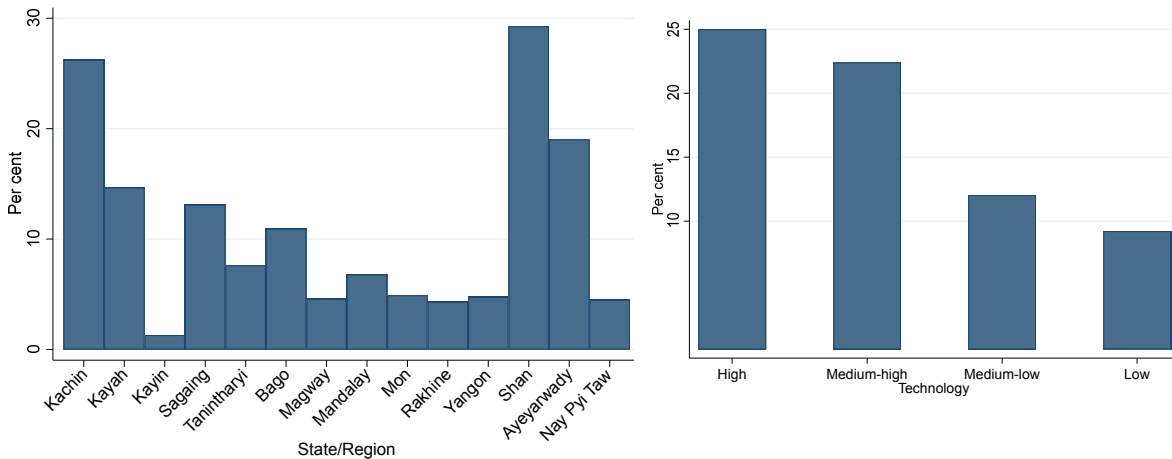
Figure 5.4: Innovation by region/state and technology level

Note: Population percentages. The value for Chin State is 0, so not shown.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 5.5 shows that the most common reasons for improving existing products are requests from purchasing enterprises and increasing competition from domestic competitors. While formal and informal

firms equally emphasize the importance of buyers' requests, rice mills are more motivated by domestic completion. Only formal firms report concerns about completion from imports or foreign firms.
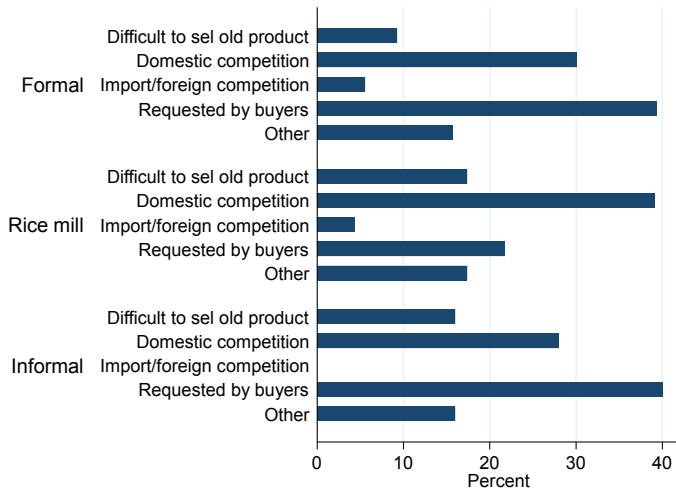
Figure 5.5: Motivation for improving existing products

Note: Sample percentages.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 5.6 shows the relationship between innovation and labour productivity. The average productivity appears to be larger for firms that innovate, and this is especially the case for large firms from the sample. The difference in labour productivity between firms could, however, come from other factors, not only innovation. For example, more productive firms could also be the ones more likely to innovate, so the higher revenue per employee we observe may be due to initially higher productivity levels, not innovation. Uncovering the causal effect of innovation on firm performance is not within the scope of this report, but a task to be carefully executed in further in-depth studies.

In sum, Chapter 5 has shown that enterprises tend to be highly specialized, indicated by a negligible share of firms producing more than one product identified at 4-digit MSIC level. The innovation rates are also low, both in terms of introducing new products and improving existing ones. As such, product diversification and innovation do not seem to be a tool for risk reduction among the enterprises in Myanmar. This deficiency is important to recognize as an area requiring strong focus if enterprise performance and competiveness are to be improved. The average productivity appears to be larger for firms that innovate and this is especially the case for large firms. This could indicate that innovation could

become a cause of widening inequality between small and large enterprises in the future, which puts strengthening innovative capacity of SMEs as a high priority in the industrial policy dialogue.
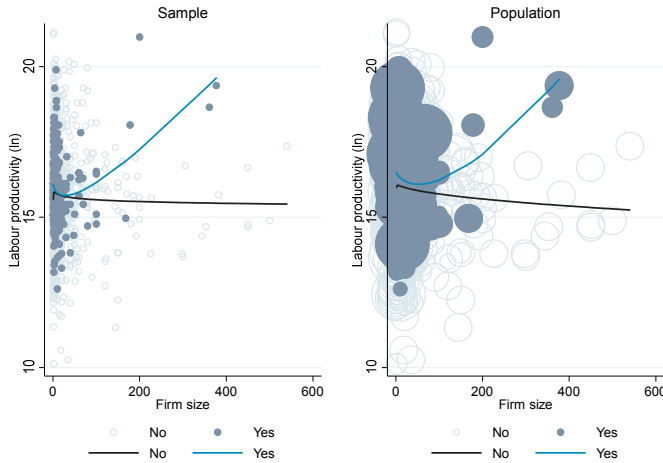
Figure 5.6: Labour productivity and innovation

Source: Authors' illustration based on Myanmar MSME 2017 data.

6   Ownership and management characteristics

An enterprise's success may be strongly influenced by the personal characteristics of its owner. In the US, gender differences in company performance have been found, due to unequal amounts of start-up capital, dissimilar educational levels, and differing business goals (Fairlie and Robb 2009). In Eritrea, the company owner's age influences its access to credit (Ogubazghi and Muturi 2014). A firm's productivity can also be affected by certain management practices (Bloom and Van Reenen 2010), which, in the case of MSME, are most likely decided upon and applied by the firm's owner, who also functions as the top manager.

Management practices seem to be different from country to country and are believed to be 'one important explanation for the large differences in productivity between firms and countries' (Bloom and Van Reenen 2010). In the context of Myanmar, there is little information about company owner characteristics and their management style. Thus, this chapter first describes manufacturing firm owner characteristics such as their age, gender, educational level, ethnicity, and risk preference levels. Second, a business practice index is set up to investigate how management practices affect firm performance in terms of labour productivity.

6.1 Owner and manager characteristics

Figure 6.1 illustrates that around 22 per cent of the sampled manufacturing enterprises are female-owned, and 6 per cent are managed by women. While female ownership decreases with firm size, female management increases. Females own 23 per cent of micro firms, 21 per cent of small companies, and 13 per cent of medium and large enterprises, while 3 per cent of micro, 10 per cent of small, and 28 per cent of medium and large companies are managed by females. The share of female-owned or managed informal enterprises is, at 35 per cent, slightly higher than for the whole sample. This is not surprising because it is often more difficult for women to formalize their business as they are less likely to possess ownership rights, and their work is less valued than men's (Watson 2012). The states with the highest share of female owners/managers are Mandalay and Yangon. In Mandalay, many textiles industries were interviewed, and this is the sector in which women are second most represented (20 per cent). Most women are located in the food sector (43 per cent), which also represents the highest share of sampled firms for Yangon Region (58 per cent).[5]
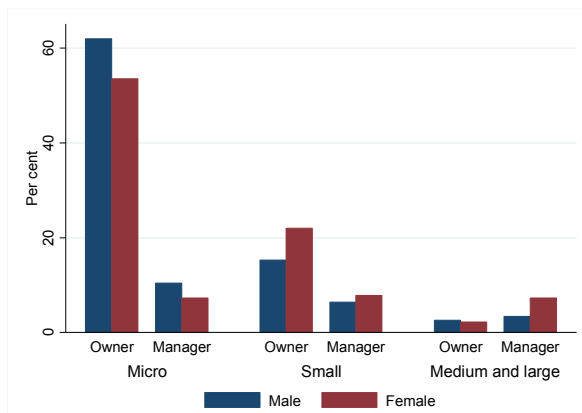
Figure 6.1: Gender of owners and managers by firm size

Source: Authors' illustration based on Myanmar MSME 2017 data.

The average age of the surveyed company owners/managers is 47. Figure 6.2 shows the age distribution of enterprise owners and managers.[6] Overall, managers are, on average, younger than owners irrespective of

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[5] We do not report details of the differences in owners' gender by formality, sector, and state, but this information can be obtained from the authors upon request.

[6] The respondents were asked to identify their position in the enterprise by choosing among the options: owner, manager, owner and manager, and other. In this figure, mangers are identified as those choosing the option of manager or owner and manager. Those choosing option other are not included in the analysis of owner and manager characteristics.

the firm size category. The most common age range for enterprise owners is over 65 years, while the managers tend to be in the youngest age group. Owners of micro enterprises are, on average, one year older than owners of larger enterprises, while the opposite can be observed for managers, who appear to be, on average, older in larger than in smaller enterprises. The average age of male owners is 48.5 years and the average age of male managers is 43 years. Male owners are, on average, one year older than female enterprise owners, while male managers are around two years older than female managers.
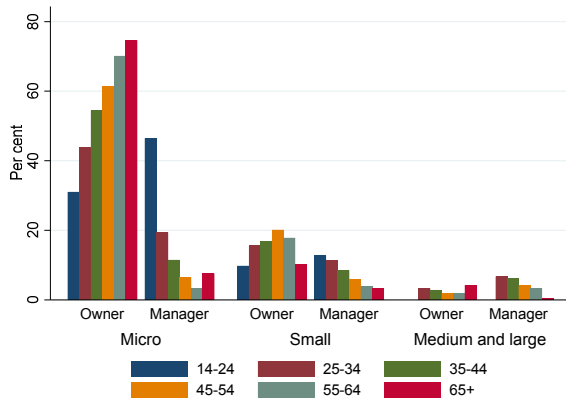
Figure 6.2: Demographic structure of enterprise owners and managers (per cent)

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 6.3 reports that the average education level of male enterprise owners tends to be low, with most of the male owners having completed primary and middle school as their highest education level (26 and 28 per cent, respectively). The education level of female owners tends to be much more polarized, with most of the female owners having finished primary school education (29 per cent) and only a slightly lower share (28 per cent) having obtained a Bachelor's degree. A higher proportion of male managers has a Bachelor's degree than male owners (41 compared to 23 per cent, respectively). The same pattern is observed for female managers, who have a higher share of Bachelor's degrees (55 per cent) than female owners (28 per cent), indicating that higher education could be a prerequisite for managerial positions. Both female owners and managers have a significantly higher share of Master's degrees than their male counterparts.
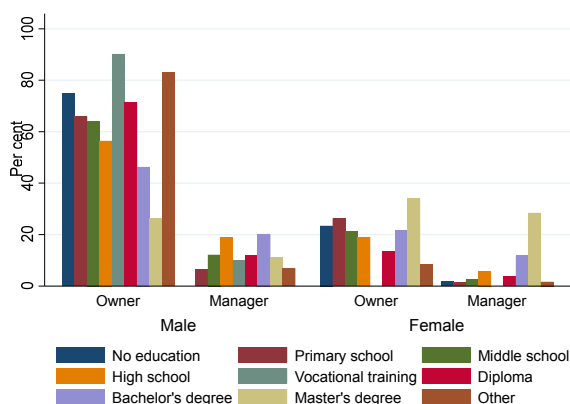
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Figure 6.3: Education level of female and male enterprise owners and managers (per cent)

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 6.1 reports that the majority of firm owners and managers are of Bamar ethnicity (72 per cent). The share of Bamar rice mill owners in the sample is lower (47 per cent) than of the whole rice mill population (61 per cent). Moreover, Shan (10 per cent) and Rakhine (10 per cent) are more common ethnicities among rice mill owners than among the whole population (6 and 4 per cent). The share of Chinese and Indian firm owners/managers is relatively low for the manufacturing population, (4 and 2 per cent, respectively). Chinese and Indian business owners and managers are mostly male. Other foreign ethnicities are almost non-existent among manufacturing company owners and managers. Around 2 per cent of other domestic ethnicities remain undisclosed.

Table 6.1: Ethnicity of enterprise owners and managers (per cent)

	Sample					Population	
	All	Rice Mills	Female	Male	Informal	All	Rice Mills
Bamar	71.59	46.77	73.14	70.94	77.63	71.68	60.57
Mon	6.21	14.52	6.48	6.10	6.58	4.59	4.93
Shan	5.25	11.29	4.86	5.41	2.63	5.88	9.76
Rakhine	4.73	11.83	4.18	4.96	6.05	4.32	10.00
Chinese	3.21	2.69	2.56	3.48	1.32	3.97	3.42
Indian	2.04	0.54	0.54	2.68	1.05	2.22	0.27
Other domestic ethnicity	2.08	2.15	1.89	2.17	1.84	2.11	2.15
Observations	2,496	186	741	1,755	380	71,226	19,783

Note: Shares below 2 per cent are not reported.

Source: Authors' calculations based on Myanmar MSME 2017 data.

6.2   Risk preferences

Risk preferences seem to influence a person's decision to open a business, how it is run and, ultimately, whether they succeed (Cramer et al. 2002). To investigate Myanmar business owners' risk attitudes, we measure these on an 11-point scale, taken from the German Socio-Economic Panel (SOEP), asking if the interviewee is generally a person who is fully willing to take risks (10) or tries to avoid taking risks (0) (SOEP 2007). We first asked about the interviewee's general willingness to take risk and subsequently about their risk preferences in the contexts of financial matters, occupation, health, leisure and sports, and driving (CIEM et al. 2016).

The mean value of the respondents' general risk attitude is 5.7, and Figure 6.4 illustrates that the modal response of 5 accounts for almost one-third of the companies. More than 60 per cent indicated a value from 3 to 7, and the value 10 is outstanding as it was indicated by 12 per cent of the firms. The values between 0 and 2 were chosen by a low 10 per cent. This pattern is not in line with what has been observed for a sample from Viet Nam, where the levels of 0–2 were chosen by around 30 per cent, and almost no one indicated a level of 10 (CIEM et al. 2016). We thus decided to look at risk levels across different firm sizes.
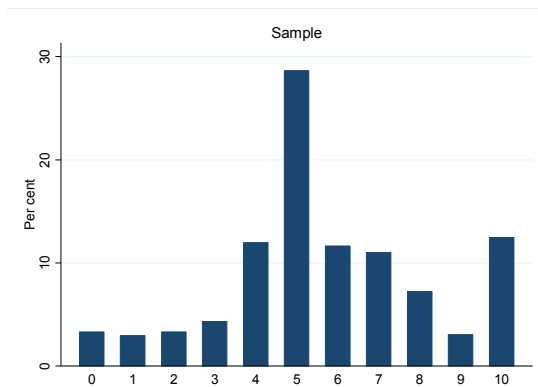
Figure 6.4: General willingness to take risks

Source: Authors' illustration based on Myanmar MSME 2017 data.

As Figure 6.5 shows, the distribution for micro firms looks almost like the distribution for all firms. The modal response continues to be 5, and the average value is 5.6. It is interesting to observe that 12 per cent of micro firm owners said they are fully willing to take risks because, in other countries, micro firms tend to

be quite risk averse as their owners are often fully liable for the company. Small, medium, and large firms are slightly more risk loving than micro firms, as their respective mean values are 6.0, 5.9, and 5.9.
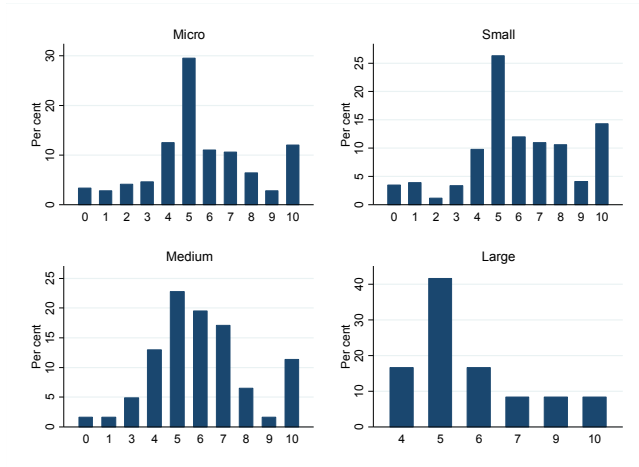
Figure 6.5: General willingness to take risks by firm size

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 6.2 reports the means and standard deviations for the risk preferences in specific contexts. The willingness to take risk while driving is the lowest when analysing the whole sample, with an average value of 3.2, followed by hobbies and sports (4.1). Risk attitudes in financial matters, running a business, and health all take an average value above 5, with risk in financial matters taking the lowest (5.1) and risk in running the business the highest average level (5.8). A t-test shows that rice mill owners seem to be more risk averse in a specific context as their average risk levels are lower for driving, recreational hobbies, and health than for the whole sample. Comparing formal with informal firms, the t-test shows that formal firms are more risk loving while driving and taking part in hobbies. When looking at gender differences, we find that men are significantly more risk loving then women in all contexts except for health.[7] Nevertheless, women's average risk attitude in running their business (5.6) is not much lower than that of men (5.9). The mean values for the whole population are only slightly different from those for the sample.

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[7] We do not report t-test values, but this information can be obtained from authors upon request.

Table 6.2: General and context willingness to take risk by firm type and gender

Context	Sample					Population		
	All	Rice Mills	Informal	Female	Male	All Rice Mills Informal	Female	Male
General	5.708	5.565	5.526	5.398	5.839	5.751	5.366	5.919
	(2.49)	(2.55)	(2.64)	(2.36)	(2.54)	(2.54)	(2.35)	(2.60)
Driving	3.240	2.941	2.771	2.686	3.475	3.289	2.751	3.524
	(2.72)	(2.82)	(2.77)	(2.62)	(2.72)	(2.84)	(2.62)	(2.90)
Financial matters	5.136	5.070	5.166	4.930	5.223	5.130	4.895	5.233
	(2.38)	(2.39)	(2.47)	(2.37)	(2.38)	(2.46)	(2.43)	(2.47)
Recreational hobbies & sports	4.172	3.946	3.879	3.891	4.291	4.194	4.050	4.256
	(2.27)	(2.20)	(2.37)	(2.22)	(2.28)	(2.32)	(2.22)	(2.36)
Running business	5.783	5.672	5.671	5.567	5.875	5.804	5.602	5.892
	(2.43)	(2.49)	(2.45)	(2.40)	(2.44)	(2.49)	(2.48)	(2.49)
Health	5.087	4.839	5.003	5.032	5.111	5.172	5.151	5.182
	(2.41)	(2.41)	(2.40)	(2.40)	(2.417)	(2.52)	(2.46)	(2.55)
Observations	2,496	186	380	741	1,755	71,226	21,556	49,670

Note: Population values in parentheses.

Source: Authors' calculations based on Myanmar MSME 2017 data.

An interesting result is that the willingness to take risk among Myanmar business owners is higher than those of proprietors in Viet Nam, where the average of the general risk attitude is 3.82 and in running a business is 3.4 (CIEM et al. 2016). Therefore, Table 6.3 compares whether the general attitude towards the future is also more positive in Myanmar than in Viet Nam. When asked if the companies were planning to start up new projects and/or product lines in the near future, around 22 per cent of Vietnamese interviewees indicated they were planning to do so, while a slightly higher share of 27 per cent said the same in Myanmar. Thus, the differences are not too big, and there may be additional reasons why Myanmar company owners are more risk loving than Vietnamese business people.

Table 6.3: Companies planning to start up new projects/product lines

	Viet Nam	Myanmar
Yes	21.99	27.46
No	78.01	72.54
Observations	2,647	2,396

Note: 100 enterprises in Myanmar data indicated 'Don't know'.

Source: Authors' calculation based on SME survey data from Viet Nam (CIEM et al. 2016) and Myanmar MSME 2017 data.

6.3   Management practices

McKenzie and Woodruff (2016) have compiled a business practices index based on 26 different business practices that should be seen as '"best practices" which are universally good so that all firms would benefit from adopting them' (Taylor 1911; McKenzie and Woodruff 2016). We use 21 of these practices because the questionnaire did not enquire about all 26 (see Table 6.4). Additionally, these practices are grouped into the following four sub-indices: marketing, stock and buying control, record keeping, and financial planning (McKenzie and Woodruff 2016). On average, the surveyed firms apply six of the business practices. Figure 6.6 illustrates that only very few, i.e. 1 per cent of the firms, do not use any of these practices. Around 25 per cent use one of the practices, but the share of enterprises applying two practices is much lower, i.e. 9 per cent. Overall, more than half of the sampled companies only apply 1 to 5 practices. Just one firm uses all, and 14 apply 20 practices.
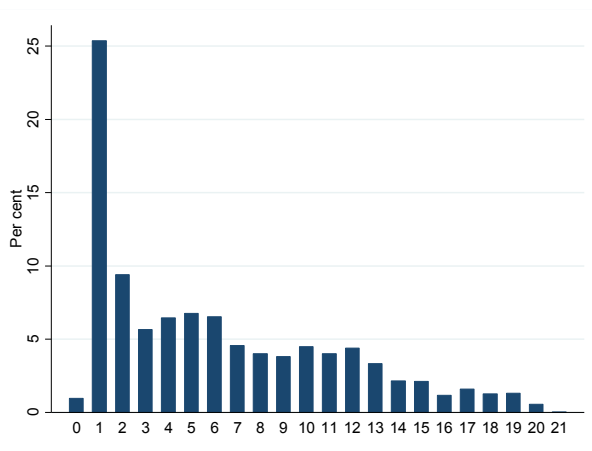
Figure 6.6: Number of business practices applied (per cent)

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 6.4 illustrates that the most frequently used business practices are: ensuring they do not run out of stock frequently (65 per cent), negotiating with a supplier for lower prices on inputs or raw materials (48 per cent), and comparing prices and quality of inputs used to those offered by alternative suppliers (47 per cent). The least-used practices are the maintenance of formal accounting books (7 per cent), advertisement in any form (12 per cent), and usage of special offers to attract customers (20 per cent). Only 6 per cent of the sampled owners do not use any of the buying & stock control index, while the shares of companies not using any practice of the other indices are higher—53 per cent for marketing, 48 per cent for cost and record keeping, and 55 per cent for financial planning. Rice mills, on average, only apply five practices. The

practices used least by the entire sample are also used least by rice mills, and the two practices used most by the sample are also the most used by rice mills. Female owners seem to make slightly less use of the practices (5.8 on average) than men (6.3 on average).

Table 6.4: Business practice proportion of firms by firm type and gender

	Sample %			
Business Practices	All	Rice mills	Female	Male
Marketing 1: Visited competitor to see prices	24.88	25.81	21.59	26.27
Marketing 2: Visited competitor to see products	23.72	22.58	21.86	24.50
Marketing 3: Asked customers about offer of other products	28.89	26.34	25.91	30.14
Marketing 4: Talked with customer to see why stopped buying	19.91	18.28	17.95	20.74
Marketing 5: Used special offer to attract customers	19.87	15.05	19.84	19.89
Marketing 6: Asked supplier which products sell well	12.78	10.22	9.85	14.02
Marketing 7: Advertises in any form	11.62	8.06	9.99	12.31
Buying & stock control 1: Negotiation with supplier for lower prices	48.08	50.54	41.97	50.66
Buying & stock control 2: Compare alternative suppliers	47.24	46.77	40.35	50.14
Buying & stock control 3: Don't run out of stock frequently	64.74	69.35	64.64	64.79
Cost & record keeping 1: Keep formal accounts	7.33	3.76	9.72	6.32
Cost & record keeping 2: Record every purchase and sale	26.72	24.73	26.05	27.01
Cost & record keeping 3: Able to document cash balance	34.94	32.26	34.41	35.16
Cost & record keeping 4: Use financial records to know whether sales of product increase or decrease	32.41	25.81	32.12	32.54
Cost & record keeping 5: Detailed costs of each product	38.38	23.12	27.25	38.86
Cost & record keeping 6: Have monthly written budget	28.04	20.43	26.99	28.49
Financial planning 1: Review financial performance monthly	34.29	26.88	33.87	34.47
Financial planning 2: Have sales target for next month	26.16	19.89	26.32	26.10
Financial planning 3: Compare actual sales to target set	27.68	21.51	26.99	27.98
Financial planning 4: Have annual profit and loss statements and cash flow statements	27.80	25.81	25.51	28.77
Financial planning 5: Have annual income/expenditure sheet	26.04	23.12	25.91	26.10

Source: Authors' calculations based on Myanmar MSME 2017 data.

To see whether companies applying business practices are more successful, we investigate whether business practices are correlated with labour productivity in the Myanmar manufacturing sector. We run a linear regression of the real productivity on the business practices score. Subsequently, we add control variables, namely the log of number of workers (firm size) and log of capital stock. Moreover, the above-described owner characteristics might be correlated with productivity and business practices. Thus, we include gender (owner=male), owner age, and firm age (McKenzie and Woodruff 2016). We also control for fixed effects of owner education, state, and the company's legal status and sector.

Column 1 of Table 6.5 shows a significant correlation between business practices and higher labour productivity. When controlling for firm size and capital stock, Column 3 illustrates a slightly stronger positive relationship between business practices and productivity on a 5 per cent level. This correlation stays positively significant on a 1 per cent level when additionally controlling for owner characteristics, despite some of the controls being highly significant themselves. An increase in the score by one practice is associated with a 1.7 per cent increase in productivity. When running the same regression for the whole population, Column 6 reports that an increase in the score by one practice increases productivity by 1.6 per cent.

Table 6.5: Business practices and labour productivity

	Sample				Population	
	(1)	(2)	(3)	(4)	(5)	(6)
	Log (Real LP)	Log (Real LP)	Log (Real LP)	Log (Real LP)	Log (Real LP)	Log (Real LP)
Business Practices Index	0.017**	0.0020**	0.019**	0.017*	0.019**	0.016*
	(0.008)	(0.009)	(0.007)	(0.007)	(0.009)	(0.009)
Firm size (ln)		-0.063	-0.201***	-0.196***	-0.225***	-0.215***
		(0.041)	(0.045)	(0.045)	(0.051)	(0.051)
Capital stock (ln)			0.220***	0.224***	0.236***	0.240***
			(0.031)	(0.031)	(0.043)	(0.040)
Male owner				0.119		0.211**
				(0.059)		(0.094)
Firm age				-0.004***		-0.005**
				(0.002)		(0.003)
Owner age				-0.000		0.001
				(0.002)		(0.004)
Owner education FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Legal status FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,496	2,496	2,459	2,459	70,229	70,229
R²	0.16	0.16	0.22	0.23	0.26	0.27

Note: Probability weights. Labour productivity is measured as real revenue per employee. All values expressed in real terms, using Yangon city as a base. Standard errors clustered at the township level in parentheses. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 6.6 analyses each of the four sub-indices separately. Columns 1 to 4 show that the index for the cost and record keeping practices index is the only one that has a statistically significant association with labour productivity on 5 and 1 per cent levels. For the whole population, the results obtained are statistically insignificant. However, overall, our results confirm the findings of McKenzie and Woodruff (2016) that firm

owner aspirations and education are not the only reason for differences in firm performance in developing countries. Instead, 'business practices have effects on enterprise outcomes which are independent of the effects of basic human capital' (McKenzie and Woodruff 2016: 19).

Table 6.6: Sub-indices and labour productivity

	Sample				Population	
	(1)	(2)	(3)	(4)	(5)	(6)
	Log (Real LP)	Log (Real LP)	Log (Real LP)	Log (Real LP)	Log (Real LP)	Log (Real LP)
Marketing practices	-0.003	-0.003	-0.005	0.004	0.030	0.027
	(0.022)	(0.023)	(0.021)	(0.020)	(0.019)	(0.018)
Buying & stock control	0.038	0.036	0.038	0.034	0.076	0.069
	(0.051)	(0.050)	(0.047)	(0.046)	(0.067)	(0.064)
Cost & record keeping	0.033**	0.040**	0.033***	0.032*	-0.0023	-0.024
	(0.015)	(0.015)	(0.012)	(0.012)	(0.021)	(0.020)
Financial planning	0.014	0.017	0.011	0.010	0.042*	0.040*
	(0.021)	(0.022)	(0.017)	(0.017)	(0.022)	(0.021)
Log (firm size)		-0.067*	-0.202***	-0.198***	-0.216***	-0.206***
		(0.039)	(0.043)	(0.043)	(0.048)	(0.048)
Log (capital stock)			0.220***	0.223***	0.238***	0.242***
			(0.032)	(0.031)	(0.044)	(0.042)
Male owner				0.118*		0.201**
				(0.058)		(0.092)
Firm age				-0.004***		-0.006**
				(0.002)		(0.003)
Owner age				-0.000		0.002
				(0.002)		(0.004)
Owner education FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Legal status FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,496	2,496	2,459	2,459	70,229	70,229
R^2	0.16	0.16	0.22	0.23	0.26	0.27

Note: Probability weights. Labour productivity is measured as real revenue per employee. All values expressed in real terms, using Yangon city as a base. Standard errors clustered at the township level in parentheses. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

In sum, around one-third of the sampled manufacturing enterprises are female-owned or managed. On average, company owners are younger than enterprise managers. The majority of firm owners and managers are Bamar people. Compared with Viet Nam, Myanmar companies are relatively risk loving. Finally, companies that apply better business practices are more productive.

7 Investment and access to finance

Financial market constraints are often mentioned as one of the most important obstacles for future growth of SMEs. Based on the MSME data, we can see that 826 firms (33 per cent) report access to finance as the most serious constraint to growth, and as many as 954 firms (38 per cent) say that better access to finance would improve their doing business conditions. A total of 1,008 firms (40 per cent) state that the most important assistance that the government could provide would be to facilitate easier access to credit. This section therefore takes a closer look at the investment behaviour of the surveyed firms, their current debt situation, as well as their formal and informal access to credit.

7.1 Investments and debt

Table 7.1 shows the percentage of enterprises that made investments in the past two years, depending on firm size, legal structure (in terms of having a business licence), and location. In 2017, 22 per cent of the 2,496 enterprises reported new investments. Almost one-third of firms with 10 to 49 employees reported having made new investments, while approximately one-quarter of enterprises in the other firm size categories reported the same. Formal firms made more investments than their informal counterparts, and almost twice as many firms located in Mandalay reported investing compared to firms in Yangon.

Table 7.1: New investments

	Obs.	Per cent
All	2,496	22.0
Micro	1,815	19.5
Small	544	30.9
Medium	125	20.0
Large	12	16.7
Formal firm	2,116	22.9
Informal firm	380	16.8
Mandalay	339	22.1
Yangon	358	12.6

Note: Unweighted estimates.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 7.2 shows the current debt situation of the surveyed firms across different firm characteristics. We operate with two different debt definitions. First, we ask the firms directly about their equity and liabilities and based on this we generate an indicator variable taking the value 1 if the firm has either formal or

informal debt service obligations. Using this information, a surprisingly low share of firms hold debt (12.9 per cent). Second, we utilize information from an indirect question asking the firm owner whether firm debt is smaller/equal to/larger than the total value of the firm. If owners answer equal to or larger, we take this as indirect evidence for having debt. This increases the number of firms holding debt to 31.3 per cent of the firms interviewed. Debt incidence does not seem to vary much along the firm size dimension, whereas legal structure and firm location seem to matter more.

Table 7.2: Debt incidence

	Obs.	Debt def 1 Per cent	Debt def 2 Per cent
All	2,496	12.9	31.3
Micro	1,815	12.2	30.4
Small	544	15.4	36.0
Medium	125	12.0	25.6
Large	12	0.0	25.0
Formal firm	2,116	13.4	32.1
Informal firm	380	9.7	27.1
Mandalay	339	18.5	50.3
Yangon	358	5.8	26.9

Note: Unweighted estimates.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 7.3 shows debt incidence across a number of selected firm characteristics including investment probability. Unexpectedly, larger firms are generally not more likely to have debt than smaller firms after controlling for the influence of firm age, legal structure, and location. Only when differences across production sectors are controlled for does firm size becomes positive and well determined in the debt incidence model. As expected, we do see that firm age is generally positive and well determined, but we do not see any significant differences in debt incidence across legal structure. However, a strong positive significant relationship is found between debt incidence and investment, which signals that investment financing through external debt sources may be crucial for the innovative capacity of firms.

Table 7.3: Debt incidence characteristics

	(1)	(2)	(3)	(4)
	Debt def 1	Debt def 1	Debt def 2	Debt def 2
Firm size (log)	0.061	0.090**	0.016	0.020
	(0.041)	(0.044)	(0.045)	(0.050)
Firm age (log)	0.069	0.047	0.122***	0.088**
	(0.045)	(0.043)	(0.037)	(0.034)
Informal (Yes = 1)	-0.101	-0.129	-0.053	-0.106
	(0.162)	(0.159)	(0.131)	(0.136)
Made investment (Yes = 1)	0.703***	0.759***	0.545***	0.570***
	(0.065)	(0.081)	(0.097)	(0.100)
Location controls	Yes	Yes	Yes	Yes
Sector controls	No	Yes	No	Yes
Observations	2,483	2,331	2,483	2,419

Note: Robust standard errors clustered at the township level are in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Figure 7.1 shows the sources of finance for new investments. The most important source of investment finance is own capital (81.8 per cent). Loans from banks or other official institutions are only considered as the main source of financing for 14.4 per cent of the 579 firms making investments in the past two years. Informal loans from friends and family is only considered as the most important source of finance for 2.4 per cent of firms, and other informal loans are only seen as the most important source for around seven firms. External investment financing does not yet seem to be a well-integrated element of doing business in Myanmar.
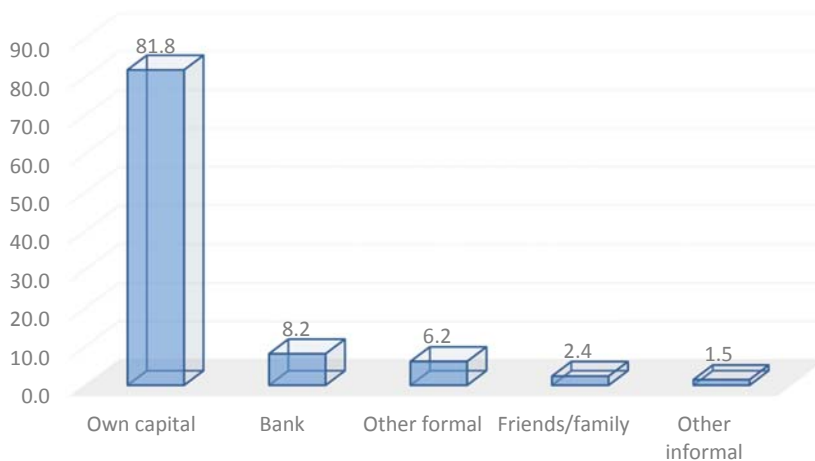
Figure 7.1: How was the investment financed?

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 7.2 shows the investment purpose of enterprises in 2017. Investments were primarily made in order to increase production capacity (51.7 per cent). The second most important reason to invest was to improve quality of output followed closely by investments made to improve productivity.
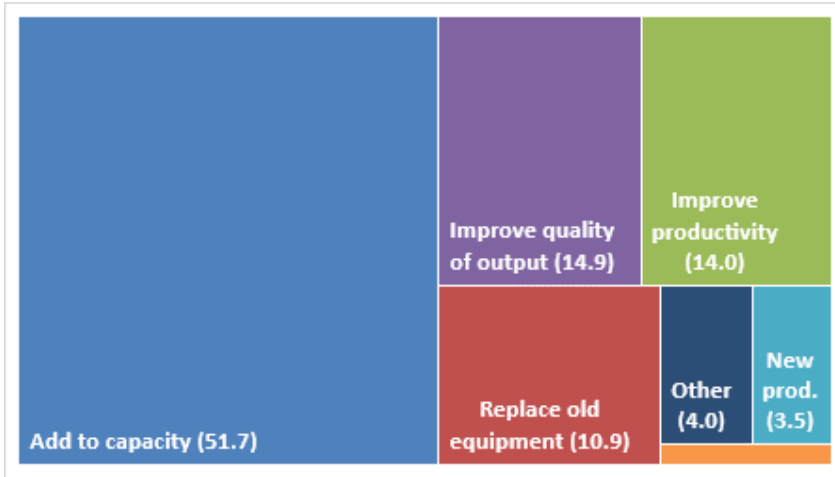
Figure 7.2: Investment purpose (per cent)

Source: Authors' illustration based on Myanmar MSME 2017 data.

The investment profile of the firms will be better understood with the information about credit market conditions. Thus, the following section describes the borrowing behaviour of firms from the sample.

7.2   Credit

Table 7.4 shows the number of enterprises that applied for bank loans or credit from formal institutions in the past two years. In 2017, only 8.2 per cent applied for a formal loan and of these 26.5 per cent had problems getting the loan. The main reason for the very low debt share of Myanmar enterprises is therefore traceable to liquidity constraints and financial access barriers. The low debt level is consistent with the result that investments are, to a large extent, financed through retained earnings. Moreover, most of the firms obtaining loans say that they were rationed (did not get the loan amount applied for). Access to credit for different groups of enterprises shows that a larger share of small and medium firms (as compared to micro firms) apply for credit, but that all firms share similar experiences regarding problems in getting formal loans.

Table 7.4: Access to credit in 2017

		All	Micro	Small	Medium
Applied	Per cent	8.2	6.4	13.4	11.2
	Obs.	2,496	1,815	544	125
Problems getting loan	Per cent	26.5	27.4	24.7	28.6
	Obs.	204	117	73	14

Source: Authors' calculations based on Myanmar MSME 2017 data.

The majority of enterprises state that they are not in need of a loan (40 per cent) or do not want to incur debt (20 per cent), as shown in Figure 7.3. These firms (together with those already heavily indebted) cannot be considered as credit constrained, but out of the non-applicant group (2,292 firms) around 38 per cent may potentially be classified as credit constrained. Figure 7.3 shows that this may be due to inadequate collateral (8 per cent), high interest rates (3 per cent), or a difficult application process (18 per cent). In this way, we identify 871 enterprises with limited access to credit even though they did not apply. Adding rationed firms (firms with problems in getting loans) means that 39 per cent of firms in the sample are credit rationed or constrained. This number is comparable to the number of credit-constrained SMEs in other Asian countries.
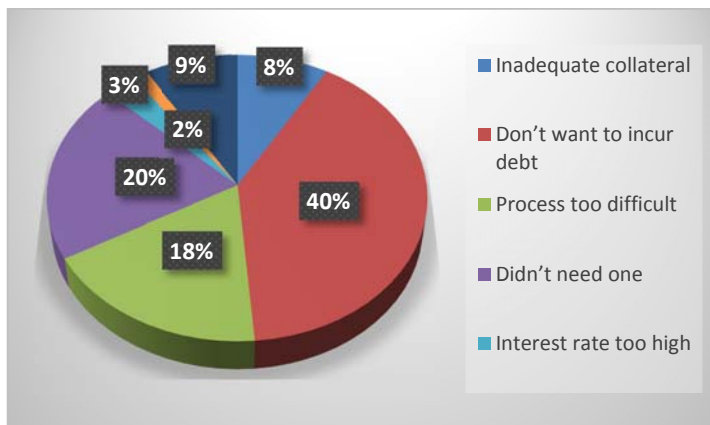
Figure 7.3: Why enterprises do not apply for loans?
Source: Authors' illustration based on Myanmar MSME 2017 data.

Focusing on the characteristics of credit-constrained enterprises, Table 7.5 shows probit estimates with being credit constrained as the dependent variable. First, we see that both firm size and firm age are negatively correlated with being financially constrained. Larger and older firms are more established businesses with better access to external financial resources than their smaller and younger counterparts.

Moreover, we see that investing firms are about 30 per cent more likely to be financially constrained, and firms already having debt are about 27 per cent more likely to be identified as credit constrained.

Table 7.5: Which enterprises are credit constrained?

	(1)	(2)	(3)	(4)
	Constrained	Constrained	Constrained	Constrained
Firm size (log)	-0.079***	-0.087**	-0.097***	-0.108***
	(0.030)	(0.037)	(0.029)	(0.036)
Firm age (log)	-0.079*	-0.065*	-0.078*	-0.061*
	(0.043)	(0.037)	(0.040)	(0.035)
Informal (Yes =1)	0.064	0.020	0.082	0.032
	(0.103)	(0.119)	(0.099)	(0.115)
Made investment (Yes = 1)			0.337***	0.305***
			(0.071)	(0.075)
Have debt (Yes = 1)			0.274**	0.271**
			(0.112)	(0.112)
Location controls	Yes	Yes	Yes	Yes
Sector controls	No	Yes	No	Yes
Observations	2,346	2,278	2,346	2,278

Note: Robust standard errors clustered at the township level are shown in parentheses.

Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 7.6 looks at the relationship between formal and informal financing. First, we see that 7 per cent of firms obtain formal loans and 6 per cent obtain informal loans. Second, only 14 firms out of 2,496 have both informal and formal loans, and 138 firms without formal credit access use informal loans. This is equivalent to only 6 per cent of those firms not obtaining formal financing. It therefore seems that informal loans only finance a small fraction of total firm investments, contrary to what is seen in many neighbouring countries. Therefore getting a formal financial system up and running for supporting entrepreneurship seems a critical aspect of the future doing business agenda in Myanmar.

Table 7.6: Formal and informal loans in 2017

		Formal loan			
		No	Yes	Total	Per cent
Informal loan	No	2,175	169	2,344	(93.9)
		(92.8)	(7.2)	(100.0)	
	Yes	138	14	152	(6.1)
		(90.8)	(9.2)	(100.0)	
	Total	2,313	183	2,496	(100.0)
	Per cent	(92.7)	(7.3)	(100.0)	

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 7.7 looks at the determinants of formal and informal borrowing for all firms. The general picture is that larger firms are more likely to obtain formal credit. Firm size does not seem to matter for informal lending. Informal firms are, as expected, less likely to have access to formal financing, so this may indicate that informal firms may benefit from formalizing and thereby get better access to credit. Finally, we see that constrained firms and investing firms are more likely to have obtained access to both formal and informal financing, which could signal that rationing is taking place among the firms with credit demand.

Table 7.7: Credit access characteristics

	(1)	(2)	(3)	(4)
	Formal debt	Formal debt	Informal debt	Informal debt
Firm size (ln)	0.101	0.164*	0.001	0.005
	(0.063)	(0.090)	(0.048)	(0.048)
Firm age (ln)	0.039	0.017	-0.002	-0.013
	(0.050)	(0.057)	(0.054)	(0.061)
Informal (Yes = 1)	-0.699**	-0.630	0.156	0.130
	(0.332)	(0.412)	(0.127)	(0.146)
Credit constrained (Yes=1)	0.233*	0.263*	0.419***	0.381***
	(0.123)	(0.141)	(0.080)	(0.080)
Made investments (Yes=1)	0.293**	0.363***	0.342***	0.334***
	(0.114)	(0.140)	(0.088)	(0.087)
Location controls	Yes	Yes	Yes	Yes
Sector controls	No	Yes	No	Yes
Observations	2,082	1,248	2,250	1,909

Note: Robust standard errors clustered at the township level are shown in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Finally, in Table 7.8 we take a look at the relationship between firm investment plans and their current investment and credit status. The dependent variable is an ordered variable going from expecting to close down the business (1) to very likely to make investments (6). Reported estimates are therefore outputs

from ordered logit models. First, we see that there is a strong persistence in investments. If you invested in 2017 you are very likely to report that you are planning to invest in the near future again. This is a strong result keeping in mind that we are keeping firm size, age, legal status, location, and sector constant. Firm size is positively correlated with the propensity to invest in the future, but it seems to be the younger firms that are planning to carry out most future investments. Informality and being credit constrained are positively correlated with the likelihood of future investments. Whether this signals that informal firms are planning a transition into formality, and whether credit-constrained firms expect to have better access to external finance in the future goes beyond this report to analyse.

Table 7.8: Investment plans for the future

	(1)	(2)
Firm size (ln)	0.215***	0.243***
	(0.061)	(0.062)
Firm age (ln)	-0.184***	-0.154***
	(0.046)	(0.050)
Informal (Yes = 1)	0.226**	0.197
	(0.109)	(0.122)
Credit constrained (Yes=1)	0.510***	0.536***
	(0.116)	(0.113)
Have debt (Yes=1)	0.171	0.149
	(0.112)	(0.124)
Made investments (Yes=1)	0.953***	0.897***
	(0.183)	(0.180)
Location controls	Yes	Yes
Sector controls	No	Yes
Observations	2,346	2,346

Note: Robust standard errors clustered at the township level are shown in parentheses.

Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Authors' calculations based on Myanmar MSME 2017 data.

8 Trade and sales

The current structure of manufacturing enterprises in Myanmar shows a predominant role for SMEs, which are characterized, among others, as being more independent, multi-tasking, based on personal transactions, informality, managing owners, and highly local within their business operations (Perrini et al. 2007). In this manner, these characteristics greatly influence how firms operate their business. In this chapter, MSME data for sales structure in terms of sub-sector and market segmentation are depicted. Also, internationalization and competition between firms are displayed in order to gain more general insights into the business position of Myanmar's enterprises.

8.1 Sales structure

8.1.1 Sector segmentation

As seen in Chapters 2 and 3, MSME data indicate that manufacturing in Myanmar is dominated by the food and beverages sector, which accounts for up to 43.5 per cent of all firms in the sample and 57.7 per cent for the national weighted sample. The textiles and wood sectors are second and third in their share of firms with 11.1 per cent (8.8 per cent weighted) and 8.1 per cent (6.2 per cent weighted), respectively.

Table 8.1 displays the number of customers for firms' most important product, which varies slightly across the different sectors. The customer base in the textiles industry is small, with 53.6 per cent of firms having one sole customer and 24.3 per cent having between two and five customers. This might be explained by the more artisanal micro and small firm weaving industry selling to sole customers who are then in charge of distribution. The same could apply for the tobacco industry, in which 14.8 per cent of firms have one sole customer and 33.3 per cent have between two and five customers, which points towards small-scale tobacco production for local customers (e.g. cheroots). In contrast, the food and beverages sector accounts for 38.5 per cent of firms with more than 21 customers, as well as the wood (39.4 per cent) and other manufacturing (43.8 per cent) sectors, which therefore have the largest consumer base among sectors.

Table 8.1: Share in number of customers (non-weighted) per sector and per size

		1	2–5	6–10	11–20	21–50	> 50
	Number of customers						
Sector	Food and beverages	2.7	18.7	18.6	21.6	17.4	21.1
	Rice mills	1.1	19.4	19.4	21.5	12.9	25.8
	Tobacco	14.8	33.3	20.4	11.1	16.7	3.7
	Textiles	53.6	24.3	8.7	6.9	2.9	3.6
	Apparel and leather	10.2	26.1	20.5	12.5	15.9	14.8
	Wood	3.0	18.2	16.3	23.2	17.2	22.2
	Paper and publishing	3.7	29.6	18.5	14.8	7.4	25.9
	Other manufacturing	1.6	15.6	18.0	21.0	19.3	24.5
Firm size category	Micro	8.9	18.7	18.5	19.4	16.0	18.5
	Rice mills	1.3	18.9	20.1	20.1	12.0	27.7
	Small	8.2	20.4	14.1	18.0	16.7	22.6
	Rice mills	0.0	26.1	13.0	30.4	17.4	13.0
	Medium	4.1	17.9	13.0	22.0	17.9	25.2
	Rice mills	0.0	0.0	25.0	25.0	25.0	25.0
	Large	16.7	16.7	0.00	25.0	8.3	33.3
Observations		213	475	430	481	404	493

Note: Weighted results follow similar structure.

Source: Authors' calculations based on Myanmar MSME 2017 data.

The customer base regarding size of the firm seems relatively similar for micro and small firms, with firms distributed across all intervals. Medium firms seem to have a slightly higher customer base, while large firms have the largest share of sole customer firms, which would point towards large firms with a high production level selling to intermediaries. Values for rice mills, while exclusively being part of the food and beverages sector, show a similar customer structure as the whole sector, although the difference in the proportion of customers in the '21–50 customers' category and in the 'more than 50 customers' category seems to vary more for rice mills (13 percentage points) than in the whole sector (4 percentage points). In terms of size, rice mills' customer base seems to increase for the whole sample.

8.1.2   Market segmentation

Principally, there seems to be a size effect in the geographical reach of the customer base from micro to medium enterprises. Thus, Figure 8.1 illustrates the share of customers' location by enterprise size. MSME data show that micro enterprises mostly tend to attract local clientele within the same township, and few to none engage in exporting. Similarly, small enterprises' clientele comprises up to 80 per cent of local township and within-state customers. In the case of large enterprises, customers are distributed uniformly between local town, within-state, outside-state, and exports; this could be due to large enterprises being located exclusively in the industrial hubs of Yangon and Mandalay with better opportunities to trade closely within state and also easier access to foreign markets.
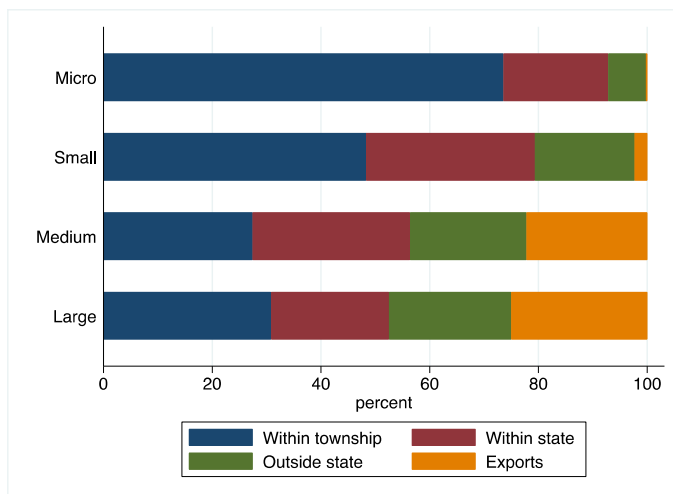

Figure 8.1: Share of customers' origin location by size

Note: Weighted results follow similar structure.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 8.2 displays the composition of the customer base across different states, with predominant shares of within-township customers. Results show Chin State exclusively trading within their respective townships, while Yangon firms stand out with the highest share of within-state customers (39 per cent of their customer base on average) as well as exports, pointing to the influence of being an industrial hub (more on exports in Section 8.2).

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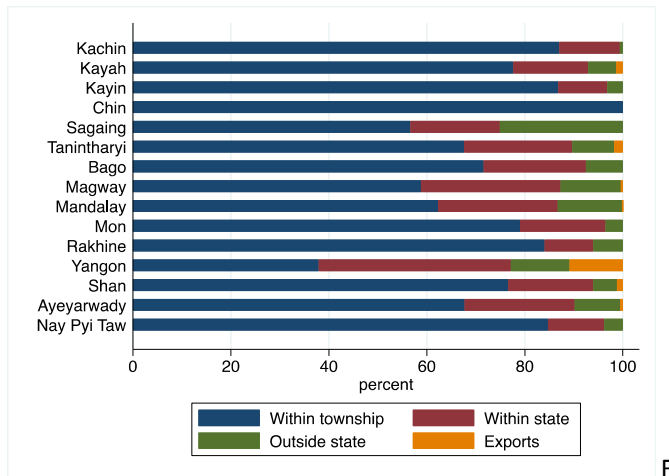
Figure 8.2: Share of customers' origin location by state

Note: Weighted results follow similar structure.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 8.3 looks at types of customers defined as: individual people or households, other enterprises/wholesale/retail, government authorities (non-commercial), and exports. The largest share of individuals as customers can be found in micro firms, while the most common type of customer remains other enterprises/wholesale/retail across all firm sizes; this would indicate a sales structure oriented towards intermediaries instead of final consumers. Similarly, larger shares for outside-country customers are found in medium and large enterprises. The comparatively small customer share of government authorities is concentrated in large and small enterprises, although it has to be emphasized that commercial activities and therefore state-owned enterprises are not included in this group. The wood sector attracts comparatively more individuals as well as government authorities. The food and beverages and the apparel and leather sectors on the other hand attract more outside-country consumers. The high share of consumers being other enterprises across all sectors points towards SMEs being part of larger supply chains and not selling to the final customer.
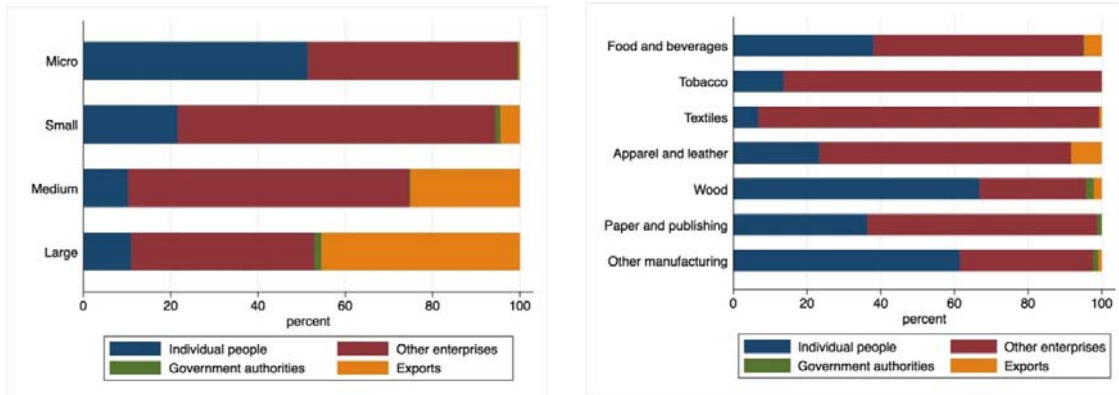
Figure 8.3: Share of customers' origin location by firm's size and sector.

Source: Authors' illustration based on Myanmar MSME 2017 data.

8.2   Firms' internationalization

The historical and political setting in Myanmar has undermined the development of the international trade sector in the economy. Trade openness in the country remains moderately low. However, it increased from 22.3 per cent in 2012 to 47.3 per cent in 2015, with a steep decrease in 2016 down to 45.5 per cent (World Bank 2018b). Myanmar's trade remains highly focused on the Association of Southeast Asian Nations (ASEAN) region (40 per cent of imports and 50 per cent of exports) and as part of the ASEAN Trade in Goods Agreement, which includes preferential import tariffs within ASEAN countries and also with China, Japan, Republic of Korea, Australia, New Zealand, and India (World Trade Organization 2014). However, international standards, quality management, certification, and testing remain a constant challenge for Myanmar's businesses (MOC and ITC 2015).

The 2017 MSME data reflect a very limited degree of internationalization for manufacturing enterprises in Myanmar. Table 8.2 shows that only 2.8 per cent of enterprises are involved in exporting, slightly increasing for the weighted national level (4 per cent). The difference between the sample and the population averages is due to informal firms rarely ever exporting. Moreover, the MSME sample shows that all exporting enterprises are located in urban areas and 81 per cent of those are found in the Yangon Region (85.3 per cent at the national level).

The data display a size effect from micro to medium enterprises in terms of share of exporters, which are generally concentrated in the medium and large range, reaching up to 47.6 per cent and 8.6 per cent of exporters as medium and large, respectively. As mentioned in Section 8.1, the low level of internationalization might be explained by the nature of firms included in the report. Selling to trade intermediaries who are then in charge of exporting might be common practice. Moreover, townships within the Mandalay Region do not

include Mandalay city (second largest city in Myanmar), which might explain differences between the prevalent industrial hubs of Yangon and Mandalay. Also, Myanmar's Special Economic Zones) have increasingly been recognized for manufacturing activity and internationalization of firms (Hunter et al. 2018), which might not be captured within the sampled firms.

The legal status of enterprises in terms of ownership type identifies most exporting enterprises as private firms (40 per cent), followed by family businesses (25.7 per cent), and limited liability companies (20 per cent). The share of exporting enterprises as family businesses decreases at the national level, while the share of exporters as partnerships increases. In addition, the data show that somewhat mature firms, established before 2011, tend to export more than younger firms (operating for less than 5 years) or older firms (operating for more than 25 years).

The main exporting sector is the food and beverages sector, which includes 74.3 per cent of all exporting firms in the sample, with an even larger share at the national level (81.8 per cent). Apparel and leather and wood follow with 8.6 and 7.1 per cent (3.9 per cent each at the national level), while the other sectors make up less than 3 per cent of the share of exporting firms.

Table 8.2: Exporting enterprise characteristics (per cent)

		Sample	Weighted
All		2.8	3.9
By location	Urban	100.0	100.0
By size	Micro	10.0	7.0
	Small	38.6	36.7
	Medium	42.9	47.6
	Large	8.6	8.6
By ownership	Family business	25.7	20.8
	Private firm	40.0	40.4
	Partnership	8.6	13.3
	Cooperative	1.4	1.6
	Limited liability company	20.0	20.2
	Joint venture company	4.3	3.7
By sector	Food and beverages	74.3	81.8
	Textiles	2.9	1.9
	Apparel and leather	8.6	9.4
	Wood	7.1	3.9
	Other manufacturing	7.1	3.0
Observations		2,496	71,270

Note: Data exclusively on rice mills not included due to small number of observations.

Source: Authors' calculations based on Myanmar MSME 2017 data.

In terms of exporting goods' characteristics, Table 8.3 shows that 52.8 per cent of exporting firms account for 100 per cent of their production being engaged towards final goods, while 26.7 per cent and 18.2 per cent engage 75–99 per cent and 50–74 per cent, respectively, of their production towards final goods. This indicates that exporting firms in Myanmar tend to specialize in final goods production instead of intermediate goods.

The lack of internationalization in terms of imports is further reflected in the fact that 98 per cent of enterprises do not import any of their raw materials for production; however, the data show that exporters tend to import in a greater measure than non-exporters. Contextually, imports for production inputs and capital equipment have faced restrictive licensing systems, and the introduction of new policies intended to facilitate internationalization have created further costs and uncertainty for business (MOC and ITC 2015).

In terms of procedures, imports require companies to firstly be registered with DICA and authorized to engage in international trade (Myanmar National Trade Portal 2018). Import licences are also required for a number of goods, which can be obtained through application or recommendations by relevant ministries, and are reviewed once a year (Myanmar National Trade Portal 2018). Also, some goods might require certain certificates, permits, or advice letters. All imports declared at customs must be accompanied by a number of documents and relevant certificates at the time of arrival. Exports follow similar procedures of registration, licensing, and customs requirements.

Table 8.3: Export and non-exporter comparison (per cent)

	Sample		Population	
	Exporters	Non-exporters	Exporters	Non-exporters
Observations	59	2,437	2,504	68,722
100% Imported inputs	7.1	0.5	7.8	0.6
0% Imported inputs	88.6	98.4	88.5	98.2
100% Final goods production	58.6	69.0	52.8	66.1
75–99% Final goods production	24.3	17.4	26.7	21.8
50–74% Final goods production	12.9	8.3	18.2	7.9
Investment in last 2 years	20.0	22.0	14.3	25.7
Introduced new products in last 2 years	0.0	0.2	0.0	0.2
Improved products in last 2 years	11.4	10.6	13.3	11.9
Improved production processes in last 2 years	8.6	5.4	4.8	8.6

Note: For reference, data are chosen as Imported inputs or Within-country inputs and Final goods production or Intermediate goods production. Data exclusively on rice mills not included due to small number of observations.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Regarding investment, a larger share of non-exporters (25.7 per cent) claim to have invested in the past two years compared to exporters (14.3 per cent). Both exporters and non-exporters show extremely low levels of introducing new products. Exporters account for a slightly larger share of upgrading product and production processes than non-exporters, their main motivation being a requirement by buyers to improve quality. Among exporters, the most innovative sectors are fabricated metal products (50 per cent) and wood (40 per cent), followed by food and beverages (7.8 per cent), which claim they have improved their products in the past two years. Low technological improvement might be explained by firms' technological skills in Myanmar remaining limited and those in the manufacturing sector focusing narrowly on low technology production (MOC and ITC 2015).

The current international and regional context might influence the development of Myanmar's internationalization in the future. China's transition, increasing labour costs, as well as an increase in product demand opens opportunities for Asian supply chains (The Economist 2015). It remains highly important for SMEs to switch towards internationalization strategies which would enable them to cope with regional and sectoral competition (Etemad 2004). Related to this, the next section gives an overview of the competition setting for firms in Myanmar based on MSME data.

8.3   Competition

In this section we show the degree of competition perceived by firms, in which the average firm faces low to moderate competition, while urban firms face a higher degree of competition than rural firms. It is also shown that there is a positive correlation between firm size, the introduction of new technology, and being an exporter and the perception of higher competition. The Herfindahl Index also displays the degree of concentration of firms within the 2-digit MSIC code based on market shares and size of firms. Sectors with an ample number of firms and similar market shares account for the lowest value (e.g. food, non-metallic mineral products), while fewer sectors, with firms accounting for larger market shares, display the largest index values (e.g. beverages, rubber and plastics).

Table 8.4 displays the degree of competition as perceived by the firms. MSME responses show, in general, a low to moderate degree of competition. About 8.5 per cent of urban firms in the sample specify severe competition in contrast with 5.8 per cent of rural firms, while 24.9 per cent of rural enterprises do not perceive any competition versus 18.1 per cent of urban enterprises. Generally, there seems to be a difference between rural and urban firms in the degree of competition they face, which is also revealed in the population weighted values. Rice mills perceive a lower degree of severe competition and a higher degree of more moderate or

insignificant competition. As in the sample and population values, rice mills located in urban areas tend to face greater degrees of competition. For those enterprises with accumulated goods which are difficult to sell, as shown in Table 8.5, the most common reason for rural enterprises remains a lack of sales channels followed by too much product in the market. For urban enterprises, both reasons for accumulation of goods are indicated more equitably. In general, it seems that perceptions about competition and goods' accumulation due to competition are more prevalent in urban enterprises. Also, only 1.5 per cent (0.9 per cent weighted value) of rural enterprises and 2.8 per cent (3.1 per cent weighted value) of urban enterprises indicate 'too much competition or unfair competition' as a constraint to growth.

Table 8.4: Perception of competition (enterprise percentages)

	Sample		Population	
	Rural	Urban	Rural	Urban
Severe	5.8	8.5	4.6	8.7
Rice mills	2.9	1.7	1.2	2.7
Moderate	25.6	33.1	29.9	33.4
Rice mills	26.5	39.0	31.7	34.0
Insignificant	43.8	40.3	44.6	42.4
Rice mills	45.6	42.4	47.5	50.1
No competition	24.9	18.1	21.0	15.5
Rice mills	25.0	17.0	19.6	13.3
Observations	*434*	*2,062*	*12,537*	*58,733*
Rice mills	*68*	*118*	*7,204*	*12,579*

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 8.5: Reasons for difficulty to sell in those enterprises with accumulated goods (per cent)

	Sample		Population	
	Rural	Urban	Rural	Urban
Too much of the same product in the market	23.5	32.2	20.6	34.4
Rice mills	11.1	42.9	13.8	17.6
Low quality	5.9	5.1	1.6	3.8
Rice mills	11.1	0.0	0.0	0.0
Lack of sales channel	50.0	35.0	60.6	28.2
Rice mills	55.6	0.0	67.7	0.0
Transportation problem	2.9	5.7	9.2	4.0
Rice mills	1.1	0.0	0.0	0.0
Price too high	0.0	4.5	0.0	5.2
Rice mills	0.0	0.0	0.0	0.0
Other reasons	17.7	17.5	8.0	24.5
Rice mills	11.1	57.1	4.6	82.4
Observations	*34*	*177*	*1,438*	*5,173*
Rice mills	*9*	*7*	*953*	*721*

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 8.6. shows the results from a regression analysis of the perceptions of facing different degrees of competition (no competition versus facing insignificant, moderate, or severe competition). The results indicate that exporters are more likely to perceive competition than non-exporters. Urban location is significant at the sample level, which is driven by the difference between formal and informal firms. In this manner, more competitive environments tend to develop in urban settings, which might also relate to how firms have more difficulty to sell certain products or to introduce new processes to upgrade product quality, for instance. In terms of sectors, firms from the food and beverages sector seem to face most competition, while the tobacco and wood sectors tend to face the least competition. Finally, the likelihood of perceiving stronger competition increases with firm size.

Table 8.6: Analysis for competition perception

Variables	Sample	Population
No. employees	0.030***	0.028***
	(0.008)	(0.010)
No. customers	0.006	0.001
	(0.007)	(0.008)
Intr. new tech	0.046	0.015
	(0.047)	(0.060)
Urban	0.037	0.008
	(0.021)	(0.037)
Acc. goods	0.032	0.026*
	(0.033)	(0.041)
Exporter	0.118	0.171*
	(0.108)	(0.101)
Constant	1.055**	1.240**
	(0.481)	(0.566)
Legal ownership FE	Yes	Yes
State FE	Yes	Yes
Sector FE	Yes	Yes
Observations	2,494	71,226

Note: OLS. Probability weights. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Omitted categories are family firm and food and beverages sector. Standard errors clustered at the township level in parentheses.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Furthermore, in order to comparatively measure within-industry competition, the Herfindahl Index is used to calculate market concentration, as it accounts for relative sizes of firms as well as the total number of firms and their market shares (Weinstock 1982). Figure 8.4 shows the value for the Herfindahl Index across the different 2-digit MSIC sectors, taking the value 0 in the case of an infinite number of competing firms and 1 in a pure monopoly. Figure 8.4 shows that the least concentrated sectors are the non-metallic mineral products with a value of 0.03, the textiles sector with a value of 0.09, followed by the food sector (0.10). Both the non-metallic mineral products and the textiles sectors account for a large number of micro firms, and therefore competition

among micro firms in this case would be expected to be larger. The food sector also accounts for a large number of both micro and small firms, and therefore the level of competition as shown in the Herfindahl Index remains comparatively low. However, the most concentrated sectors are the beverages (0.96), rubber and plastics (0.99), electrical equipment (0.99) and repair and installation (0.96) sectors. Such high levels of market concentration in these sectors are due to having fewer firms and larger enterprises which account for larger market shares. This level of industrial concentration, along with a lack of linkages and technological spillovers among large enterprises and SMEs, might give way to market power abuse and high barriers of entry, which would result in lack of innovation and oligarchical structures (Mendoza et al. 2013).
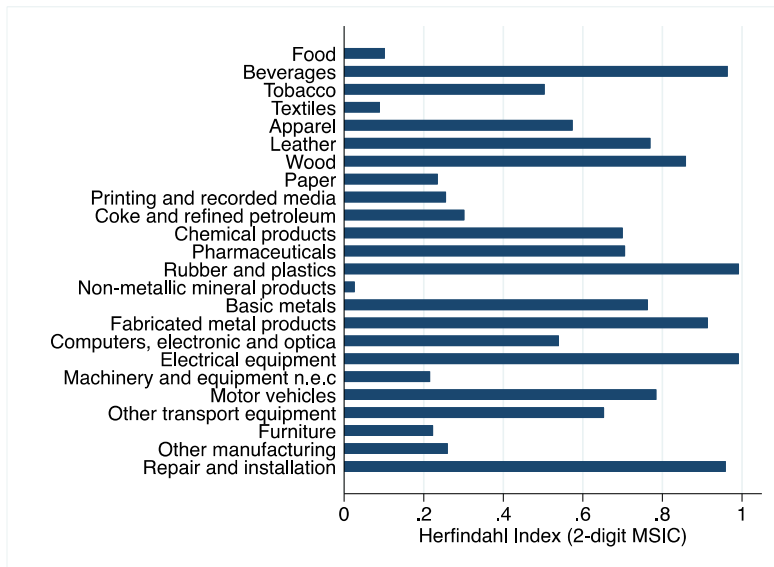
Figure 8.4: Herfindhal Index of market concentration.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Contextually, competition policy in Myanmar includes Myanmar's Competition Law, which became effective in February 2017 and tackles a basic framework for competition policy. It also restricts anti-competitive acts such as mergers or unfair trade (e.g. misleading consumers, intimidation, trade secrecy), sanctioned by strong penalties (DFDL 2015). The law tackles abuse of market dominance, obligations from suppliers to buyers to resell at a given price, and the so-called 'market monopoly', which entails controlling the purchase or service price, limiting services or production, and interfering in business (Renard and Htet 2016).

In light of experiences from the Philippines and Indonesia, for instance, the need to implement competition policies at par with industrialization strategies remains important (Mendoza et al. 2013). In general, and as raised previously in this report, the promotion of SMEs in terms of registration procedures, technological

advancements, financial markets, inclusion in international markets, and access to logistic services might raise new and more equal opportunities for smaller enterprises.

As in Chapter 8, we have shown that trade within the manufacturing sector in Myanmar is currently going through a development process by which SMEs are progressively being exposed to greater trade opportunities, such as inclusion in regional, national, or even international supply chains (Hunter et al. 2018). Three main points might illustrate this: (1) a moderate to low customer base across most sectors, especially the textiles sector; (2) customers' origin mostly including within-township trade, and (3) other enterprises being the most common customers for all firms. However, the current organization of supply chains involves costlier and more time-consuming procedures than Myanmar's regional counterparts (Rahardja et al. 2016), which calls for further trade development.

Complex and imprecise procedures might explain the low degree of internationalization of private enterprises in Myanmar shown by the data. Although only direct exports and imports are illustrated in the data, goods might be exported and imported through trade intermediaries. Exporting firms also tend to import raw materials in a greater share than non-exporters. In general, most exporting firms are medium-sized, private firms, and in the food and beverages sector.

The results from the MSME data therefore support a need for trade facilitation for small and medium enterprises. Inclusion in international markets also calls for an upgrade of logistics services and infrastructure beyond clear regulatory and legal frameworks (Rahardja et al. 2016), i.e. reforms in border procedures, namely cargo clearance, facilitation of cargo insurance, and information of customs' tariffs. There is also a need to simplify or ideally link export and import procedures for small and medium enterprises in terms of access to licences and required documentation, and the available information about permits and licences needed for certain products must be made clear. SMEs are limited by the necessity of being registered by DICA; hence, the possibility of obtaining licences at a regional or municipal level would ease the access of SMEs to international markets.

Access to exports and imports for SMEs could also be limited due to their geographical dispersion and language barriers. In this context, the presence of an intermediary body between potential international customers and producers within Myanmar, or support to regional associations devoted to this task, would be highly useful to link buyers and producers in international markets. Similarly, the facilitation of imports in terms of production machinery would support more innovative and efficient production processes.

9   Employment

This chapter considers the labour market structure in the Myanmar manufacturing sector based on the matched employer–employee data, which enables going beyond firm averages and estimating individual outcomes. In addition to wage level and wage determinants, this section considers various aspects of the working conditions, including workforce composition, hiring methods, benefits, education, and training of the workforce.

9.1   Workforce composition

Table 9.1 presents the shares of regular workers, full-time workers, and female workers in comparison to the total workforce. The share of regular workers is 84 per cent among the formal firms and 79 per cent among the rice mills in the sample, which is significantly different (t = 2.09). The pattern is the same at the population level: rice mills employ a lower share of the regular workforce. The average proportion of regular employees in informal firms is 85 per cent, which is not significantly different from the figures for formal firms. In terms of full-time employees, both rice mills and informal firms have lower shares than formal firms. Medium and large firms have, on average, a lower share of full-time employees than micro firms. Family businesses have a higher employment rate of full-time workers than any other legal ownership form. It is more common to find permanent full-time employees in rural than in urban firms, which could be a consequence of less competition in these areas.

Female employees comprise around one-quarter of the manufacturing sector workforce in Myanmar. They are much less frequently employed in rice mills and more frequently employed in informal than in other types of enterprises. Women more commonly find employment in larger firms and rural areas. As visible from Figure 9.1, high shares of female labour force can be found in Tanintharyi and Sagaing regions. This pattern holds for informal firms as well. One explanation for the observed distribution of the female labour force could be a tendency for larger firms to be established in sectors more compatible with female labour skills and in locations with more female labour available. This claim finds some support in Figure 9.2, which shows the labour force composition by sector. We can observe that apparel and textiles are the two sectors with the highest shares of female labour force (74 and 63 per cent, respectively). These figures are comparable to Bangladesh where the estimates show that around 80 per cent of garment factory workers are female (Khatun 2008). The higher average education level of the female labour force does not come as a surprise as the garment sector has positive returns to cognitive skills and education (Heath and Mushfiq Mobarak 2015). A relatively high proportion of female employees can also be found in the tobacco and pharmaceutical industries. Correspondingly, the highest share of female workforce can be found in

Mandalay and Yangon regions, precisely where, as described in Chapter 3, the textiles and apparel industries are concentrated.

Table 9.1: Labour force composition (per cent of total workforce)

		Sample				Population		
		Formal	Rice mills	Informal	All	Formal	Rice mills	Average
All	Regular	84.4	79.3	85.1	84.2	84.3	73.7	81.4
	Full-time	80.0	76.5	78.3	79.5	80.0	71.4	77.6
	Female	24.3	10.3	39.6	25.7	27.6	9.3	22.5
Micro	Regular	86.5	85.4	85.3	86.2	86.5	82.7	85.3
	Full-time	82.0	82.2	78.1	81.3	82.1	79.7	81.3
	Female	19.5	10.8	38.7	22.3	22.0	9.9	18.2
Small	Regular	79.0	46.2	84.7	78.0	79.7	43.2	72.1
	Full-time	74.7	46.2	81.4	74.0	75.6	43.2	68.8
	Female	33.6	8.0	47.7	33.7	35.1	7.5	29.3
Medium and large	Regular	81.9	73.4	81.7	79.8	82.4	56.0	76.4
	Full-time	77.9	71.7	79.7	75.9	78.2	54.9	72.6
	Female	43.1	44.9	52.7	41.6	44.2	29.1	39.6
Family business	Regular	85.5	79.2	87.0	85.3	86.0	74.9	82.8
	Full-time	80.7	75.7	79.7	80.2	81.4	71.8	78.7
	Female	25.1	7.9	42.1	26.5	28.2	6.3	21.9
Private firm	Regular	82.7	80.2	80.9	82.3	81.7	71.7	79.0
	Full-time	79.4	79.2	75.3	78.8	78.1	71.3	76.3
	Female	22.8	16.3	33.3	23.9	26.6	16.8	24.0
Partnership/cooperative	Regular	76.2	60.9	53.3	72.6	73.1	60.9	69.0
	Full-time	66.1	60.9	50.0	64.0	66.1	60.9	64.4
	Female	21.9	2.3	32.5	21.7	24.9	2.3	17.4
Joint venture/limited company	Regular	78.0	0.0	0.0	78.0	75.0	0.0	75.0
	Full-time	70.9	0.0	0.0	70.9	68.8	0.0	68.8
	Female	24.1	0.0	0.0	24.1	24.0	0.0	24.0
Urban	Regular	84.0	77.3	84.5	83.7	83.8	71.2	81.1
	Full-time	79.8	73.8	77.7	79.3	79.7	68.3	77.3
	Female	23.9	10.7	38.4	24.8	26.9	8.5	23.0
Rural	Regular	87.8	82.8	85.9	86.4	88.3	78.1	82.5
	Full-time	81.6	81.2	79.2	80.7	82.1	76.8	79.1
	Female	27.9	9.7	41.3	30.0	33.6	10.8	20.5
Observations		1,940	176	380	2,496	51,443	19,783	71,226

Note: Proportions for the sample and the population of enterprises.

Source: Authors' calculations based on Myanmar MSME 2017 data.
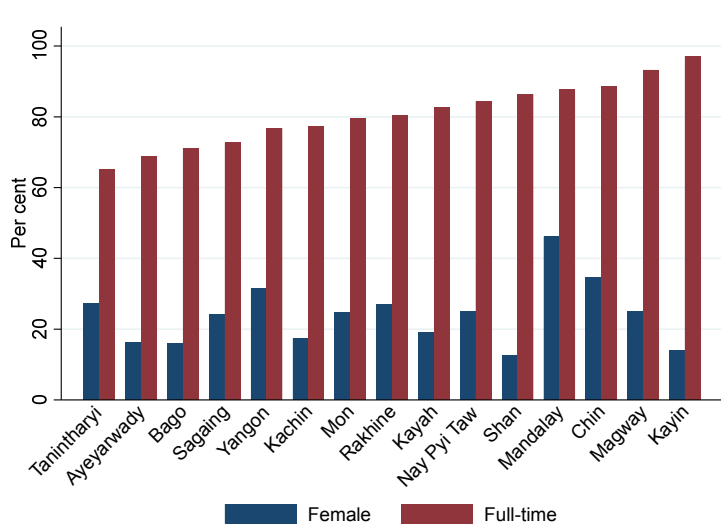
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Figure 9.1: Labour force composition by state (per cent of total workforce)

Note: Sample proportions.

Source: Authors' illustration based on Myanmar MSME 2017 data.
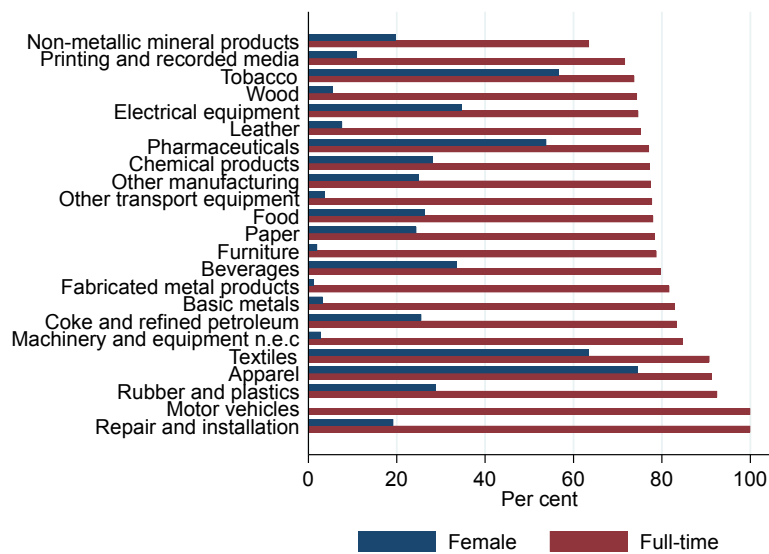

Figure 9.2: Labour force composition by sector (per cent of total workforce)

Note: Sample proportions.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Figure 9.3 shows the age distribution of employees in enterprises of different size categories. The average employee age in the sample is 32.5, but spans from 8 to 90 years. Such an age distribution indicates that

the sample could contain individuals too young to be engaged in income-earning activities. There are a total of 11 employees (0.16 per cent) in the sample aged below 14 years, which is the legal work age. The Myanmar Child Law states that children have the right to engage voluntarily in work, but not if they are younger than 14 (ILO 2017). The maximum permissible number of working hours for children aged 14–15 is four hours per day. Among the working children of that age in our sample, the average number of hours worked per day is 8.2, with a range of 5 to 11. These facts indicate the presence of prohibited child labour in the sample and the violations of the Myanmar Child Law. The upper limit of the employee age in the sample is also unusually high, but only 0.85 per cent of the sample are persons older than 65. The average age in the working-age group of employees, that is, those between 14 and 65 years old, is 32.2, which is similar to the whole employee sample.

The analysis of demographic differences by firm size shows that the majority of employees in medium and large firms come from the 35–44 age group, while the majority of employees in micro and small firms come from the 45–54 age group. Micro firms employ a higher proportion of workers over 65 years of age. These employees are mostly members of the owner's household.
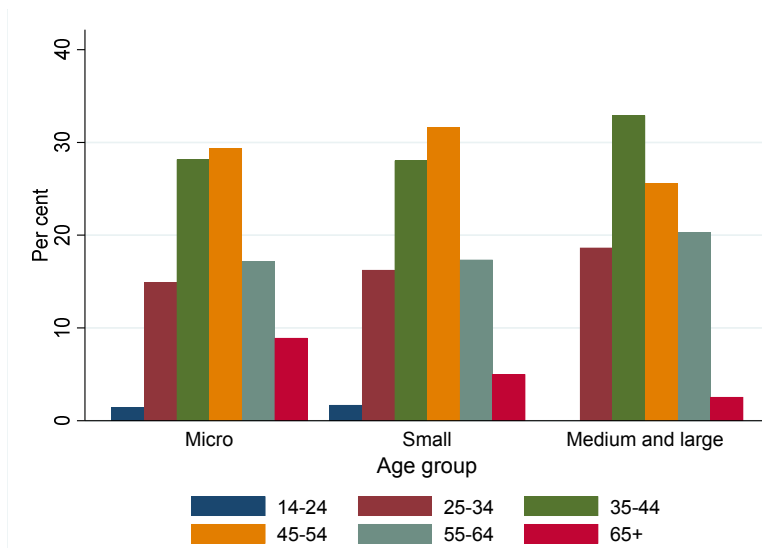

Figure 9.3: Demographic structure of employees (per cent)

Note: Sample proportions.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 9.2 investigates the distribution of main occupations in the labour force. Skilled production workers are by far the most frequent types of workers, comprising 85 per cent of the workforce. Informal and formal firms do not differ at all in terms of reliance on this occupation type, but rice mills tend to have a smaller share. The unskilled production workers are the second most frequent employee type, but only at 7 per cent of total workforce. Managers comprise 5 per cent of the workforce, on average.

The share of professionals, that is, employees with university and college degrees is low and amounts to 1 per cent. The share of professionals in rice mills is 1.8 per cent, possibly indicating a premium for this occupation category in this type of activity. At the same time, larger firms employ 5 per cent of professionals, which could perhaps indicate higher task complexity in this type of firm. These firms also have a higher rate of substitution of skilled with unskilled production workers than smaller firms. Skilled production workers comprise about 85 per cent of the workforce in micro and small firms, while larger firms have about a 15 percentage point lower share. Larger firms have around 12 per cent of unskilled production workers, while small and micro firms have 9 and 5 per cent, respectively.

Table 9.2: Labour force composition by occupation (per cent)

	Sample						Population		
	Formal	Rice mills	Informal	Micro	Small	Medium and large	All	Formal	Rice mills	Average
Manager	4.4	8.0	3.3	5.6	1.8	1.4	4.5	4.5	6.2	5.0
Professional	0.9	1.4	0.6	0.6	0.8	5.0	0.9	1.2	1.8	1.4
Skilled production workers	85.9	82.7	87.9	87.3	85.2	71.7	86.0	85.8	82.6	84.9
Unskilled production workers	7.0	5.1	4.8	5.2	9.4	11.7	6.5	7.2	6.3	6.9
Apprentice	2.0	0.8	1.1	1.5	1.9	5.7	1.8	2.0	0.6	1.6
Other	1.4	1.1	1.4	0.9	2.0	5.3	1.4	1.5	1.6	1.6
Observations	1,940	176	380	1,815	544	137	2,496	51,443	19,783	71,226

Note: Percentages of total workforce. Firms for which the information about labour force structure disaggregated by occupation is not consistent with total labour force size are excluded.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 9.3 shows the shares of employees that were hired and left the workplace in the 2016–17 period. On average, 8.8 per cent of the total workforce in the sample got a new job, and a slightly lower share, 8 per cent of the workforce left their workplace. Informal firms had the largest turnover. Rice mills tended to replace workers more frequently than firms practising other types of manufacturing activities. Overall, there was a small positive net job creation in the 2016–17 period, driven unexpectedly by micro firms that, on average, gained 9.6 per cent and lost 8.5 per cent of their workforce. Medium and larger firms increased

their workforce, on average, by 0.5 percentage points, while the small enterprises shrunk by about 0.4 percentage points.

Table 9.3: Stability of workforce (per cent)

	Sample							Population		
	Formal	Rice mills	Informal	Micro	Small	Medium and large	All	Formal	Rice mills	Average
Hired	9.5	6.1	6.4	9.6	7.0	5.3	8.8	8.1	6.7	7.7
Left	8.9	5.1	5.1	8.5	7.4	4.8	8.0	8.0	5.6	7.3
of which										
Left voluntarily	93.7	94.7	96.9	95.7	90.4	95.6	94.0	93.6	92.8	93.4
Were fired	2.7	0.0	3.1	1.1	5.1	3.2	2.6	3.3	0.0	2.6
Retired	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.1
Left because of illness	1.0	2.6	0.0	0.6	1.8	0.7	1.0	1.0	3.6	1.6
Died	0.1	0.0	0.0	0.0	0.3	0.1	0.1	0.1	0.0	0.1
Left for other reasons	2.4	2.6	0.0	2.6	2.1	0.3	2.2	1.8	3.6	2.2
Observations	1,939	176	380	1,814	544	137	2,495	10,307	2,774	13,081

Note: The figures for hired and left are expressed in percentages of total workforce. The reasons for leaving the workplace are expressed in percentages of employees leaving the workplace.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Examining the reasons for leaving the workplace, we see that about 94 per cent left voluntarily, 3 per cent were fired, and the rest left due to retirement, illness, or other reasons. Such low shares of leaving the workplace due to retirement are most likely due to practically non-existent pension schemes for the employees in the private sector due to which employees work as long as they are physically capable of doing so. Employees in informal enterprises are more likely to voluntarily leave the enterprise than employees in formal firms. Leaving the workplace due to illness is most common among the employees in rice mills. There are no clear enterprise size effects on the reason for leaving, although it appears that small firms may have a higher tendency to fire their employees.

9.2 Employee qualifications

Table 9.4 provides information on the formal education of employees in the Myanmar manufacturing sector. For the majority of workers, primary school is the highest education level they have attained (33 per cent). A slightly lower share (31 per cent) report finishing middle school. Given the structure of the education system in Myanmar, where completing primary school translates into four and completing middle school translates into eight years of schooling, the average education level of manufacturing workers is very low. One in five employees have completed high school, which translates into ten years of

education. The skill level of the labour force documented here is a consequence of a 'broken education system and the exodus of young and ambitious people' (Rieffel 2010).

The average education level in informal firms is lower than in other firms, indicated by a higher share of employees with primary school and a lower share of employees with high school education. Post-secondary or higher education can be observed for around 7 per cent of the total workforce and about 23 per cent of the workforce in large and medium firms. These numbers are lower than, for example, in Viet Nam where 13 per cent of employees in a similar survey of manufacturing SMEs hold a university degree (CIEM et al. 2016). Rice mills have a lower share of highly educated employees than formal firms, but a higher share than informal firms. Differences in education between female and male employees will be analysed more closely in Chapter 10.

The workers participating in the 2017 Myanmar MSME survey are much better educated compared to the general employed population of Myanmar. According to the Report on Myanmar Labour Force Survey 2015, only 6.5 per cent of the working-age population has completed high school (MOL and ILO 2016). The figure for the share of highly educated workers in the MSME data (7 per cent) is also slightly larger compared to the Myanmar Labour Force Survey (5.8 per cent). The deviations in these two data sources are likely due to the focus of the survey being on manufacturing enterprises instead of on the labour force in general.

Table 9.4: Education attainment (per cent)

	Formal	Rice mills	Informal	Micro	Small	Medium and large	All
No education	7.2	10.7	10.4	8.1	8.1	5.1	7.8
Primary school	32.3	36.5	37.1	35.9	32.5	14.8	33.2
Middle school	31.4	30.4	30.5	33.0	30.8	19.5	31.3
High school	20.3	17.1	18.3	17.1	21.3	36.8	19.9
Vocational training	0.3	0.0	0.0	0.1	0.6	0.0	0.2
Diploma	0.2	0.0	0.0	0.2	0.2	0.2	0.2
Bachelor's degree	6.9	4.3	2.7	4.3	5.5	22.7	6.2
Master's degree	0.1	0.0	0.0	0.0	0.1	0.4	0.1
Other	1.2	0.9	1.0	1.3	0.9	0.6	1.1
Observations	5,151	345	809	4,023	1,749	533	6,305

Note: Matched employer–employee sample.

Source: Authors' calculations based on Myanmar MSME 2017 data.

We next investigate compatibility of workforce skills with employer requirements when hiring workers. Table 9.5 shows that among the firms that have hired new workers (17 per cent of enterprises in the sample), almost one-half have had difficulties in recruiting workers with the required skills. This is particularly noticeable in rural areas. Informal firms report being more affected by the problem of finding skilled labour than formal firms, which could be due to their inability to offer attractive working conditions for skilled employees.

In the majority of cases (80 per cent), the recruitment difficulties are caused by the lack of skilled labour, which is most commonly expressed by larger firms. The fact that larger enterprises are more likely to experience difficulties in recruiting skilled workers is in line with Table 9.1, showing that these enterprises employ more professional staff. The overall perceived shortage of skilled labour is higher than in Viet Nam, where 69 per cent of firms cite skilled labour shortages as the main recruitment difficulty (CIEM et al. 2016). Around 5 per cent of difficulties are attributed to too-low wage offers and unattractive working conditions, which are not at all a concern for rice mills. Proportionally more micro than larger firms mention unattractive working conditions as the main reason for recruitment difficulties. Such a high level of unmet demand for skilled labour could be partly explained by the generally low education level of the available workforce, by a schooling system that does not reflect what is needed in the labour market, or by information problems that prevent well-educated workers to find enterprises with a demand for their skill profile.

Table 9.5: Difficulties in hiring workers (per cent)

	Sample						Population		
	Formal	Rice mills	Informal	Urban	Rural	All	Formal	Rice mills	Average
Difficulties in recruiting workers with required skills									
Yes	46.8	47.6	56.4	46.4	54.5	47.7	47.4	47.5	47.5
No	50.8	47.6	35.9	50.8	40.9	49.3	50.4	46.6	49.5
Don't know	2.4	4.8	7.7	2.7	4.5	3.0	2.1	5.9	3.1
Reason for recruitment difficulties									
Lack of skilled labour	79.9	80.0	81.8	80.0	80.6	80.1	78.9	86.7	80.9
Cannot provide sufficient wage offer	5.7	0.0	4.5	5.3	5.6	5.3	6.2	0.0	4.7
Working conditions not attractive	4.0	0.0	9.1	4.1	5.6	4.4	4.4	0.0	3.3
Other	10.3	20.0	4.5	10.6	8.3	10.2	10.5	13.3	11.2
Observations	372	21	39	366	66	432	9,340	3,070	12,411

Note: Proportion of enterprises that have hired new workers in the previous year.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Continuing the analysis of workforce skills, Table 9.6 shows owners' perceptions about the quality of local labour. Consistent with Table 9.5, labour quality is such that it only partly satisfies the needs of the firm, as believed by 61 per cent of the firms from the sample. Rice mills tend to be slightly more content with the local labour quality than other firms. Medium and large firms are most likely to criticize the quality of the local labour: it is, in their opinion, sufficiently good only in one-quarter of the cases. The quality of available labour has been at this level for some time. Slightly more than half of the respondents confirmed that the quality of local labour has basically stayed the same during the past two years. The consensus is, however, difficult to achieve as 45 per cent of respondents believe that the labour quality has improved. Looking only at those who recently hired new workers, 51 per cent believe the latter. At the same time 6 per cent of these believe that the quality of available labour has declined.

Table 9.6: Current quality of the available local labour (per cent)

	Sample							Population		
	Formal	Rice mills	Informal	Micro	Small	Medium and large	All	Formal	Rice mills	Average
It satisfies all needs of firms	35.0	37.5	35.3	36.5	32.9	26.7	35.2	33.2	35.5	33.9
It partly satisfies needs of firms	61.3	60.2	60.3	59.6	64.1	69.6	61.1	64.2	61.7	63.5
It generally cannot satisfy needs of firms	2.8	2.3	2.9	3.0	1.8	3.7	2.8	2.1	2.8	2.3
Absolutely cannot satisfy needs of firms	0.9	0.0	1.6	0.9	1.2	0.0	0.9	0.5	0.0	0.4
Observations	1,940	176	380	1,851	510	135	2,496	51,443	19,783	71,226

Note: Enterprise proportions.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 9.7 provides information on the most common methods enterprises use to recruit new employees, as the literature finds important implications of recruiting methods for firm performance (Montgomery 1991; Larsen et al. 2011). Combining the categories 'recommended by friends, relatives or other workers' and 'personal contacts', we get the category 'informal contacts'. With the rate of 87 per cent, informal contacts are clearly the most frequently used method for enterprises to recruit new employees. This level of reliance on informal recruitment corresponds to the level in rural areas of Viet Nam (CIEM et al. 2016). Informal recommendations are used more by informal than by formal firms in Myanmar.

Table 9.7: Current quality of the available local labour (per cent)

	Sample							Population		
	Formal	Rice mills	Informal	Micro	Small	Medium and large	All	Formal	Rice mills	Average
Newspaper advertisement	4.1	1.1	0.5	1.6	4.9	22.2	3.4	6.0	0.7	4.5
Labour exchange	4.1	1.7	2.4	2.9	4.9	8.9	3.6	4.6	2.5	4.0
Recommended by friends, relatives, or other workers	58.9	59.1	52.9	57.5	62.0	48.9	58.0	58.0	56.2	57.5
Personal contacts	1.9	1.7	1.1	1.3	3.5	0.7	1.7	2.5	1.5	2.2
Recommended by local authorities	27.3	29.5	35.8	31.1	23.5	16.3	28.8	25.7	34.2	28.1
Other	3.8	6.8	7.4	5.6	1.2	3.0	4.5	3.2	5.0	3.7
Observations	1,940	176	380	1,851	510	135	2,496	51,443	19,783	71,226

Note: Enterprise proportions.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Informal contacts are important for recruiting regardless of the size of the enterprise, but their importance declines in firm size. Informal ties are more important for micro and small enterprises, where 89 and 86 per cent, respectively, use this method of recruiting. Consistent with enterprise averages, 69 per cent of employees found their current job through informal contacts, that is, through an owner who is a friend or a relative, or through a relative or a friend working in the firm. Door-to-door visits led to a new job for around 15 per cent of the interviewed employees, while job agencis and advertisements were used by about 2 per cent of the employees. Medium and large enterprises find around 65 per cent of their employees through informal contacts and 22 per cent through newspaper advertisements. The use of media advertising is negligible among smaller firms (2 and 5 per cent for micro and small firms, respectively). Labour exchange is a source of about 4 per cent of new employees for firms in Myanmar.

Even though the surveyed enterprises criticize the quality of the labour force, only 2.6 per cent of them normally train workers. Table 9.8 shows that in the enterprises that train their workers, one-half of employees receive training. The most commonly offered training type is on-the-job training. Only 3 per cent of employees receive informal training and only around 1 per cent receive training outside the regular workplace. Informal firms are least likely to train their employees, but rice mills are not excelling either. Large enterprises are more likely to report providing employee training (41 per cent), but they train a proportionally lower share of their workers than smaller enterprises, which could be due to higher skill level requirements prior to recruiting in larger firms.

Table 9.8: Types of employee training for firms that normally train their employees (per cent)

	Formal	Rice mills	Informal	Micro	Small	Medium and large	All
All forms of training	52.1	3.3	33.3	75.0	53.2	40.8	51.1
On-the-job training	48.0	3.3	33.3	75.0	45.5	37.5	47.0
Off-the-job training	1.3	0.0	0.0	0.0	3.9	0.1	1.3
Informal training	3.2	0.0	0.0	2.8	3.3	3.1	3.1
Observations	62	1	1	12	20	32	64

Note: Percentages of total workforce in the sample. Enterprise data.

Source: Authors' calculations based on Myanmar MSME 2017 data.

9.3 Wage setting and social benefits

This section shows wage levels for the workers surveyed in the employee sample and average production worker wages obtained from the enterprise sample. The average real monthly wage of production workers, as reported by enterprise owners or managers, is 136,832 Kyats. The average real monthly wage for all occupation categories of employees, as reported by the employees from the sample, is 140,972 Kyats. According to the International Labour Organization guide to Myanmar labour law (ILO 2017), the current minimum wage is 450 Kyats per hour and 3,600 Kyats per day.[8] This rate is based on an eight-hour day, excluding overtime, bonuses, incentives, or any other allowances. Adult workers should not be required to work more than eight hours per day or 44 hours per week. The surveyed enterprises, on average, pay higher than the monthly minimum wage of 93,600 Kyats,[9] but 16 per cent do not. For 20 per cent of these, the level is not more than 10 per cent lower than the minimum wage.

Figure 9.5 shows that larger firms, on average, pay higher wages to production workers. The highest wages can be found in rice mills, while informal firms pay the lowest wages. Differences between regions are also noticeable. The highest real wage level by far is detected in Mon State. This could be due to the strong pressure for higher wages from high outward migration to Thailand that is affecting this region. The industrial centres of Mandalay and Yangon come next in terms of the wage levels, while Chin and Rakhine states have the lowest wages for production workers.

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[8] In January 2018, the National Committee for Minimum Wage decided to set the basic daily salary of workers at 4,800 Kyats or 600 Kyats per hour. Both the Myanmar Labour Union Federation and Confederation of Trade Unions of Myanmar believe a daily wage of 5,600–6,600 Kyats is more reasonable given the high cost of living, especially in cities (Htwe 2018). As the data refer to the 2016–17 period, we do not use the new minimum wage level to infer compliance with the minimum wage regulation.
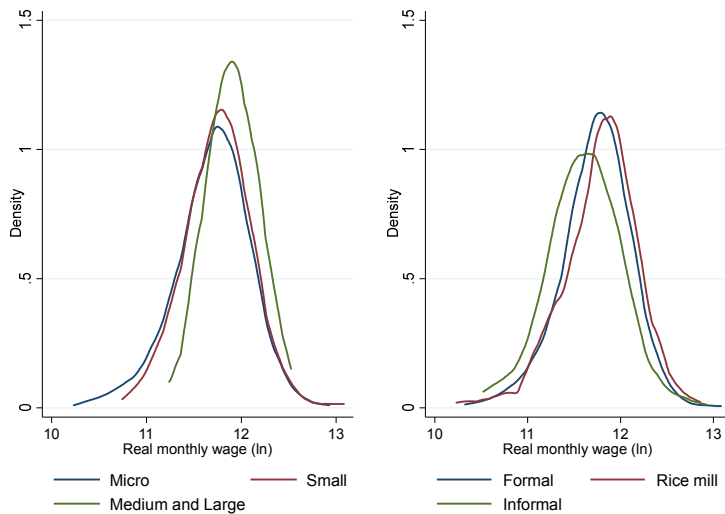
[9] Calculated as 3,600 Kyats times 26 days.

Figure 9.4: Average monthly wage of production workers

Note: Working-age sample. Enterprise values. Observations with wages above the 99th and below the 1st percentile have been removed to take account of outliers.
Source: Authors' illustration based on Myanmar MSME 2017 data.

The line illustrating the relationship between age and labour income has a positive slope until it peaks at around age 35, as shown in Figure 9.5. Labour income starts to decline after the age of 40. This inverse U-shaped relationship between labour income and age is well documented in the literature. Earnings tend to increase in the early stages of a career, flatten out in middle age, and then drop when the worker gets closer to retirement age due to reduced hours worked (Willis 1986; Johnson and Neumark 1996; Rupert and Zanella 2015). An important difference from this general pattern is that in Myanmar, the decline in wages occurs about ten years earlier than in other countries. Given the history of the country, this could be due to the lower education level of older workers. Indeed, workers with no formal education and primary school education are, on average, older (34 years) than those completing middle or high school (30 years) and higher education (33 years).

Figure 9.5 also shows that employees with post-secondary education earn higher wages than others, but also that uneducated workers earn more than those with primary school education. There is no significant difference in the monthly wage between workers with no education and workers with middle or high school education, indicating that there is a premium for skills over lower-level formal education in the labour market. Wage differences between genders are explored in more detail in Chapter 10.
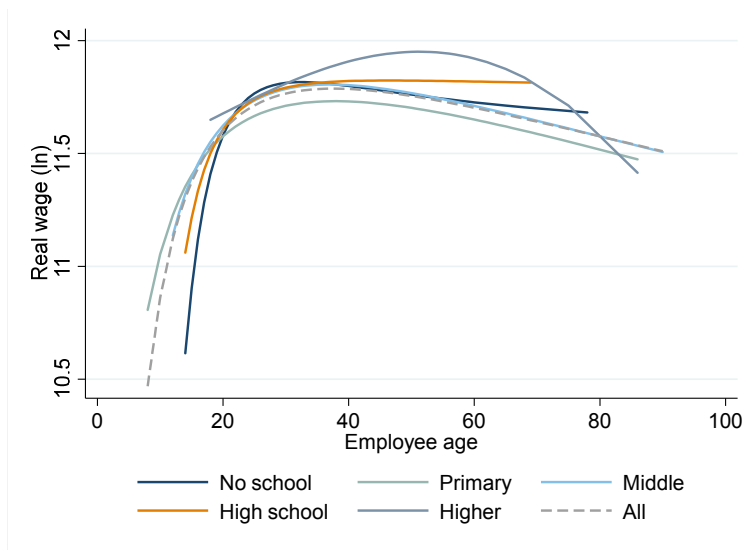
Figure 9.5: Average monthly wage by education level and age

Note: Matched employer–employee sample. Observations above the 99th and below the 1st percentile have been removed to take account of outliers. Vocational training and other types of education are not shown due to low importance. Higher education includes Diploma, Bachelor's and Master's degree.
Source: Authors' illustration based on Myanmar MSME 2017 data.

Due to the high importance of informal ties in finding employment, we assume that these would also be important for wage levels. Figure 9.6 illustrates the differences in the wage levels of employees with different kinds of relationships to the enterprise owner. The most remarkable feature is that owners and members of the owners' household earn slightly less than owners' friends or relatives and that non-relatives have the highest wage level. Earlier empirical evidence finds that family relations play a significant role in compensation schemes for enterprises in developing and emerging markets (Nyantakyi 2016). In the case of family and non-family managers, the evidence is in favour of family members who earn higher salaries, receive more bonuses, and have more decision rights and job responsibilities (Cai et al. 2012). The data from Myanmar confirm the different treatment between family and non-family employees, such that non-family employees are better off. An explanation for this could be that owners cannot impose performance-based pay, so family members underperform in particular tasks. Another explanation could be that members of the owner's household benefit from the enterprise in non-monetary terms. To account for this, we calculate wages with benefits in terms of the food, transport, and accommodation provided, and show the comparison between household members and other employees in panel b). Even after accounting for in-kind compensation, non-family employees earn more than the owner's household members. This could imply that family employees enjoy additional utility that regular employees do not enjoy precisely because their work is performed within the context of their own family firm (Block et al. 2015).
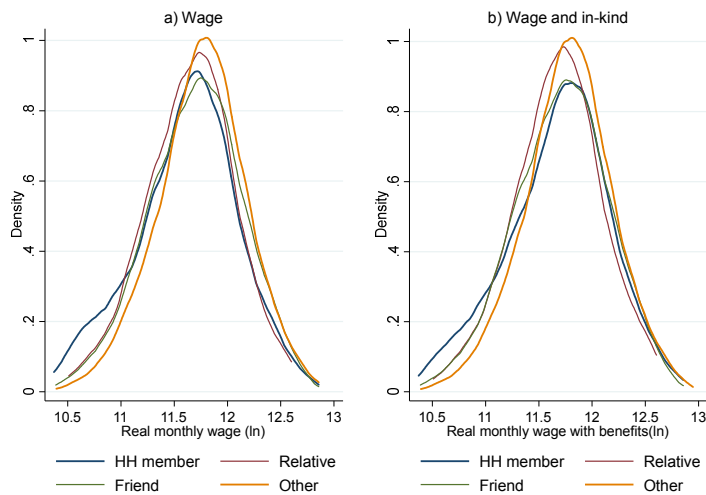
Figure 9.6: Average monthly wage and the employee relationship to the enterprise owner

Note: Matched employer–employee sample of working-age employees. Observations above the 99th and below the 1st percentile have been removed to take account of outliers.
Source: Authors' illustration based on Myanmar MSME 2017 data.

Table 9.9 shows the traditional wage determinants in a wage regression with employee and firm characteristics. The results indicate that male workers receive higher wages, which is further explored in Chapter 10. Wages increase with age, but start declining after middle age. The number of years spent working is also a significantly positive determinant of the wage level. Positive returns to experience are in accordance with earlier findings (Hering and Poncet 2010; CIEM et al. 2016). The results do not show a significant relationship between wages and education or informal recruitment (by personal contacts or recommendations from friends and relatives).

In terms of firm-specific control variables, firm size has a significant and positive association with wages. This is in line with what is illustrated in Figure 9.4 and the general finding that larger firms tend to pay higher salaries (Söderbom et al. 2005). The formality status of firms is not a significant predictor of wage level, nor is male ownership. In contrast, having a larger female workforce correlates negatively with wages. Overall, there are no major differences between the estimates of monetary, joint monetary, and in-kind labour income.

Table 9.9: Wage determinants

	(1) Real wage (ln)	(2) Real wage (ln)	(3) Real wage and in-kind (ln)	(4) Real wage and in-kind (ln)
Male employee	0.235***	0.165***	0.236***	0.167***
	(0.040)	(0.029)	(0.039)	(0.028)
Age of worker	0.031***	0.029***	0.029***	0.028***
	(0.004)	(0.003)	(0.004)	(0.003)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Years of experience	0.012*	0.013***	0.012*	0.012***
	(0.006)	(0.003)	(0.006)	(0.003)
Years of experience squared	-0.000	-0.000**	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Recruited by informal methods	0.000	-0.002	0.002	-0.001
	(0.027)	(0.016)	(0.028)	(0.017)
Firm size (ln)	0.076***	0.064***	0.070***	0.059***
	(0.014)	(0.012)	(0.015)	(0.012)
Capital (ln)	0.022**	0.024***	0.023**	0.024***
	(0.010)	(0.007)	(0.010)	(0.007)
Formal (registered)	0.010	0.008	0.004	0.003
	(0.029)	(0.027)	(0.029)	(0.028)
Owner male	0.010	-0.002	0.011	-0.000
	(0.020)	(0.018)	(0.020)	(0.019)
Share of female labour force		-0.134***		-0.128***
		(0.022)		(0.023)
Share of production workers		0.009		0.013
		(0.048)		(0.046)
Constant	10.420***	10.290***	10.471***	10.373***
	(0.228)	(0.157)	(0.224)	(0.162)
Education	Yes	Yes	Yes	Yes
State/region FE	No	Yes	No	Yes
Legal FE	No	Yes	No	Yes
Sector FE	No	Yes	No	Yes
Observations	6,046	6,046	6,046	6,046
R^2	0.19	0.34	0.19	0.33

Note: OLS estimates. Matched employer–employee sample of working-age employees. Observations above the 99th and below the 1st percentile have been removed to take account of outliers. Education categories include: primary, middle, secondary, post-secondary and other education. The omitted education category is no education. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Standard errors clustered at the township level are reported in parentheses.
Source: Authors' calculations based on Myanmar MSME 2017 data.

Table 9.10 shows the types of employment benefits paid to workers. The information is provided for nine different kinds of contributions, from social and health insurance to end-of-year bonus. The 2012 Myanmar Social Security Law stipulates that companies with five workers or more must register with the Social Security Township Office of the Social Security Board and pay contributions to protect workers in case of sickness, maternity, death, or work injury (ILO 2017). The employer contributions are usually matched by the employees. For example, they each contribute 2 per cent to the Health and Social Care Fund. In our sample, the share of employees receiving any kind of benefits is 63.6 per cent. The most commonly provided benefit is end-of-year bonus, which is given to 46 per cent of all employees. The second most commonly provided benefit is the social security benefit, which is followed closely by paid sick leave.

Employers are least likely to provide pension and health insurance, which is understandable given that public health insurance coverage has only recently become possible.

Table 9.10: Employment benefits (per cent)

	Formal	Rice mills	Informal	Micro	Small	Medium and large	All
End-of-year bonus	50.0	37.7	27.2	39.4	55.2	72.8	46.4
Sick leave	21.7	16.9	10.9	12.6	25.1	62.9	20.1
Maternity leave	7.0	2.6	2.9	1.8	7.4	37.3	6.2
Pension	0.7	0.3	0.9	0.8	0.3	0.7	0.7
Health insurance	5.8	7.7	2.8	3.1	7.0	20.1	5.5
Social security benefit	25.9	12.4	5.6	10.7	33.7	79.7	22.5
Compensation for accidents or illness	15.4	9.5	7.8	9.8	19.4	31.1	14.1
Severance pay	15.7	11.9	7.4	11.1	15.8	36.2	14.4
Annual paid leave	4.9	0.8	3.0	2.6	4.2	19.4	4.4
Any social benefit	67.7	57.0	40.4	54.8	75.0	95.6	63.6
Observations	5,489	379	854	4,360	1,815	547	6,722

Note: Matched employer–employee data. The firms with missing information have been omitted in each category.

Source: Authors' calculations based on Myanmar MSME 2017 data.

Informal firms also provide some benefits to their employees. Compatible with enterprise averages, informal firms most commonly provide end-of-year bonuses and paid sick leave. Differences in the rate of payment of social benefits are apparent by firm size. A higher rate of payment of social benefits is observed among larger enterprises. Medium-sized firms pay all types of benefits at a very high rate, greatly surpassing the average values.

Some regional differences can be observed. Figure 9.7 shows the highest level of contributions in Yangon Region, followed by Bago Region and Kachin State. This could be due to firms in these regions having better information about relevant legislation, stronger employee demands, or labour union activity.

In sum, Chapter 9 has presented the labour market structure in the Myanmar manufacturing sector. The main features include: micro enterprises leading the creation of new jobs, on average low education and skills levels but a high premium for post-secondary education. Wage levels differ widely by region and firm size. Providing non-monetary employment benefits such as pensions, health, and social insurance is not a frequent practice among the manufacturing firms. Larger firms show a clear advantage in all dimensions of the working environment. This could possibly lead to a rise in workforce inequality. One way of bridging the

gap could be to provide support for increasing competitiveness of smaller employers and workforce skills through off-the-job targeted training.
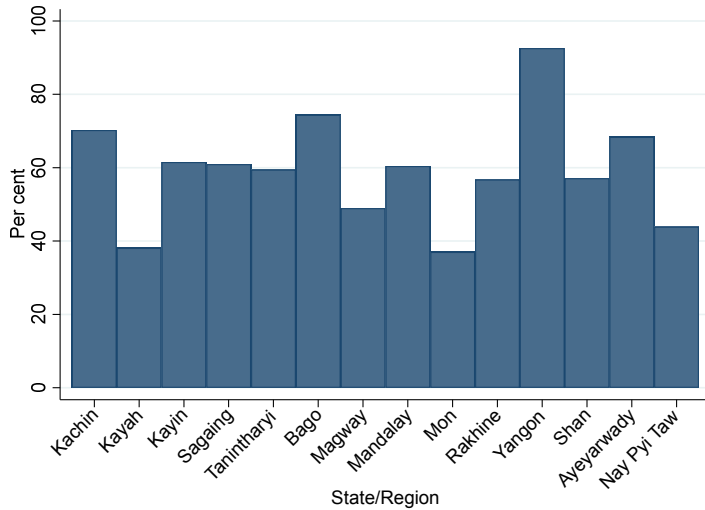

Figure 9.7: Employment benefits by region/state

Source: Authors' illustration based on Myanmar MSME 2017 data.

10   Gender gaps

10.1   Gender gap in wages

The participation of women in the labour market depends on culture, traditions, and discrimination, which could create unfavourable outcomes for female workers compared to male workers. For example, there may be pay differences between male and female workers. The literature recognizes that there is discrimination against female workers whenever the relative wage of a male worker exceeds that earned by a female worker if they are doing the same task (Oaxaca 1973). Amartya Sen (1999) claims that women's well-being is strongly influenced by socio-economic factors including education, labour market participation, being able to earn an independent income, and participation in decision-making processes within and outside the family. Women's limited role in society affects the well-being of all household members, and women's empowerment is an essential tool for the development of any country (Sen 1999).

According to the MSME 2017 survey, 65 per cent of the employees of firms in Myanmar are male. The prevalence of men is even higher in firms' ownership, as about 70 per cent of the firms have male owners. Figure 10.1 shows the share of female employees by firm type. Overall, we see that the share of female employees increases with firm size for formal firms, but decreases for informal firms and rice mills.
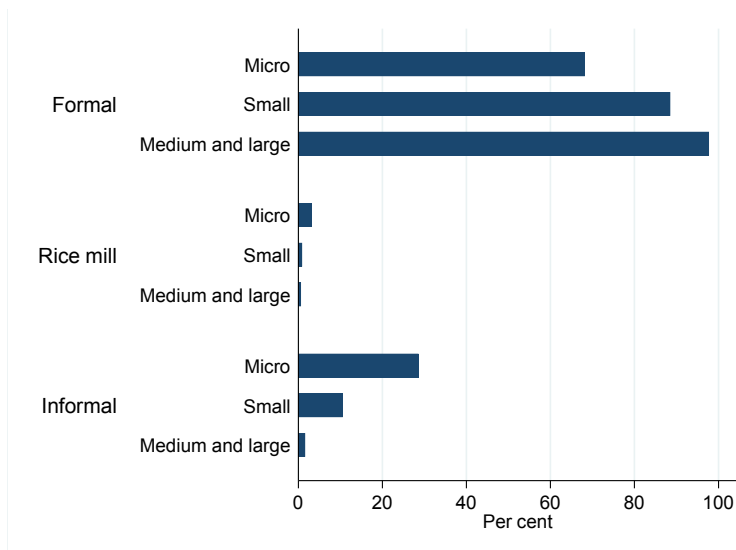
Figure 10.1: Share of female employees by firm type

Source: Authors' illustration based on Myanmar MSME 2017 data.

Under-representation of female workers and firm owners is accompanied by lower wages. Table 10.1 presents a comparison between male and female monthly wages, which shows that, on average, male workers earn significantly more than female workers. For a better (visual) understanding, Figure 10.2 compares the wages of male and female workers. The figure shows the distribution of wages after deflating wages by the Consumer Price Index by firm size. As the fitted values show, there is a gap in wages between male and female workers, and the difference in wages is highly statistically significant (t = 19.1).

Table 10.1: Mean and median of the nominal monthly wage by employee gender (in Kyats)

	Nominal			Real		
	Mean wage	Median wage	Standard deviation	Mean wage	Median wage	Standard deviation
Men	150,248	150,000	59,167	142,939	130,447	60,135
Women	119,377	116,100	49,464	115,036	107,800	50,326
Average	139,576	129,000	57,892	133,292	126,103	58,458

Source: Authors' calculations based on Myanmar MSME 2017 data.

Figure 10.2: Real monthly wages, by size of the firm and employee's gender

Source: Authors' illustration based on Myanmar MSME 2017 data.

The gender gap in wages will be further analysed by regression analysis, which controls for factors that can affect average wages, for example, if women are overrepresented in lower-wage sectors. The estimation is based on a Blinder-Oaxaca decomposition because this method divides the wage differential between two groups into a part that is explained by group differences in productivity characteristics and a residual part that is unexplained. The latter is often used as a measure of discrimination.

The estimation controls for a number of key employee and enterprise characteristics. Employees' demographic characteristics include age, being a relative of the owner, belonging to the Bamar ethnic group, years of labour market experience, and region and urban/rural area. Firm characteristics include industry and the size of the firm, while the socio-economic characteristics are the employee's education level, membership of a union, having a permanent full-time contract, and the number of working hours per week.

Table 10.2 presents the summary statistics of the demographic and socio-economic employee characteristics. It shows that, on average, male workers are one year older than female workers. Female employees are more likely to be a relative of the owner, with 21 per cent of women in the sample being a relative of the firm owner, while only 18 per cent of men in the sample are relatives of the owner. Moreover, there are differences in educational attainment between male and female workers. Of all the female workers in the sample, 25.1 per cent had attained middle school education while 34.5 per cent of

male workers had reached the same level of education. Of all the workers who had stated that they had high school level education, the shares of male and female workers are roughly the same. Further, medium and large firms have a higher share of female employees than micro and small firms.

Table 10.2: Descriptive statistics of employee characteristics (percentages)

	Female	Male
Employee's age	31.6	32.5
Owner's relative	20.5	17.6
Years of working experience	2.6	2.7
No education	8.0	7.8
Primary school	35.9	31.7
Middle school	25.1	34.5
High school	20.6	19.6
Vocational training	0.2	0.2
Diploma	0.1	0.2
Bachelor's	8.7	4.9
Master's	0.1	0.0
Other	1.2	1.1
Union member	0.8	0.6
Full-time employee	96.5	96.5
Hours worked per week	49.9	48.5
Urban area	83.6	85.9
Micro	26.6	73.4
Small	46.0	54.0
Medium and large	56.1	43.9

Source: Authors' calculations based on Myanmar MSME 2017 data.

As shown in Table 10.3, there are only four industry sectors where the majority of the workers are female. Of the four sectors led by female labour, two are related to the production of textiles and apparel. The remaining two are the production of tobacco, where 77 per cent of the total labour force is female, and the pharmaceutical industry, where 70 per cent are female workers. Aside from these four sectors, there are some sectors with a relatively equal distribution of male and female labour. For example, this is the case in the rubber and plastic industry. In the remaining industries, male workers constitute the majority of the labour force. The region with the most equal female participation in the labour market is Mandalay where 51.4 per cent are female workers, followed by Yangon where 45.4 per cent are female workers. However, the differences in other regions are quite high, for example in Shan only 20.6 per cent of the labour force are female workers. This outcome is likely related to a higher prevalence of specific industries in certain locations, e.g. textiles in Mandalay Region.

Table 10.3: Descriptive statistics of firm characteristics (percentages)

	Average	
	Female	Male
Food	38.3	61.7
Beverages	45.7	54.3
Tobacco	**77.2**	22.8
Textiles	**65.8**	34.2
Apparel	**85.9**	14.1
Leather	12.7	87.3
Wood	7.9	92.1
Paper	18.2	81.8
Printing and recorded media	25.8	74.2
Coke and refined petroleum	35.7	64.3
Chemical products	42.6	57.4
Pharmaceuticals	**70.0**	30.0
Rubber and plastics	48.1	51.9
Non-metallic mineral products	24.4	75.6
Basic metals	9.5	90.5
Fabricated metal products	2.9	97.1
Electrical equipment	38.9	61.1
Machinery and equipment n.e.c. [a]	2.5	97.5
Motor vehicles etc.	0.0	100.0
Other transport equipment	5.6	94.4
Furniture	5.9	94.1
Other manufacturing	39.4	60.6
Repair and installation	33.3	66.7

Note: [a] n.e.c. stands for 'not elsewhere classified'.

Source: Authors' calculations based on Myanmar MSME 2017 data.

After analysing the demographic, firm, and socio-economic characteristics of the employees, Table 10.4 shows the result from the Blinder-Oaxaca decomposition estimation of employees' wages. The results show a highly significant gap in average monthly wages between men and women. Compared with male employees working in the same firm with the same occupation, and with other characteristics being equal (including work experience, level of education, ethnicity, etc.), female employees receive on average 23 per cent lower wages. Most of the gap is unexplained in this model (20 out of the 23 per cent are unexplained), suggesting that there could be some kind of discrimination against women in the labour market. In contrast, the estimation with firm fixed effects in columns (3) and (4) shows that differences in firm characteristics entirely account for the difference in wages between female and male employees.

Table 10.4: Blinder-Oaxaca decomposition of wages

	(1)	(2)	(3)	(4)
Variables	Differential	Decomposition	Differential	Decomposition
Male	11.784***		11.784***	
	(0.036)		(0.036)	
Female	11.555***		11.555***	
	(0.054)		(0.058)	
Difference	0.228***		0.228***	
	(0.043)		(0.048)	
Explained		0.031		0.186***
		(0.022)		(0.069)
Unexplained		0.198***		0.042
		(0.030)		(0.080)
Observations	6,528		6,528	

Note: Matched employer–employee sample of working-age employees. Columns (3) and (4) show results with firm fixed effects. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the township level are reported in parentheses. Source: Authors' calculations based on Myanmar MSME 2017 data.

10.2 Gender gaps in firm productivity

We now look at whether a gap can be identified in firm productivity depending on the gender of the firm owner. Figure 10.3 shows productivity by gender of the owner and size of the firm. The figure illustrates that there could be a gap in firm performance for male and female-owned enterprises. The t-test shows a statistically significant difference (t = 1.68) and a Blinder-Oaxaca decomposition is used to analyse the magnitude of this difference.
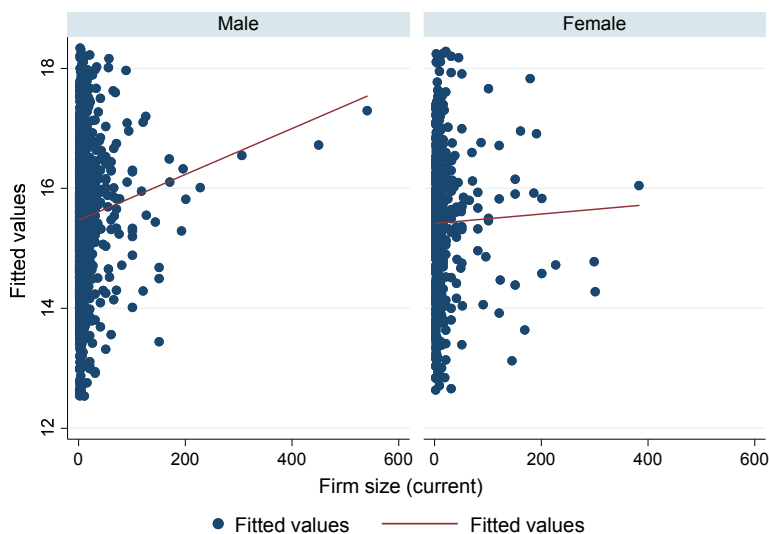

Figure 10.3: Productivity by size of the firm and owner's gender
Source: Authors' illustration based on Myanmar MSME 2017 data.

The difference in productivity by owner's gender is not as large as that found for wages. In this case, Table 10.5 shows that there is a gap of about 8 per cent in productivity in favour of male-owned firms compared to female-owned firms. The difference in productivity is not explained by firm or owner characteristics and can be taken as a sign of the discrimination of female-owned firms in the market. If female owners retained their characteristics and their firms were as productive as male-owned firms, the average productivity of female-owned firms would increase by 20 per cent.

Table 10.5: Blinder-Oaxaca decomposition of firm productivity

Variables	(1) Differential	(2) Decomposition	(3) Differential	(4) Decomposition
Male	15.510***		15.510***	
	(0.071)		(0.026)	
Female	15.428***		15.428***	
	(0.101)		(0.040)	
Difference	0.082		0.082*	
	(0.070)		(0.048)	
Explained		-0.047		-0.119
		(0.047)		(0.076)
Unexplained		0.129**		0.201***
		(0.052)		(0.077)
Observations	2,378		2,378	

Note: The sample excludes least and most productive firms (bottom and top 1 per cent). Columns (3) and (4) show results with firm fixed effects. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Standard errors clustered at the township level are reported in parentheses.
Source: Authors' calculations based on Myanmar MSME 2017 data.

As analysed in this chapter, it is possible to conclude that there are gender gaps in Myanmar in enterprise productivity. Gender gaps in wages are entirely due to differences in characteristics between firms. The importance of reducing these gaps is because the cost of discrimination is not just that it harms women but it also imposes a cost for the entire society and can impede economic growth.

11 Economic constraints and potentials

This chapter aims to present the main constraints and potentials that characterize the business environment in Myanmar and the experiences of manufacturing enterprises operating within this environment. The business environment comprises a combination of policies, institutions, infrastructure, human resources, and geographic features that affect the efficiency with which firms operate (Eifert et al. 2005). Firm growth, investment, and innovation are all affected by the quality of the business environment (Collier 2000; Bigsten and Söderbom 2006). At the firm level, the business environment can affect the costs of production, while at the industry level, it can affect the market structure and competition (Eifert et al.

2005). Understanding the conditions under which enterprises operate, as well as the constraints and opportunities they face, is increasingly important for policies conducive to sustaining economic growth.

Two explanations of Myanmar's underperforming economy are the political conflict that has plagued the country for 60 years and high reliance on foreign exchange from natural resources (Rieffel 2010).[10] Myanmar gained independence in 1948, when the government of the Anti-Fascist People's Freedom League) introduced the private and foreign sectors. Alongside this flourishment of private industries and under the industrial plan, the government set up state-owned industries, which were mostly large-scale (Kyaw 2008). After 1962, a socialist economic system was established with the nationalization of large private enterprises. However, small private businesses were preserved. After the deterioration of the economic situation in the 1970s, new efforts for institutional reform were made, but private investment was still limited by the state.

In 1988, a military takeover by the State Law and Order Restoration Council switched towards a more market-oriented economy, reversing all socialist policies but failing to mimic the high growth of other authoritarian regimes of the same period (International Crisis Group 2012). Contrary to expectations, the government failed in international engagement and, due to the international community's concerns about political and human rights, Myanmar was suspended from bilateral and multilateral agreements, and received sanctions and trade restrictions. After the failed elections in 1990, Myanmar remained even more isolated, and it would not be until 2011 that a new government would take power. However, this new government inherited low levels of industrialization, a large share of the labour force working in the informal sector, and a dysfunctional finance sector (Turnell 2003; International Crisis Group 2012).

The current situation can best be described as difficult. The scale of the challenge businesses face is indicated by the country's low ranking in the World Bank's Doing Business index, where Myanmar ranked 171st out of 190 countries in 2017 (World Bank 2017a). An improved business environment has been shown to benefit economies through higher employment, increased trade, and reduced corruption. That is why the focus of the following subsection is on exploring the perceptions of the main challenges affecting firm growth and performance.

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[10] A thesis that natural resources have helped sustain the military regime for many years is appealing (Rieffel 2010).

Perceptions by enterprises of the problems faced when doing business and how these problems have changed over time is often used as an indicator of the current business environment. Averaging just below 70 per cent, the proportion of enterprises that face important constraints to firm growth can be assessed as very high. Figure 11.1 shows the differences in perceived business challenges by firm type and size. While there is no significant difference in the level of reporting business constraints between formal and informal firms, rice mills appear to be more affected than other manufacturing firms. The level of perceived constraints declines in firm size for formal firms, but it does not seem to be related to firm size for informal firms and rice mills.
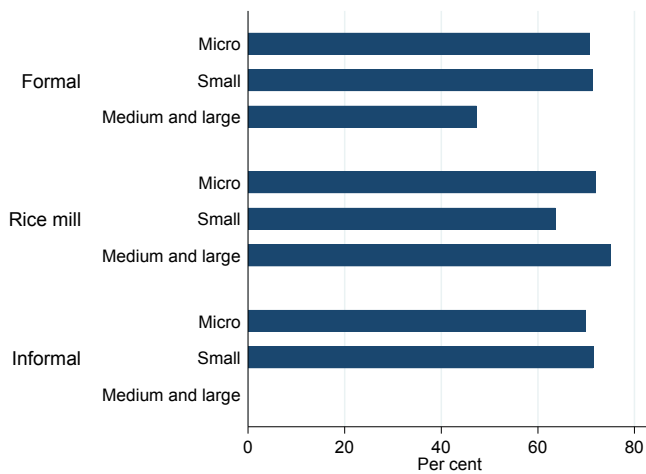
Figure 11.1: Proportion of firms reporting to be facing important constraints to firm growth

Note: Sample percentages.

Source: Authors' illustration based on Myanmar MSME 2017 data.

Regional and industry differences in the perceived constraints are large. Almost all firms in Kayah State reported experiencing important constraints to firm growth. The proportion of firms is twice as low in Bago Region and Nay Pyi Taw. Among sectors, coke and refined petroleum and motor vehicles are the ones with the most constraints. Around 80 per cent of firms in the wood and textiles sectors also report facing important constraints to growth.

By far the most important constraint to growth is a shortage of capital or credit. As shown in Figure 11.2, this problem affects more than one-third of enterprises in Myanmar, mostly those from the motor vehicles, textiles, and metals sectors. The second most important challenge is the lack of technical know-how, affecting around 7 per cent of enterprises, primarily the leather industry. The lack of raw materials is the

third most serious challenge to growth, reported by 5 per cent of firms. The sectors most affected by the problem of accessing raw materials are wood and furniture, which is likely related to the sustainability policy and efforts to stop deforestation in Myanmar. The importance of these challenges is consistent across different firm size categories. The findings in this section are similar to the Myanmar Investment Climate Assessment that identified the main obstacles for firms to grow as: access to finance, access to land, access to electricity, and access to skilled workers (World Bank 2015).
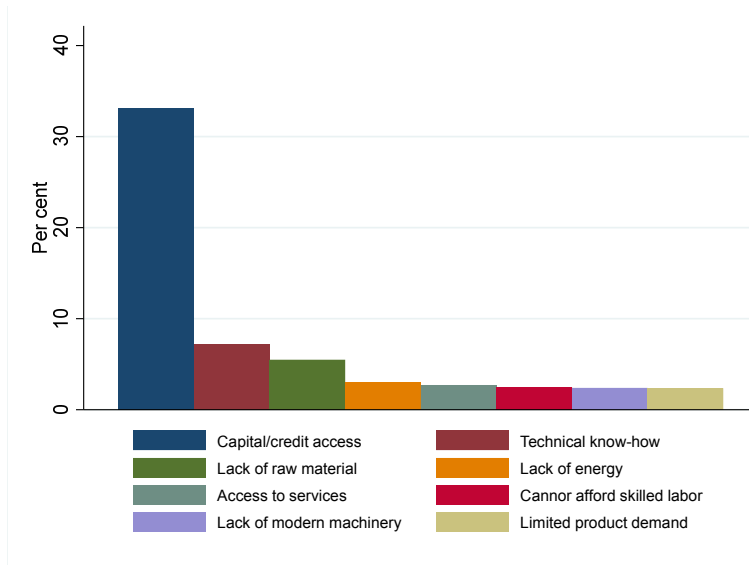
Figure 11.2: Most important constraints to growth as perceived by the enterprise

Note: Sample percentages.

Source: Authors' illustration based on Myanmar MSME 2017 data.

The survey also asked enterprises about the most important constraints to doing business in the state/region where they are located. The results shown in Figure 11.3 indicate a few differences compared to the firm growth challenges. Access to market appears to be the main constraint to doing business in general. There are also difficulties due to transport infrastructure and youth emigration, which mostly affects states in close proximity to Thailand, namely Kayin and Mon. Lack of skilled labour and limited access to finance and technology are perceived not only as the individual enterprise challenges but as the challenges of the local economic environment. Enterprises perceive that the role of government in relieving business difficulties could be in providing easier access to credit, assisting with technical know-how, and easing access to quality raw materials.

An improved business environment can increase enterprise performance both domestically and in foreign markets. Chapter 11 has shown that the main constraints in the private manufacturing sector relate to limited access to finance, technical knowledge, and inputs, indicating that the bare minimum of conditions for developing a successful manufacturing sector has not been met. There are numerous areas for improvement, but the main include: providing easier access to credit, assisting with technical know-how, and easing access to raw materials.
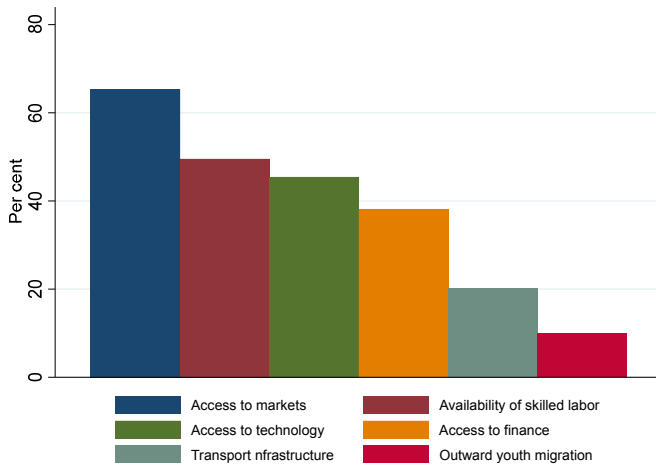

Figure 11.3: Most important constraints to doing business in the State/region

Note: Sample percentages.

Source: Authors' illustration based on Myanmar MSME 2017 data.

12 Conclusion

The aim of this report was to provide characterization of private enterprises in the manufacturing sector in Myanmar. The manufacturing sector has been identified as having a large potential for improving Myanmar's economic growth and in all likelihood it will continue to do so in the future. The overall success of the sector, however, should not be taken as given, as it greatly depends on the policy and business environment in which manufacturing activities take place. It is, therefore, important to understand different aspects of the business environment in which manufacturing activities take place in order to help inform policies conducive to securing sustainable economic growth.

Manufacturing activity in Myanmar follows the topographical circumstances of the country, with the majority of economic activity concentrated in the central lowland strip down to the coast in the south. The

foundation of the sector is the food industry, accompanied by basic metals, fabricated metal products, and non-metallic mineral products concentrated in the south, and textiles and apparel in the north-west. Enterprises appear to be taking advantage of agglomeration benefits in the form of industrial zones and clusters, but the infrastructure conditions could be improved. Not all firms have access to electricity, public water, good roads, and the internet. A direct policy message is to scale up investments in public infrastructure. Both infrastructure access and conditions should be improved throughout the country.

The regulatory environment is complex, which results in different degrees of non-compliance in several areas of enterprise activity. Many different government authorities are responsible for business registration and licensing. The MSME data show a high rate of formalization, defined as obtaining a licence or registration with any government authority responsible for business, but a low rate of registration with DICA, the Directorate of Investment and Company Administration, which is expected to be the only institution responsible for the registration of enterprises. The adherence to tax regulation appears to be weak. Informality measured as employment without a written contract seems to be the norm in Myanmar. A comparison of wage and productivity levels of informal firms indicates their lower performance compared to formal firms. These findings indicate that less-productive firms select into informality due perhaps to the high requirements of the registration process. Including these firms in industrial policy instead of repressing them would be positive for economic development, as informal firms appear to offer potentially desirable job opportunities to less-productive workers. A direct policy recommendation is to reduce bureaucratic obstacles and improve coherence among different government authorities to assist businesses with registration and tax payment. This could, for example, be achieved by establishing different services under one or as few government authorities as possible with 'one-window' offices in all townships. Developing a culture of trust in the government by showing the population that it is getting something in return when paying taxes is another priority task for policy-makers.

Manufacturing enterprises tend to be highly specialized, as indicated by a negligible share of firms producing more than one product. Technology-wise, enterprises rely on hand tools and old, second-hand machinery. It is not common to import equipment and machinery. These facts indicate high financial constraints and limited direct contact with the producers of technology, which may limit knowledge transfer and productivity. A direct policy recommendation is to facilitate access to modern technology by streamlining import procedures, opening special lines of credit or grants for this purpose, or providing tax deductions for purchases of new technology.

The innovation rates are also low, both in terms of introducing new products and improving the existing ones. Certification of international standards, which could facilitate market access and competitiveness, is also very low, the exception being a handful of larger firms. Policies could address these deficiencies by providing subsidies or tax deductions for research and development efforts, new product development, and certification of international standards.

The majority of enterprises have a moderate to low customer base, and trade with other enterprises from the same township. Direct foreign trade is rare and entirely dominated by larger enterprises located in the industrial hubs of Yangon and Mandalay. Complex and often unclear export and import procedures, and the fact that foreign trade mainly takes place through intermediaries, may explain the low degree in internationalization. These deficiencies are important to recognize as an area requiring strong focus if enterprise performance and competitiveness are to be continuously improved. A direct recommendation is to encourage development of industry clubs or associations that could assist knowledge-sharing and dissemination of market information between enterprises. Of utmost importance is the simplification of export procedures related to registration, licensing, and customs requirements, preferably by relaxing existing product-specific restrictions and opening a 'single-window' service. Requirements about the documentation, permits, and licences needed for export and import must be made clear. This information should be made available to enterprises through local authorities, with specific training being organized throughout the country or media outlets. Better inclusion in international markets also calls for better logistics services and infrastructure, as well as a better use of internet and online commerce platforms. Geographic dispersion and language barriers could be overcome through designated intermediary bodies, regional associations, or events devoted to the task of linking producers and buyers in international markets.

Manufacturing firms tend to be overwhelmingly owned and managed by men. Only one-third are female-owned or managed, possibly due to a combination of different opportunities, preferences, and skills between genders. Females display less willingness to take risks than males, which translates into lower performance of female-owned or managed enterprises. Business practices, measured as a combination of marketing, buying, record keeping, and financial planning practices, are found to positively affect firm productivity. Female entrepreneurs tend not to apply as many beneficial business practices as men. Policy-makers should be aware of the gap in performance of male- and female-owned enterprises. Developing and supporting gender-based training initiatives would help address the challenge that female-owned firms are less productive.

The labour market structure in the Myanmar manufacturing sector shows, on average, low education and skills levels of the labour force, and a high premium for post-secondary education. Micro and informal enterprises tend to hire less-skilled employees and to replace them more frequently than other enterprises.

Providing training to employees is a rare practice, especially among informal enterprises. Wage levels vary widely across regions and firm size categories. Non-monetary employment benefits such as pensions, health, and social insurance are not frequently encountered. In all dimensions of the working environment, larger firms show a clear advantage. This could possibly lead to a rise in workforce inequality where large firms attract and pay more-skilled employees while smaller firms struggle with low productivity of less-skilled workers. One way of bridging the gap between larger and smaller firms could be increasing support for higher education, vocational programmes, and off-the-job training targeted at developing industry-relevant skills and more general management and public administration knowledge. Enterprises that pay for the education and training of their employees could, for example, get tax exemptions for a period of time. Working conditions in the private sector would benefit from the expansion of social security, public health insurance, and pension programmes, as well as the enforcement of the minimum wage regulation. The information about social protection, insurance programmes, and labour laws should become more easily available, so both employees and employers become better informed about their rights and obligations.

The circumstances under which private manufacturing enterprises in Myanmar operate are not without constraints, which include poor access to finance, infrastructure, lack of skilled labour, and technical knowledge. Access to finance is undeniably the most important constraint. A larger share of small and medium firms, as compared to micro firms, apply for credit, but all firms share similar problems when attempting to get formal loans. Only part of the demand for credit is met through informal loans. The consequences are that new investments need to be made from retained earnings, which limits the level of enterprise growth. Improving access to finance also to firms considered informal, seems to be critical for supporting entrepreneurship in Myanmar. This can be achieved by simplifying procedures and conditions for obtaining loans, introducing longer-term loan options, cutting the loan-processing times, establishing micro-credit institutions, activating more SME-oriented loan programmes, and opening additional bank branches in smaller townships. Substantial reform of lending policies should be accompanied by more collaboration with commercial financial institutions and the formalization of property rights, such as in relation to private property ownership and land titles. To improve equality of opportunity, information-sharing efforts about loan opportunities and requirements should be scaled up throughout the country.

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