

## Enhancing the Quality of Industrial Policies (EQIP) – Tool 10

**Name of the tool:** Gender equality in manufacturing

**Objective:** The aim of this tool is to provide a set of indicators to help analysts understand female participation in manufacturing and structural change, as well as their key determinants, so that policymakers can identify how an industrialization trajectory can become more gender-just. Ultimately, the objective is for women and men to have equal opportunities to contribute to, lead and benefit from structural transformation.

**Key questions addressed:**

1. What is the extent and composition of female **participation** in manufacturing at present (vs male)?
2. What do we know about the **wages**, quality and type of employment of women in manufacturing (vs men)?
3. How is women's participation in manufacturing changing as the country undergoes **structural transformation** towards manufacturing, technology-intensive sectors and more efficient production processes?
4. What are the key **determinants** of female participation in manufacturing?

**Indicators used:**

### Part I: Setting the scene

1. Female share of total labour force
2. Female share of employment in agriculture, industry and services

### Part II: Overview of gender equality in manufacturing

1. Female share of employment in manufacturing
2. Gender Dissimilarity Index in manufacturing
3. Gender wage gap in manufacturing
4. Female share in management roles
5. Female share of employment by status in employment
6. Wage differential to minimum wage, by gender
7. Informal employment as a share of total, by gender

### **Part III: Structural change and manufacturing subsectors**

1. Gender-balanced structural change towards manufacturing
2. Gender-balanced structural transformation towards medium and high-tech sectors
3. Female intensity by manufacturing subsectors
4. Changes in productivity and female intensity per subsector

### **Part IV: Key determinants**

1. Female to male ratio: unpaid care work
2. Distribution of labour force by level of education and sex
3. Female share of science, technology, engineering and mathematics graduates
4. Female share of vocational training pupils
5. Female share of research and development personnel
6. Female to male ratio: accounts in financial institutions
7. Female to male ratio: borrowed from a financial institution
8. Percentage of women/men who borrowed to start, operate or expand an economic activity
9. Gender gap in internet usage
10. Female to male ratio: mobile money account
11. Female to male ratio: digital payments in past year
12. Workplace rights
13. Legal rights to own land and non-land assets and to access financial services
14. Perceptions on the right of women to have a paid job outside the home

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# 1 Introduction

## **Justification and objective**

Female economic empowerment is a key strategy to reduce poverty, raise incomes and minimize social inequality in a country. It can directly provide half of a country's population with equal opportunities for a better life and has uniquely strong indirect effects on families and future generations due to women's spending habits. At the same time, gender equality can have strong positive effects on a country's industrialization process and economic growth, as it accelerates the pace at which a country industrializes, creates positive spillovers, and can make the manufacturing sector more sustainable and, inclusive.

The promise of industrialization is that it creates new, relatively higher-paying jobs than agriculture, which creates a virtuous cycle of economic growth and prosperity. Often, however, women as well as minorities find they struggle to participate and benefit equally from this growth. Women's contribution to industrialization is often limited to low-wage work in certain export-led sectors, where competitiveness relies on cheap labour. In these sectors women often suffer unfavorable working conditions and have little opportunity for further development and growth. A development strategy that relies on the low wages of women is, however, a short-sighted and unsustainable development strategy.

The aim of this tool is to provide a set of indicators to help analysts understand female participation in manufacturing and structural change, as well as key determinants, so that policymakers can identify how a chosen industrialization trajectory can become more gender-just. Ultimately, the objective is for women and men to have equal opportunities to contribute to, lead and benefit from structural transformation. This is one of the most crucial elements of developing an inclusive and sustainable industrialization strategy, as advocated by the United Nations Industrial Development Organization (UNIDO).

The tool will help obtain an understanding of the extent and way in which women are currently involved in the manufacturing sector and will identify opportunities and challenges for fair female participation as the country undergoes the industrial trajectory it has chosen.

The definition for gender equality used in this tool is borrowed from the working paper entitled Inclusive and Sustainable Industrial Development: The Gender Dimension (United Nations Industrial Development Organization 2019, 10).

It defines gender equality as "equality in rights, responsibilities, and opportunities for women and men. Gender equality does not necessarily mean parity, but does involve ensuring that the interests, needs, and priorities of women and men are given equal weight in industrial policy design and implementation."

## **Gender equality and industrialization – some key insights**

### Gender equality significantly boosts economic and industrial growth

There is a growing body of literature discussing the positive relationship between gender equality and economic growth, a relationship that also applies to industry. Women are still significantly underrepresented in industry in most developing countries, are disadvantaged by the persistent gender wage gap, are generally more likely to work in the informal sector and face less favourable working

conditions than men. The fact that the potential of roughly half the workforce is not fully utilized has significant repercussions on a country's growth and competitiveness. In a study called *The Power of Parity*, McKinsey estimates that in 2025 GDP could be 28 trillion USD higher if perfect gender parity was reached, or 12 trillion USD higher if countries were able to improve gender parity to the same extent as the best performing country in their region (2015). A study by Cuberes and Teignier (2012) found that gender inequalities in the labour market can result in GDP per capita losses of 15 per cent on average for low income countries, with income losses reaching 27 per cent in the Middle East and North Africa region. The underutilisation of women is therefore a large constraint to economic growth.

From a business perspective, firms report that increasing the share of women in companies, including in managerial positions and in boards, noticeably improves performance. Such firms report higher productivity, better decision-making due to different risk-management strategies between the genders, more innovation, creativity and increased efficiency. On top of that, many firms believe it is beneficial to have staff represent the consumer base. It is also safe to assume that women may make environmentally friendlier decisions, for example about production processes or suppliers, as women tend to be more environmentally conscious than men. There are therefore a wide range of crucial benefits to having more women in the workplace.

Female economic empowerment has a significant role in poverty reduction as well. Women are more likely to spend a higher portion of their income on children and the community at large, having larger spillover effects than men's income. Their stronger focus on the education and health of both girls and boys also tends to contribute to more sustained well-being. Women's larger investments in the community and future generations have positive effects on the quality of the future labour force, once again contributing to sustained economic growth.

The effects of manufacturing on education may be more immediate than assumed: a study conducted on the effects of the Bangladeshi garment sector on women found that simply because a factory plant is located in geographic proximity to a village, women are more likely to continue with their schooling (since they are aware that literacy and numeracy are rewarded in companies) (Heath and Mobarak 2014). The study also found that this effect was stronger than the government's large conditional cash transfer programme encouraging girls to attend school. This means that there can be a strong virtuous cycle between increased manufacturing and increased education.

Finally, the higher purchasing power of women means the domestic market is enlarged, giving opportunities for firms to cater to an increased and diverse domestic demand.

#### The industrialization trajectory of a country has a unique potential to reduce gender inequality

The manufacturing sector has the potential to create employment opportunities for women as well as for men in highly productive sectors, where wages are above those found in agriculture and in most services in low income countries and lower middle-income countries. This ensures women have a certain disposable income. Given the now common findings that women tend to invest a larger share of their income on the household than men, having more women in manufacturing could have a positive ripple effect, as women will more likely invest in education and in girls.

Aside from the wages argument, gender equality-driven industrialization can have a very exceptional role for the future. Being engaged in manufacturing in a way similar to men – that is, a fair distribution of female workers across sectors and activity types, earning similar wages and benefiting from equal job quality –, requires and often enables skills development. This means women too will have the skills and experience necessary to sustain economic competitiveness in the future, being active contributors to technological changes such as industry 4.0, green growth and to increased productivity in the agriculture and service sectors as well. Similarly, over 90 per cent of private sector research and development takes place in manufacturing. Ensuring women are fairly engaged in the sector also means they will be exposed to – or participating in – research and development activities. Case studies have shown that young women are more likely to enter male-dominated sectors if they have women in their networks who are working in that domain. Hence, the sheer fact that women will be working in manufacturing and activities related to research and development is likely to attract more women to join – in addition to reducing stereotyping against them. It has also been documented that women in leadership positions are more likely to hire a gender-diverse team and provide fairer working conditions to all employees.

Lastly, the manufacturing sector can play a different role in promoting gender equality than other sectors, as innovation in manufacturing and the production of consumer goods such as dish-washers and other household appliances can lift some of the burdens that women are more likely to face on a daily basis than men. As women suffer the burden of unpaid household and care work more so than men (something which is often ignored in GDP calculations), such products can help free up some time and allow women more flexibility.

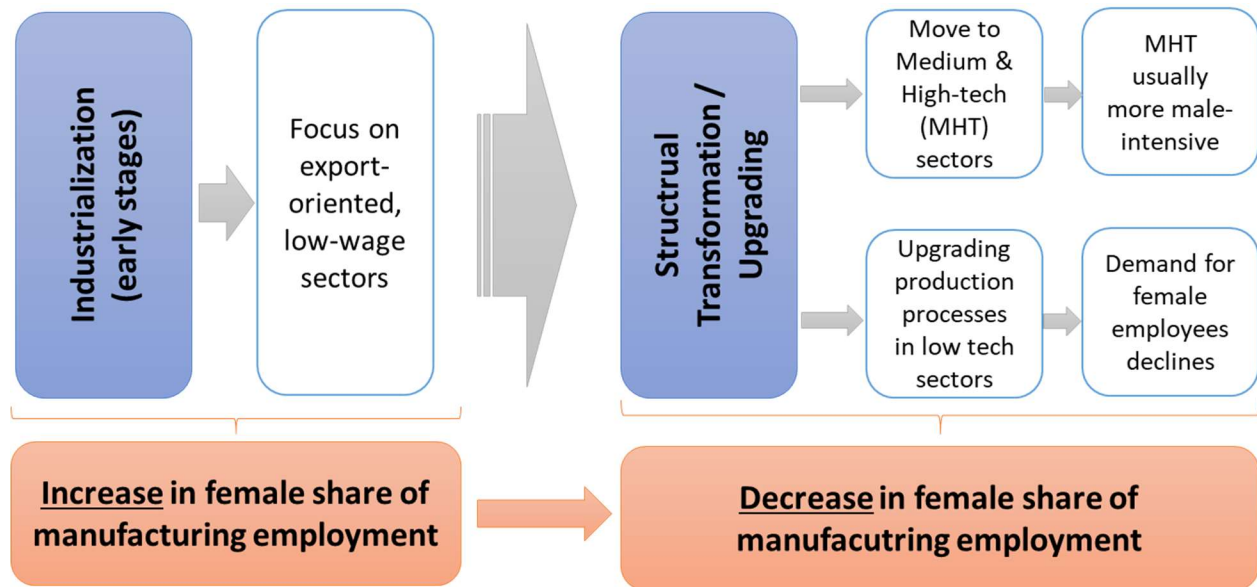
In addition to products that support women in the household, innovation and technological advancement also generate jobs in certain manufacturing sectors that are more attractive and accessible to women. This is because hard physical tasks can now be performed by robots and machines, creating new positions that are less reliant on muscle power. Thus, innovation in the manufacturing sector can lower the access barrier for women to this sector by eliminating the importance of physically demanding tasks (World Economic Forum 2018).

#### A common story of women in manufacturing

While the manufacturing sector has the potential to support gender equality, it has not lived up to its potential. We have seen how the share of women in manufacturing increases as countries undergo an early industrialization phase, in which they increase their export earnings by relying on labour-intensive, low-wage sectors (notably the textiles and apparel sector, footwear, food processing and electronics) and exploit the fact that women earn on average significantly less than men, while maintaining high productivity. This has enabled firms to keep production costs low and countries to become attractive destinations for foreign direct investments.

This common strategy at early stages of industrialization is, however, short-sighted, in that workers' wages cannot be kept competitively low as the countries continue to develop. Economies will need to move into more sophisticated and technology-intensive sectors and – perhaps more importantly – production processes that require skills that many women are unlikely to have acquired by then. This has led to the defeminization of manufacturing employment in many countries that have undergone such development, including in East Asia.

**Figure 1: Common trajectory of female participation in manufacturing throughout stages of industrialization**



Source: United Nations Industrial Development Organization

**What can industrial policymakers do to ensure just and sustained female participation in manufacturing?**

Industrial policymakers have the opportunity to shape policies and strategies and make them more gender-equal, rather than allowing global demand trends to determine women’s destiny. To do so, policymakers first need to have a clear picture of the current situation and the trends in terms of female participation in manufacturing and its subsectors, as well as identify changes throughout the industrialization process of the country. This will require a multidimensional approach. Having this information will make it possible to design policies, strategies and interventions that unlock the potential of women, allow them to benefit fairly from the sector, while contributing to the inclusive and sustainable industrialization of the country, social equality and overall economic growth.

**Key strategic questions the tool will help answer**

This tool will guide analysts and policymakers in examining the situation of women in manufacturing through a multifaceted analytical approach. The aim is to ensure policymakers have a clear understanding of the complex issues of gender equality in the manufacturing sector of their country, so that they can use this information to develop gender-just strategies while undergoing the industrialization trajectory deemed most suitable for the country. The key strategic questions it will help answer are the following:

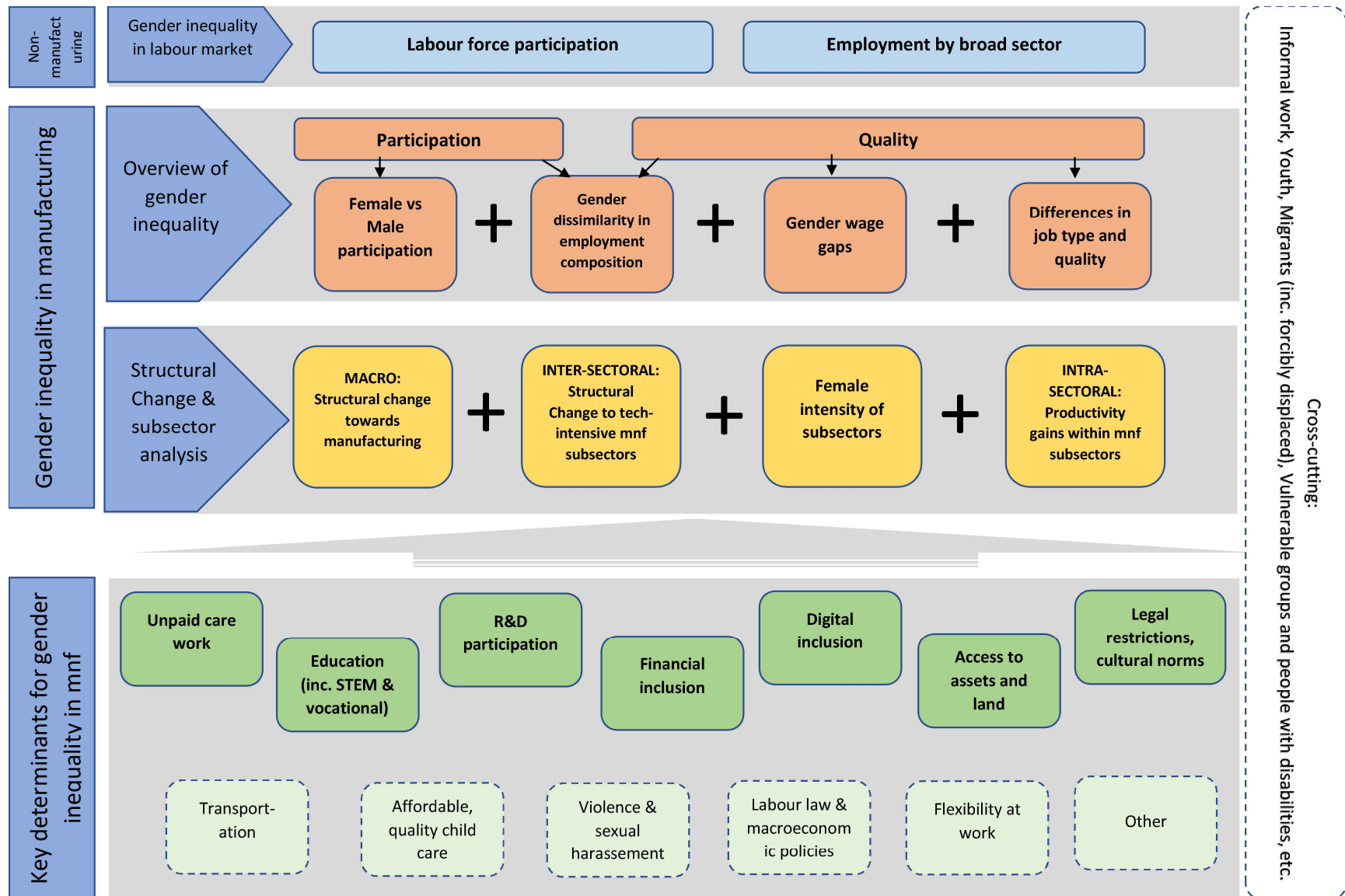
1. What is the extent and composition of women **participation** in manufacturing at present (vs men)?
2. What do we know about the **wages**, quality and type of employment of women in manufacturing (vs men)?
3. How is women's participation in manufacturing changing as the country undergoes **structural transformation** towards manufacturing, technology-intensive sectors and more efficient production processes?
4. What are the key **determinants** of female participation in manufacturing?

### **Analytical framework and structure of analysis**

The diagram below helps illustrate the analytical framework presented in the present EQUIP tool to measure gender inequality in manufacturing.



Figure 2: Analytical framework to measure gender inequality in manufacturing



Source: United Nations Industrial Development Organization

The present tool will follow the analytical framework presented in Figure 2. **Part I** of the analysis (top row, blue) allows the researcher to learn about the context in which he/she will be assessing gender inequality in manufacturing. It assesses basic indicators of gender balance in the labour market and gender distribution across the three broad economic sectors (agriculture, industry and services).

**Part II** (red) gives an overview of gender equality in manufacturing. It provides analysts and policymakers with a general idea of the extent and type of gender inequality existing in the manufacturing sector of the country. It looks at both quantitative and qualitative aspects of equality. Policymakers may wish to aim at increasing the share of women in manufacturing if they are currently underrepresented, (quantity/participation component) in order to provide equal opportunity, as well as similar quality of jobs. In other words, simply increasing female employment in manufacturing through typical sweatshop jobs is not considered gender equal or fair. Hence, qualitative aspects should receive at least as much attention as quantitative ones. Gender dissimilarity in the employment composition is both quantitative and qualitative. It measures participation in manufacturing subsectors, thus the concept itself is quantitative. However, the interpretation tells us more about the quality of employment: the extent to which there is discrepancy in the distribution of workers by gender tells us whether women are generally excluded or find it more difficult to enter certain types of sectors. Different sectors generally offer different working conditions. Other topics addressed in the qualitative section are the gender wage gap in manufacturing and some indicators on the type of jobs undertaken (such as managerial) as well as on working conditions (for example on the distance of wages from the minimum wage and informal employment). Not all indicators on the latter are manufacturing-specific, due to the unavailability of data, although in the analysis section we combine it with manufacturing related analysis to the extent possible. By the end of this section the analyst should be able to detect the extent and type of gender inequality in a country's manufacturing sector, having also compared with the situation and trends of benchmarking countries.

**Part III** (yellow) of the analysis looks at structural change and subsector analysis. It will assess the following questions:

- Macro-level analysis: has the country been undergoing structural change towards manufacturing and has the gender composition of the manufacturing sector become more equal over time?
- Inter-sectoral analysis: has there been an increasing share of female participation in medium and high-tech sectors as the country's industrial structure moves to these more technology-intensive sectors (if applicable)?
- Intra-sectoral analysis: : what is the female intensity of individual manufacturing subsectors and how does it relate to the average wage per subsector? As the production processes of manufacturing subsectors become more capital and technology-intensive, how have the female shares of employment in these individual subsectors changed over time? And, simultaneously, have average wages increased with productivity as expected?

Structural transformation is the backbone of industrialization and is at the core of the EQuIP toolkit. However, the relationship between structural change and female employment in manufacturing has not always been so positive due to cases of defeminization of manufacturing employment. The reasons for

this have been discussed above. In an attempt to measure such trends, this part guides the analyst from a macro assessment down to a within-sector analysis of female participation during structural change.

In addition to being able to answer the questions listed above, the analyst will be able to identify the following:

1. Female-intensive subsectors, in order to be able to commission more detailed studies specifically in the subsectors in question, including on job types, characteristics and quality of employment. This would then provide more insights into female experiences in manufacturing and could provide useful information for policymakers who hope to improve the situation of female workers.
2. Key subsectors where productivity, employment and wages are high or have increased, and where it would be desirable to see (further) increases in female employment shares. Once these subsectors are identified, key constraints need to be understood as to why women are not already more strongly represented in these subsectors.

The final part of the analysis, **Part IV** (green), looks at some of the key determinants that affect women's participation in manufacturing. This includes the extent to which women are more heavily engaged in unpaid care work than men, which affects their overall propensity to undertake paid productive employment and is a key determining factor. Other indicators are more specific to manufacturing and entrepreneurship. A number of them are in line with some of the determinants suggested in EQUiP tool 9, covering topics of skills (level of education; graduates in science, technology, engineering and mathematics; and vocational training), research and development, access to finance and access to digital technology. However, it also comprises indicators that are more specific to gender inequality, such as on the right of women to work and to own land. The analysis undertaken compares both sexes. After undertaking this analysis, analysts and policymakers will have a better sense of the aspects in which women are lagging behind most and hence, whether there may be larger factors affecting their unequal participation in manufacturing. One main caveat to this analysis is that we can only measure determinants where data is available and that seem to be among the most relevant for manufacturing employment. It should be very clear to the analysts that there is a large number of other determinants that are not measured in this tool but may be equally or even more important. These are highlighted throughout the tool. It will then be the role of the analyst to determine which of these are most relevant to their country and obtain the required information.

Across the whole tool, data limitations and the consequences of this deficit require attention. The tool proposes a multifaceted approach to measuring gender issues in industry, focusing on the key concerns of women in manufacturing: 1) the large extent of low pay and low-quality jobs women fall into, and 2) the defeminization that often comes with structural change. However, the severe lack of gender-disaggregated data limits the extent, depth and quality of the assessment that can be done. In particular, gender wage gaps within manufacturing subsectors would be key, as well as information on the type of roles men and women have at the subsector level. These will explain much of the gender inequalities in manufacturing and would be very useful for policymaking. More indicators on employment type and job quality would also be crucial, from part-time work in manufacturing to issues of (sexual) violence at the workplace, availability of childcare facilities on site, safety at the workplace and many more. Similarly, gender-disaggregated data on the key determinants of people entering the manufacturing sector should be made available – Figure 2 lists a few. Finally, a key indicator for which there is currently no gender-

disaggregated data on international databases is entrepreneurship in manufacturing. This would shape the analysis further and help to establish key determinants (e.g. access to finance to invest in a business is more relevant for entrepreneurs than for employees).

Analysts are strongly urged to seek national data on the type of indicators listed above, to complement the analysis proposed in this tool. The methodology section points out useful data to look out for. With all its data limitations, the analysis suggested in this tool remains multidimensional and reveals valuable information for policymakers to identify what subsectors they should prioritize to strengthen female employment shares and to commission sector-specific studies that can uncover missing information.

### **Links to other EQUIP tools**

The current tool is linked very strongly to several of the previous EQUIP methodologies. Firstly, it is an expansion of the gender aspect lightly introduced in tool 5 on employment creation. Tool 5 included two related indicators: female share of employment in manufacturing subsectors – an indicator adopted here as well – and gender wage differentials within manufacturing subsectors. Much of the analysis relies on national data, differently to the current tool, which advises on the use of international databases to allow for cross-country comparisons. Furthermore, although mentioned briefly, there is little room in tool 5 for discussion and focus on the key challenges women face particularly in manufacturing. There was therefore a need to develop a separate and fully-fledged tool to measure as well as bring attention to these specific issues and so, contribute to creating more inclusive industrialization processes.

The current methodology to measure gender inequality is particularly linked to the dynamic concept of structural change, as it assesses how women participate in manufacturing at different stages of structural transformation and throughout different upgrading processes. There are strong links to tool 1, as the macro-level structural change indicator is adopted here and combined with trends in female participation. Similarly, the current tool takes the indicator on structural change towards a higher share of medium and high-tech sectors from tool 3 on upgrading to assess whether women contribute to value addition in technology-intensive sectors.

Finally, Part III of this tool focuses on determinants and is aligned with some of the determinants found in EQUIP tool 9, particularly on skills and research and development, as well as on the concepts of access to finance and technology. The current tool does, however, introduce factors not discussed in tool 9, which are specific to gender issues, such as the equality of rights in the workplace.

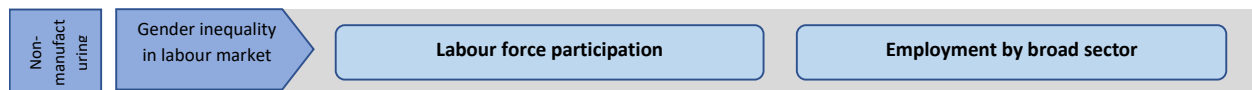
## 2 Methodology

This section will guide the analyst through the different indicators proposed to examine gender inequalities and female participation in manufacturing. The section is structured into four parts in accordance with the analytical framework presented in the introduction, namely:

- Part 1: Setting the Scene – Gender inequality in the labour force.
- Part 2: Overview of gender inequality in manufacturing.
- Part 3: Female participation in structural change and manufacturing subsectors.
- Part 4: Key determinants of female participation in manufacturing.

Indicators will be presented individually and in the same format: first, an introductory paragraph will discuss the indicator briefly and make the analyst aware of its relevance; key questions that the analyst should be able to answer with the help of the indicator will then be listed; finally, the variables and databases needed for the indicator will be presented and calculation will be explained if necessary.

### 2.1 Part I: Setting the scene – gender inequality in the labour force



Before we examine employment by sex in the manufacturing sector, it is important to have a general understanding of whether gender inequalities in the labour force exist at large. This will help us understand the context, which will allow us to better assess performance and trends in the manufacturing sector. Two indicators will be used for this general overview: female share in the labour force of the country and female share in the three broad economic sectors (agriculture, industry, services).

#### 2.1.1 Female share of the total labour force

Generally, women are less likely to form part of the labour force than men. This already means that a large portion of the female population is excluded from earning an income, being economically empowered and contributing to economic growth. Having an indication of the labour force participation rate of women vs men in the country will give a good initial idea of gender equality in the country as a whole. Understanding this will tell us something about the types of determinants we should be looking at more specifically. For example, if there is a large gap in labour force participation rates, then overall factors such as available, affordable and good quality childcare will also be important in addition to the more specific drivers for manufacturing such as female participation in STEM and research and development. Alternatively, if we find that women are just as likely to form part of the labour force but

may be underrepresented in manufacturing, then factors that affect women’s participation in the manufacturing sector in specific will be more important.

### Strategic question

- Are women underrepresented in the labour force, and hence, is there is smaller pool of women able to potentially engage in the manufacturing sector than men?

### Data and sources

| Indicator                    | Variable  | Data source |
|------------------------------|---|-------------|
| Female share of labour force | Labour force by sex and age, in thousands (15+, female) | ILOSTAT     |
|                              | Labour force by sex and age, in thousands (15+, total)  |             |

### 2.1.2 Female share in agriculture, industry and services

It is advisable to measure the gender distribution in the three main economic sectors before moving into manufacturing. This gives us a sense of what broad economic sectors women are mainly engaged in, and how this compares to the sectors men are engaged in. Are women the main participants in the agricultural sector? Are most of the workers in the industrial sector men? What is the situation in the service sector? This will show us how female participation in manufacturing compares to the other main sectors, further contributing to our understanding of whether possible gender imbalances are specific to manufacturing and to identifying which sectors are more female intensive.

We generally speak of structural change as the shift from an agriculture-based economy to one with a stronger manufacturing base, and finally to a large service sector. It is argued that, on average, wages are higher in manufacturing than in agriculture, and in services than in manufacturing. Therefore, we may be tempted to say that it is more important to have gender balance in services than in industry or manufacturing. However, we need to take into consideration that this may not always be true. The service sector comprises many different types of activities, from retailers and hairdressers to investment bankers. Within this sector wages and salaries as well as working conditions vary widely, as they vary between the different manufacturing subsectors as well. Therefore, we cannot say that having gender balance is more important in one broad sector than the other. The analysis does, however, give us a first sense of where women and men work and how similar the distribution is.

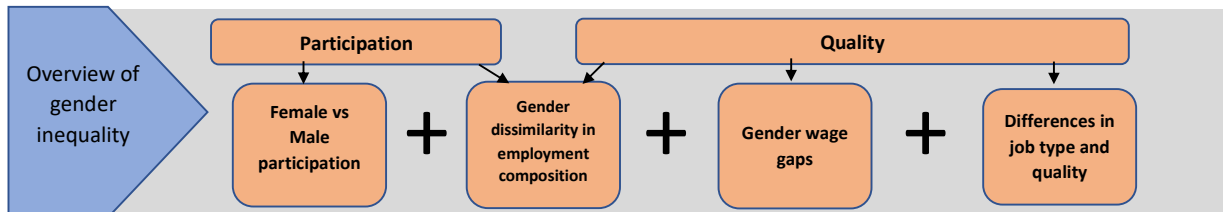
### Strategic question

- What is the gender balance in the three broad economic sectors?
- To what extent do sectors differ in terms of gender representation?

### Data and sources

| Indicator                              | Variable                               | Data source |
|--|--|-------------|
| Female share in broad economic sectors | Female employment by economic activity | ILOSTAT     |
|  | Employment by economic activity        |             |

## 2.2 Part II: Overview of gender inequality in manufacturing



As a first step of the manufacturing analysis, we need to have an overall understanding of the extent and type of gender differences there may be in the manufacturing sector of a country. This overview guides the analyst in doing so. It provides a snapshot of four different aspects of gender inequality within the sector: female employment shares, Gender Dissimilarity Index, gender wage gap and differences in job quality/type (although not all of the latter are manufacturing-specific due to the lack of such data at the international level). As discussed in the introduction, while the simplest and probably most intuitive measure would be to check the female share of manufacturing employment, this can give a very misleading picture, as it hides information about the wage gaps, the type of sectors women are engaged in and their roles in comparison to men. It is therefore important to look at all four aspects together. The analysis in this section focuses on benchmarking the performance of one country with that of comparators. This allows us to have an idea of a country's relative performance.

## 2.2.1 Female share of manufacturing employment

This indicator shows us the ratio of women to men employed in the manufacturing sector. We will calculate this for the country of interest and comparator countries. A low share indicates an underrepresentation of women in manufacturing. This means they do not have equal opportunities to benefit from the advantages associated with being engaged in the sector, such as generally higher wages than in agriculture and in many service sectors, more access to skills development, engagement in research and development, etc.

We need to be cautious with the interpretation of this indicator. While generally speaking a roughly equal share of women and men seems fair (and expected in a society with no gender inequalities), a higher share of women is often found in countries that focus on low-wage export-oriented sectors, such as the textiles sector, which rely on female employment precisely due to the fact that women are often paid less than men. This does not allow women to benefit equally from working in this sector. Therefore, to have a better sense of whether a relatively higher share of female employment in manufacturing is positive or not, it is necessary to interpret this indicator jointly with one that tells us either something about the composition of employment by gender across the different manufacturing subsectors (such as the Gender Dissimilarity Index) or something about the quality of employment, where a valuable message would be the gender wage gap. The latter may be a stronger indication, as it comprises different elements that illustrate gender inequality.

### Strategic questions

- To what extent are women participating in the manufacturing sector?
- How is the female share of employment in manufacturing changing over the years?

### Data and sources

| Indicator                                | Variable  | Source  |
|--|---|---------|
| Female share of manufacturing employment | Employment by sex and economic activity (thousands) (manufacturing, female) | ILOSTAT |
|  | Employment by sex and economic activity (thousands) (manufacturing, total)  |         |

**Note:** it is also possible to use INDSTAT data for this indicator, although using ILOSTAT may be somewhat more comprehensive, as it mostly relies on labour force surveys, household surveys, population census or similar.



## 2.2.2 Gender Dissimilarity Index in manufacturing

The Gender Dissimilarity Index (GDI) was presented in the report, Inclusive and Sustainable Industrial Development: The Gender Dimension as a suggested way to express in a single value the extent in which the distribution of female employment across different manufacturing subsectors is different or equal to that of men's in a given economy (United Nations Industrial Development Organization 2019). It is important to measure such an indicator, as often men and women are preferred for different sectors. Women are more often employed in very specific, labour intensive subsectors such as textiles and apparel, leather, electronics and food and beverages. In these subsectors they are often required for routine and often manual tasks and the wages are often lower than in other subsectors. This does not only limit women from earning wages similar to men's or ensures better job quality (which is often the case in more sophisticated production processes), but it also holds women back from having opportunities to gain more skills and to participate in the structural change of the country.

The indicator sums the absolute difference between the subsector's share in total manufacturing employment for women and that of men and divides the sum by two. The closer the value of the index is to one, the stronger the gender segregation. A value of 0 means that the distribution of employment across subsectors is equal between men and women, hence indicating no gender imbalances in the type of manufacturing subsectors people are engaged in (i.e. the composition of employment of men and women is the same). An analyst or policymaker will probably want to see its GDI value decreasing. This would hint that women are starting to enter subsectors they previously had less opportunities in. While it still does not reveal information on the type of activities undertaken in the subsectors (where we expect to find large differences between women and men), the index together with the female share of employment (and wage gap) offers a valuable first insight into gender inequalities in manufacturing.

### Strategic questions

- To what extent is there a discrepancy in the employment composition of men and women across different manufacturing subsectors?
- Has the dissimilarity increased or shrunk throughout the years?

### Data and sources

| Indicator                  | Variable         | Data source      |
|----------------------------|------------------|------------------|
| Gender Dissimilarity Index | Female employees | INDSTAT2, rev. 3 |
|                            | Employees        |                  |

**Calculation:**

$$\frac{1}{2} \sum_i \left| \frac{M_i}{M} - \frac{F_i}{F} \right|$$

To obtain the gender dissimilarity index, it is first necessary to calculate the share of female and male workers in each subsector, relative to total female/male employment in manufacturing. We can then take the absolute difference of the female and male share, before calculating the sum of these absolute differences and dividing by two.

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**BOX 1: Beyond a Gender Dissimilarity Index based on a two-digit ISIC code**

While the Gender Dissimilarity Index offered here gives us a good first picture of gender segregation between manufacturing subsectors, it would be significantly more telling if we were to use data at a more disaggregated level, such as using the four-digit ISIC code rather than the two-digit. We are proposing analysis at two-digit level as many countries do not report more disaggregated levels in the database. If the country does have four-digit level data, either in INDSTAT or from national datasets, it is advisable to use that.

Similarly, using the GDI to calculate differences in occupations of men and women within manufacturing may in fact be more telling. There is no such information internationally, but such analysis can be added if national data is found.

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**2.2.3 Gender wage gap in manufacturing**

The gender wage gap, particularly in manufacturing, is a well-known issue. There are several reasons for this, such as being engaged in different manufacturing subsectors, having different roles in firms, and having different and often lower skills. Sometimes there is also no apparent reason for this wage gap. The present indicator does not disaggregate this information yet, but rather gives us an overall understanding of the extent of the wage differentials between men and women – which is a large determining factor of gender inequality. It should also be used to observe trends over time, to identify whether the gap is shrinking over the years, remaining constant or even increasing. Note that wages and the gender wage gap can also give us an idea of the extent of discrepancies in working conditions between men and women. Like the Gender Dissimilarity Index, this indicator gives us crucial information to complement the first

indicator on female share of manufacturing employment as it tells us something about the extent to which women are profiting from working in the sector.

### Strategic questions

- What is the overall gender wage differential in manufacturing?
- Has there been a decline in the wage gap over the years?

### Data and sources

| Indicator                        | Variable   | Data source |
|----------------------------------|--|-------------|
| Gender Wage Gap in manufacturing | Mean nominal monthly earnings of employees by sex and economic activity (female) | ILOSTAT     |
|                                  | Mean nominal monthly earnings of employees by sex and economic activity (male)   |             |

**Calculation:** 
$$\frac{\text{Female mean nominal monthly earnings in manufacturing}}{\text{Male mean nominal monthly earnings in manufacturing}}$$

## 2.2.4 Female share of employment in management roles

Large gender imbalance in the types of jobs that women and men have is very common. Men are much more likely than women to have managerial or leading roles, which is associated with higher pay and better job quality. In addition to being beneficial to women and their families, a number of studies show that having more women in managerial positions is also beneficial to firms. They often refer to better risk-management and decision-making processes overall and more consideration of environmental sustainability and gender equality in the workplace (see introduction).

Note that this indicator is not manufacturing-specific, as such data is not available in international databases. Therefore, analysts and policymakers should be aware that this information is for the economy as a whole and the precise share in manufacturing could vary. Nonetheless, it provides a good indication of the general extent to which women are able to obtain managerial positions in the country – and an assumption can be made that a similar share could be true in the manufacturing sector as well.

### Strategic question

- What is the share of women in management positions?

## Data and source

| Indicator                                   | Variable   | Data source |
|---|--|-------------|
| <b>Female share in managerial positions</b> | Female share of employment in senior and middle management (%) | ILOSTAT     |

**Note:** please see Appendix 1 on how this could be adjusted to provide a proxy for manufacturing.

### 2.2.5 Female share of employment by status in employment

In addition to checking the female share of managers, we can also explore the gender balance in other forms of employment. Since data for the manufacturing sector is not available at the international level, it is advisable to use national data. To get a rough idea of the type of employment of women and men, the analyst can use status of employment, where the International Classification of Status in Employment (ICSE) distinguishes between employee, employer, own-account worker, contributing family members and members of producers' cooperatives. While the former is categorized as paid employment, the remaining are considered self-employment jobs.

In addition, we propose a more specific indicator here that may prove to be interesting for analytical purposes, which is the gender difference in the share of contributing family workers in total employment. There is a strong correlation between the share of contributing family workers in an economy and industrialization. The more a country is industrialized, the smaller the share of contributing family workers. The difference between the male and female share, when taken as percentage points, will therefore also be significantly smaller as a country industrializes. This means that with one value we will get a sense of both the extent of contributing family workers (in a very broad sense) and of the gender differentials.

#### Strategic question

- What is the status of women in employment (in manufacturing)?
- How does this differ from men's and how is it changing over time?
- How sharp is the difference between the share of contributing family workers for men and women?

## Data and source

| Indicator                            | Variable  | Data source |
|--------------------------------------|---|-------------|
| Distribution of employment by status | Employment by status in employment (female, male) | ILOSTAT     |
|                                      | Total employment (female, male)                   |             |

### Calculation:

$$\frac{\text{Contributing family workers (female)}}{\text{Total employment (female)}} - \frac{\text{Contributing family workers (male)}}{\text{Total employment (male)}}$$

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## BOX 2: Additional analysis where international data is not currently manufacturing-specific

### A. Female entrepreneurship

Having a sense of the prevalence of entrepreneurs in the manufacturing sector and particularly of female entrepreneurs will allow for further investigation on the different challenges they face, and the support they would most likely need to succeed in their business and contribute to industrial growth. A dynamic manufacturing sector, which is not driven by a few large companies disconnected from the rest but rather by a larger number of dynamic, varied, innovative and competitive firms, will have greater spillover effects on the economy and on the overall development of a country. Measuring the extent to which women are also entrepreneurs is important as this would mean that they are also innovators and drivers of change in the economy – rather than being dependent on employers and their conditions. Being able to monitor female entrepreneurs would help us understand gender balance, but it would also be the preliminary step in examining the performance and constraints of female-owned enterprises.

Ideally, we would have information on the number of female-owned and male-owned firms in the manufacturing sector, in addition to other details such as survival rates, year established, sales, etc., to compare their performance and constraints. Unfortunately, such information is not available in an internationally comparable manner. It is advisable to obtain such data on a country-by-country basis from national sources.

To give us an indication of the recent gender composition of entrepreneurs in the economy as a whole, an indicator that could be used is “Percentage of female 18-64 population who are either a nascent entrepreneur or owner-manager of a new business, divided by the equivalent percentage for their male counterparts” by Global Entrepreneurship Monitor. This gives us the female to male ratio and focuses on ‘new’ entrepreneurs and businesses. On the one hand, this allows us to obtain a picture of the extent to which women are starting such activities, showing latest trends and initiatives. On the other hand,

however, it hides information on how many of these women and men succeed with their businesses beyond the short term. It is therefore highly recommended to obtain national information on this.

### Strategic question

- What is the ratio of female to male population who are new entrepreneurs or entrepreneurs at a new business?

### Data and source

| Indicator  | Variable   | Data source                     |
|--|--|---------------------------------|
| <b>Female to male ratio of nascent entrepreneurs</b> | Percentage of female 18-64 population who are either a nascent entrepreneur or owner-manager of a new business, divided by the equivalent percentage for their male counterparts | Global Entrepreneurship Monitor |

### B. Other recommended analysis

National datasets may offer a range of other relevant indicators for analysis, such as on part-time employment, employment by age group and more. ILOSTAT does offer insightful datasets on the economy as a whole, which allows us to get a general picture that, while not manufacturing-specific, could be useful if national data is not available. Below is some useful additional information one can retrieve from ILOSTAT.

### Job type and quality

1. Part-time employment, by sex: are women taken on part-time agreements more often than men?
2. Temporary employment, by sex: are women taken for temporary positions more often than men?
3. Average hours worked in manufacturing, by sex: do men or women work more hours on average in the manufacturing sector?

### Characteristics of employees

1. Number of people employed per age group: what is the difference in gender balance per age group (with particular attention on youth)?
2. Employment by level of skills, by sex: how does the level of skills used differ between men and women? This can be combined with the information on unemployment by level of education.
3. Employed migrants, by sex and status in employment: what is the prevalence of migrants in overall employment by type of job? Note: very few countries report on this.
4. Working poor, by sex and age: what is the prevalence of those who are employed but fall under the poverty line?

In addition to these it is possible to obtain from the same database data on wages per occupation and by sex, which should give us an idea of the difference in wages between men and women in a certain occupation type.

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## Decent work

### 2.2.6 Wage differential to minimum wage, by gender

In addition to measuring the gender wage gap in manufacturing, it is advised to compare women's and men's average wages in manufacturing to that of the minimum wage of the country. The minimum wage usually tells us something about the minimum income required to live a decent life. Unfortunately, the share of working poor can be relatively large in some countries and social groups. To check this, we can take the minimum wage from the ILOSTAT database. This is also one indicator suggested by the ILO Decent Work agenda. It goes without saying that wages below the minimum wage will alert policymakers to the immediate need for action. It is worth adding, however, that this analysis is based on formal employment and that wages and job quality in informal employment are expected to be significantly lower.

#### Strategic questions

- How do the average wages in manufacturing by sex compare to the minimum wage of the country?
- Do men and women earn above or below the minimum wage? Do only women fall below the threshold?

#### Data and sources

| Indicator                                    | Variable  | Data source |
|--|---|-------------|
| Female/male wage in relation to minimum wage | Mean nominal monthly earnings of employees by sex and economic activity (female/male) | ILOSTAT     |
|  | Statutory nominal gross monthly minimum wage  |             |

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**Note:** further analysis can be undertaken on average wages per manufacturing subsectors (using INDSTAT databases) and comparing these to the minimum wage. This will shed light on the subsectors where employees are more likely to be getting a wage below the minimum.

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## 2.2.7 Informal employment as a share of total, by gender (non-agricultural sectors)

A large challenge that particularly women face is high employment rates in the informal sector and informal employment. This is also true in manufacturing, particularly for low- and semi-skilled jobs. Much of the production work, especially in the textiles and garment subsectors, are outsourced informally to either micro-firms or to women to do domestically. In some countries and in some subsectors these forms of contracts are very common and leads to a substantial share of workers being invisible – making it difficult to monitor their wellbeing or support them through policy interventions. They tend to suffer the most from low and/or irregular pay and poor working conditions, no social security, limited access to skills development, often working excessive hours or even in unsafe working environments. In some countries sexual and other types of violence in the workplace are also not uncommon and are more likely to happen in the informal sector.

The informal economy remains a key challenge for policymakers. While it is useful because it generates employment and contributes to output, it is difficult to track developments within this sector. Statistics on informal employment are crucial to have an idea of the contributions these workers, and especially women, have to the economy, as well as understanding their working conditions. A large part of the informal economy is based on self-employment, which for women is a particularly important source of income. Note that countries' definitions of what constitutes the informal sector varies, which makes a cross-country comparison of this indicator more difficult. What is important for our analysis is to check the gender gap.

Again, while this indicator is not specific to the manufacturing sector, it can give us a general idea of how common informal employment is in the country, and how large the difference is between the share of women and men in the informal sector.

Ideally, we would carry out the entire analysis of this tool for the informal economy as well. This data is not available on international databases, but national data may be able to reveal some more information and it is encouraged to search for data covering the informally employed in manufacturing.

### Strategic questions:

- *How common is informal employment in the economy?*
- *To what extent does the share of women and men in the informal economy differ?*

### Data and source

| Indicator                           | Variable  | Data source |
|-------------------------------------|---|-------------|
| Share of informal employment by sex | Informal employment as a percent of (non-agriculture) employment by sex (%) | ILOSTAT     |



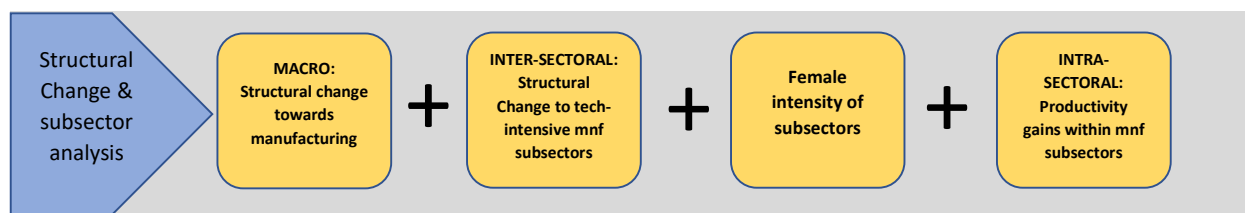
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**BOX 3: Recommended additional analysis: informal employment in manufacturing**

International databases do not provided data on informal employment in manufacturing. If such data is available at the national level, it is strongly advisable to use this. In addition, there may be more information on the informally employed. The analyst is encouraged to explore these, as informal employment often creates a large portion of jobs.

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## 2.3 Part III: Female participation in structural change and manufacturing subsectors



Most developing countries are putting industrialization at the forefront of their development strategy. Structural transformation to more technology-intensive and skills-intensive sectors and upgrading to more efficient capital- or technology-intensive production processes is often the desired growth path.

One entry point into the industrialization process that creates large numbers of jobs is becoming globally competitive in export-oriented, labour intensive subsectors such as textiles and garments, or foods and horticulture. While this absorbs significant numbers of workers and women, being competitive in such subsectors and on the basis of very low wages is not the end goal of any country aiming to industrialize. There will be the ambition to increase technology and skills in production, leading to more efficient production processes and/or a move towards more technology-intensive subsectors.

Policymakers interested in ensuring the benefits of industrialization are felt by the citizens – and by women equally to men – will hence be keen to understand how women’s and men’s employment opportunities in the manufacturing sector have been changing with the different types of upgrading and structural changes.

The analysis carried out in this section will look at the following:

1. Changes in the female share of employment in manufacturing following a structural transformation towards a larger contribution of manufacturing to GDP
2. Changes in the female share of employment in medium and high-tech sectors following a structural change towards more technology-intensive manufacturing sectors

3. The female intensity of manufacturing subsectors and average wages per subsector
4. Changes in female share of employment in manufacturing subsectors following increased productivity and wages.

Note that this section does not introduce a new indicator as such, but rather advises the analyst on how to combine indicators found in this and other EQuIP tools in order to obtain crucial information and observe critical trends on women’s experience throughout structural transformation.

### 2.3.1 Macro-level analysis: gender-balanced structural change towards manufacturing

Using one of the core indicators of EQuIP tool 1 (MVA share of GDP), together with the female share of manufacturing employment, we attempt to understand whether the country in question has been able to create a more gender-balanced manufacturing sector during the process of structural change towards manufacturing – the key concept of industrialization. In other words, are women included or excluded from the structural transformation of the country?

#### Strategic questions

- Is structural transformation towards manufacturing gender-inclusive?

#### Data and sources

| Indicator  | Variable                        | Data source   |
|--|---------------------------------|---|
| <b>Gender-balanced structural change towards manufacturing</b> | Female employees                | INDSTAT2, rev. 3  |
|  | Employees                       |   |
|  | Manufacturing Value Added (MVA) | World Development Indicators/ UN National Accounts <sup>1</sup> |
|  | Gross Domestic Product (GDP)    |   |

<sup>1</sup> Note: This information can also be found on the UNIDO Statistics Data Portal, in the MVA database: <https://stat.unido.org/database/MVA%202019,%20Manufacturing>

### 2.3.2 Inter-sectoral analysis: gender-balanced structural transformation towards more technology-intensive manufacturing subsectors

Industrial deepening – the increasing share of medium and high-tech subsectors in MVA – is one of the key indicators in EQulP tool 3. It measures structural change (or upgrading) within the manufacturing sector, from resource-based and low-tech subsectors into more technology-intensive (medium- and high-tech) subsectors. Many countries will aim at increasing their share of medium and high-tech subsectors as they industrialize. Often, however, women are less likely to participate in these sectors, particularly in activities which require high skills. This is the second reason why as countries industrialize further, the share of women in manufacturing decreases again.

This measure aims to observe whether this trend also holds true for the country being analysed. It measures changes in female employment shares in medium and high-tech subsectors as these subsectors' share changes in Manufacturing Value Added over time. It is hoped that both the share of medium and high-tech subsectors in Manufacturing Value Added increases and the female share of employment rises, as long as it is below half.

#### Strategic questions

- Has structural change into more medium and high-tech (or priority) subsectors occurred and come with efforts to reduce the gender imbalance in these subsectors?
- Can we therefore conclude anything about the extent to which women are included in the structural change agenda of the country?

#### Data and Sources

| Indicator   | Variable                                       | Data source      |
|---|--|------------------|
| <b>Gender-balanced structural change towards technology-intensive manufacturing sectors</b> | Female employees                               | INDSTAT2, rev. 3 |
|   | Employees                                      |                  |
|   | Value added of medium and high-tech subsectors |                  |
|   | Manufacturing Value Added                      |                  |

.....

**Note:** as mentioned before, it is also here strongly advised to assess the situation of workers (women and men alike) within the subsectors in question. Even in the cases where gender balance in terms of participation rate seems healthy, the need to check actual activities by gender, wages and job quality is very important, even in medium and high-tech subsectors where it is generally assumed that conditions

are better. Since production processes have become more and more fragmented and dispersed across the globe, it is common to find high shares of women in certain medium- and high-tech sectors as they engage in the assembling of parts (e.g. for mobile phones or computers).

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### 2.3.3 Female intensity by manufacturing subsectors and average wages

This part of the analysis examines the female share of employment in each manufacturing subsector. It provides a full picture in terms of the subsectors' gender composition and reveals what subsectors have the highest female intensity and which ones are male dominated. This analysis, meant to be a static observation of the current or latest situation, can be done for the latest year reported only or it can take an earlier year as well, in order to observe changes.

As a next step, the analysis will add the average wage of the subsector. By doing so it offers a powerful picture of the extent to which women are more or less absorbed in higher wage subsectors. This will shed more light on whether women are more limited to low wage subsectors and how strongly on average wages differ across subsectors. By comparing to either the minimum wage or the average manufacturing wage, it will be possible to obtain a first understanding of which subsectors may have a stronger need for gender balance.

We need to take into consideration, however, that we are looking at average wages of subsectors here. This means that these do not, in fact, represent the actual wages of women (which are likely to be lower), and do not show any differences in remuneration of employees of different employment types (e.g. managers vs blue-collar workers).

#### Strategic questions

- Which manufacturing subsectors are the most/least female-intensive?
- Are the sectors where there is a low female share of employment increasing its share over time?
- What is the average wage of the subsectors with the highest female employment share?
- What are the subsectors with high wages where women are currently underrepresented?

#### Data and sources

| Indicator  | Variable           | Data source      |
|--|--------------------|------------------|
| Female intensity by manufacturing subsectors and average wages | Female employees   | INDSTAT2, rev. 3 |
|  | Employees          |                  |
|  | Wages and salaries |                  |

**Calculation:**

$$\text{Female intensity of subsector} = \frac{\text{Female employment in mnf subsector}}{\text{Total employment in mnf subsector}}$$

$$\text{Average wage of subsector} = \frac{\text{Wages and salaries per mnf subsector}}{\text{Employees per mnf subsector}}$$

**Note:** it is advisable to plot the two indicators using a scatter graph.

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**Box 4: Gender wage gaps within manufacturing subsectors using national data, as shown in EQulP tool 5**

Ideally, we should also be looking at the wage differentials between men and women within a given subsector. National data can be sought to identify such wage differentials. Section 6 of the EQulP tool 5 illustrates what this could look like using the case of Ethiopia.

Additionally, or alternatively, it would be good to receive national data on the types of activities people undertake in the different subsectors, by gender. It is important to remember that ILOSTAT has average wages per types of activities and gender at a macro level, which means that this would allow us to estimate possible wage differentials within subsectors.

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### 2.3.4 Changes in productivity and female employment intensity per subsector

This measure aims to assess how female employment shares change within sectors, as these sectors increase productivity. It is a well-known fact that as production processes become more capital intensive, the share of women declines, as a number of countries have experienced this trend. This is due to the fact that the demand for labour changes as activities move from mostly routine, semi-skilled and manual tasks often undertaken by women to more varied activities that require higher skill sets. Men are more likely to be hired for the latter, which leads to a decline in female share of employment in the given sector. This is particularly the case in the textiles and garments, food and beverages or other light manufacturing subsectors.

It is possible and advisable to add to the analysis an observation of the changes in wages. The assumption is that as productivity increases, so should the average wage in the subsector. If this is not the case, it could be considered to be “exploiting” the workforce. Checking this will also help identify the sectors that are most “attractive” for creating a better gender balance in the future.

### Strategic questions

- As manufacturing subsectors become more productive, usually due to the increase of capital and technology in the production processes, how does this affect the female share of employment in the sector?
- Can it be anticipated that the female share in key subsectors will either be maintained or increased further? Or are we also facing the challenges experienced by several countries, of men being preferred as productivity increases?

### Data and sources

| Indicator   | Variable                      | Data source      |
|---|-------------------------------|------------------|
| Productivity and female employment intensity by subsector | Female employees by subsector | INDSTAT2, rev. 3 |
|   | Employees by subsector        |                  |
|   | Value added by subsector      |                  |

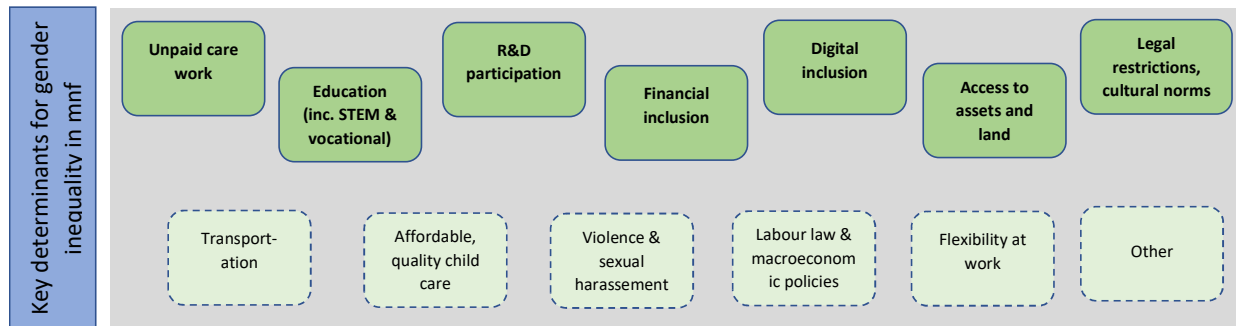
It is possible to present the information in two different ways – both of which have advantages:

**Graphical illustration:** Compound annual growth rate of productivity (value addition/employment per sector) vs change in female share of employment in a bubble graph. This will allow us to have a simple graphical presentation of the data, allowing us to create quadrants to easily categorize subsectors and performance. We suggest having the bubble size represent female share of employment in the latest year reported and to have two distinct colours of bubbles, one representing an overall increase and another an overall decrease in employment in the given subsector over the same period.

**Table:** presenting the information in a table allows us to add more data – and is of course simpler to generate. One important indicator we would like to observe is changes in the average wages of the subsector. We can also ensure we have both levels and changes over time presented.

**Note:** refer to tool 5 on productivity increases vs changes in wages.

## 2.4 Part IV: Key determinants of female participation



Female participation in the labour force, but also specifically in manufacturing, is strongly determined by a number of factors. Some of these factors are general, such as what hinders or encourages women to join the labour force to begin with, and others are more specific to the manufacturing sector.

The selection of determinants used here is based on the main constraints faced by women, extracted from a large literature review on the topic. It also combines indicators with those suggested in EQuIP tool 9 where possible, ensuring there is some level of alignment. While the choice of determinants assessed is strongly constrained to those where data is provided on international databases, this section is in fact able to touch on most crucial indicators which can be disaggregated by gender.

The indicators analysed are the following:

### Distribution of unpaid responsibilities

- Female to male ratio of time devoted to unpaid care work (this indicator mainly determines the female labour force participation rate)

### Education and skills

- Distribution of labour force (and unemployed) by level of education (female, male)
- Female share of STEM graduates from tertiary education
- Female share of vocational pupil in secondary education
- Female share of research and development personnel

### Access to finance

- Percentage of the population aged 15+ who have a financial institution account (female to male ratio)
- Percentage of the population aged 15+ that borrowed from a financial institution (female to male ratio)
- Percentage of women/men who borrowed to start, operate or expand a farm or business

## Digital access and digital banking

- Percentage of women/men using the internet
- Percentage of the population aged 15+ with a mobile money account (female to male ratio)
- Percentage of the population aged 15+ that made digital payments in the past year (female to male ratio)

## Legal rights and attitudes

- Workplace rights
- Legal rights to access financial services, to own land and non-land assets
- Perceptions on the right of women to have a paid job outside the home

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### **BOX 5: Note on other determinants**

The indicators presented in this section are limited to those available on international databases. Some factors that strongly affect female participation either in the labour force or in manufacturing in specific are very difficult to measure but need to be mentioned at least. They will require the analyst to research these aspects for the country or countries in question to obtain a more complete picture.

Stereotyping and cultural/social norms have a particularly strong effect on female participation in the manufacturing sector, especially for technology-intensive tasks. This starts already from early childhood, through education and the often unconscious instilment of the idea that certain jobs are done either by a man or a woman, leading also to selective choices of courses – as well as implicit gender biases by potential employers. It is difficult to measure such information, although the Gender, Institutions and Development Database offers some indicators on this, which are used in this section.

Important constraints that are often not measured include (sexual) violence at work and availability of affordable and safe transportation. Finally, childbearing itself is a large factor holding women back from employment or career advancement, particularly in countries with high fertility rates. In addition to this, a number of countries have legal restrictions on women working, such as on the types of jobs they can undertake or the hours they can work. This is only partially addressed in the methodology.

Individual countries may have national data on other relevant indicators and/or may find that there are other key constraints specific to the country which have not been listed here. Analysts are encouraged to expand this section in light of their national context.

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### **2.4.1 Unpaid care work**

Women's disproportionately large responsibility in regard to unpaid care work is one of the main hindrances of female economic empowerment. It occupies much of their time, minimizing their opportunities to undertake further education and engage in paid economic activities. On average, women



spend over 2.5 times more time on unpaid work than men, with this ratio being even higher in developing countries (UNWomen 2019). Although in most countries unpaid care work is not included in the calculation of GDP, the values of the tasks – which range from cooking, cleaning and taking care of dependents to collecting firewood and more – is estimated to be between 10 to 39 per cent of GDP and represent a significant support to the economy.

There should be efforts to relieve women’s burden on these unpaid activities. On one hand, this can happen by more evenly distributing the tasks between the sexes. On the other hand, the government should provide adequate social protection, infrastructure and services. This would free women from such chores and enable them to enter the workforce and/or spend time in education and training.

We use the indicator on Female to male ratio of time spent on unpaid work of the OECD Gender, Institutions and Development Database (2014). This indicator is not specific to manufacturing, but since unpaid work has a large impact on whether or not women decide to enter the workforce, it has a strong impact on the pool of women ready to work in manufacturing as well.

### Strategic questions

- To what extent are women more heavily burdened with unpaid care work, creating a barrier for them to gain more skills and become economically active?

### Data and sources

| Indicator                                | Variable         | Data source  |
|--|------------------|--|
| Female to male ratio of unpaid care work | Unpaid care work | OECD Gender, Institutions and Development Database |

## 2.4.2 Labour force by level of education

In addition to availability of time, another determinant of whether women will work in the manufacturing sector (or any other sector) and what their experience will be is their level of education. Higher levels of education mean they will probably be accepted for higher-skilled and higher-paying jobs and probably jobs that are more rewarding, less manual, and with better working conditions. It could also mean that they will have stronger bargaining power to request higher pay, for example. Furthermore, people with higher levels of skills generally find it easier to switch between jobs and learn new tasks.

We can compare the distribution of the labour force of men and women based on their completed level of education. In recent years the gender gap in education globally has narrowed significantly. Yet, in a number of countries differences still exist. This indicator will show the skills-level of the labour force by

gender. It is worth noting that it does not provide information on the type of courses undertaken or skills attained, therefore we are unable to comment on possible skills-mismatch, which is often an issue.

### Strategic questions

- What level of education/skills is available in the labour market by gender?
- How different is the attained educational level between men and women?

### Data and sources

| Indicator                                 | Variable   | Data source |
|---|--|-------------|
| <b>Labour force by level of education</b> | Labour force distribution by education (female, male, 15+) (%) | ILOSTAT     |

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### Box 6: Unemployment by level of education

Additionally, we can observe the educational attainment of the unemployed by sex. This will give us a sense of the unutilized skilled female and male labour force.

### Strategic question

- What is the composition of unemployed women in the economy, in terms of their educational level?
- How does the educational level of unemployed men and women differ?

### Data and sources

| Indicator   | Variable  | Data source |
|---|---|-------------|
| <b>Unemployment by level of education and sex</b> | Unemployment by level of education (female, male) | ILOSTAT     |
|   | Total unemployment (female, male)                 |             |

**Note:** This indicator can be further disaggregated by age, which can provide very useful information on unemployed youth, for example.

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### 2.4.3 STEM graduates and vocational training

For the manufacturing sector, some skill sets are more relevant than others. There is a high propensity for STEM graduates to work in the industrial sector. Although in many countries the number of women who complete tertiary education is higher than men, the share who study STEM courses tends to be significantly lower, therefore decreasing the likelihood of women working in industry. As countries move to more technology-intensive sectors and production processes, women risk losing out from participating in these if they are not equally represented in STEM programmes. Therefore, participation in STEM programmes is a key indicator for determining to what extent women will participate fairly in long-term structural change.

Vocational training is also primarily associated with the manufacturing sector. Women tend to be far less represented than men here also. Women’s low participation in STEM programmes and vocational training are likely to be a reflection of social stigma, often already instilled in children from a young age. Education would play a crucial role in closing the gender gap, particularly education that focuses on technology and digitalization, in preparation for the fourth industrial revolution and beyond. While this has already been globally acknowledged and has led to the development of a range of initiatives to tackle the issue of underrepresentation of women in STEM programmes and vocational training (e.g. through media, teacher training, etc.), most countries still lack a coherent policy agenda.

#### Strategic questions

- Is the gender balance in STEM programmes and in vocational training healthy?
- How has the trend been in terms of gender balance in the two?
- Does it seem as though there is a relationship between these two indicators and the findings of Part 1 of the tool?

#### Data and sources

| Indicator                             | Variable  | Data source                     |
|---------------------------------------|---|---------------------------------|
| <b>Female share of STEM graduates</b> | Percentage of graduates from Science, Technology, Engineering and Mathematics programmes in tertiary education who are female (%) | UNESCO Institute for Statistics |

|   |   |                              |
|---|---|------------------------------|
| <b>Female share of vocational training pupils</b> | Secondary education, vocational pupils (% female) | World Development Indicators |
|---|---|------------------------------|

#### 2.4.4 Research and development personnel

Over 90 per cent of private sector research and development (R&D) takes place in the manufacturing sector. R&D significantly contribute to product development and value addition. Hence, understanding the extent to which women are involved in them is a key indication of the contribution they have to advancing the manufacturing sector of the country. The indicator used is R&D personnel in the country and is not disaggregated by sector. Data should be analysed with caution, as it has been found that female researchers tend to stay more in academia, rather than move to the private sector.

#### Strategic questions

- Is there an equal representation of women and men in research and development activities?
- Can we notice a change in trends throughout the years and is it leading to more gender equality?

#### Data and sources

| Indicator   | Variable  | Data source                     |
|---|---|---------------------------------|
| <b>Female share of total research and development personnel</b> | Total research and development personnel (full-time equivalents), -- % female | UNESCO Institute for Statistics |

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#### BOX 7: Recommended additional analysis: research and development

The UNESCO Institute for Statistics datasets offer many different variations of this indicator. In fact, they have sex-disaggregated information on engineering and technology researchers working in a business enterprise. This would be ideal to use, as it looks at those people who are working in the private sector and is more focused on fields related to manufacturing. Nonetheless, this indicator is not suggested as the main one to use here due to the low country coverage it has (42 countries). However, if the country in question has available data, it is strongly advisable to add this analysis to the general research and development indicator proposed.

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## 2.4.5 Access to finance

Access to finance is one of the largest constraints for entrepreneurs in the manufacturing sector, and even more so for female entrepreneurs. Banks and financial institutions are often reluctant to give out the size of loans required to invest in manufacturing and are further put off by the long period before firms can see returns on their investments. Yet the manufacturing sector tends to depend more heavily on larger investments than other sectors do. Women find it particularly difficult to obtain funding, as they usually have less collateral (e.g. land/asset ownership) and less credit history. In some countries they may even face legal restrictions.

Data for the manufacturing sector in particular is not available. We will therefore need to rely on more general indicators. We propose here three indicators that will allow the analyst to obtain a more comprehensive picture: female to male ratio of i) holding an account in a financial institution, ii) borrowed from a financial institution, and iii) borrowed for an economic activity.

### Strategic questions

- What is the female to male ratio in having a financial institution account?
- What is the female to male ratio in having borrowed from a financial institution?
- What is the female to male ratio in borrowing capital to start or expand an economic activity?

### Data and sources

| Indicator   | Variable  | Data source                           |
|---|---|---------------------------------------|
| <b>Female to male ratio: having an account with a financial institution</b> | Financial institution account (female, male) (% age 15+)                            | World Bank Global Financial Inclusion |
| <b>Female to male ratio: borrowed from a financial institution</b>          | Borrowed from a financial institution (female, male) (% age 15+)                    |                                       |
| <b>Female to male ratio: borrowed for economic activity</b>                 | Borrowed to start, operate, or expand a farm or business (female, male) (% age 15+) |                                       |

## 2.4.6 Access to digital technology and digital banking

Access to digital technology has long been an important factor behind women's economic empowerment. In addition to the connectivity and mobile banking services, it provides education and lifelong training opportunities. Digital literacy may be key for the success of entrepreneurs, who can rely on the internet

for their sales, connect with suppliers, use different management apps, undertake financial transactions, build relevant knowledge and much more.

With the fourth industrial revolution unfolding, and digitalization being at its core, digital literacy is a skill employers are focusing on more and more – and one that would allow employees to access better paying jobs. Women are generally less digitally literate, which risks them being further excluded from decent jobs and technological changes. We use the ratio of female to male internet use as an indicator of access to digital technology<sup>2</sup>.

In addition, digital banking has recently significantly eased business for many, including for many vulnerable people and those who have limited geographic proximity to banking facilities. Although these new forms of online and particularly mobile banking have given a large number of women the possibility of making transactions and managing money, it is still said that women have less opportunities for digital banking than men. Two indicators are proposed here to check for this in a given country: female to male ratio of making digital payments and female to male ratio of people holding a mobile money account.

### Strategic questions

- To what extent do women have access to the internet and are using digital technology? How does this differ from men?
- What is the extent of women who have made digital payments in the last year, as a ratio to men?
- What is the extent to which women have a mobile money account in relation to men?

### Data sources

| Indicator   | Variable  | Data source                           |
|---|---|---------------------------------------|
| <b>Female to male ratio: internet use</b>         | Individuals using the Internet (from any location), by gender (%) | International Telecommunication Union |
| <b>Female to male ratio: digital payments</b>     | Made digital payments in the past year (female, male) (% age 15+) | World Bank Global Financial Inclusion |
| <b>Female to male ratio: mobile money account</b> | Mobile money account (% age 15+)                                  |                                       |

<sup>2</sup> In addition, it was found that there is a strong link between gender parity in internet use and in enrollment in tertiary education (International Telecommunication Union, 2017).

## 2.4.7 Legal rights and culture

In a number of countries women still do not enjoy the same rights as men. This hinders women from living a fulfilled life, choosing whether and where to work, owning land and other assets, being able to hold a bank account, voting, moving freely, having reproductive autonomy and more. While such restrictions generally give us a sense of the extent to which a country has gender equality, some of these restrictions will be more relevant for women who would like to work in the manufacturing sector (or work in general).

We will observe the equality of workplace rights, equal rights to own land and non-land assets and to access financial services. Information on this can be obtained from the OECD Gender Institutions and Development Database. It will give a value of 0 to 1 for each of these, where 0 is “Women and men have the same legal rights, without legal exceptions regarding some groups of women. Customary, religious and traditional laws or practices do not discriminate against women’s legal rights” and 1 is “The legal framework does not guarantee equality”. The following values are given: 0, 0.25, 0.5, 0.75 and 1. Exact descriptions are provided below.

### Strategic questions

- To what extent do women have equal rights to men, especially in aspects related to their opportunities for participating in the labour market, and hence in manufacturing, and for being entrepreneurs?

### Data sources

| Indicator   | Variable   | Data source                                   |
|---|--|---|
| <b>Workplace rights</b>                           | Measures whether women and men have the same legal rights and opportunities at the workplace   | Gender, Institutions and Development Database |
| <b>Secure access to formal financial services</b> | Measures whether women and men have the same legal rights to open a bank account and obtain credit at a formal financial institution |   |
| <b>Secure access to land assets</b>               | Measures whether women and men have the same legal rights and secure access to land assets   |   |
| <b>Secure access to non-land assets</b>           | Measures whether women and men have the same legal rights and secure access to non-land assets                                       |   |

### ***Definition of values from the Gender, Institutions and Development Database:***

#### *Workplace rights*

**0:** *The legal framework guarantees equality between women and men in the workplace. Parental leave is available to mothers and fathers and the law protects women’s rights during pregnancy and maternity/parental leave. Customary, religious and traditional laws or practices do not discriminate against women’s legal right to enter certain professions, choose a profession and register a business.*

**0.25:** *The legal framework guarantees equality between women and men in the workplace. Parental leave is available to mothers and fathers and the law protects women's rights during pregnancy and maternity/parental leave. However, there is evidence of customary, religious or traditional practices or laws that discriminate against women's legal right to enter certain professions, choose a profession or register a business.*

**0.5:** *The legal framework guarantees equality between women and men in the workplace. Parental leave is available to mothers and fathers and the law protects women's rights during pregnancy and maternity/parental leave. However, this does not apply to all groups of women.*

**0.75:** *The legal framework guarantees equality between women and men in the workplace. However, parental leave is not available to mothers and fathers and/or the law does not protect women's rights during pregnancy and maternity/parental leave.*

**1:** *The legal framework does not guarantee equality between women and men in the workplace.*

#### Rights regarding access to financial services

**0:** *Women and men have the same rights to open a bank account and obtain credit at a formal financial institution, without legal exceptions regarding some groups of women. Customary, religious and traditional laws or practices do not discriminate against women's above legal rights.*

**0.25:** *Women and men have the same rights to open a bank account and obtain credit at a formal financial institution to women and men, without legal exceptions regarding some groups of women. However, some customary, religious or traditional practices or laws discriminate against women's legal rights.*

**0.5:** *Women and men have the same rights to open a bank account and obtain credit at a formal financial institution to women and men. However, this does not apply to all groups of women.*

**0.75:** *Women and men have the same rights to open a bank account at a formal financial institution. However, women do not have the same rights as men to obtain credit.*

**1:** *Women do not have the same rights as men to open a bank account at a formal financial institution.*

#### Legal rights regarding land and non-land assets

**0:** *Women and men have the same legal rights and secure access to non-land assets, without legal exceptions regarding some groups of women. Customary, religious and traditional laws or practices do not discriminate against women's legal rights.*

**0.25:** *Women and men have the same legal rights and secure access to non-land assets, without legal exceptions regarding some groups of women. However, some customary, religious or traditional practices or laws discriminate against women's legal right.*

**0.5:** *Women and men have the same legal rights and secure access to non-land assets. However, this does not apply to all groups of women.*



**0.75:** *Women and men have the same legal rights to own non-land assets; but not to use, make decisions and/or use non-land assets as collateral.*

**1:** *Women do not have the same legal rights as men to own non-land assets.*

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### **Box 8: Sexual harassment in the workplace and other legal considerations**

Currently, 104 countries have laws in place that prohibit women from working in certain jobs (World Economic Forum 2018). The World Bank estimates that this results in about 2.7 billion women being unable to make a free choice in terms of their employment. There are also numerous countries where women are not allowed to legally register a business in the same way as men, are restricted in their movement and travel and are required to obey their husbands and/or male relatives. The World Bank has put together a database recording whether women have the same rights as men on a number of issues, mainly on employment and freedom of movement. It is recommended to review this for the country/countries in question. The dataset also covers information on whether sexual harassment in the workplace is illegal or not and whether there are legal penalties for this.

The dataset is available under the following link: <https://wbl.worldbank.org/>

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### **2.4.8 Society's perceptions on women's right to work**

Legal rights may not suffice to ensure women are able to work in the same way than men. Whether women are allowed to work also depends on society's perceptions. Perceptions can hinder someone from hiring a woman who is equally or more qualified than a man for the same position. This can also mean that a male relative (normally husband or father) could forbid the woman from undertaking an economic activity of her choice (or from working altogether). Since the manufacturing sector is generally male dominated, this could be holding women back from working in this sector in particular.

The Gender, Institutions and Development Database measures the "Percentage of the population who disagrees with 'It is perfectly acceptable for any woman in your family to have a paid job outside the home if she wants one'". This gives us a broad sense of the extent to which a society is open to women making their own economic decisions.

### **Strategic questions**

- What is the general attitude of the society regarding women's choice to engage in paid employment?

## Data sources

| Indicator   | Variable  | Data source                                   |
|---|---|---|
| <b>Prevalence of discriminatory attitudes towards working women</b> | Percentage of the population that disagrees with 'It is perfectly acceptable for any woman in your family to have a paid job outside the home if she wants one' | Gender, Institutions and Development Database |

## 3 Interpretation of findings and conclusions

This section gives an example of the quantitative analysis that can be undertaken using the methodology presented above. The main objective of this section is to propose types of graphs that could be used to best illustrate the data. The description of the graphs in this section could also serve as guidance. However, it is important to stress that the findings of this quantitative work need to be complemented with qualitative information. While the numbers ensure comparability, qualitative information should be used to help make sense of the data, as well as complement it with information the data does not cover.

The analysis undertaken here looks at the following countries: Ecuador, Indonesia, Mexico, the Philippines, Saudi Arabia, United Republic of Tanzania and Viet Nam. In some cases, other countries were also added to the graphs to give more perspective. The idea is to present a range of countries that are at different stages of industrial development, cover various geographic regions and have different cultures. The analysts of a specific country will need to select benchmarking countries most suitable for the country in question. The analysis will have a focus on Viet Nam.

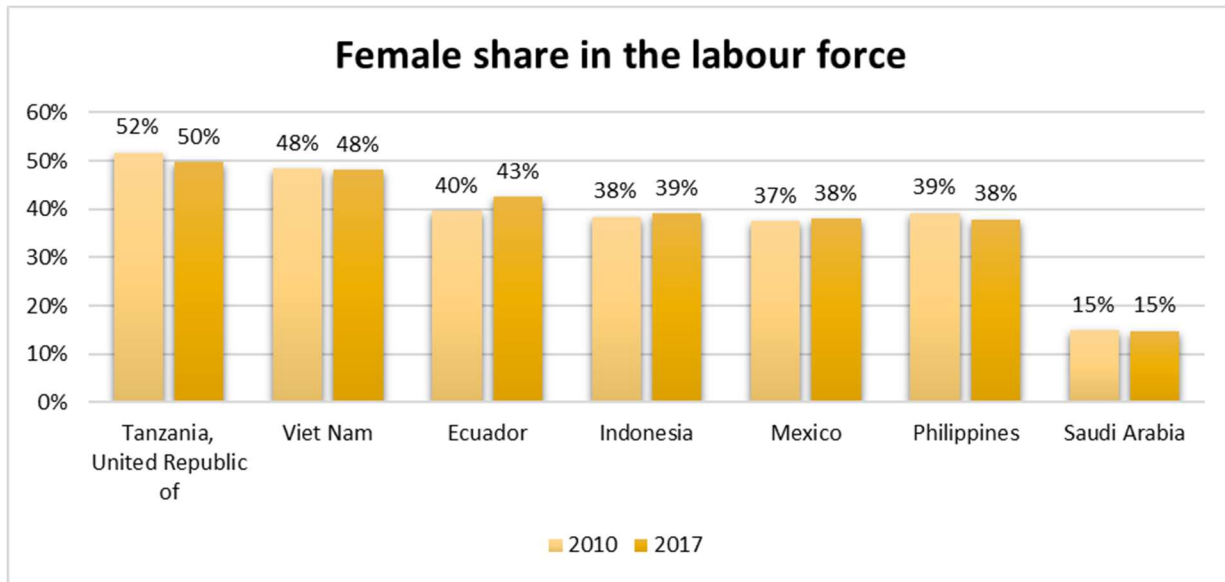
### 3.1 Part I: Setting the scene – gender inequality in the labour force

The analysis should start with a more general part, to provide a context to the examination of gender inequality in manufacturing. This will help us understand whether the inequalities are limited to the manufacturing sector or if there seems to be a general issue with female participation the economy. We use two straightforward indicators for a quick overview.

#### 3.1.1 Female share of total labour force

For this simple indicator, we calculate the share of women in the total labour force of the country and check for changes over the years. This will show us if women in general are less likely than men to form part of the workforce. This is the case in a number of countries, and it is often related to the extent to which women are disproportionately responsible for the unpaid care work in the household or to restrictions women face.

**Figure 3: Female share in the labour force, 2010 and 2017**



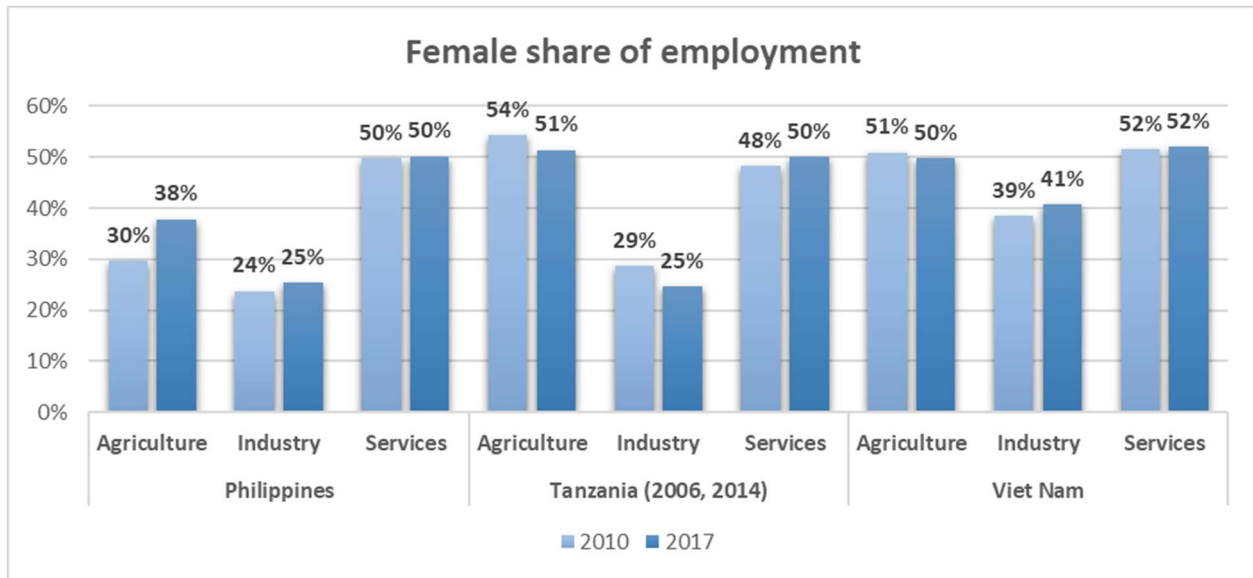
Data source: ILOSTAT

The graph above compares the female share of employment in Viet Nam with that of the selected other countries. We see that there is roughly an equal distribution of men and women in the labour force of Viet Nam, with women making up 48 per cent. This share has remained constant between the two years observed. Apart from Tanzania, where there is currently an exact gender balance in the labour force, the remaining countries have less women than men working or searching for employment. This indicates that there is some gender inequality in the economy at large.

### 3.1.2 Female share in agriculture, industry and services

The next question that naturally arises is what types of sectors women and men are engaged in. We can meaningfully measure this by checking the distribution of employed women and men per broad economic sector. In this case we would be able to see the share of women that work in a specific sector. Alternatively, we can check the female share of employment in each one of the sectors. This might be somewhat more useful for our analysis, as we want to identify whether there are gender imbalances, and how these differ per sector.

**Figure 4: Female share of employment by broad economic sector (2010, 2017)**



Data source: ILOSTAT

The clustered column chart above is one way to present this information in a clear manner. For all three countries presented we see that the female share of employment in industry is lowest. This means the industrial sector is much more likely to absorb men than women. In the Philippines and Tanzania this is particularly pronounced, where there is one woman for every four men. In Viet Nam 41 per cent of those working in industry are female and there has been an increasing trend. Nonetheless, they are still somewhat underrepresented. Meanwhile, in both agriculture and services, the gender balance seems to be better, with the exception of the agricultural sector in the Philippines. The analyst should keep in mind, however, that this data does not include the informal sector, and that it is expected that the shares would be somewhat different if such information was included.

The following part of the analysis observes the female share in manufacturing in specific, which represents the core of this assessment. It is important to understand already that in terms of female participation (not addressing quality of employment), women in Viet Nam seem to be underrepresented exclusively in the industrial sector.

### 3.2 Part II: Overview of gender inequality in manufacturing

We now move on to analyse employment specifically in the manufacturing sector. As a first step, we would like to gain a general understanding of gender inequality in manufacturing before focusing on structural change. Gender equality looks at both number of jobs (and how that compares with men's number of jobs) and the quality of jobs. In other words, for inclusive and gender-just industrialization to take place, we would hope to see the manufacturing sector create more and better jobs for women as well as for

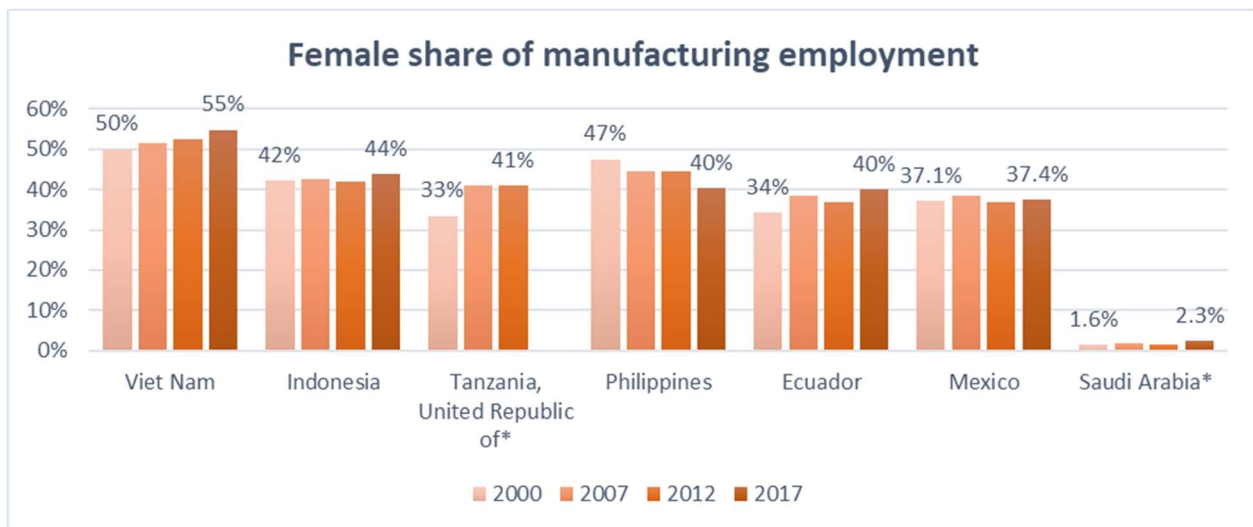
men. This overview attempts to measure both these aspects with the range of indicators presented in the methodology section.

### 3.2.1 Female share of manufacturing employment

This indicator shows the actual female share of employment in the manufacturing sector. It therefore answers in a straight-forward manner the following question: to what extent are women included in the manufacturing sector?

In addition to looking at shares in the most recent available year, it will be interesting to observe trends over time to see whether the countries are moving in the “desired” direction, that is, to a more or less balanced participation of men and women.

**Figure 5: Female share of manufacturing employment (2000-2017)**



*Tanzania: 2001, 2006, 2014, Saudi Arabia: 2000, 2007, 2012, 2016*

*Data source: ILOSTAT*

The clustered column graph above is a simple and clear way to compare countries while showing individual trends in each country. The period chosen here was from 2000 to 2017, as we would like to see trends in the medium to long term. A line graph could also be used if there are not many data gaps throughout the years.

This diagram reveals that Viet Nam has the highest share of women in its manufacturing sector, and that this rate has been increasing to over 50 per cent. The impressive rate of industrialization Viet Nam is known for is therefore indeed providing women a lot of new opportunities.

We need to remember, however, that by looking at this indicator in isolation, we do not obtain any information on the type of jobs, wages and working conditions that women have, and whether these are

similar or quite different to that of men. These are very important aspects that cannot be overlooked and that are covered by the remaining indicators of this section.

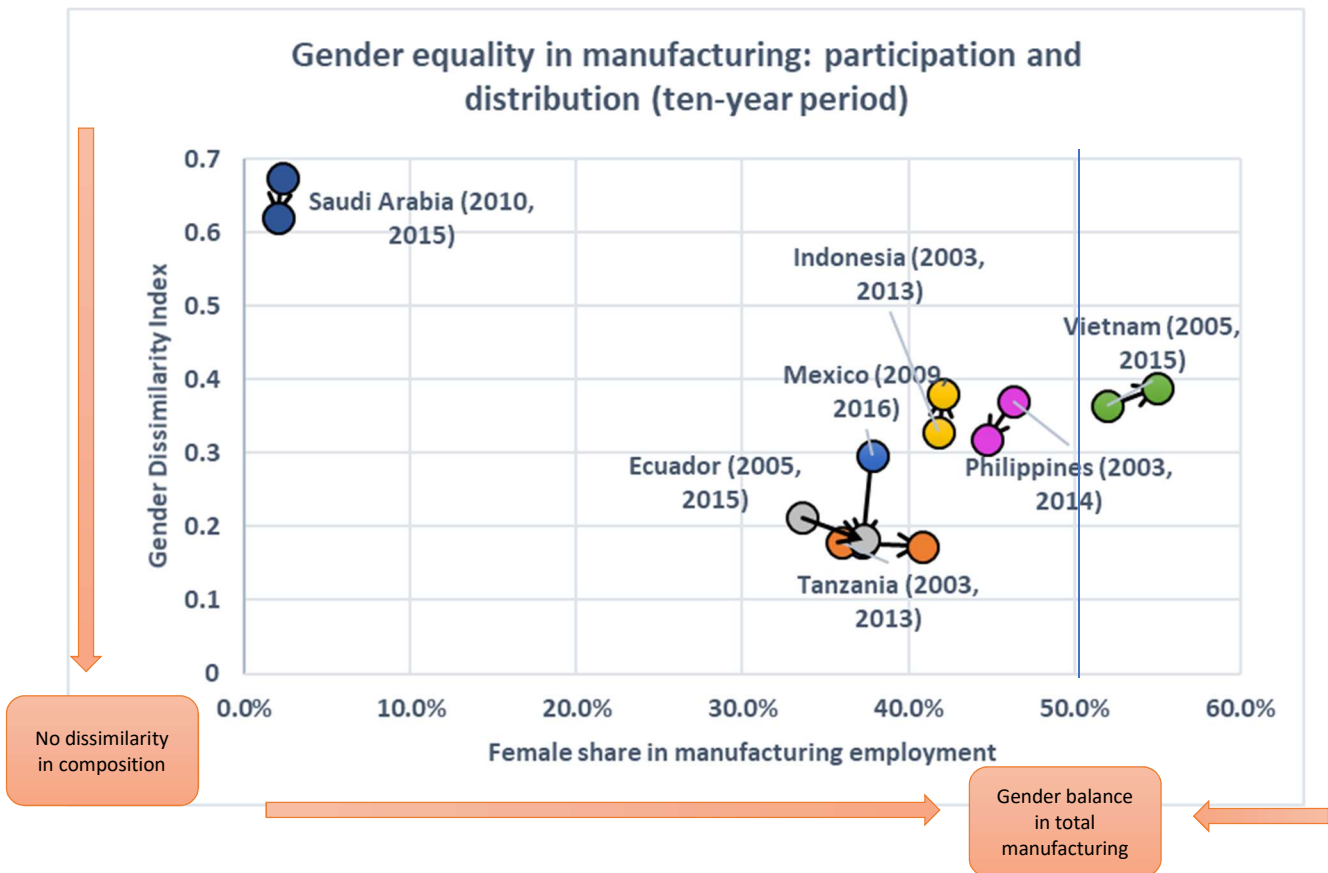
Meanwhile, in all other countries apart from Saudi Arabia, 37 to 44 per cent of manufacturing workers are women. Indonesia, Tanzania and Ecuador have seen slight increases over the years. The Philippines had quite an equal distribution of gender participation in the early 2000s (at which point its Manufacturing Value Added per capita was similar to that of Viet Nam today) but it has since seen a decline in its female share. Reasons for this will need to be explored further. The manufacturing sector of Saudi Arabia is almost entirely dominated by men: only 2 per cent of its workers are women and that is a slight increase from the previous 1.6 per cent.

### 3.2.2 Gender Dissimilarity Index in manufacturing

We add to the above analysis the Gender Dissimilarity Index, in order to get a first insight into the composition of female and male employment in manufacturing. The index tells us how different this composition is between men and women. Again, it makes sense to look at the change in value over time, as being able to reduce the index value (obtaining a value closer to 0 over time) would mean that women are starting to be able to move into sectors that have previously been less accessible to them. This is a good indicator to be used together with female share of employment in manufacturing (just like in the case of female share of employment, this indicator would not be very useful on its own). It focuses on the idea that in early stages of industrialization, women are often used in very specific sectors – mainly very low-waged, export-oriented ones. Therefore, while we may find high female shares in employment, the GDI will indicate at first glance whether and to what extent we may find such dynamics of women working predominantly in very specific manufacturing subsectors in the country.

It is worth mentioning that reaching a point where the distribution of women and men across the different subsectors is exactly equal (in which case the index would have a value of 0) is unlikely. We need to keep in mind that preferences do exist. On the other hand, very high or increasing Gender Dissimilarity Index values are not desirable either.

Figure 6: Female participation and gender segregation in manufacturing



Data source: ILOSTAT, INDSTAT 2 rev. 3

The scatter plot above combines the dissimilarity index with the female share of manufacturing employment (same indicator as above), and plots values of two years covering a ten-year period to the extent possible. Note that the actual years will differ across countries, which is due to data availability per country.

Although Viet Nam has the highest female share in employment, we do find large gender dissimilarities in the types of manufacturing subsectors people are engaged in. In theory, 40 per cent of Vietnamese women or men would need to change their sector in order to generate the same composition in manufacturing employment between the two sexes. However, rather than seeing the gender dissimilarity reducing, we notice an upward trend. The already relatively large discrepancy is growing further, meaning that over time women are more and more likely to work in certain sectors, and to have more difficulty accessing male dominated ones.

Interestingly again, we find that the Asian economies seem to be similar in the extent of their gender dissimilarity, as they are concentrated around the 0.3 and 0.4 values. The Latin American economies and Tanzania have lower dissimilarities in the composition of employment in manufacturing, with Gender



Dissimilarity Index values of just under 0.2. Saudi Arabia has a female to male discrepancy of over 0.6, the highest in this sample of countries.

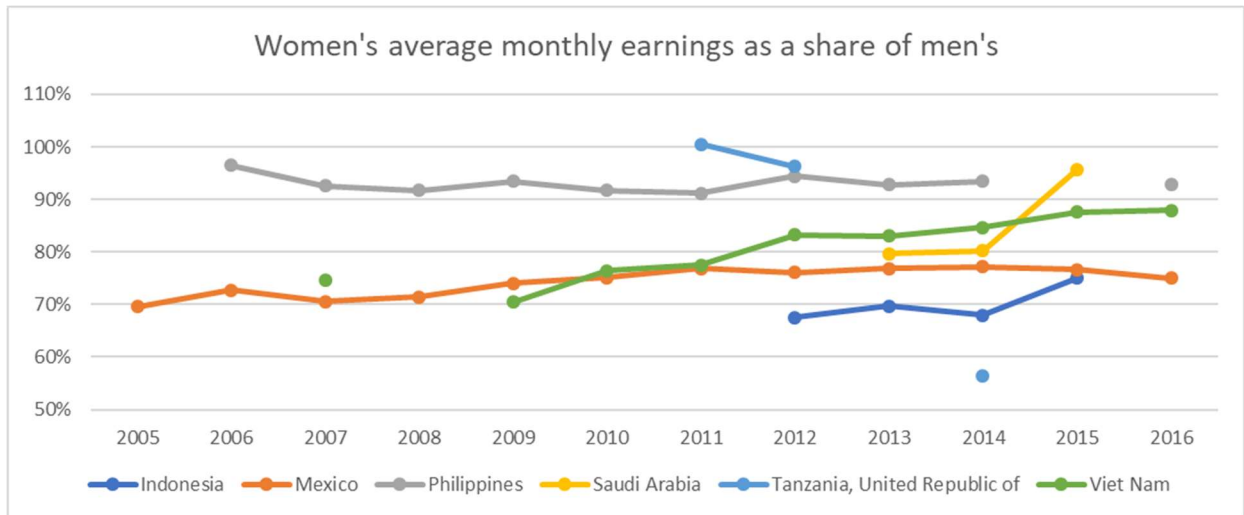
The most meaningful way to assess this indicator is by looking at the trends of the country over time and comparing with relevant countries (as mentioned earlier, reaching a value of 0 is unrealistic). It should be mentioned that Indonesia is the only other country apart from Viet Nam that is experiencing an increase in the gender segregation of manufacturing employment. The other economies have, in fact, been able to reduce this gender dissimilarity across the different sectors.

This analysis shows us that while Viet Nam's manufacturing sector has been the most "inclusive" in terms of female participation in manufacturing, the types of sectors women work in seem to be quite different to the ones of men – and increasingly so. This shows that working in manufacturing can be a very different experience for a woman than for a man.

### 3.2.3 Gender wage gap in manufacturing

Comparing wages between men and women working in manufacturing gives us one indication of the extent to which people are benefiting from being employed in the sector. A country aiming to reduce gender inequalities will hope to see the gender gap close. Wages and salaries depend on a large number of factors and will be determined by types of sectors and activities people engage in, their skills, experience, bargaining power and much more. We are unable to entangle these determinants here, but this indicator gives us a summary of their combined outcome.

**Figure 7: Gender wage gap in manufacturing**



Data source: ILOSTAT

The exact indicator used is women’s wage as a share of men’s for manufacturing. The lowest gender wage gap for the manufacturing sector is found in Saudi Arabia and the Philippines, where women earn more than 90 per cent of the average male wage. Over the years, however, Viet Nam has steadily but significantly decreased its large wage gap. While in 2009 women earned on average only 70 per cent of what men did, by 2016 they were earning almost 90 per cent. This is particularly interesting as we have found relatively large differences in the type of sectors that women and men work in. Nonetheless, a continued upward trend at the same pace would result in gender wage parity within the next 10 years.

Mexico and Indonesia still have larger wage gaps, with women earning about 75 per cent of men’s wages. The positive development in the case of Viet Nam becomes clear when comparing the country to Mexico, since in 2010 and 2011 both countries had the same gender wage gap. Viet Nam was able to improve this substantially, while the value has remained relatively unchanged in Mexico.

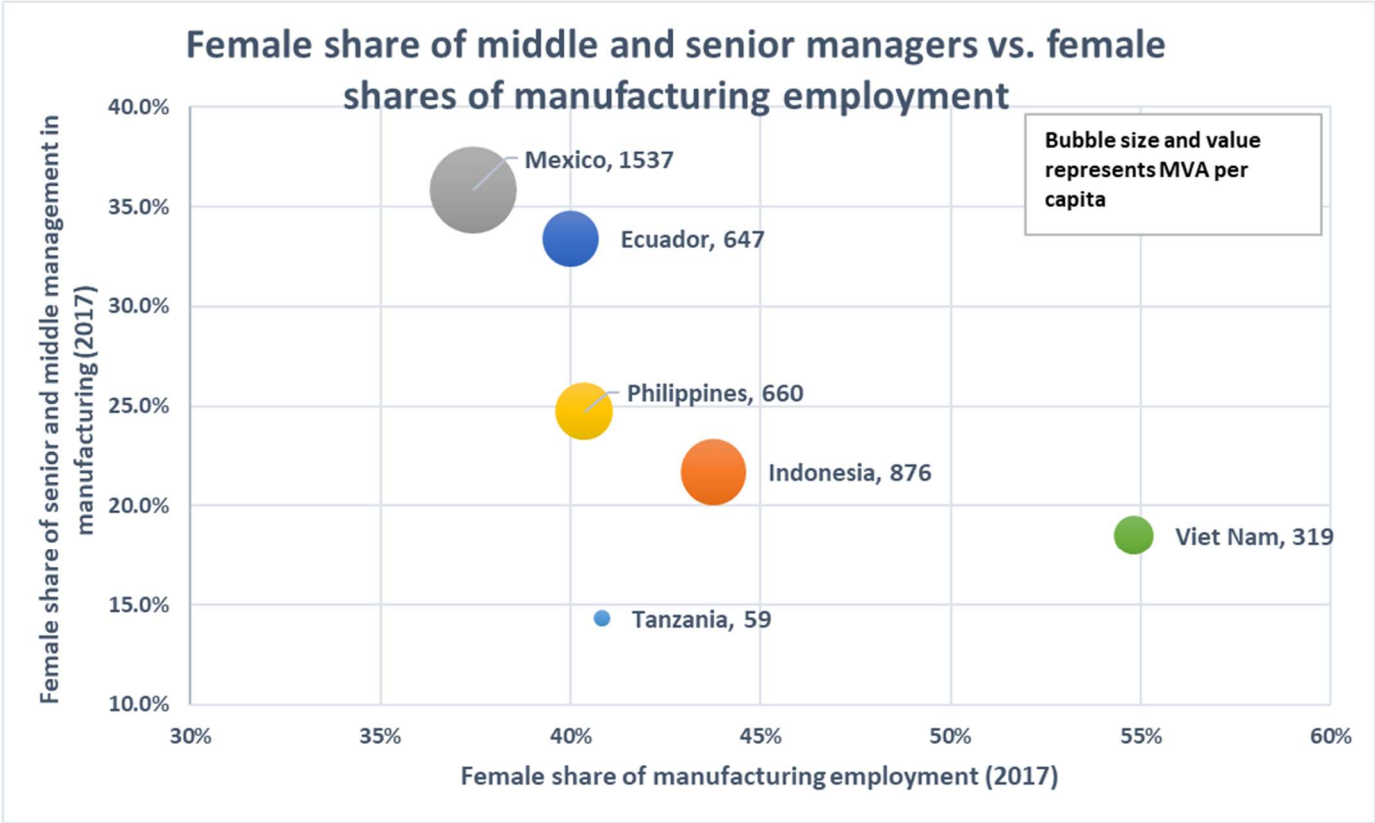
### 3.2.4 Female share of employment in management roles

Until now, we have managed to gain an understanding of the extent of female participation in manufacturing, how the composition of female employees across subsectors varies from that of males, and how their pay differs. Many studies undertaken conclude that much of the female experience of working in manufacturing depends on the type of occupation. Unfortunately, this kind of information is not available in a sex-disaggregated manner for the manufacturing sector. Nonetheless, there is data available for most countries at total economy level. Although the type of occupation of women may differ across sectors, understanding women’s roles in the economy as a whole will complement our manufacturing-specific knowledge of their experience.

The first indicator we will look at, and perhaps one of the most telling, is the female share of employment in middle and senior management. Looking at management roles in particular makes sense also because of the positive impact women in management can have on firm productivity and inclusive growth.

In Appendix 1 we suggest a methodology to calculate a proxy for female managers in the manufacturing sector in specific. This is based on ILOSTAT data, although it cannot account for sector specificities. Due to the fact that the picture does not change significantly, the time and effort of calculating the proxy may not make it too appealing.

**Figure 8: Female share of managers vs manufacturing employment (2017)**



*Tanzania: 2014, Indonesia: 2010, Viet Nam 2007. No data on Saudi Arabia available.*

Data source: ILOSTAT, World Development Indicators<sup>3</sup>

While other types of graphs can be used, we chose to combine this information with the female share of employment in manufacturing and with MVA per capita (represented by the bubble size), as we were able to identify interesting trends. This is not obligatory.

What we seem to find here is a negative correlation between female share in manufacturing and the female share of managers (note that there have not been large changes in the shares throughout the

<sup>3</sup> Note: In this graph, as well as in all others where total Manufacturing Value Added (MVA) is used, we are using constant MVA in 2010 prices. This is in line with other EQUiP tools, as we prefer to exclude inflation from our analysis. Unfortunately, as discussed later on, the data on value added per manufacturing subsector from INDSTAT is only reported in current prices.

years for those countries where data was available). This might be in line with the idea that high shares of female employment in manufacturing may be due to the demand for women as relatively cheap sources of labour. It also seems as though generally more industrialized economies have a higher share of female managers (though still far from 50 per cent), which may be explained by more balanced skills development in these countries and generally higher gender equality. More research would need to be undertaken to check these assumptions.

Particularly noticeable here is Viet Nam, with a relatively high female share in employment but a very low percentage of female managers (roughly 19 per cent). If we can use this general information to say something about the manufacturing sector in the country, we could say that men are more likely to have leadership roles in manufacturing firms, presumably leaving the routine factory floor tasks more to women.

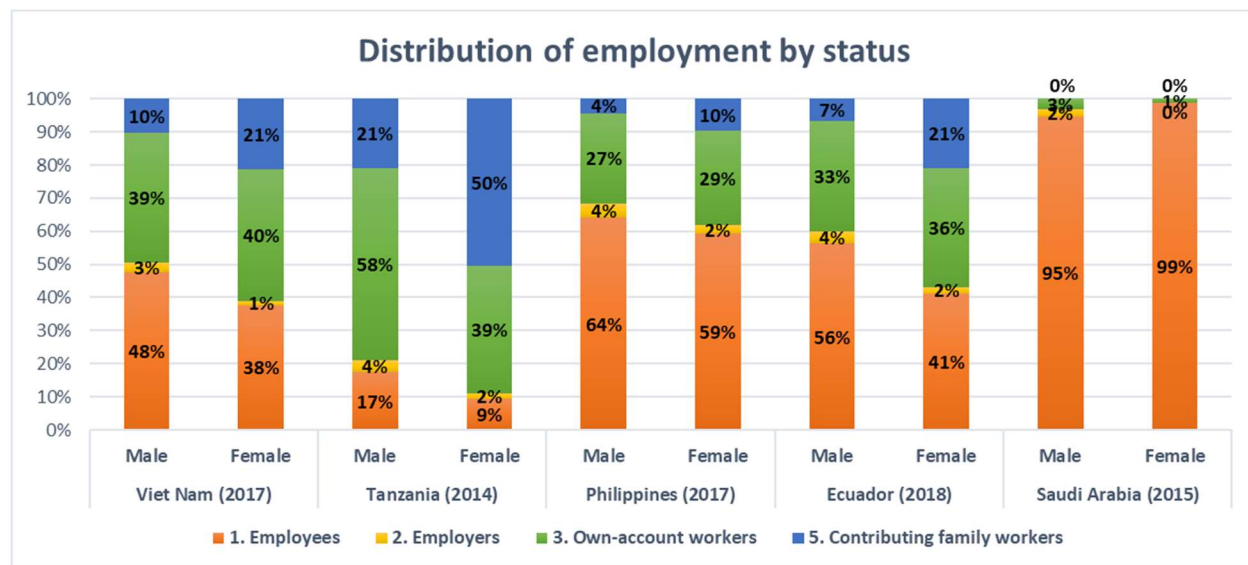
Mexico and Ecuador (both middle income countries) have much lower female employment shares than Viet Nam but relatively higher shares of female managers. Nonetheless, the shares (around 35 – 40 per cent for both indicators), still show large imbalances in female participation and type of occupation.

Philippines and Indonesia once again show similarities, with about 20 to 25 per cent of the managers being female, situating them between the two Latin American countries and Viet Nam. Tanzania is the exception in this graph: its female share of manufacturing employment is similar to that of the Philippines and Indonesia, however the likelihood of middle and senior managers being women is significantly lower than in the Asian comparators, at below 15 per cent. It should be remembered that the Tanzanian manufacturing sector is still at very early stages of industrial development, resulting in large differences in the context of the countries.

### 3.2.5 Female share of employment by status in employment

To complement the above analysis on female share of managers, we now look at the status of employment of women versus men. This is important to understand whether many of the workers are in fact contributing family workers, meaning they have significantly less responsibility and are dependent on a family member. Contributing family workers also tend to work fewer hours and earn lower or irregular wages. Their experience is very different to that of an employer, an own-account worker, or an employee. The below is also a good example of the type of illustration that can be made at a national level when there is information available for the manufacturing sector in specific.

**Figure 9: Distribution of employment by status and sex**



Data source: ILOSTAT

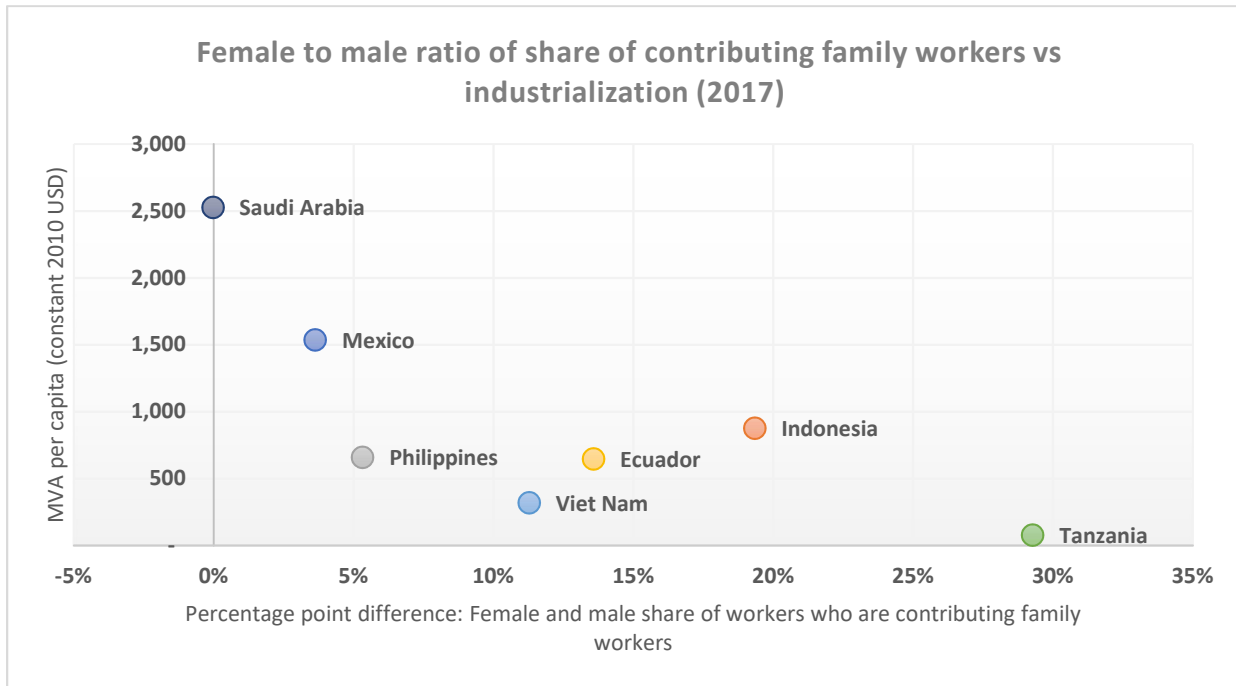
From the stacked bar chart created we can identify that 40 per cent of working women in Viet Nam are own-account workers, 38 per cent are employees, 21 per cent are contributing family workers and 1 per cent are employers. For men, only 10 per cent are contributing family members – they are less than half as likely to have this role. For all countries observed we find that the share of women as contributing family members is higher than that of men (this being particularly pronounced in Tanzania). Similarly, women are less likely to be employers.

We can check how the type of employment correlates with the level of industrialization of a country. The more industrialized the country is (measured by MVA per capita), the less it will have contributing family workers as their share of total employment. This holds true for men and women. Although women continue to be contributing family workers more often than men even in more industrialized nations, this form of employment drastically loses importance, affecting only a relatively small number of women (and men). For developed countries, between 0-2 per cent of working women and men are contributing family workers.

In addition to this, the more industrialized the country, the smaller the difference between the number of men and women that are contributing family workers, therefore contributing to the reduction of the gender gap in this regard.

One way to put this information into a graph is by using the difference (in percentage points) of the share of both men and women as contributing family workers. This allows us to combine two interesting pieces of information: is, roughly speaking, the extent of contributing family workers in the economy large or not? Secondly, to what extent are women more likely than men to be contributing family workers?

**Figure 10: Gender gap in share of contributing family workers vs level of industrialization**



Data source: ILOSTAT

Even using a small sample of countries confirms what was found globally: there is a correlation between a gender gap in contributing family workers (measured by percentage point differences) and level of industrialization. Tanzania is still at an early stage of industrialization and overall still 50 per cent of working women are contributing family workers. At the same time, it has an almost 30 percentage point difference in the share of contributing family workers between men and women. Mexico and particularly Saudi Arabia have higher levels of MVA per capita and their shares, as well as the difference in their shares, of contributing family workers are smaller: less than 5 percentage points<sup>4</sup>. Viet Nam is somewhat in the middle: it is still at relatively low levels of industrialization (although it is industrializing rapidly) and 21 per cent of employed women are contributing family workers, versus roughly 10 per cent of men. This still means that women are significantly more likely than men to have this status (double as likely, in fact). On the other hand, there are countries with higher levels of MVA per capita that still have larger differences in this regard, such as Ecuador and Indonesia.

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**BOX 9: Female entrepreneurship**

As mentioned in the methodology section, we measure female entrepreneurship because we would like to understand how likely it is for women, compared to men, to own businesses. Women often face certain challenges that are different to those faced by men, and their experiences and needs differ. Entrepreneurs

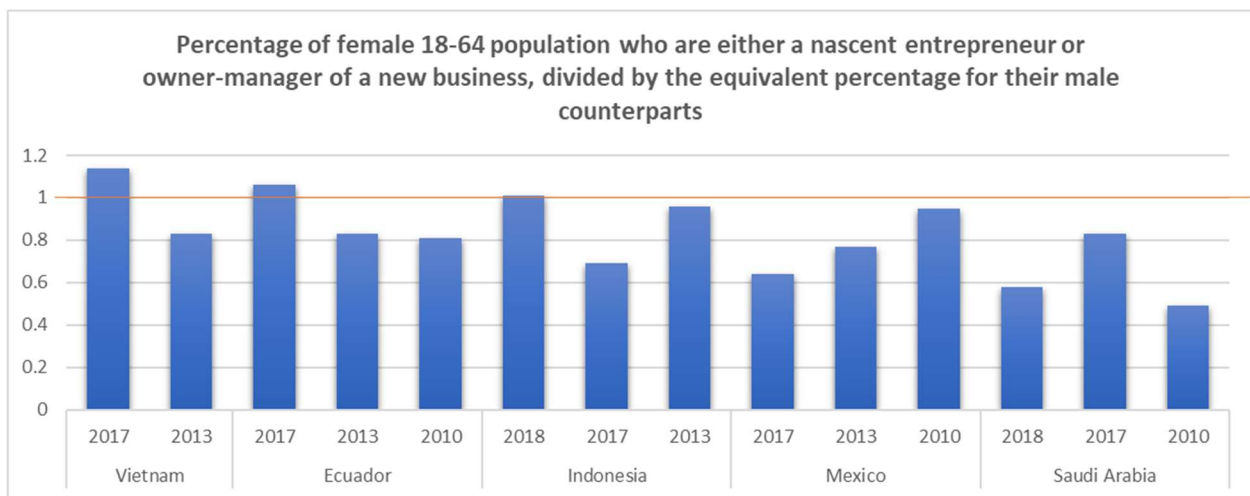
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<sup>4</sup> In the case of Saudi Arabia, we need to keep in mind that women make up 15 % of the labour force, significantly less than the other comparator countries.

drive economies, employ workers, create innovation and generate growth. In many countries the number of male entrepreneurs exceeds that of women. As women often face other challenges, such as owning land and accessing credits, this affects their experience as an entrepreneur and can determine the level of success (or failure) of their business. While some of the drivers will be assessed in the determinants section, we first need to check the female to male ratio in the country in question.

The indicator identified is female to male ratio in terms of percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business. This means we are focusing on new entrepreneurs or businesses. Note that ideally, we would have actual numbers of female and male entrepreneurs and complement this with data on average years of existence of the company and performance indicators such as output and so forth. Let us also remember that this indicator is not manufacturing-specific and it is unclear what share of women entrepreneurs (or men) are in manufacturing. Nonetheless, manufacturing creates very strong backward and forward linkages, demanding both agricultural products and services. Therefore, a strong manufacturing sector could have indirect effects on (female) entrepreneurs in other sectors of the economy.

**Figure 11: Female to male ratio in terms of percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business (2010-2017)**



Data source: Global Entrepreneurship Monitor (GEM)

With no calculations required for this indicator, we can plot the values as obtained from the database. Viet Nam and Ecuador both seem to have a higher percentage of women as nascent entrepreneurs than men in 2017 after significant increases from previous years. Indonesia reports practically the same share irrespective of gender, while in Mexico and Saudi Arabia it is significantly more likely for men to become entrepreneurs than for women. A value closer to 1 means there is more gender balance. In the case of Mexico there has been a very stark negative trend for women and this probably calls for more analysis to understand the reasons behind this.

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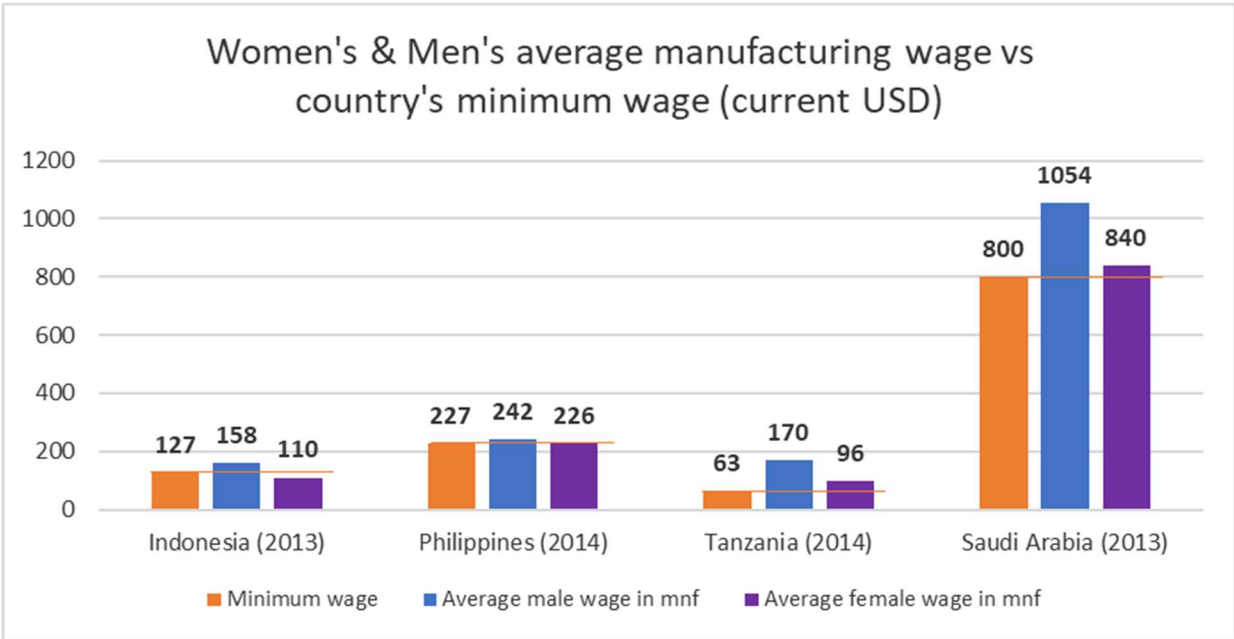
## Decent work

It is well known by now that working conditions in various manufacturing firms can be very difficult, especially in sectors that rely on low wages. Such sectors, in turn, tend to be female dominated. On top of looking at the type of occupation, we would ideally like to understand working conditions. Data for this is largely unavailable, however, so we will use two indicators to obtain a first image: wage differentials to minimum wages, by sex and informal employment.

### 3.2.6 Wage differential to minimum wage, by sex

We have already begun looking at the average wages of women and men in manufacturing and comparing them to uncover a gender wage gap. Another aspect is whether wages are below the minimum wage set by the country, and how far away they are from it. Earning a wage above the minimum wage is one aspect of decent work.

**Figure 12: Average wages in manufacturing by sex vs minimum wages per country, latest year reported**



Data source: ILOSTAT

Data is not available for all the countries we are observing and is missing for Viet Nam, Mexico and Ecuador. The graph shows us that the average wage of women in Indonesia's manufacturing sector is clearly below the minimum wage. This should call for further investigation as to why this is the case and



for a solution. A minimum wage is usually set to determine a threshold under which basic living conditions may not be met. Hence, the finding that women are on average earning below this level is alarming. In the Philippines the average for women just falls short of the minimum wage, and in Tanzania and Saudi Arabia female wages are not very far from the minimum. Careful attention should be paid here, as it should also be kept in mind that these are averages and hence there will be people earning below these levels as well.

Note that further analysis could be undertaken on average wages per manufacturing subsectors and comparisons could be drawn with the minimum wage.

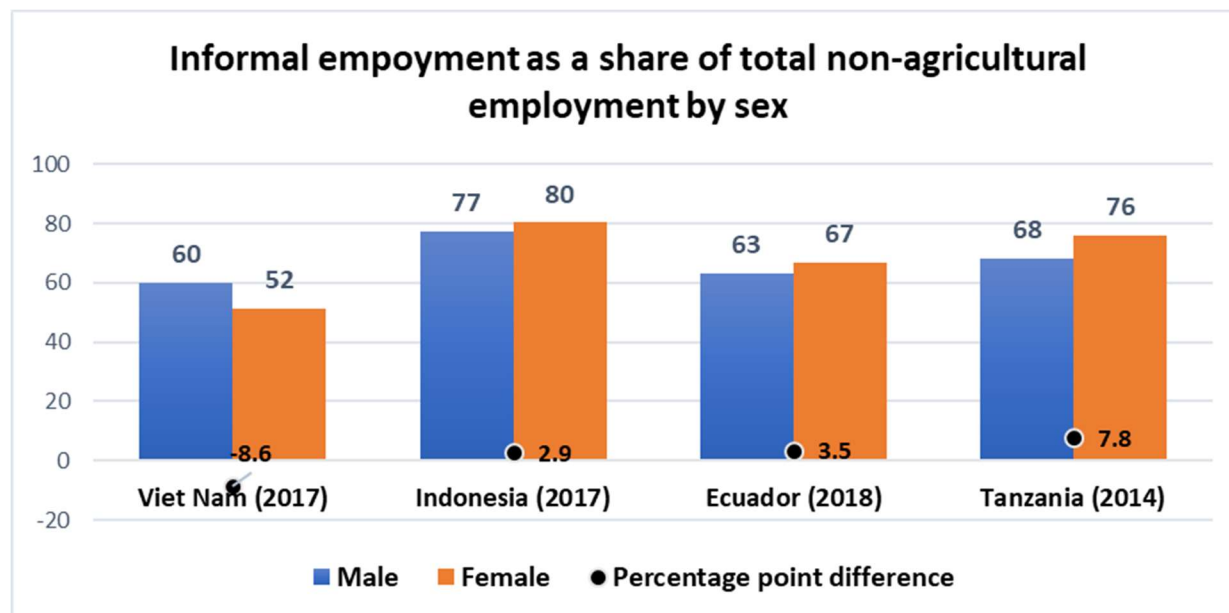
### 3.2.7 Informal employment as a share of total, by sex (non-agricultural sectors)

Informal employment represents a very large part of employment in many countries of the world. Undertaking a gender assessment including the informal sector will likely reveal a very different, and probably aggravated, picture of the situation of women and workers in general in manufacturing. While some countries may have national data including informal employment in manufacturing, this tool is largely limited to assessing gender differentials in formal employment. One indicator we can and should look at is the share of informality and the difference between men and women in our countries of interest. This will give us an indication of the extent of the population we are not considering in our analysis.

Informal employment generally means significantly worse working conditions and remuneration. There is a demand for informal workers to avoid complying with labour laws and minimum wages. While this indicator is not manufacturing-specific (but for the non-agricultural sectors, i.e. industry and services), it can give us an indication of the extent of informal employment in the country in general and of gender differences.

To get a quick and comparative overview of this, we have chosen to use a clustered column graph, and added a line graph on a second axis to highlight the difference between women's and men's informal share.

Figure 13: Informal share of employment by sex, latest year reported



Data source: ILOSTAT

In all countries more than half of those employed are hired informally. This means that more than half of the workers risk having more difficult experiences than in the formal sector and do not enjoy social security.

The situation seems worst in Indonesia, where around 80 per cent are informally employed, and is followed by Tanzania. Viet Nam has, among these comparator countries, the lowest share of informality, though it is still above half of non-agricultural employment. When comparing the gender differences, women are more at risk of being informally employed than men in Indonesia, Ecuador and Tanzania. The largest gap is found in the latter, where 76 per cent of women work informally, while the share is 68 per cent for men. Interestingly, in Viet Nam women have a lower likelihood than men of being informally employed. Further analysis is required to understand the reasons behind this and to find out more about job quality in the informal sector for both genders.

With a large share of workers being employed informally in each of the countries, the need to track, assess and understand the dynamics in the informal sector cannot be stressed enough. These high shares mean that many of the policy interventions either do not directly affect the informal sector (or have a limited effect on it) or its effect is not well documented. Further attention needs to be given to the informal sector, including the need to generate more data to ensure that the anticipated outcomes can be obtained through policy.

## **Summary: Gender inequality in the labour force and manufacturing sector of Viet Nam**

The multidimensional analysis undertaken in the first two sections allows us to obtain a first insight into the issue of gender inequality in the labour force, and more specifically in the manufacturing sector. In the case of Viet Nam, it was found that the manufacturing sector has been able to create a significant number of jobs for women – and continues to do so. Currently, more than half of the workers in the sector are women. Female representation in the overall labour force is lower. Nonetheless, wages, the type of sectors women work in and occupations they have are important determinants of the extent to which they are benefiting from being engaged in manufacturing. Globally, the experience has been that countries have a high female share in manufacturing when they focus on labour-intensive export sectors and that they are often hired as factory workers with relatively low wages and poor working conditions.

In Viet Nam, women's wages relative to men have been increasing in the manufacturing sector and the gap has become smaller than in most benchmarking countries. Nonetheless, on average women still earn less than 90 per cent of men's salaries. The Gender Dissimilarity Index reveals that there is a big difference in the type of sectors that women and men work in. This is in line with our knowledge that Viet Nam is heavily engaged in textiles and electronics (labour-intensive export sectors) and has been relying on these sectors to achieve its fast industrial growth.

The fact that women may not be benefiting to the same extent as men in the manufacturing sector is also indicated by the generally very low female share of managers in the country. Earnings, job satisfaction, working conditions, opportunities of skills development and further career development are known to be significantly higher in such jobs, especially in comparison to sweatshop jobs. The likelihood of women being contributing family workers – which often results in lower and less regular salaries – is also more than twice as high as that of men. In addition to this, over half the employed women are employed informally. While the figures show that this value is even higher for men, it does mean that we can expect working conditions to be significantly below those reported. It also means that this requires special consideration when designing policy, which may affect formal and informal workers differently.

On a positive note, there has been significant improvements in the female to male ratio of being new entrepreneurs or starting a new business, to the point where today it is slightly more likely for a woman to be a new entrepreneur than a man. This, however, is not manufacturing-specific information.

It is now clear that although women have been offered a fair amount of employment opportunities in manufacturing, there seem to be imbalances in the sectors and types of roles they are engaged in – which impacts their wages and working conditions. Further analysis needs to be undertaken to understand what type of sectors women tend to be most absorbed in and how their employment possibilities are changing as the country undergoes structural transformation.

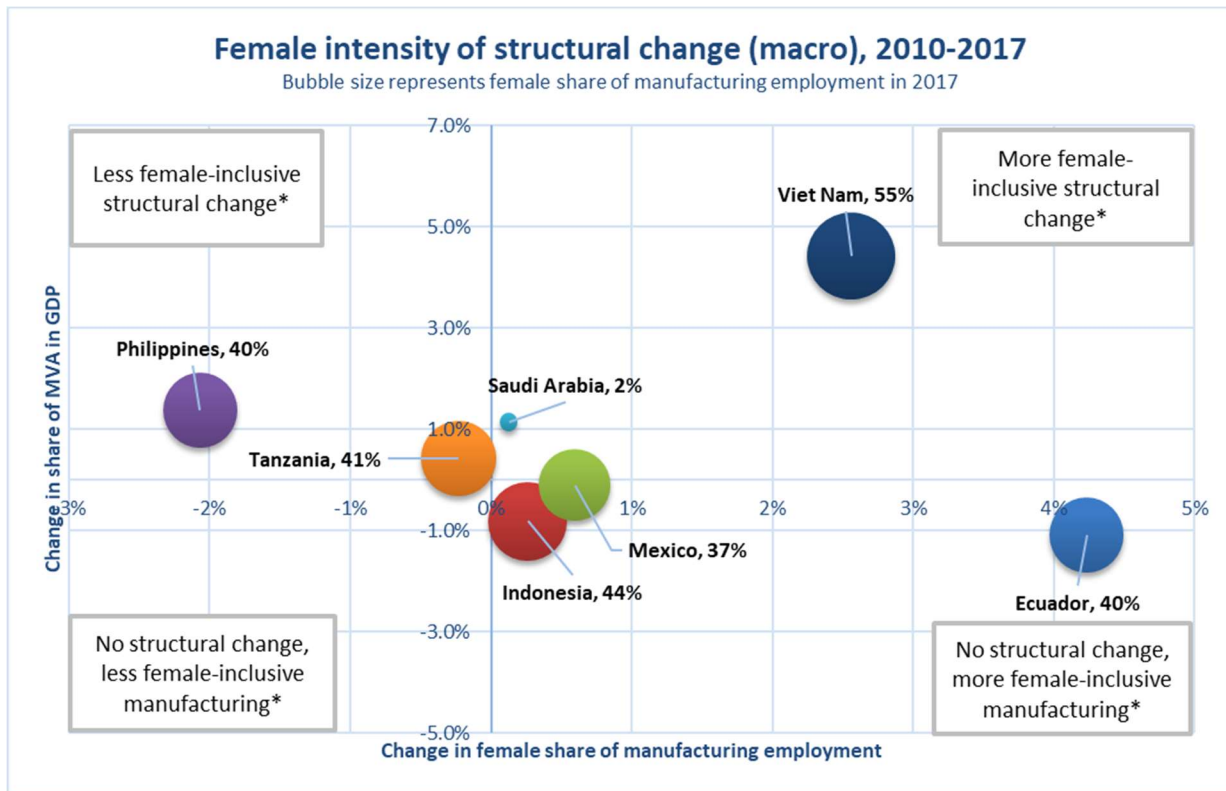
### 3.3 Part III: Female participation in structural change and manufacturing subsectors

While Part I gave us a good overview of the extent of gender inequality in manufacturing, Part III looks at dynamic changes of female participation as the country undergoes structural transformation. This analysis is important since female participation often changes at different phases of industrialization. A country can undergo a phase of high female intensity in the manufacturing sector if it focuses on labour-intensive export sectors, most commonly textiles and apparel. However, as the country moves into more technology-intensive sectors or technology-intensive production processes within the same sector, the female share of employment tends to decrease again. The analyst will be able to check for such trends using the methodology in this section and include quality dimensions to the greatest extent possible. Note that much of the analysis here borrows the indicators found in previous EQUIP tools (especially tools 1 and 3), as structural change and upgrading are core concepts of the toolbox.

#### 3.3.1 Macro-level analysis: gender-balanced structural change towards manufacturing

We will start by analysing macro trends. That is, whether structural change towards manufacturing has gone hand in hand with a more gender-balanced manufacturing sector. It is anticipated that this will be determined by the phase of industrial development the country is in and the development strategy it has undertaken.

**Figure 14: Female intensity of structural change (2010-2017)**



\*Female share of employment in manufacturing in latest year needs to be taken into consideration for descriptions to hold (percentage indicated next to country name). Descriptions hold as long as female share of manufacturing employment is not above 50 per cent.

Data source: World Development Indicators<sup>5</sup>, ILOSTAT. In order to include three variables, we have decided to use a bubble chart. In case this is too complex, it is possible to present the information in a table as well or use a scatter plot comparing changes in MVA as a share of GDP and changes in the female share of manufacturing employment.

The bubble chart above measures the change in MVA share of GDP (indicator from EQUIP tool 1) and the change in female share of manufacturing employment. Additionally, the bubble size represents female share of manufacturing employment for 2017. We can create four quadrants and give them adequate descriptions: female inclusive structural change (which is generally positive if female shares of employment are below half); non-inclusive structural change; more female inclusive manufacturing though no structural change, and non-inclusive manufacturing, with no structural change.

<sup>5</sup> MVA and GDP in constant 2010 prices.

Note that a country will not always want to increase its female share. It will probably want to target a rough gender balance. Therefore, larger increases in female shares may not always be desirable and much will depend on the bubble size (female share in the latest year reported).

Viet Nam clearly has had the largest structural transformation, with the share of MVA in GDP increasing by roughly four percentage points between 2010 and 2017. At the same time, it has increased female share of employment. While this is generally a positive development (and often considered female-inclusive structural change), we find that women already make the majority of manufacturing employment in Viet Nam. Therefore, it seems as though it is the female intensity of manufacturing that has contributed to the increasing relative growth of the sector. Gender imbalance is therefore on the rise in Viet Nam. This will be further explored below.

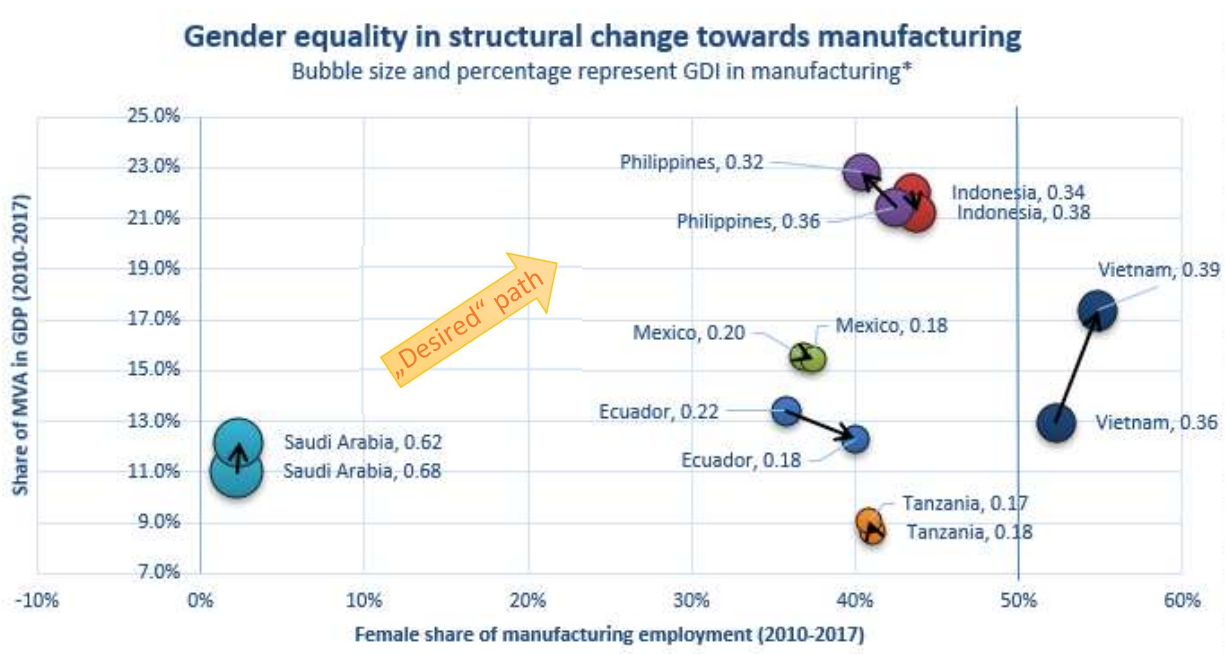
Saudi Arabia also falls into the category of female-inclusive structural change, although its changes of both MVA share of GDP and more so of female share in manufacturing were small.

Both Tanzania and the Philippines are undergoing positive structural change but in a less inclusive way: they are experiencing a declining share of women in manufacturing, who are already underrepresented in the sector. The trend is much more pronounced in the Philippines, which is also at a significantly more advanced stage of industrial development.

The two Latin American economies together with Indonesia have seen an enlarging share of women, which is desirable as they have not yet reached gender parity in terms of numbers of jobs in the sector. However, they have not experienced a shift towards a larger importance of manufacturing throughout these years. Nonetheless, this is a positive development as women do not yet make up half of the manufacturing sector and although there was no structural change, the manufacturing sectors have still grown in the three countries.

It would be important to add some dimensions of job quality and occupation type to this analysis. Below is a graph using the same information but adding the Gender Dissimilarity Index dimension.

Figure 15: Gender equality in structural change towards manufacturing (2010-2017)



\*Years selected for the Gender Dissimilarity Index (2010 and most recent year, namely: Ecuador, Saudi Arabia, Viet Nam: 2015, Indonesia, Tanzania: 2013, Mexico: 2016, Philippines: 2014).

Data source: World Development Indicators<sup>6</sup>, ILOSTAT, INDSTAT 2, Rev. 3.

This graph is in fact a combination of the information found in Figure 14 above and in Figure 6 on the Gender Dissimilarity Index and female share of employment. While interpreting it again would be repetitive, it makes sense to illustrate another way to present the information.

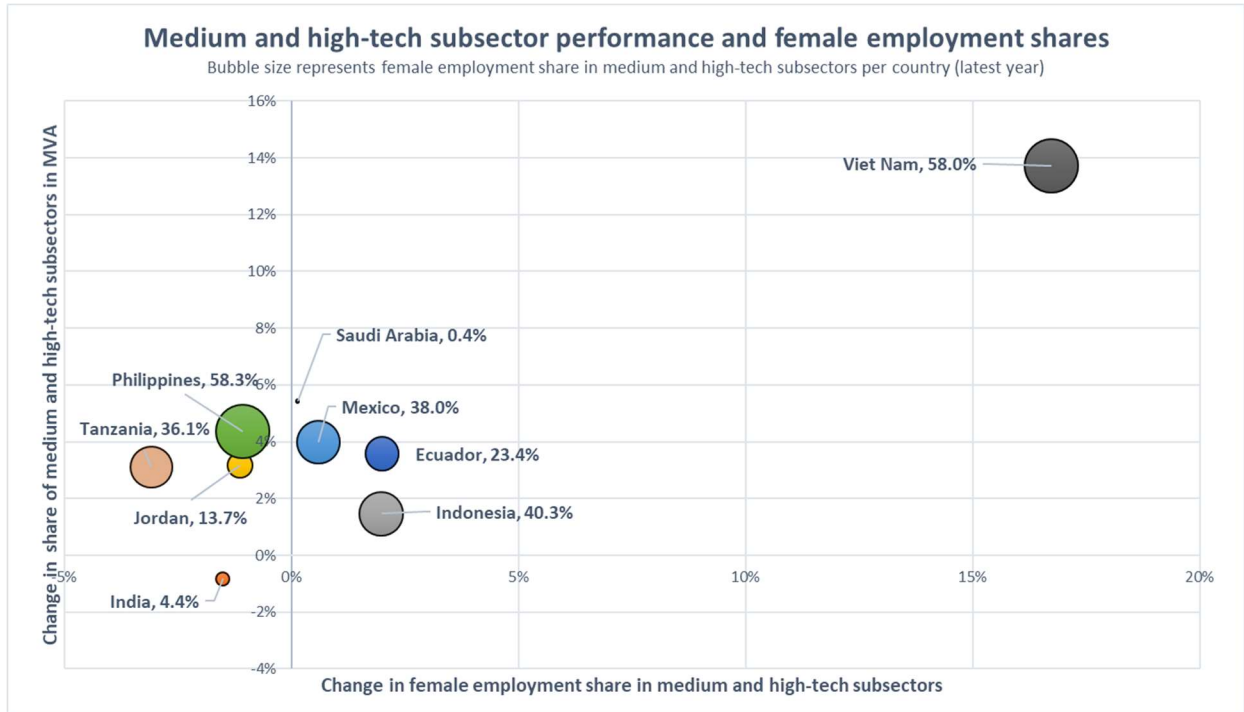
### 3.3.2 Inter-sectoral analysis: gender balanced structural transformation towards more technology-intensive manufacturing subsectors

Industrial policy agendas will identify priority subsectors and develop strategies to increase the importance of these subsectors in overall manufacturing. In Equip tool 3 the assumption is that countries will probably want to focus on more technology-intensive sectors. There is sufficient evidence showing that focusing on technology-intensive sectors generally allow for greater economic competitiveness in the long run. This analysis measures whether structural change towards medium and high-tech subsectors has been accompanied by a trend towards gender balance in these subsectors. In other words, the analysis measures to what extent women are participating in this shift. If the understanding is that over time countries aim to move more into these sectors, women should have equal opportunities to be part of this transition. In addition, medium and high-tech subsectors are generally more research-and-development-

<sup>6</sup> MVA and GDP in constant 2010 prices.

and skills-intensive, providing certain advantages for engaging in them. For the exact list of medium and high-tech subsectors, please see Equip tool 3.

**Figure 16: Structural change towards medium and high-tech subsectors and their gender balance (2005-2015)**



Years: Ecuador, Jordan, Viet Nam: 2005-15; Tanzania and Indonesia: 2005-13; Philippines: 2005-2014; India: 2005-14; Saudi Arabia: 2010-15.

Data source: INDSTAT 2 Rev. 3

To combine three indicators into one illustration, we used the bubble chart again. However, for simplicity it is possible to keep the information in a table or use a scatter plot. Figure 16 allows us to compare the changes in medium and high-tech subsectors share of Manufacturing Value Added and changes in female employment in the medium and high-tech subsectors. The bubble size represents the latest female share in medium and high-tech subsectors. Viet Nam is also here the country that has been experiencing the strongest changes in the shift towards medium and high-tech subsectors. Along with this shift, there has been a large increase of female participation in this group of subsectors. However, we notice that even within these subsectors, women are already occupying the majority of jobs. The exact subsectors they are engaged in, and which have led to these strong increases, will be seen in the next graph. Due to the increases of fragmentation of production globally, there are now many activities within medium and high-tech subsectors that in fact are low-paying and routine jobs, especially assembling tasks. Such activities are not the type considered when researchers talk about subsectors with higher technological and therefore skills content, higher paying jobs and better working conditions. To check for this, we will need to undertake the analysis in the next section.



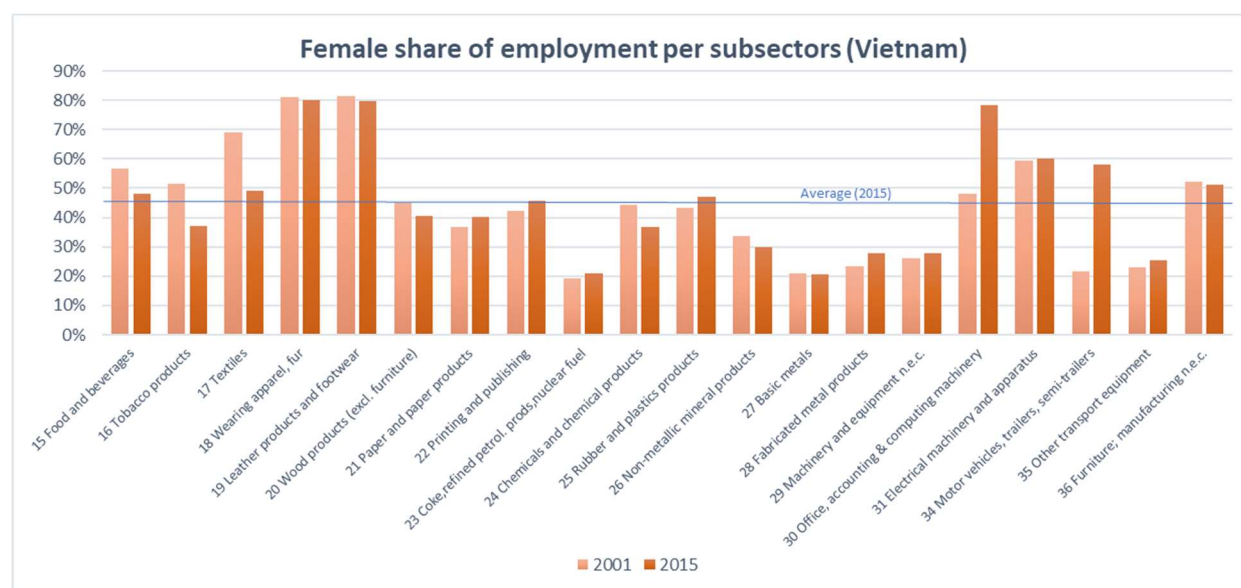
Although other countries have not had changes of the same extent as Viet Nam, Ecuador, Indonesia, Mexico or even Saudi Arabia (though to a very small extent), they did all experience female employment share gains with a shift towards more technology-intensive sectors. In all these cases female employment in the sectors is still below half, which hints to the fact that further developments in the same direction would be desirable.

Countries like Tanzania, Jordan and the Philippines have experienced female unfriendly structural change – that is, they have undergone inter-sectoral structural change but the shares of women in medium and high-tech subsectors have declined. This seems to be a bigger concern for the former two, both of which have very low female participation. Policymakers interested in creating a gender-just manufacturing sector may want to try to understand what has led to the declining share of women in these sectors – why is there an increasing preference for men? This will support in identifying the best policy intervention in an attempt to reverse this trend.

### 3.3.3 Female intensity by manufacturing subsectors

After forming some broad pictures of female participation throughout countries' structural transformation, we now focus on one country only and look at female employment in its individual subsectors. We will take the case of Viet Nam. We have seen that there has been an increasing participation of women both in manufacturing as a whole and in medium and high-tech subsectors, as the country has been shifting to these subsectors. Now we would like to understand what the most female intensive manufacturing subsectors are and which ones have become most female intensive during the structural transformation (as seen in the two graphs above). After this, we will compare female intensity with the average wage of the subsectors, to understand whether women are in the most "attractive" (at least in terms of remuneration) subsectors, before we look at within-subsector structural transformation. The analysis hence now moves from a cross-country comparative to a country-specific one.

**Figure 17: Female intensity in manufacturing subsectors (Viet Nam, 2001-2015)**



Data source: INDSTAT 2 Rev. 3

Figure 17 shows that there are certain subsectors that are more female intensive. These are: wearing apparel, leather and more recently office equipment (which includes mobile phones). In these subsectors, women make up almost 80 per cent of the workforce. The contrast of female intensity between subsectors is high. Coke and refined petroleum, non-metallic mineral products, basic and fabricated metals, machinery and equipment and other transport equipment only have a female share of between 20 to 30 per cent.

There has been a sharp increase in the female share of employment in the office, accounting and computing machinery subsectors, as well as in the motor vehicles subsector. They are clearly the subsectors that have been contributing to the growth of female participation in medium and high-tech subsectors, as seen in Figure 16. While they are both considered to be medium and high-tech subsectors, the actual activities women have been undertaking may not in fact necessarily be the ones where high skills are required. Depending on the country, a significant portion of these jobs may in fact be assembly work and may be associated with low or even unsafe working conditions – a tendency that has developed with increased globalization and the fragmentation of production.

It would be ideal to have information on the type of occupation people have within these subsectors. While such information is not available on international databases, for the case of Viet Nam it is possible to use the four-digit ISIC classification for a better understanding.

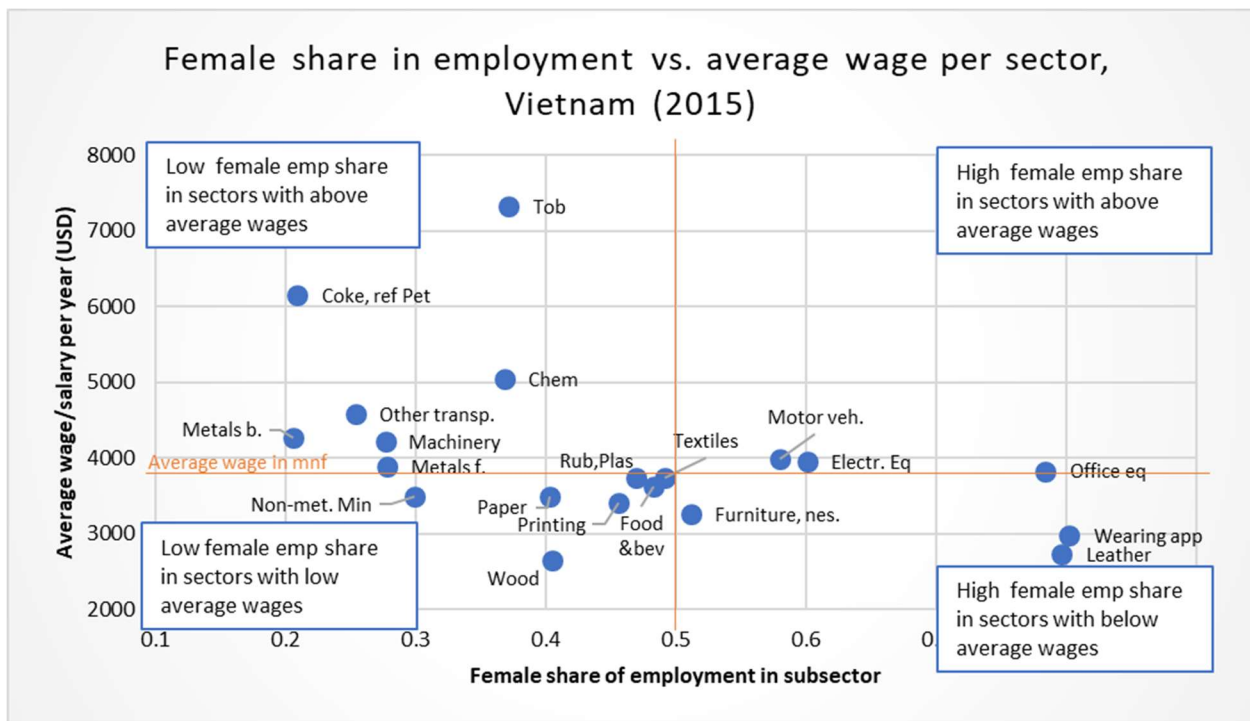
Including the average wages of the subsectors into the picture

Learning about the type of subsectors women are most strongly represented in is not very telling if we do not have more information about the quality of employment in these sector subsectors. For this reason, we can enrich the analysis above by comparing the female shares with average wages in the subsectors.

Ideally we would have sex-disaggregated information on wages per subsector, but this is not available in international databases.

The following scatter plot can be created, where it is possible to distinguish between four quadrants, based on female share of employment (with above 50 per cent being considered is high) and average wage of the subsector (based on the average wage of the country’s manufacturing sector).

**Figure 18: Female share in employment vs average wage in sector, Viet Nam (2015)**



Data source: INDSTAT 2 Rev 3

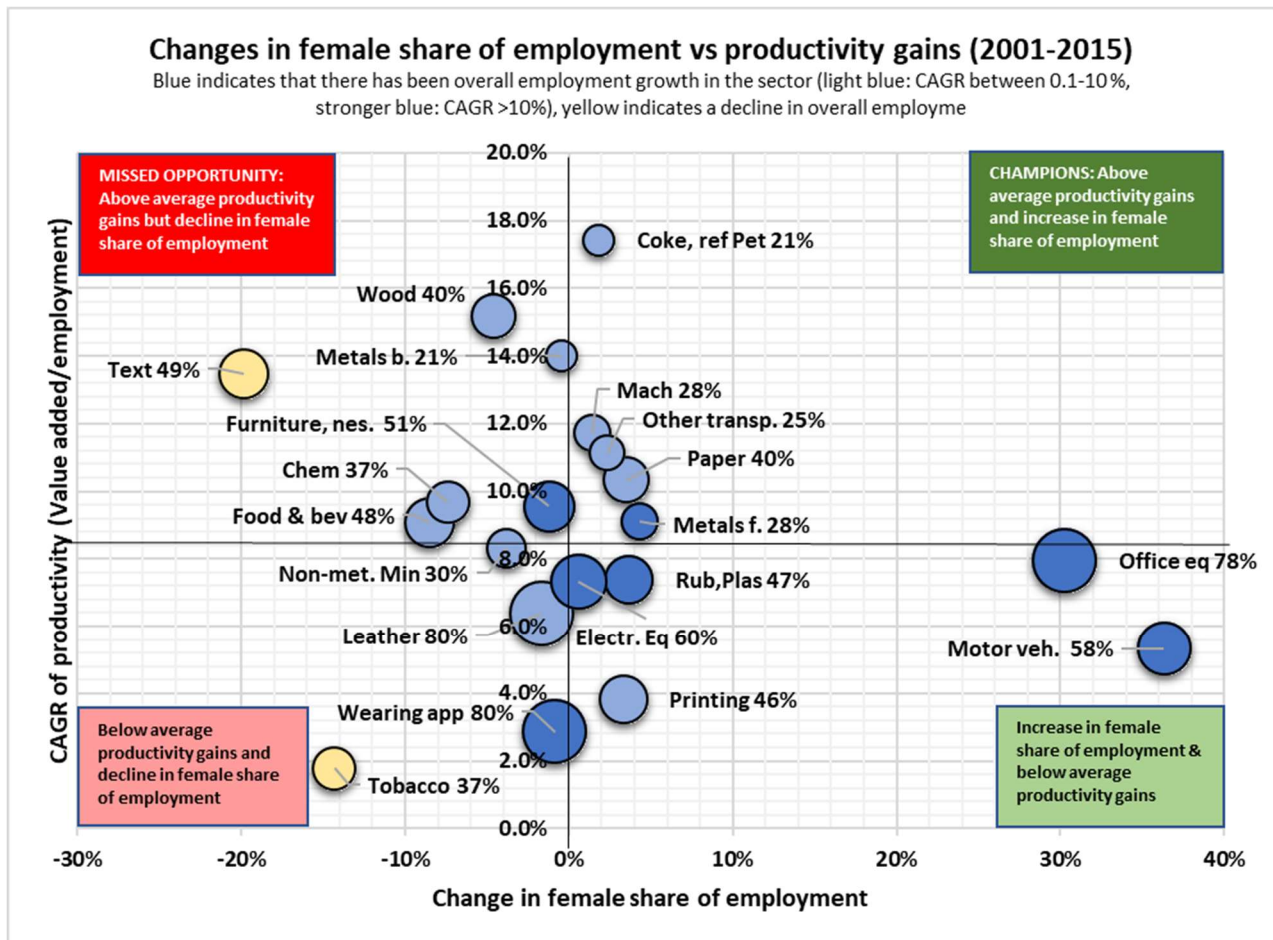
For Viet Nam, we clearly find an inverse relationship between average wage in the subsector and female share of employment. The subsectors that absorb most women are also among the lowest paying subsectors on average, such as wearing apparel and leather. The other subsectors with a high female share is the office, accounting and computing machinery subsector. Here average wages are roughly equal to the average in manufacturing.

In the sectors where average wages are highest – such as tobacco, coke and refined petroleum, other transport equipment and chemical products – women are underrepresented. This hints towards the fact that women may not have equal opportunities in getting employment in the higher high-waged sectors. Policymakers hoping to tackle gender inequalities will probably want to understand the key bottlenecks women face to enter such subsectors in order to ensure they have a fair chance to enter them and benefit from the higher wages and presumably (though not necessarily) better working conditions they offer.

### 3.3.4 Changes in productivity and female employment intensity per subsector

Now that we have assessed women participation in subsectors and their average wages, we are interested to see how female employment has been changing in each of these subsectors, as the sectors have become more productive. The justification for this analysis stems from the understanding that there have been cases where female shares of employment decline as production processes become more capital- and technology-intensive, even in previously female-dominated sectors. This is another cause of defeminization of employment as countries industrialize, together with the shift to more technology-intensive sectors.

**Figure 19: Changes in productivity vs changes in female shares of employment (Viet Nam, 2001-2015)**



Bubble size and percentage next to subsector name refer to female share of employment in 2015.

Data source: INDSTAT 2 Rev 3

As we would like to analyse different dimensions at once in this case, we decided to use a bubble graph, and added colours to it too. While the y-axis shows changes in productivity between 2001 and 2015 and the x-axis shows the change in female employment, the bubble size represents the female share of employment in 2015 (with the actual percentage indicated next to the subsector name). We added

colours to the bubbles to indicate whether overall employment has been increasing or decreasing throughout time in the given subsector. As all of Viet Nam's manufacturing subsectors have had productivity gains, we decided to draw a horizontal line across the average growth rate of productivity in manufacturing to help us understand which subsectors have been growing faster or slower than average. By doing so, we can have four quadrants, based on whether productivity has increased faster than average (top half) and whether there was an increase or decrease in female employment share.

First, it is important to point out that only two subsectors, namely textiles and tobacco, have seen overall decreases of employment as its productivity grew. This indicates that Viet Nam has had an employment-generating industrial growth trajectory so far. In terms of female share, however, we find that only half the manufacturing subsectors have seen gains in this regard. This means that there has been a contraction in female shares for ten manufacturing subsectors, where in fact productivity has increased. While this depicts the story of defeminization experienced by some countries before, we know that overall the country has seen its female share of employment increase. This, however, does not paint a bright picture for all subsectors. Female employment shares have increased most significantly in two subsectors: office, accounting and computing equipment, and motor vehicles. The fact that half the subsectors have seen declining shares is not very positive – unless there is a redistribution of the composition of female employment towards more “attractive” subsectors. Note, however, that we have seen an overall increase in the dissimilarity of the composition of employment between men and women, which is generally not considered desirable, especially if the extent of the dissimilarity is not low.

Policymakers who aim to develop a gender-fair industrial development trajectory are likely to be interested in having an increased female share of employment in those subsectors that have fast productivity gains while still increasing overall employment and female shares where women are still strongly underrepresented. These are, for example, subsectors such as basic metals, wood, non-metallic minerals and, above all, chemicals. We would first check that these are also relatively high-paying subsectors on average (which can be seen from Figure 18 above) and that wages continue to increase with productivity gains – something we will look at with the next indicator.

A last point to mention before turning to wages is that while both the textiles and tobacco subsectors have had an overall decline in employment, the fact that the female share has shrunk significantly in both subsectors is not appealing. This means that more women have been dismissed than men, as labour-saving measures have taken place. This is particularly a problem for the textiles subsector, which absorbs a large portion of women. However, due to the overall increase in female share of employment, it could be true that some of them were absorbed by subsectors with high female growth rates.

#### Change in wages with productivity gains

In order to complete our analysis, after which we can select “attractive” subsectors to focus on for improving gender balance, we now add the wage dimension to the above analysis on productivity gains. We will look at both wages per subsector (as taken from above) and at changes in wages (an expected result of productivity gains). In order to include all relevant variables, it makes sense to use a table.

**Table 1: Changes in female employment shares, productivity and wages per subsector in Viet Nam (2001 and 2015, values in USD)**

| Tech  | ISIC Description                                | Productivity (2015) | CAGR productivity | Wage per employee (2015) | CAGR wages | CAGR employment | Female emp share (2015) | Change in fsh |
|-------|---|---------------------|-------------------|--------------------------|------------|-----------------|-------------------------|---------------|
| RB/LT | 15 Food and beverages                           | 14,567              | 9.1%              | 3,626                    | 11.1%      | 5.1%            | 48%                     | -9%           |
| RB/LT | 16 Tobacco products                             | 25,224              | 1.8%              | 7,322                    | 10.3%      | -1.3%           | 37%                     | -14%          |
| RB/LT | 17 Textiles                                     | 9,844               | 13.5%             | 3,749                    | 11.7%      | -0.01%          | 49%                     | -20%          |
| RB/LT | 18 Wearing apparel, fur                         | 2,598               | 2.9%              | 2,978                    | 10.2%      | 12.6%           | 80%                     | -1%           |
| RB/LT | 19 Leather, leather products and footwear       | 2,827               | 6.4%              | 2,734                    | 10.6%      | 9.2%            | 80%                     | -2%           |
| RB/LT | 20 Wood products (excl. furniture)              | 7,433               | 15.2%             | 2,655                    | 10.8%      | 4.7%            | 40%                     | -5%           |
| RB/LT | 21 Paper and paper products                     | 8,977               | 10.3%             | 3,489                    | 10.2%      | 7.4%            | 40%                     | 3%            |
| RB/LT | 22 Printing and publishing                      | 7,389               | 3.8%              | 3,411                    | 7.4%       | 7.5%            | 46%                     | 3%            |
| RB/LT | 23 Coke,refined petroleum products,nuclear fuel | 228,797             | 17.4%             | 6,156                    | 2.0%       | 14.7%           | 21%                     | 2%            |
| MHT   | 24 Chemicals and chemical products              | 17,293              | 9.7%              | 5,050                    | 9.9%       | 6.7%            | 37%                     | -7%           |
| RB/LT | 25 Rubber and plastics products                 | 7,946               | 7.4%              | 3,734                    | 9.5%       | 10.5%           | 47%                     | 4%            |
| RB/LT | 26 Non-metallic mineral products                | 11,154              | 8.3%              | 3,494                    | 10.1%      | 4.5%            | 30%                     | -4%           |
| RB/LT | 27 Basic metals                                 | 22,990              | 14.0%             | 4,272                    | 9.0%       | 7.6%            | 21%                     | 0%            |
| RB/LT | 28 Fabricated metal products                    | 8,201               | 9.1%              | 3,892                    | 11.8%      | 12.7%           | 28%                     | 4%            |
| MHT   | 29 Machinery and equipment n.e.c.               | 8,584               | 11.7%             | 4,215                    | 14.8%      | 7.4%            | 28%                     | 1%            |
| MHT   | 30 Office, accounting and computing machinery   | 20,969              | 8%                | 3,831                    | 8%         | 23%             | 78%                     | 30%           |
| MHT   | 31 Electrical machinery and apparatus           | 10,317              | 7.3%              | 3,958                    | 9.3%       | 10.1%           | 60%                     | 1%            |
| MHT   | 34 Motor vehicles, trailers, semi-trailers      | 15,861              | 5.3%              | 3,995                    | 12.9%      | 13.5%           | 58%                     | 36%           |
| MHT   | 35 Other transport equipment                    | 17,896              | 11.1%             | 4,588                    | 13.1%      | 5.7%            | 25%                     | 2%            |
| RB/LT | 36 Furniture; manufacturing n.e.c.              | 5,094               | 9.6%              | 3,261                    | 12.2%      | 13.1%           | 51%                     | -1%           |
|       | D Total manufacturing                           | 8,600               | 8.2%              | 3,394                    | 10.5%      | 9.1%            | 61%                     | 3%            |

Data source: INDSTAT 2 Rev 3

*Note: as Viet Nam has data at a more disaggregated form, it is possible to do the above at a four-digit ISIC level. Please see Appendix 2 for an example.*

To the analysis already made above, we can now add that wages have increased in all subsector, in line with the fact that productivity has too.

We have seen the largest increase in female employment in the motor vehicle subsector. We now see that average wages in the subsector are above average (which we were also able to identify from an earlier analysis) and that it is one of the sectors with the highest growth in wages at almost 13 per cent annually. Again, whether these wages and trends are perceived by the average woman employed in the sector cannot be identified from this analysis, but it can be assumed that wages may be better here than in some of the low-wage subsectors, where the increase is also not as marked.

Other subsectors with relatively high wages and relatively fast growing wages are machinery, other transport equipment, and to a lesser extent fabricated metal products. All these have seen an increase in female share, though only very mildly, in a 14-year period. In these three subsectors women's share is very low, between 25 per cent and 28 per cent, therefore further increases are desirable. The chemicals sector, which has an average wage higher than that of the three subsectors mentioned before, is also growing at just about 10 per cent annually, suggesting there may be interesting opportunities also for women. Currently the share of women in this subsector is low (37 per cent) and declining. Finally, the basic metals subsector, which was identified in the previous analysis as a potentially attractive one, also has an above-average wage (higher than office equipment and motor vehicles) and is growing at almost 10 per cent annually. These subsectors may be considered to be interesting ones to attract more women, although we cannot stress enough that the type of jobs will matter greatly.

## **Summary: Female participation in manufacturing subsectors and structural change in Viet Nam**

Viet Nam is often seen as an ongoing success story when it comes to industrialization and structural transformation. While it is still at a relatively early stage of development, its fast economic growth rates and exemplary structural change trajectory have been highly commended. The country has been focusing on labour-intensive export sectors to achieve this growth. Earlier the focus was more on textiles, though it has recently been shifting to certain electronics sectors and motor vehicle parts. But has this success also been beneficial to women? The analysis we have been undertaking has shown that as the country has been increasing its share of manufacturing in overall GDP, it has also come with an increase in female participation in manufacturing. In fact, women make up more than 50 per cent of manufacturing employment already, indicating that they are perhaps one reason for this growth. The shift towards more technology-intensive sectors in Viet Nam has also seen a growth in the representation of women in these subsectors. Within the medium and high-tech subsectors, women already account for 58 per cent of employment. However, when we observe female intensity by subsector, we find that women are generally employed in low-wage subsectors. Additionally, we find that female intensities decline in half of the manufacturing subsectors as they increase productivity. This is not an issue if it is in fact a redistribution of female workers towards higher wage subsectors. However, this is not necessarily the case, as we can see by comparing the chemicals and tobacco subsectors to the motor vehicles and office equipment subsectors.

On the one hand, this has highlighted the need to identify “attractive” subsectors, where policymakers interested in gender equality would hope to see more gender-balanced growth. On the other hand, it is important to acknowledge the subsectors that are currently most female intensive, ensure that wages and job quality are decent and that the future work of employees is relatively secured – or shifts to other subsectors are eased.

Priority subsectors where it would be desired to see increases in female shares of employment could be: chemicals, basic metals, machinery, other transport equipment and fabricated metals. All of them have productivity growth, employment growth, above average wages and wage increases, and women are currently underrepresented in them. Further investigation should be undertaken to learn about the key constraints for women in these subsectors. Creating gender balance in priority subsectors will help reduce the country’s GDI value.

Sectors that at present are very female-intensive are: wearing apparel; leather; office, accounting and computing equipment; electrical machinery; motor vehicles; and to a lesser extent, furniture.

### **3.4 Part IV: Key determinants of female participation**

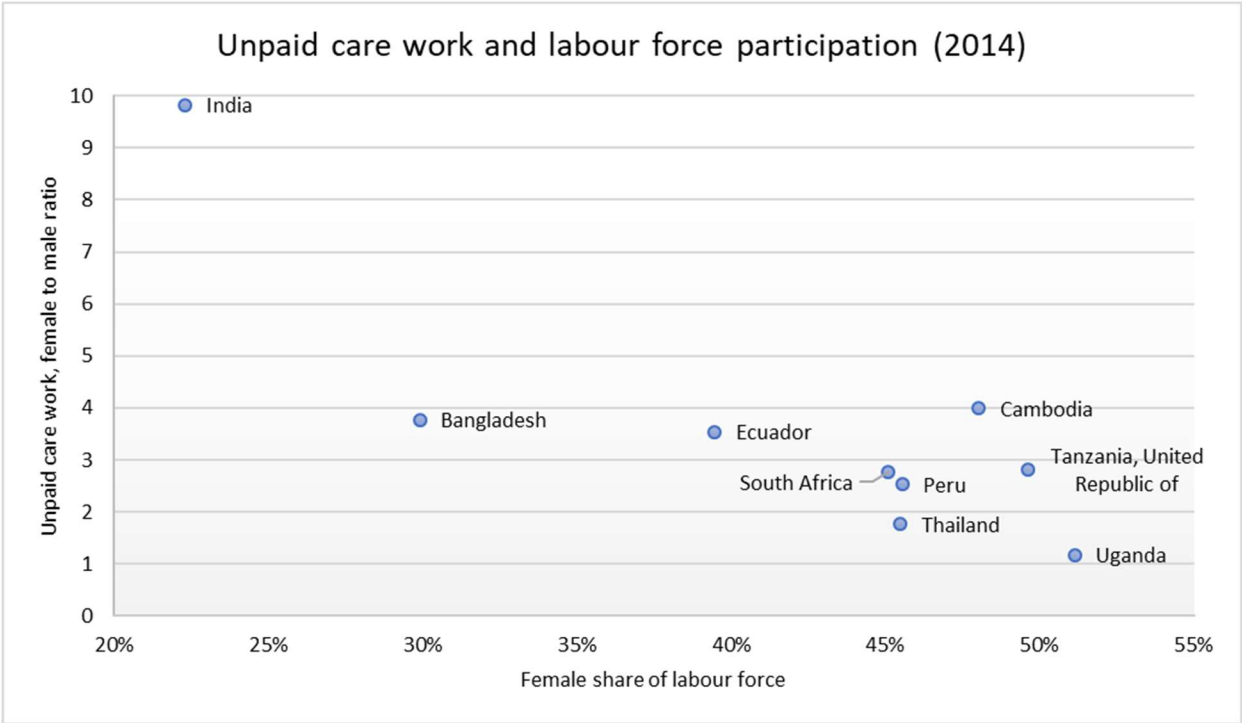
The previous two sections have looked at gender inequality in manufacturing, in subsectors and changes with structural transformation. This section, Part IV, analyses some of the key determinants of the analysis undertaken above. It needs to be taken into consideration that we are not measuring causality. Also, this is only a small subset of the different determinants of female employment in manufacturing, and in each

country the importance of the determinants is likely to be different. These points should be kept in mind throughout the analysis. The section will look at unpaid care work; education levels, STEM, vocational training, research and development; access to finance and digital technology; and legal rights and societal perceptions. This will be a cross-country analysis.

### 3.4.1 Unpaid care work

Unpaid care work is known to be a key constraint to undertaking paid work in general. A woman who has a disproportionately large responsibility of taking care of children, the household and other dependents, will inevitably face a trade-off between care work and engaging in productive activities. It therefore makes sense to examine this indicator together with labour force participation rate. If women have a lower labour force participation, the supply of female workers for manufacturing declines as well. In the scatter plot below, the indicator was plotted against the difference (in percentage points) of labour force participation rate between men and women, due to the fact that the indicator we have on unpaid care work is also relative. For gender equality, these indicators suit our analysis well.

**Figure 20: Unpaid care work burden vs female share of labour force (2014)**



Data sources: OECD Gender, Institutions and Development Database 2014, ILOSTAT

Data on unpaid care work is only available for 2014 on the OECD Gender, Institutions and Development Database, which does not allow us to track changes over time, although we are able to make cross-country comparisons. With the small number of countries we present in this graph we can already identify a negative relationship between the two. The higher the female burden of unpaid care work, the less likely



they are to participate in the labour force. Due to the lack of data available for most of the countries in our sample, it was decided to add other relevant countries instead.

Uganda had the lowest difference in gender in terms of hours spent on unpaid care work, with a ratio of just slightly above one. This is in line with the fact that about half of the labour force is female. In Tanzania, women dedicate three times more time to unpaid work, although interestingly enough, half of the labour force is female. This means that many women are juggling between roles, resulting in an overall imbalanced burden on women. On top of this, women earn significantly less than men in manufacturing. These differences would perhaps deter a woman from working in the manufacturing sector, as her trade-off is relatively large. Meanwhile Ecuador has an even higher burden on women when it comes to unpaid chores, but this has also been reflected in a lower female participation rate in the paid sector.

Policymakers would need to relieve women from the disproportional burden of unpaid work, on the one hand to reduce female struggles (particularly in a country like Tanzania, where women are seemingly struggling between the two roles), and on the other hand to ensure more women are available to work in manufacturing.

It is unfortunate that there was no data for Viet Nam and the other comparator countries.

### 3.4.2 Labour force by level of education

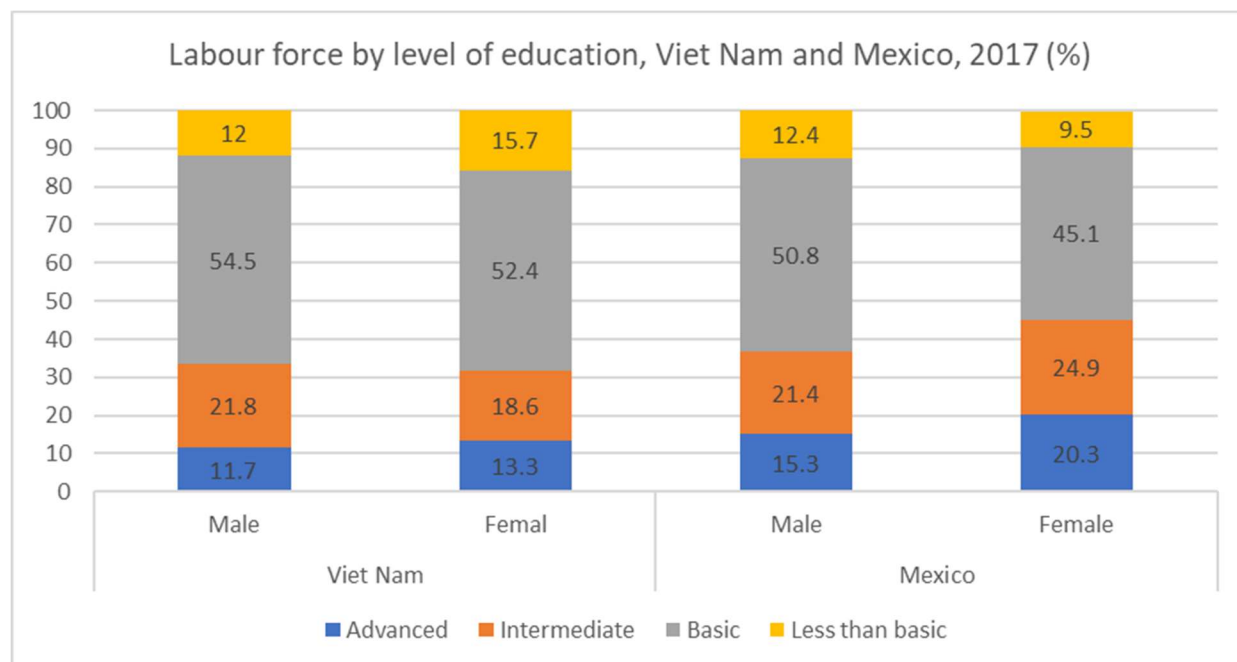
Measuring the labour force by level of education gives us a sense of the level of skills available. Doing so by sex, lets us understand the composition of the female (or male) labour force based on completed level of education, indicating the quality of the available workers. This is important as it is one of the determinants for research and development and innovation, flexibility to learn new tasks and adapt to new situations, which are closely linked to competitiveness.

In addition, comparing women's and men's level of education means we can gain an understanding of whether there are strong inequalities in access to education. If women in the labour market are much less likely than men to have an intermediate or high level of education completed, they may be less likely than men to take leading roles and contribute to structural change. It could hold them back from undertaking the same activities or have the same positions as their male peers and it could impact their working conditions and pay.

The data can simply be presented in a stacked bar chart. We can either compare different moments in time for a single country to check whether there have been noticeable trends, or we can compare different countries for the latest year reported.

Note that the level of education does not tell us what type of skill sets the labour force has exactly. Many countries face a challenge of mismatch of skill sets. That is, it is not so much an issue of not having enough skilled people, but rather that the skills obtained do not correspond to the skills required by the industry. However, we are not addressing this here and will be looking at this in more detail when we examine vocational training and STEM.

**Figure 21: Labour force by level of education, male and female (2017)**



Data source: ILOSTAT

The graph above shows that in Viet Nam the majority of the labour force – whether male or female – has a basic level of education or below (above 65 per cent). The average level of education in Mexico is higher. The difference between the female and male labour force when it comes to the composition by level of education in Viet Nam is small. Women have a slightly larger share of the labour force with an advanced education (1.6 per cent), while a slightly higher share of men have an intermediate level of education. When we group together the share of labour force that has completed either an advanced or an intermediate level of education we notice only a negligible discrepancy between men and women. In Mexico women have a higher share of the labour force with an advanced and intermediate level of education.

We need to consider absolute values as well, or at least, remind ourselves of the female share in the labour force. For Viet Nam, the female share of the labour force is almost equal to that of men (48 per cent female), in which case the number of Vietnamese women in the labour force with advanced levels of education would probably be similar to that of men.

In both countries, the fact that women’s level of education is not significantly lower than men’s would allow us to assume that the level of education would not be a reason to hinder women from participating in manufacturing and having similar jobs and experiences to men. It means women and men are more or less equally equipped to be positive actors in the economy and for structural change based on their level of education. We will need to assess if the type of courses women and men have studied are those most relevant for the manufacturing sector.

## Unemployment by level of education

Let us try to get a sense of the untapped potential of women compared to men, which we will do by checking the level of education completed by the unemployed. Are most of the female unemployed highly skilled and how does that compare to their male peers? Additionally, if we compare the educational attainment of the unemployed with the entire labour force we should be able to deduct what type of women and men are mostly being hired.

**Table 2: Unemployment by level of education and age group, Viet Nam (2010 and 2017)**

|                 | Female 15+ |      | Male 15+ |      | Female 15-24 |      | Male 15-24 |      |
|-----------------|------------|------|----------|------|--------------|------|------------|------|
|                 | 2010       | 2017 | 2010     | 2017 | 2010         | 2017 | 2010       | 2017 |
| Advanced        | 18%        | 35%  | 13%      | 20%  | 21%          | 41%  | 12%        | 19%  |
| Intermediate    | 33%        | 27%  | 37%      | 32%  | 35%          | 31%  | 38%        | 35%  |
| Basic           | 40%        | 31%  | 43%      | 41%  | 40%          | 26%  | 46%        | 43%  |
| Less than basic | 8%         | 7%   | 6%       | 7%   | 4%           | 2%   | 3%         | 3%   |
| Total           | 100%       | 100% | 100%     | 100% | 100%         | 100% | 100%       | 100% |

Data source: ILOSTAT

Due to the fact that we would like to present quite a lot of information at once, we choose to present the data in the form of a table. When looking at the overall population of 15+ we find that 35 per cent of women have an advanced degree, while the share is 20 per cent for men – both having increased significantly since 2010. At the same time, the share of unemployed men who have a basic education is 10 percentage points higher than that of unemployed women. This shows that the “quality” of unutilized female labour is relatively high. The picture is even more pronounced when we look at the unemployed youth. Here 72 per cent of women either have an intermediate or an advanced level of education, while 54 per cent of men have attained the same level of education. The grand majority of unemployed young women are therefore well educated, but unable to find employment.

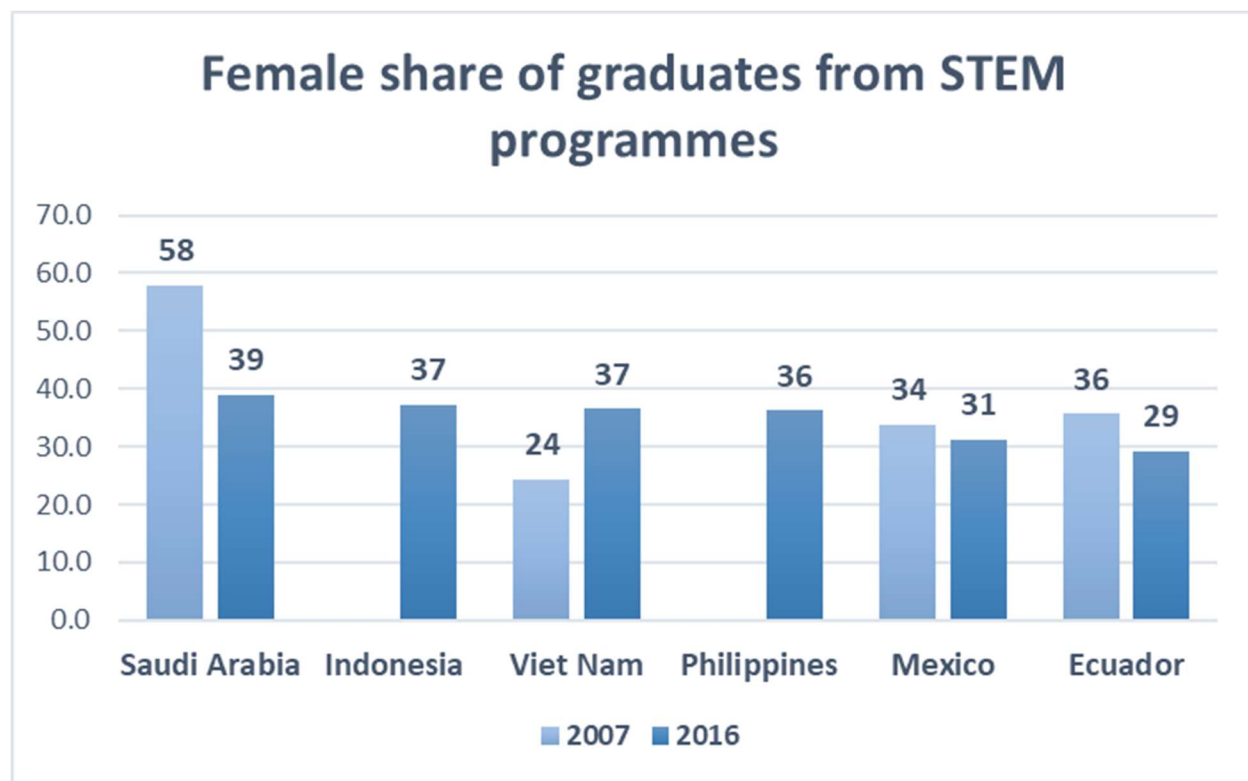
If we compare these shares with the shares in the overall labour force, we can draw the conclusion that a higher share of highly educated men is being employed compared to women, leaving more of the highly educated women without jobs. In other words, more skilled women than men are unable to find employment. Two explanations that would come to mind is that either the type of skills men have acquired through the education is more suited to the current demand of firms or that there is gender discrimination when hiring. In absolute numbers women make up 44 per cent of the unemployed.

We have seen in Part II and III of the analysis that women are generally in lower waged sectors, make up less than a fifth of all managers and the majority of contributing family workers. The information we find here is in line with this, as more skilled men than women are being hired.

### 3.4.3 STEM graduates

STEM has been identified as one of the key drivers of industrial development. The share of female STEM graduates will tell us something about the extent to which women are at par with men in terms of skills required for the manufacturing sector.

Figure 22: Female share of STEM graduates (2007 and 2016)



Data source: UNESCO Institute for Statistics

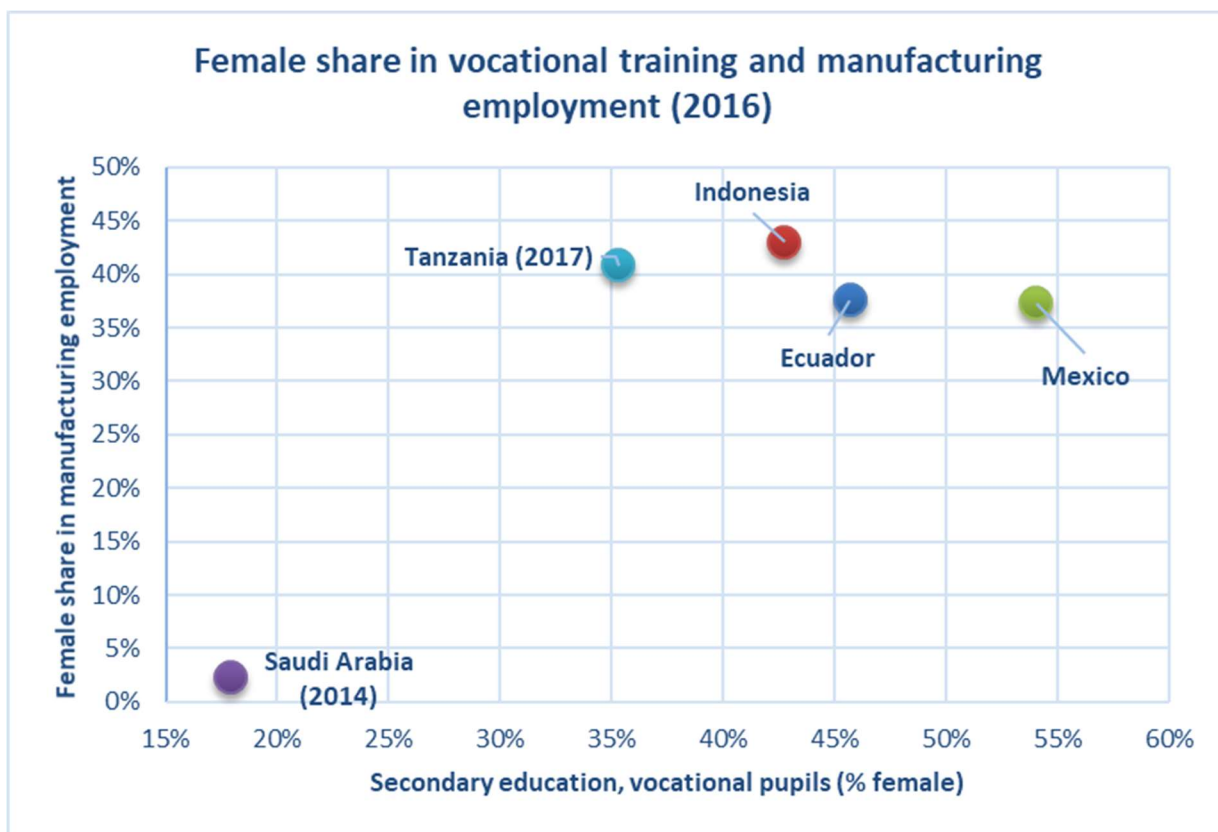
In 2016 the female share of STEM graduates was between 29 per cent and 39 per cent for the countries observed. While Saudi Arabia, Mexico and Ecuador have all seen their share of female STEM graduates decline, Viet Nam has had a strong increase from 24 per cent in 2007 (when it had the lowest share in the sample) to 37 per cent in 2016. The large improvement is a sign that Vietnamese women have the opportunity to and/or are more and more interested in completing courses that are considered to be more male dominated, and more relevant for decent jobs in the manufacturing sector. This should in the future lead to more women in better paid manufacturing jobs. Nonetheless, a female share of 37 per cent still means that men have more chances in good-quality jobs within manufacturing at present. The equal level of educational attainment in the labour force that we have seen is therefore less so in STEM fields, hence women have probably chosen other courses less relevant for manufacturing.

We need to keep in mind that while to some extent a women may prefer to study other courses than men, it is also true that there is still strong stereotyping in many societies about the types of careers and courses women and men should undertake and these are often unconsciously conveyed at a very young age, affecting women's decisions in the long run.

### 3.4.4 Vocational training

There is a relatively high propensity of people in vocational training to enter the manufacturing sector. For this reason, this indicator is observed in addition to STEM. Vocational training is practical and it is intended to give pupils the necessary skills for manufacturing in particular. Nonetheless, it is often highlighted that vocational training programmes are outdated in various countries and that there is a mismatch between supply and demand of skills. Having said this, vocational training is still closely linked to manufacturing employment. There is also a lot of stereotyping here, as these usually more manual and practical tasks are seen in many societies as “jobs for men”.

**Figure 23: Female share of vocational training and manufacturing employment (2016)**



Data source: World Development Indicators, ILOSTAT

We can plot the female share of vocational pupils against the female share in manufacturing employment. There is unfortunately no data available for Viet Nam on the World Development Indicators database, so we will proceed to analyse comparator countries.

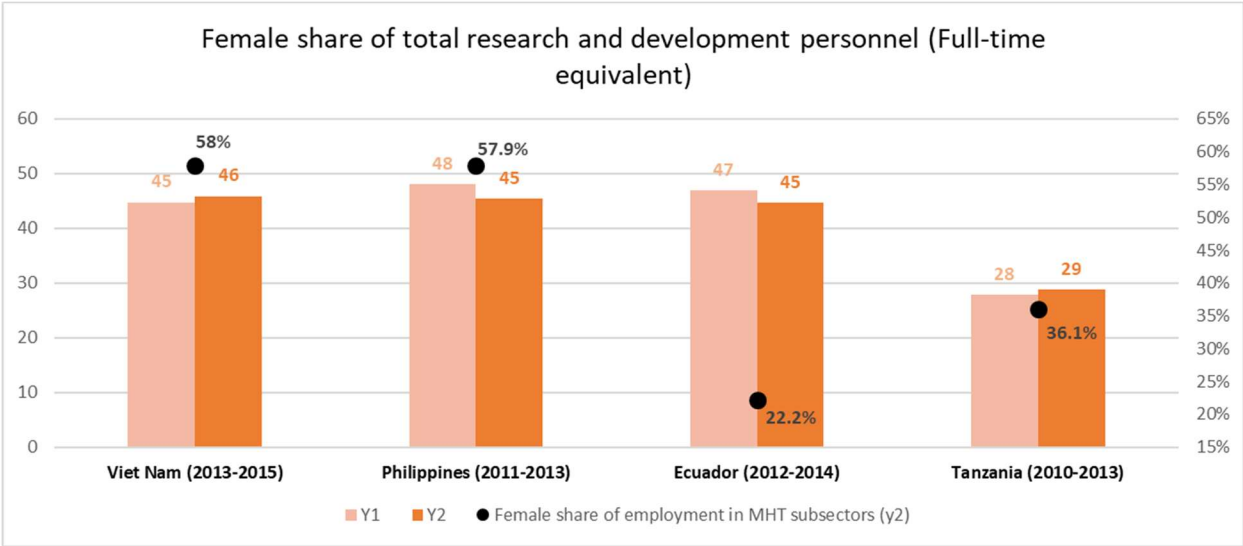
We find that Mexico has the highest female share in vocational training and that in fact more than half of the pupils are female. This, however, is not fully reflected in the female share of manufacturing employment, which is 37 per cent.

All other countries have more males in vocational training than females. Interestingly, Indonesia, Mexico and Ecuador have a higher female share in vocational training (secondary education) than in STEM programmes (tertiary education). This could be in line with the idea that generally women are still somewhat less equipped with the skills required for manufacturing, particularly for more skills-intensive activities. This may, then, also help explain the generally lower share of women in medium and high-tech subsectors, in managerial roles, and generally gender differences in manufacturing.

### 3.4.5 Research and development personnel

Research and development is necessary to increase innovation and is particularly relevant – and most commonly found – in the manufacturing sector. Women’s participation in R&D will allow them to be in the forefront of new findings and developments, leading to more empowerment and decent and well-paid jobs. To compare female and male staff in research and development we can take the “female share of research and development personnel” indicator. The figure below compares it to the share of women in medium and high-tech subsectors.

**Figure 24: Female share in total research and development personnel vs female share in medium and high-tech subsectors**



Data source: UNESCO Institute for Statistics, INDSTAT 2 Rev 3

Viet Nam had the same female share of R&D personnel as Philippines and Ecuador, when we compare the 2013 values. Since then, Viet Nam has been able to further increase the share of women, so that by 2015, 46 per cent of research and development personnel were female. This seems strong considering the level of industrial development in Viet Nam. While we are observing a trend of just two years, meaning we should be cautious of our interpretation, both Philippines and Ecuador seem to have a downward trend. Tanzania is still at an earlier stage of industrial development and it is not surprising that the female share is also lower. It is unclear how much of this information gets translated into manufacturing, although over 90 per cent of private sector research and development takes place in the manufacturing sector. Women,

however, often prefer to stay in academia or do research outside the private sector, so there is a certain level of leakage.

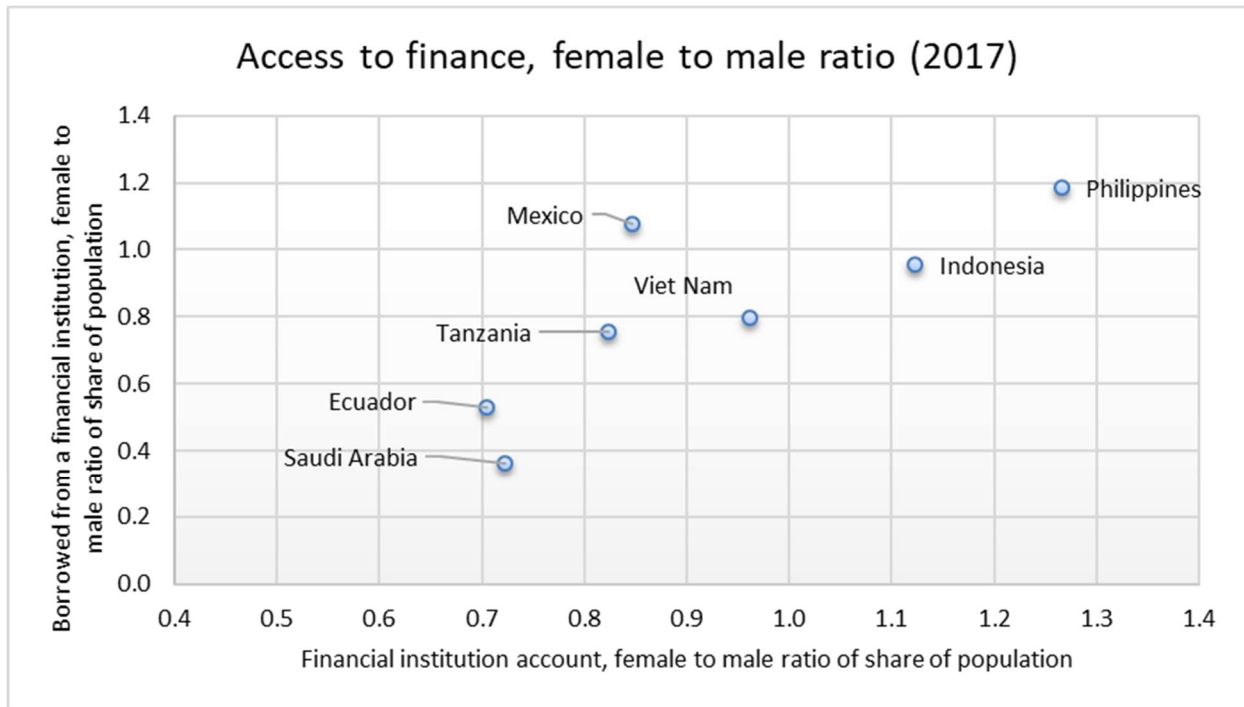
From the graph we find that countries with a higher female share in research and development also tend to have a higher female share in medium and high-tech subsectors, with the exception of Ecuador. However, we need to remember that many of these activities are still low paid and probably consist of more assembly work than anything else, as is the case in Viet Nam. The link between research and development and medium and high-tech subsectors is therefore still weak, especially when we consider absolute numbers. Nonetheless, since Viet Nam has such a large number of women already working in subsectors considered medium and high-tech (although their current tasks might not be considered high-skilled), skilled women may find it easier in the future to enter this sector as well, even if with a different role. Normally, women are more likely to enter certain types of jobs if they have in their network someone who works in the same place or undertakes a similar task.

Policymakers may want to ensure that women working in research and development have equal opportunities to men, also in the manufacturing sector.

### 3.4.6 Access to finance

We will now look at access to finance. This indicator is in fact much more relevant for an entrepreneur than for a factory worker or employee. Unfortunately, data on female entrepreneurs in manufacturing does not exist at the international level. Nonetheless, we can use three indicators to give us a good picture of gender disparities in access to finance. We can look at the indicators individually or in combination. The first example is more general and looks at the gender differences in having an account with a financial institution and the extent of borrowing from a financial institution. For this, we have chosen to combine both into the same graph. Also note that we are measuring the ratio between male and female (female share divided by male share). A value of 1 means women and men are equally as likely to have an account or borrow; a value below 1 means that women are less likely to borrow or have an account than men; a value above 1 means that they are more likely.

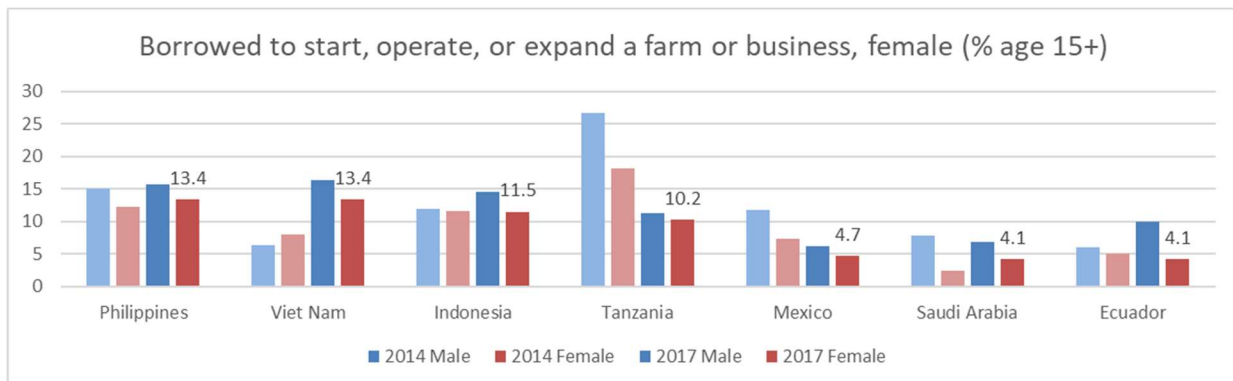
**Figure 25: Gender balance in access to finance (2017)**



Data source: World Bank Global Financial Inclusion database

The countries presented in the graph above seem to illustrate a trend in which having an account and borrowing go more or less hand in hand. We can conclude that in Viet Nam, along with Saudi Arabia, Ecuador and Tanzania women have somewhat less access to financial services than men. The graph reveals that although Viet Nam is not the worst performer, women there are both less likely to have an account and to borrow from financial institutions than men, though there is a wider gap in borrowing. In the Philippines it seems that men have less access to finance than women, while in Mexico and Indonesia, women outperform men in one of the two indicators.

**Figure 26: Borrowed to start, operate or expand an economic activity, female vs male (2014, 2017)**



Data source: World Bank Global Financial Inclusion database



When looking at borrowing money for an economic activity, in all countries observed women have a lower borrowing rate than men, at least in the latest year reported. The largest gender discrepancy was found in Ecuador, where only 4.1 per cent of women have borrowed for farming or business purposes in 2017, compared to 10 per cent of men. In general, our graph indicates that it is generally easier and more common to borrow in the Asian economies we are assessing than in the Latin American ones. These are too few countries to make any comments on the other countries in the regions, though.

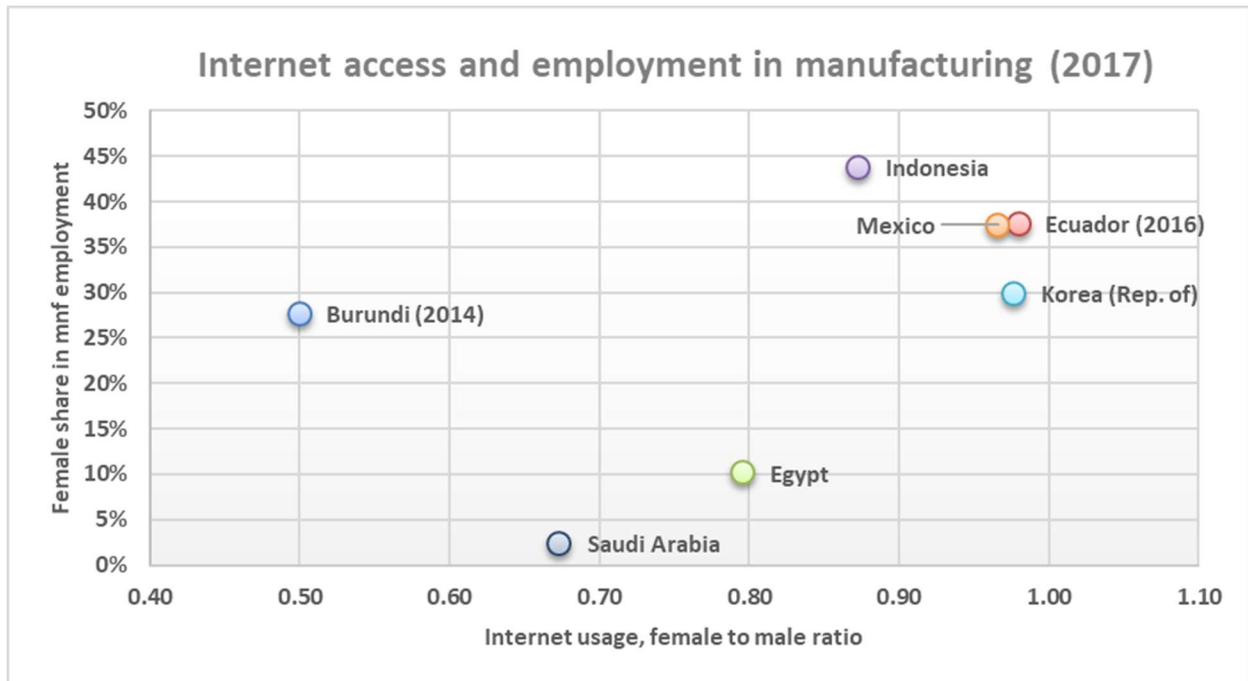
All in all, Ecuador, Indonesia and Viet Nam have experienced a widening gender gap throughout the years, whereas Saudi Arabia, Mexico, Tanzania and the Philippines have seen narrowing gender gaps. Viet Nam has seen the largest increase in female borrowing between the two years, although the growth has been larger for men. In 2017, Viet Nam and the Philippines have seen 13.4 per cent of their women receive loans for farming or business purposes.

Generally, however, it seems that rates are very low. The female to male ratio of borrowing for an economic activity is the same as for borrowing in general, at 0.8. Women and men would benefit from having greater access to loans, and we can assume this is true for loans specific to the manufacturing sector as well.

### **3.4.7 Access to digital technology and digital banking**

We have already discussed the importance of digital technology as well as its use for banking. We will look at three indicators, the first one being internet use by sex. This will give us an indication of the extent of access to digital technology – something which is expected to be more and more necessary with increased digital solutions and the fourth industrial revolution.

**Figure 27: Female to male ratio of internet use and female share in manufacturing employment (2017)**



Data source: International Telecommunication Union, ILOSTAT

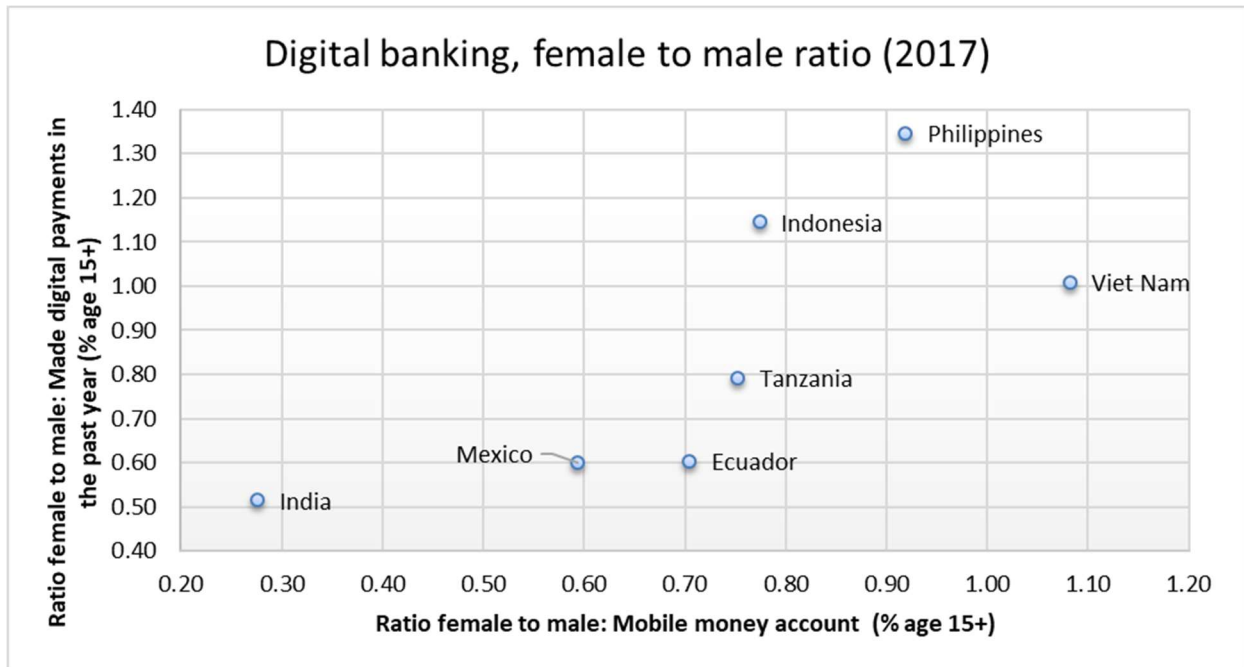
The Republic of Korea, Mexico and Ecuador have the highest female to male ratio when it comes to internet usage. However, female usage was only 65 per cent in Mexico and 55 per cent in Ecuador in the latest year reported, while in the Republic of Korea it was 96 per cent. The female share of manufacturing employment was between 30 and 38 per cent for these three countries. In Indonesia, where the female share of employment was somewhat higher, the ratio of internet usage was lower.

Burundi has had the highest gender imbalance in internet usage, with only 0.7 per cent of women and 1.4 per cent of men having used the internet in the last year. These are the lowest rates globally. Saudi Arabia and Egypt are highly unequal in terms of access to the internet, with women’s share of internet usage being between 70 and 80 per cent that of men’s.

For all countries it would be important to increase internet usage and reduce the gender gap, to allow women to be equally involved, and to benefit equally, from digital advancement.

We can now look more specifically at the use of digital and mobile banking. The figure below will combine two indicators: mobile money accounts and digital payments made in the last year, both expressed as a female to male ratio of percentage of the population.

Figure 28: Gender balance in digital banking (2017)



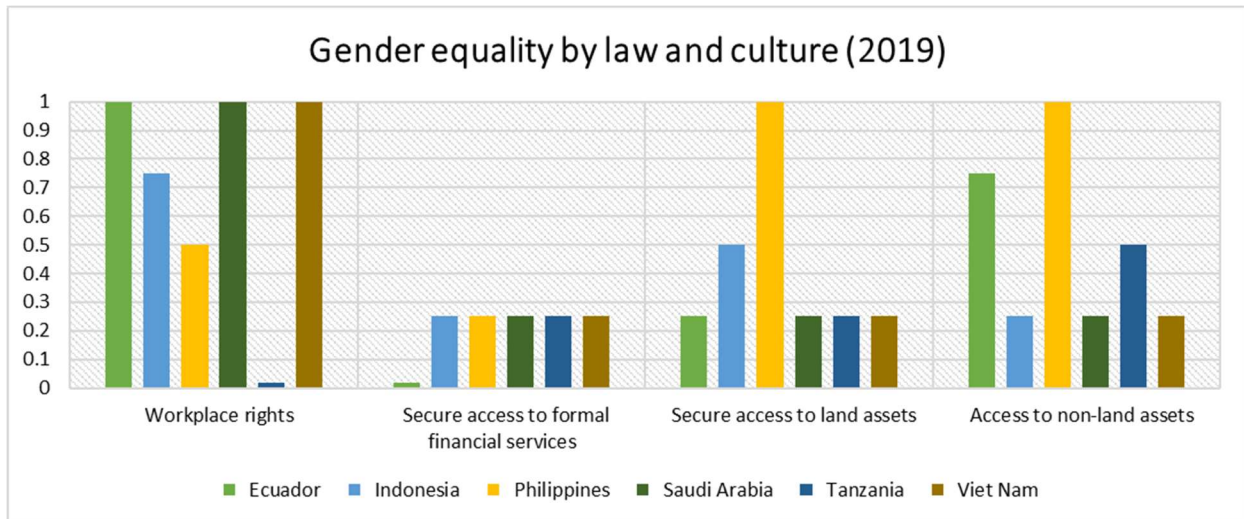
Data source: World Bank Global Financial Inclusion

Viet Nam has gender parity when it comes to women and men making digital payments in the last year. This suggests that women have the same opportunities as men in this respect. When it comes to having a mobile money account, women are more likely than men to have one. This indicates that women are not restricted in their access to digital banking. This is quite different to the traditional banking we have seen. For Viet Nam this could mean that digital banking is indeed making an impact in terms of closing the gender gap, and this is to be seen as a positive development. In all the other countries presented women are less likely than men to own a mobile money account. There may be many reasons for this, though perhaps these countries may also be able to learn from Viet Nam.

### 3.4.8 Legal rights and culture

In addition to all of the determinants examined above, one should take into account that there may be laws that limit women's economic undertakings. For the countries we are interested in, we check the extent to which the legal rights in terms of workplace rights, access to finance, access to land and access to non-land assets are equal between men and women. The dataset used also includes cultural or religious restrictions. We decided to put all information into the same graph to give us a clear overview.

**Figure 29: Gender equality by law and culture**



Data source: Gender, Institutions and Development Database 2019

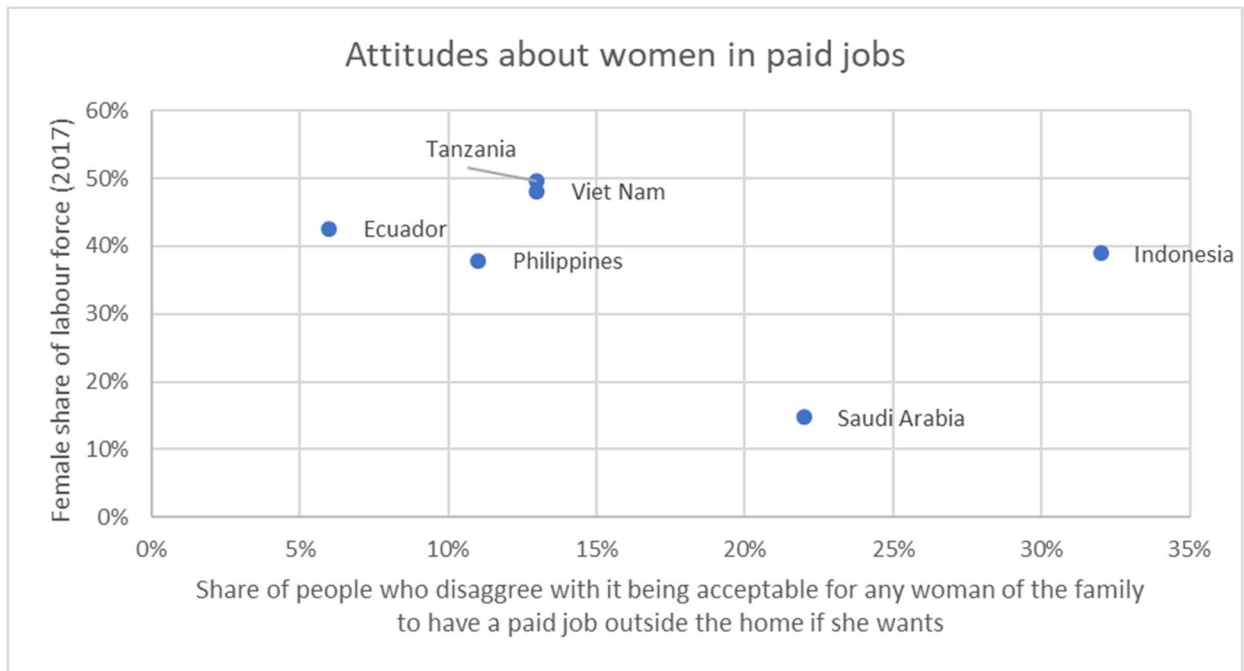
The closer the value is to 0 the more there is gender equality in the law and the less cultural restrictions there are. We find that there seems to be some degree of discrimination in every country. The most discrimination seems to happen in the workplace, for which three of the six countries observed were given the highest value. Workplace rights is also the only indicator where Viet Nam has scored particularly badly. A country’s legal framework does not guarantee equality between women and men in the workplace, as is also the case in Ecuador and Saudi Arabia (expressed by the value 1 in Figure 29). The extent of this discrimination will probably differ across countries and further investigation would be necessary to decode the score a country was given in the database. This information is crucial, as ensuring women have better working conditions requires understanding the current legal rights of women, or the lack thereof.

For the other three indicators it was found that women and men in Viet Nam “have the same legal rights without legal exceptions [...]. However, some customary, religious or traditional practices or laws discriminate against women’s legal rights” (Gender, Institutions and Development Database 2019). This is important, as it means there are aspects that have not been measured until now that could, in fact, matter significantly. Traditions are particularly difficult and slow to change and being aware of this is crucial.

### 3.4.9 Society’s perception of women working

In addition to the legal and cultural limitations women face, society may also play an important role in limiting women. People in different countries will have different views on whether women should be allowed to work. The figure below looks at the percentage of the population that disagrees with “It is perfectly acceptable for any woman in your family to have a paid job outside the home if she wants one”. Since we assume this could have a strong implication on whether women work or not, we decided to combine it with the female share of the labour force.

**Figure 30: Attitudes about women in paid jobs vs female share of the labour market (2019)**



Data source: Gender, Institutions and Development Database 2019, ILOSTAT

We could expect a negative correlation between the two indicators above: in countries where there is a negative attitude towards women having paid jobs, the female share of the labour market will also be lower. This negative correlation can be tentatively identified here. Interestingly, however, roughly a third of the population in Indonesia disagree with the statement that it is acceptable for women to have paid jobs, even though the female share of labour force is almost 40 per cent. This is higher than in the Philippines, where roughly 11 per cent share the perception. In Vietnam, 13 per cent of the population believe women should not have paid employment outside the home. As women make up almost half the workforce (48 per cent), it can be assumed that this perception has not had a significant impact on the overall female participation in the labour force of the country.

This data does show, however, that there are people who believe women should not be working. This may have a stronger effect on women’s participation in certain sectors of the economy or certain types of jobs and hence needs to be taken into consideration.

**Summary: Key determinants of female participation in manufacturing – Viet Nam**

Whether women participate in manufacturing or not, and to what extent they can benefit from it, will depend on an array of factors and probably complex relationships between them. Nonetheless, there are

some key variables that are recurrently mentioned in the literature as the main drivers for female equality and female participation in manufacturing. An attempt was also made to align these variables with the drivers listed in EQUIP tool 9 and expand them to include other determinants of gender equality.

For the case of Viet Nam we presented some interesting findings. While women and men in the labour force have roughly the same level of education, a larger share of highly educated women were left unemployed, meaning that men who completed advanced or intermediate levels of education were more likely to be hired than women with the same level of education. This is also in line with the fact that there are significantly less women in senior and middle management positions and it now becomes clear that it is not because women are less educated than men. Three possible reasons for this male preference could be: that the courses males complete are more demanded by firms than the courses females complete (an issue of skills mismatch); that there are other, less quantifiable, differences between Vietnamese men and women on average that make men more attractive candidates for the jobs (e.g. soft skills, performance levels during education); or that there is a degree of stereotyping and discrimination.

Focusing on the manufacturing sector, we have found that just over a third of STEM graduates were female. This hints that although in total the level of education of men and women is fairly equal, women are less likely than men to complete the courses required in the manufacturing sector, resulting in a more severe skills mismatch for them especially for high skilled roles, such as engineers and managers. The reasons for there being significantly less female STEM graduates should be understood, and are most likely related to stereotyping, which begins at a very young age, or to the field not being conducive to female participants. It needs to be pointed out that significant improvements have been made in Viet Nam over the past decade and that they are unmatched by any of the other comparator countries. Continuing this trend may have considerable implications on women in manufacturing in the future. Interestingly, female participation in research and development has been increasing to the point that there is almost gender balance in the field. This does not reveal, however, how many of the women work in the manufacturing sector.

In terms of access to finance, Vietnamese men and women seem to own bank and mobile money accounts in similar rates. However, women tend to be less likely than men to obtain a loan, whether for business or for other reasons. Obtaining a loan for the type of investments usually required in manufacturing is already tough for many, as generally larger sums are required and returns are not immediate – which makes it less attractive to financial institutions. However, we now know that women have an added burden, which makes it even harder for them to access finance, especially for manufacturing.

Legal rights and culture also play a role. The Gender, Institutions and Development Database reveals that the law does not guarantee equal rights in the workplace for women and men. In addition, cultural norms and traditions are said to somewhat hinder gender equality in terms of access to financial services, land and non-land assets, and roughly 13 per cent of the population believe women should not have the right to choose whether they can engage in paid employment or not. These cultural norms, which hinder women from accessing land and non-land assets, are likely to make it more difficult for them to access loans too.

All in all, the main factors which seem to be affecting women's equal opportunities in the manufacturing sector and preventing them from contributing to structural transformation seems to be lower graduates from courses which tend to be more relevant for manufacturing sector jobs such as STEM, coupled with cultural norms and views that hinder women from having full (economic) equality. This has probably also

affected women's access to loans, especially for business purposes. It needs to be highlighted that positive trends have been identified for most of the determinants, showing promising prospects for the future of women in manufacturing. Nonetheless, the targeted and effective elimination of gender inequalities requires much more analysis. These observations have pointed to where some of the key challenges most likely derive from.

## 4 Possible extensions

### Green jobs in manufacturing for women

Suggesting a methodology to calculate a proxy for the female share of employment in green manufacturing may be useful. Demand for green products are on the rise, which results in more job opportunities. Could this be an opportunity for women? Some studies point out that women are losing out on this development, as they still lag behind men in terms of the STEM skills often needed.

A recent paper by Moll de Alba and Todorov (2018) proposes a broad list of manufacturing goods considered “green” based on a combination of previously determined product groups. We could use this list to have an idea of the number of women who are employed in economic activities considered to be green.

The methodology is presented in the box below.

|   |   |
|---|---|
| <b>Topic</b>                              | <b>Green jobs</b>   |
| <b>Indicator name</b>                     | <b>Female green manufacturing jobs</b>  |
| <b>Level of analysis</b>                  | Two-digit ISIC code   |
| <b>Databases and indicators</b>           | INDSTAT2 (rev. 3) or INDSTAT4 (rev. 4): Female employment   |
| <b>Other sources required</b>             | Moll de Alba, J. and v. Todorov. Pre-calculated shares for green exports. United Nations Industrial Development Organization. based on paper: Moll de Alba, J. and V. Todorov. 2018. Green industrial performance: the GIP index. <i>World Review of Science, Technology and Sustainable Development</i> 14, Nos. 2/3, pp. 266–293.   |
| <b>Data coverage</b>                      | 47 countries have a datapoint since 2010  |
| <b>Methodology</b>                        | Using the shares provided by the United Nations Industrial Development Organization (expected to be updated annually), calculate the number of green female jobs per two-digit manufacturing activity (from INDSTAT) and obtain the sum of female green jobs in manufacturing.<br><br><b>Female green manufacturing jobs = <math>\sum(F_{EA} * SG_{EA})</math></b><br><br><b>F<sub>EA</sub></b> : Number of female employment per economic activity (two-digit code)<br><b>SG<sub>EA</sub></b> : Share of green production per economic activity (two-digit code) |
| <b>Time-intensity/level of difficulty</b> | Straightforward, simple equation.   |
| <b>Limitations</b>                        | <ol style="list-style-type: none"> <li>1) Ambiguity regarding products considered “green” (see paper for discussion).</li> <li>2) Assumption that the shares of exported goods equal those of production (attempts to improve this is ongoing, particularly by adjusting the green shares to the share of exports in output).</li> </ol>  |

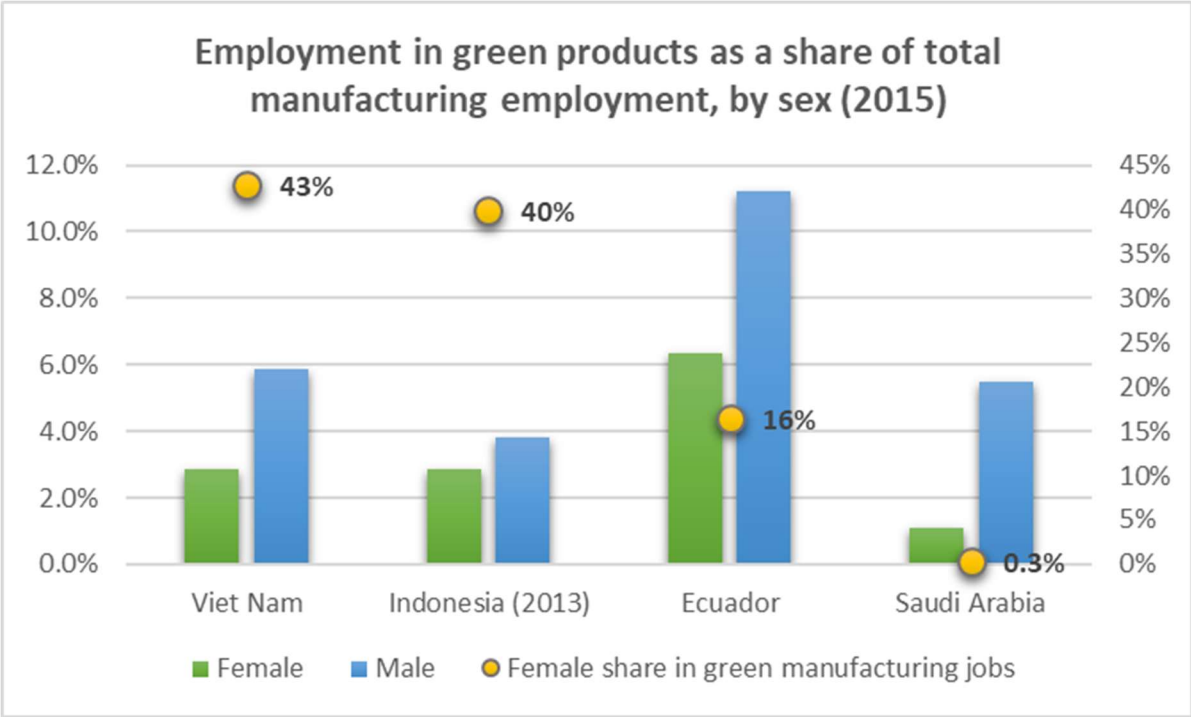


|                   |   |
|-------------------|---|
|                   | <p>3) Assumption that there is an equal distribution of labour within a given two-digit or four-digit ISIC code.</p> <p>4) Assumption that the proportion of female to male employees in a given ISIC code is equal within the economic activity.</p>   |
| <b>Conclusion</b> | Despite the limitations listed above, this is a simple tool that offers a reliable proxy of green female jobs. The methodology used by Moll and Todorov (2018) to identify the shares of green production is becoming more refined over time and will further improve the quality of this tool. |

**Example table: Employment in Green products, by gender**

| 2015             | Employment in green products |         | Share of manufacturing employment |       | Gender ratio in green jobs | Share of women in green jobs |
|------------------|------------------------------|---------|-----------------------------------|-------|----------------------------|------------------------------|
|                  | Female                       | Male    | Female                            | Male  |                            |                              |
| Viet Nam         | 105,355                      | 141,182 | 2.9%                              | 5.9%  | 0.48                       | 43%                          |
| Indonesia (2013) | 57,911                       | 87,231  | 2.9%                              | 3.8%  | 0.75                       | 40%                          |
| Ecuador          | 3,708                        | 18,833  | 6.3%                              | 11.2% | 0.56                       | 16%                          |
| Saudi Arabia     | 164                          | 51,973  | 1.1%                              | 5.5%  | 0.20                       | 0.3%                         |

**Example graph: Employment in green products, by gender**



### **Anticipated female participation in industry 4.0**

If it is expected that certain subsectors are more likely to be positively affected by industry 4.0, we could use this list of subsectors and check their female employment shares. The closer the sector is to gender balance, the more it can be expected that both men and women will benefit equally from the fourth industrial revolution.

### **Other**

Much of the difference between women's and men's experiences in the manufacturing sector relates to their working conditions. While we have attempted to cover what is possible using existing and international data, much information is still left hidden from such an analysis. Unsafe working conditions resulting from the use of chemicals, the unsafe use of machinery, insecure buildings, or working extreme hours without breaks and so forth cannot be measured. Often, these types of working conditions are found in informal employment. Clearly much of this is not reported and it is only through case studies that such information is revealed. It is strongly encouraged to complement the above suggestions for quantitative analysis with more qualitative information from reports and studies to obtain a more holistic and realistic picture.

Furthermore, women in manufacturing are a heterogeneous group. While current data does not allow us to make further distinctions, distinguishing among migrant workers, informal workers, levels of skills or age would all add very valuable information. Lastly, data on women and their challenges with pregnancies during employment and reduced likelihood to get promoted or even maintaining the job due to career breaks for childbearing would need to be assessed.

## 5 Appendices

### Appendix 1

|   |  |
|---|--|
| <b>Topic</b>                              | <b>Women in management</b>   |
| <b>Indicator name</b>                     | <b>Female share of employment in senior and middle management in the manufacturing sector (%)</b>  |
| <b>Level of analysis</b>                  | Manufacturing sector   |
| <b>Databases and indicators</b>           | ILOSTAT: Female share of employment in senior and middle management (%).<br>ILOSTAT: Female share of total employment (%).<br>ILOSTAT: Female share of employment in manufacturing (%).  |
| <b>Other sources required</b>             | N/A  |
| <b>Data coverage</b>                      | 97 countries   |
| <b>Methodology</b>                        | <p>Calculate the ratio between the share of women managers and the share of women in total employment. Apply the same share to the share of women employed in the manufacturing sector to get a proxy for the share of women managers in manufacturing.</p> $F_{mm} = F_{em} * R_{fmet}$ <p>Where:</p> $R_{fmet} = F_{mt} / F_{et}$ <p><math>F_{mm}</math>: Female share of managers in manufacturing (%)<br/> <math>F_{em}</math>: Female share of employment in manufacturing (%)<br/> <math>R_{fmet}</math>: Ratio of female share of managers to female share in employment in total economy<br/> <math>F_{mt}</math>: Female share of managers in total economy (%)<br/> <math>F_{et}</math>: Female share of employment in total economy (%)</p> |
| <b>Time-intensity/level of difficulty</b> | Relatively simple. Even though it is a two-step methodology, since it uses the same data sources it is not significantly time-intensive.   |
| <b>Limitations</b>                        | There is an assumption that the manufacturing sector has the same ratio of women employees and managers than the average of the rest of the economy. This may not be true. To account for this, it is possible to use data from the Global Gender Gap Report 2017 (data source: LinkedIn data) to check, at the global level, the proportion of the difference between female managers and female employment in manufacturing compared to the average of the other sectors. We can then apply this proportionate difference to the values we obtain above, as a way of taking sector differences (albeit global ones) into consideration. As indicated above, however, this assumes that the different behaviours in the sectors are                   |

|                          |  |
|--------------------------|--|
|                          | <p>proportionately the same for all countries. This will clearly not be the case. Furthermore, the data source is somewhat unclear.</p>  |
| <p><b>Conclusion</b></p> | <p>The proxy is sufficiently telling, as we are taking country data into consideration and adapting them to the female share in manufacturing. It is expected that cultural differences across countries will have a significant impact on the share of women in managerial positions. Adjusting for sector-specific global data will not add much value to the analysis and at the same time will be rather time-consuming.</p> <p>It is suggested to use the methodology as stated in the methodology section.</p> <p>One can then make reference in the text to the data presented by the World Economic Forum (that, in fact, says there is a slightly higher ratio of women in managerial positions in manufacturing than in the average of the whole economy).</p> |

## Appendix 2

Table 3: Medium and high-tech subsectors performance and female employment shares at ISIC rev. 4, four-digit (2006-2016), Viet Nam

| ISIC Description                                       | Wage per emp 16 (USD) | CAGR wages per emp | CAGR productivity | Fsh16 | Change in Share |
|--|-----------------------|--------------------|-------------------|-------|-----------------|
| 2816 Lifting and handling equipment                    | 6,780                 | 16%                | 11%               | 17%   | 3%              |
| 2021 Pesticides and other agrochemical products        | 6,691                 | 9%                 | 10%               | 27%   | 4%              |
| 2023 Soap, cleaning and cosmetic preparations          | 6,502                 | 8%                 | 7%                | 46%   | -3%             |
| 2829 Other special-purpose machinery                   | 5,834                 | 15%                | 8%                | 24%   | 5%              |
| 2910 Motor vehicles                                    | 5,801                 | 10%                | 15%               | 16%   | 0%              |
| 2630 Communication equipment                           | 5,779                 | 13%                | 22%               | 75%   | 22%             |
| 2811 Engines/turbines, excl. aircraft, vehicle engines | 5,553                 | 12%                | 19%               | 44%   | 27%             |
| 2100 Pharmaceuticals, medicinal chemicals, etc.        | 5,539                 | 9%                 | 3%                | 52%   | -3%             |
| 2022 Paints, varnishes; printing ink and mastics       | 5,471                 | 10%                | 4%                | 26%   | 0%              |
| 3011 Building of ships and floating structures         | 5,077                 | 13%                | 5%                | 13%   | 0%              |
| 2029 Other chemical products n.e.c.                    | 5,053                 | 8%                 | 9%                | 34%   | -1%             |
| 2011 Basic chemicals                                   | 5,042                 | 11%                | 3%                | 27%   | 2%              |
| 2823 Machinery for metallurgy                          | 4,987                 | 20%                | 6%                | 22%   | 5%              |
| 3091 Motorcycles                                       | 4,945                 | 13%                | 9%                | 34%   | 7%              |
| 2012 Fertilizers and nitrogen compounds                | 4,871                 | 9%                 | 3%                | 23%   | -5%             |
| 2660 Irradiation/electromedical equipment, etc.        | 4,847                 | 16%                | -1%               | 73%   | 39%             |
| 2813 Other pumps, compressors, taps and valves         | 4,717                 | 13%                | 7%                | 35%   | 1%              |
| 2920 Automobile bodies, trailers and semi-trailers     | 4,713                 | 13%                | -5%               | 11%   | -1%             |
| 2670 Optical instruments and photographic equipment    | 4,513                 | 10%                | -3%               | 79%   | 14%             |
| 2733 Wiring devices                                    | 4,443                 | 15%                | 10%               | 73%   | -14%            |
| 2731 Fibre optic cables                                | 4,441                 | 10%                | 19%               | 68%   | -3%             |
| 2814 Bearings, gears, gearing and driving elements     | 4,419                 | 12%                | 8%                | 29%   | 5%              |
| 2821 Agricultural and forestry machinery               | 4,283                 | 15%                | 19%               | 17%   | 2%              |
| 2720 Batteries and accumulators                        | 4,268                 | 8%                 | 5%                | 40%   | 10%             |
| 3020 Railway locomotives and rolling stock             | 4,244                 | 11%                | 1%                | 43%   | 22%             |
| 2750 Domestic appliances                               | 4,235                 | 13%                | 10%               | 43%   | 2%              |
| 2930 Parts and accessories for motor vehicles          | 4,224                 | 13%                | 5%                | 66%   | 19%             |
| 273 Wiring and wiring devices                          | 4,199                 | 11%                | 8%                | 70%   | -4%             |
| 3092 Bicycles and invalid carriages                    | 4,179                 | 11%                | -1%               | 48%   | 9%              |
| 2790 Other electrical equipment                        | 4,160                 | 13%                | 6%                | 35%   | -34%            |
| 2825 Food/beverage/tobacco processing machinery        | 4,131                 | 9%                 | 3%                | 15%   | 7%              |
| 2651 Measuring/testing/navigating equipment, etc.      | 4,109                 | 24%                | 16%               | 48%   | -34%            |
| 2732 Other electronic and electric wires and cables    | 4,076                 | 8%                 | 5%                | 69%   | 10%             |
| 2818 Power-driven hand tools                           | 4,045                 | 15%                | 8%                | 29%   | 9%              |
| 2013 Plastics and synthetic rubber in primary forms    | 4,044                 | 11%                | 17%               | 37%   | -1%             |
| 2710 Electric motors, generators, transformers, etc.   | 4,007                 | 10%                | 7%                | 61%   | -8%             |
| 2652 Watches and clocks                                | 3,997                 | 18%                | -2%               | 70%   | 12%             |
| 2819 Other general-purpose machinery                   | 3,968                 | 11%                | 9%                | 21%   | 1%              |
| 2812 Fluid power equipment                             | 3,917                 | 3%                 | -1%               | 49%   | 42%             |
| 2620 Computers and peripheral equipment                | 3,897                 | 2%                 | 0%                | 82%   | 5%              |
| 2030 Man-made fibres                                   | 3,895                 | 20%                | 1%                | 35%   | -21%            |
| 2610 Electronic components and boards                  | 3,718                 | 13%                | 11%               | 75%   | -4%             |
| 2824 Mining, quarrying and construction machinery      | 3,565                 | 9%                 | 16%               | 23%   | 4%              |
| 2680 Magnetic and optical media                        | 3,505                 | 8%                 | -7%               | 29%   | -8%             |
| 2640 Consumer electronics                              | 3,485                 | 6%                 | 3%                | 82%   | 44%             |
| 2817 Office machinery, excl. computers, etc.           | 3,391                 | 7%                 | -1%               | 70%   | -12%            |
| 2826 Textile/apparel/leather production machinery      | 3,264                 | 10%                | 14%               | 65%   | 37%             |
| 2815 Ovens, furnaces and furnace burners               | 3,229                 | 13%                | 15%               | 16%   | 5%              |
| 2822 Metal-forming machinery and machine tools         | 3,188                 | 12%                | 6%                | 18%   | -3%             |
| 3012 Building of pleasure and sporting boats           | 3,170                 | 13%                | 15%               | 24%   | 5%              |
| 2740 Electric lighting equipment                       | 2,833                 | 8%                 | 3%                | 59%   | 11%             |
| 3099 Other transport equipment n.e.c.                  | 2,639                 | 7%                 | 17%               | 29%   | 2%              |

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