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Expanded (SCIE)

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Journal's Performance

Journal Impact Factor

The Journal Impact Factor (JIF) is a journal-level metric calculated from data indexed in the Web of Science Core Collection. It should be used with careful attention to the many factors that influence citation rates, such as the volume of publication and citations characteristics of the subject area and type of journal. The Journal Impact Factor can complement expert opinion and informed peer review. In the case of academic evaluation for tenure, it is inappropriate to use a journal-level metric as a proxy measure for individual researchers, institutions, or articles.

2021 JOURNAL IMPACT FACTOR

1.859

2021 JOURNAL IMPACT FACTOR WITHOUT SELF CITATIONS

1.728

Journal Impact Factor Trend 2021
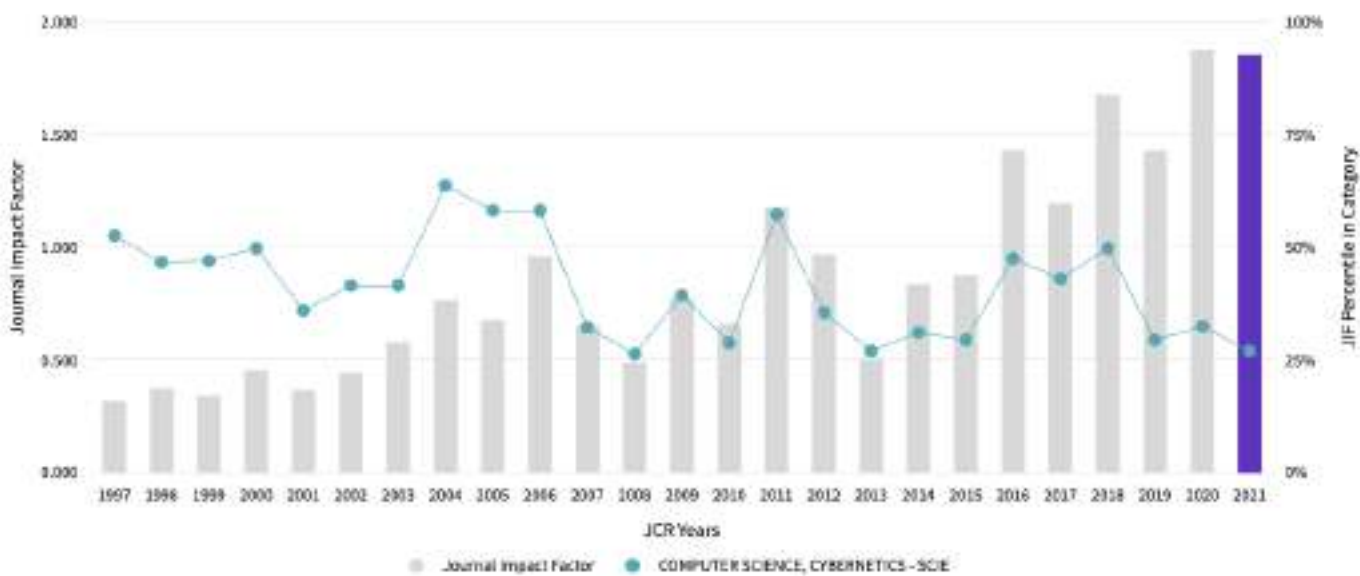
Journal Impact Factor is calculated using the following metrics

$$\frac{\text{Citations in 2021 to items published in 2019 (81) - 2020 (90)}}{\text{Number of citable items in 2019 (36) + 2020 (56)}} = \frac{171}{92} = 1.859$$

Journal Impact Factor without self cites is calculated using the following metrics

$$\frac{\text{Citations in 2021 to items published in 2019 (81) + 2020 (90) - Self Citations in 2021 to items published in 2019 (5) + 2020 (7)}}{\text{Number of citable items in 2019 (36) + 2020 (56)}} = \frac{171 - 12}{92} = 1.728$$

Rank by Journal Impact factor

Journals within a category are sorted in descending order by Journal Impact Factor (JIF) resulting in the Category Ranking below. A separate rank is shown for each category in which the journal is listed in JCR. Data for the most recent year is presented at the top of the list, with other years shown in reverse chronological order.
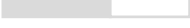
EDITION

Science Citation Index Expanded (SCIE)

CATEGORY

COMPUTER SCIENCE, CYBERNETICS

18/24

JCR YEAR	JIF RANK	QUARTILE	JIF PERCENTILE	
2021	18/24	Q3	27.08	
2020	16/23	Q3	32.61	
2019	16/22	Q3	29.55	
2018	12/23	Q3	50.00	
2017	13/22	Q3	43.18	
2016	12/22	Q3	47.73	
2015	16/22	Q3	29.55	
2014	17/24	Q3	31.25	
2013	18/24	Q3	27.08	
2012	14/21	Q3	35.71	
2011	9/20	Q2	57.50	
2010	14/19	Q3	28.95	
2009	12/19	Q3	39.47	
2008	13/17	Q4	26.47	
2007	12/17	Q3	32.35	
2006	8/18	Q2	58.33	
2005	8/18	Q2	58.33	
2004	7/18	Q2	63.89	
2003	11/18	Q3	41.67	
2002	11/18	Q3	41.67	
2001	12/18	Q3	36.11	
2000	10/19	Q3	50.00	
1999	10/18	Q3	47.22	
1998	9/16	Q3	46.88	
1997	9/18	Q2	52.78	

Rank by Journal Citation Indicator (JCI)

Journals within a category are sorted in descending order by Journal Citation Indicator (JCI) resulting in the Category Ranking below. A separate rank is shown for each category in which the journal is listed in JCR. Data for the most recent year is presented at the top of the list, with other years shown in reverse chronological order.

Only journals which have a calculated JCI value are included in the JCI ranking. The total number of journals displayed in this ranking may be less than the category overall.

CATEGORY

COMPUTER SCIENCE, CYBERNETICS

24/32

JCR YEAR	JCI RANK	QUARTILE	JCI PERCENTILE	
2021	24/32	Q3	26.56	
2020	19/29	Q3	36.21	
2019	18/29	Q3	39.66	
2018	18/29	Q3	39.66	
2017	18/28	Q3	37.50	

Building a Regional Employability Indicator Based on Ordered Weighted Average Operators

Tanya S. Garcia-Gastelum, Cristhian R. Uzeta-Obregon, Pavel A. Alvarez, Luis F. Espinoza-Audelo & Ernesto León-Castro

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Building a Regional Employability Indicator Based on Ordered Weighted Average Operators

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ABSTRACT

This article presents the process to build a regional employ-ability indicator based on the ordered weighted average oper-ator. The objective is to generate an indicator that can include different weighting vectors to analyze the information based on an analysis made from States to Regions to Nation. The main advantage of doing this type of indicators is that it is possible to made different politics for each State/Region instead of just analyze the whole Nation information. Also, based on the reordering step of the OWA operator is possible to obtain the maximum and minimum results. An example based on the National Occupation and Employment Survey (ENOE) 2020 survey conducted by the National Institute of Statistics and Geography (INEGI) in Mexico was done. Among the main results is possible to visualize the main characteris-tics of each Region.

Introduction

According to the OIT (2018), the world rate of female participation in the labor market is 48.5 percent, 26.5 percentage points lower than that of men, which is 75.0 percent; In the same period, in Latin America and the Caribbean, the participation of women and men in the labor market was 51.5 and 77.1 percent, respectively. Even though the labor participation gap has seen a change since 1990, the trend between men and women has been somewhat consistent, with the marked tendency to decrease according to the trend being observed mainly in the regions of Europe and Central Asia, and in Latin America and the Caribbean. over the years (Pimkina and de La Flor 2020).

According to information on the global gender gap, which is presented annually by the World Economic Forum, it shows the inequity for women

that exists around the world in terms of economic participation, educational attainment, health and political empowerment, in order to progress toward gender parity (Moctezuma Navarro, Narro Robles, and Orozco Hernández 2014). In this sense, in the report for 2020 of the World Economic Forum (2019), it is reflected that only some countries advanced in relation to the report of the previous year, highlighting that, in the sub-index of economic participation and opportunity for women, 257 will be necessary years to achieve gender parity, this indicator being the most alarming in terms of equality. In this sub-index, of the 153 countries studied, the last places are occupied by countries from the Middle East and North Africa region; For its part of the nations of Latin America and the Caribbean, Mexico is ranked 124, with this region being the last country on the list, below El Salvador and Costa Rica, which are ranked 119 and 112, respectively.

To better understand the phenomenon of employability, it is necessary to analyze the case individually and not in a generalized way, since not all regions and areas of the country work in the same way and therefore the way in which the job should be addressed. The problem is not the same across nations. Faced with this situation, it is found that official data are usually analyzed by simple means, which are not always the appropriate way to analyze the information. Therefore, in the present investigation, an analysis of the information will be carried out through the ordered weighted average operator (OWA) developed by Yager (1988), which through its analysis of the weight vector and reorder stage provides us with information more complete considering specific characteristics of each state, region and reaching a national result. The OWA operator and its extension has been used in different field such as finance (Espinoza-Audelo et al. 2019; Olazabal-Lugo et al. 2019), government politics (Avilés-Ochoa et al. 2017; Perez-Arellano et al. 2021b), sustainability (Jeong et al. 2014; Ruiz-Morales et al. 2021), and many other fields. The research uses the results of the National Occupation and Employment Survey (ENOE) 2020 survey conducted by the National Institute of Statistics and Geography (INEGI) in Mexico.

The paper is structures as follows. Section 2 presents the theoretical framework for gender-based employability differentiators. Section 3 explains how to build a regional employability indicator based on the OWA operator. Section 4 presents an application to the case of Mexico, and Section 5 summarizes the main conclusions of the paper.

Gender-Based Employability Differentiators

The labor force in a nation regardless of gender can dramatically improve the quality of life of the population, by creating new jobs, consumer

choices, the flow of cash between society and the bargaining power of individuals. The World Bank (2020) points out that it is essential to assess the potential impact of trade policies on men and women, as well as to develop appropriate public policies to guarantee the reflection of opportunities for all based on explain commercial and economic development.

Over the years, women, as mentioned by Çemrek and Yenilmez (2017), have taken a decisive role in social and economic development in the world. The participation of women in the labor market contributes positively to growth in the economic development of countries (Luci 2009), however, this is not entirely reciprocal in what corresponds to the presence of the female gender in jobs, where in some regions political interests and lack of equity in access to certain positions are mixed.

In developing countries, according to International Labor Organization (ILO) data (OIT 2018), the female presence in informal employment represents around a third of their total informal employment index. In the emerging economies of Asia and the Pacific, contrary to developing nations, the incidence of informal employment is higher among men, with a difference of 5 percent, compared to women; It is important to highlight that in the mentioned region the cultural aspect can influence the access of the female gender to sources of employment.

In Latin America, along with other parts of the world, the average growth rate of women in the labor market since the beginning of 2000 has been increasing, where according to a study by Economic Commission for Latin America and the Caribbean (ECLAC) & ILO (2019), the gap between men and women went from almost 40 percentage points in the early nineties to 26 points at the end of 2010; being the countries of Bolivia, Nicaragua, and Peru those that observed more drastic changes in the female participation rate, in contrast to Brazil, Ecuador, Mexico, and Paraguay, being the only countries with a more moderate evolution, even though they could be considered nations with potential most developed in the Latin American region. The foregoing implies in a general way the reduction of the poverty situation of families, promoting a better quality of life and a change in the interaction between genders in the economy, as well as a change in the dynamics of labor markets.

On the other hand, due to the changes presented in the composition of employment in the world, the number of workers in the different sectors has varied over the years, observing that the highest concentration of jobs is found in the tertiary sector, specifically the branch of trade and services, having in Latin America and the Caribbean, an average variation of 2.3 percent between the first semester of 2018 and the first semester of 2019, higher than the 1% observed in the same periods of 2017 and 2018. The highest growth in this branch occurred in the countries of Paraguay,
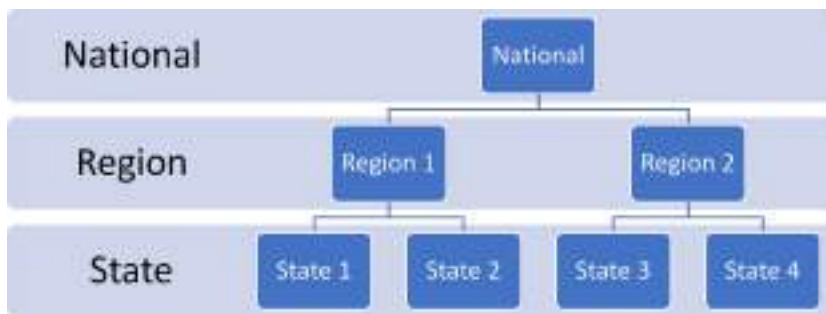
Figure 1. Aggregation process based on different levels.

Mexico, and the Dominican Republic. It should be noted that almost half of total employment in Latin American and Caribbean countries is concentrated in services, characterized by a high presence of women, as well as informal employment. Regarding employment in general in the primary and secondary sectors, the variation in the aforementioned period was −0.7% and 0.7%, respectively, confirming that these sectors are not the main sources of employment (CEPAL 2019).

Since the second half of the 20th century, Mexico has seen a considerable growth in the working-age population, that is, the Economically Active Population (EAP), and this has been thanks to the reduction in the population's fertility, in part, a product of the abandonment of the social ideology that the exclusive function of a woman is to be a mother. The majority of women tend to work in the commerce and services sectors, with a particular predominance in the financial sphere (Márquez and Márquez 2016).

The female labor offer is one of the socioeconomic issues that has acquired great relevance in recent years. That is why multiple studies have emerged that try to explain the participation of women in productive activities. In Mexico, there are studies that find that the labor market is not neutral, that is, the presence of factors such as children and the elderly directly influences the search for work in certain economic sectors (Vargas, Merino, and Hernández 2015).

It should be noted that the increasing participation of women in the labor market, together with sociodemographic changes in households, pose a series of challenges for women and men in terms of achieving a conciliation between family and work environments (Barrera and Gutiérrez 2017).

Building a Regional Employability Indicator

The objective of this paper is to propose a methodology to build a regional employability indicator based on the OWA operator. The main idea is that the information provided by each State is included with the same

importance in the Regional analysis and the Regions are equally important to the National result. Based on that idea, it is possible to visualize three levels of information (See Figure 1). It is important to note that this concept can have 4 levels if the information is provided by municipality.

To build the employability indicator, the information was divided by men and women based on economic activity sector, income level, and duration of the working day. The main idea is to obtain a Regional and National analysis with an aggregation process different than the average. To do this, different weights must be obtained for each State, that later will be used to obtain the Regional results, and for each Region, that will be used to obtain the National result. For that, the OWA operator (Yager 1988) will be used to obtain the minimum and maximum result based on the reordering process that is the main characteristic of the operator. The formulation is as follows.

Definition 1. An OWA operator of dimension n is a mapping OWA: $R^n \rightarrow R$ associated with a weight vector W of dimension n such $\sum_{j=1}^{n} w_j = 1$ and $w_j \in [0,1]$ according to the following formula:

$$OWA(a_1, a_2, \ldots, a_n) = \sum_{j=1}^{n} w_j b_j, \tag{1}$$

where b_j es the jth major element of the a_i collection. In the case of building the employability indicator there will be two different OWA operator to be obtained and are.

Definition 2. An OWA_{Region} operator of dimension n is a mapping OWA: $R^n \rightarrow R$ associated with a weight vector W of dimension n such $\sum_{j=1}^{n} w_j = 1$ and $w_j \in [0,1]$ according to the following formula:

$$OWA_{Region}(a_1, a_2, \ldots, a_n) = \sum_{j=1}^{n} w_j b_j, \tag{2}$$

where b_j es the jth major element of the a_i collection and a_i are the States that form the Region.

Definition 3. An $OWA_{National}$ operator of dimension n is a mapping OWA: $R^n \rightarrow R$ associated with a weight vector W of dimension n such $\sum_{j=1}^{n} w_j = 1$ and $w_j \in [0,1]$ according to the following formula:

$$OWA_{National}(a_1, a_2, \ldots, a_n) = \sum_{j=1}^{n} w_j b_j, \tag{3}$$

where b_j es the jth major element of the a_i collection and a_i are the Regions that form the Nation.

Table 1. Division of Mexico based on geographic location.

Region	States
Northwest	Baja California, Baja California Sur, Chihuahua, Durango, Sinaloa y Sonora
Northeast	Coahuila, Nuevo Leon y Tamaulipas
West	Nayarit, Jalisco, Colima y Michoacán
East	Puebla, Veracruz, Tlaxcala e Hidalgo
North central	Aguascalientes, Guanajuato, San Luis Potosí, Zacatecas y Querétaro
South central	Morelos, Estado de México y Ciudad de México
Southwest	Guerrero, Oaxaca y Chiapas
Southeast	Tabasco, Campeche, Quintana Roo y Yucatán

An Application to the Case of Mexico

To build the regional employability indicator based on the OWA operator, some steps are needed and are explained as follows.

Step 1. The States of the country are divided in Regions or in a distribution based on a specific criterion. In the case, the division of Mexico based on the geographic location, that divide the 32 States 8 regions, will be used (See Table 1).

Step 2. The information needed to evaluate the labor distribution between men and women in each State is obtained. In this case, all the data was obtained of the National Survey of Occupation and Employment (ENOE, for its acronym in Spanish) published by the National Institute of Statistic and Geography (INEGI, for its acronym in Spanish) in the third trimester of 2020. The specific information that was selected to do the analysis was economic activity sector, income level[1] and duration of the working day.[2]

Additionally, in this step, an analysis is done to obtain the main characteristics of each Region and to compare them to visualize if there are similarities or differences. In this study, the analysis is the following.

Mexico is the second most populated country in Latin America with 126,014,024 inhabitants, and with a distribution of 51.2% of Women and 48.8% of Men. The average age is around 29 years old. The highest concentration of population is located in the center of the country, mainly in the State of Mexico and Mexico City (INEGI 2021).

Regarding the economy, Mexico has an Economically Active Population (EAP) of 53.3 million, this being 42% of the total population (INEGI 2021). The main activities of the country can be included in Manufacturing of different types and Agricultural-Agricultural, with the United States of America being the country's main trading partner, and where more than 70% of exports are directed.

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[1]The minimum salary in Mexico for 2020 was 123.22 Mexican pesos (6.20 US dollars approximately).

[2]The total maximum hours according to the Federal Labor Law is 40 hours.

Regarding the division of the country by regions, relevant aspects of each region are detailed:

- Northwest Region. It is characterized by being a mountainous area, with desert areas and borders the United States and the Pacific Ocean; It is the most extensive region territorially and the third most populated in the country. Area mainly dedicated to agricultural services and activities, mainly agriculture and livestock, with Chihuahua and Sinaloa being the fourth and fifth place nationwide in this area, respectively.
- Northeast Region. It is the region with the lowest poverty rate in the country; it borders the United States and the Gulf of Mexico. Its main activity is construction, manufacturing, and services. In agri-food activities, only Tamaulipas is among the top ten.
- Western Region. It has extensive mountainous areas and the Pacific coast. Mainly agricultural area, being Jalisco the first place at the national level and Michoacán de Ocampo the sixth in this area, with agricultural and livestock activities; on the other hand, they have a medium average impact in the service sector, manufacturing and construction.
- Eastern Region. Despite being the second smallest region territorially, it is the second most populated in the country. It borders the Gulf of Mexico; Veracruz de Ignacio de la Llave is one of the main ports in Mexico and has an archaeological zone of greater relevance in the world, in addition, it is the second place nationwide in agri-food activities. Additionally, they have a high impact on construction and manufacturing activities.
- North Central Region. A region with extensive agricultural activity, elaboration of articles with leather material and pottery. Area dedicated to construction and manufacturing, and to a lesser extent to services.
- South Central Region. It is one of the smallest areas in terms of land area, but one of the most populated. The government powers are concentrated in this region and it is the area with the highest contribution to the national GDP. Its main activities are services, construction, and manufacturing.
- Southwest Region. Between its limits is Guatemala and the Pacific Ocean. Area mainly with agri-food activities. This region is characterized by having the highest percentage of illiterate population, indigenous language speakers, as well as emigrants. Their life expectancy is the lowest in the country.
- Southeast Region. Region that borders Belize, the Gulf of Mexico and the Caribbean Sea. It stands out for the archaeological zones, tourist areas and its biodiversity. Among the main activities are mining and oil

Table 2. Employed population by State.

State	Men	Women
Aguascalientes	342,972.00	211,979.00
Baja California	980,600.00	628,472.00
Baja California sur	228,058.00	143,223.00
Campeche	251,444.00	140,075.00
Chiapas	1,391,514.00	555,187.00
Chihuahua	1,051,120.00	652,996.00
Ciudad de México	1,915,094.00	1,492,639.00
Coahuila	792,238.00	478,182.00
Colima	214,286.00	136,070.00
Durango	491,079.00	277,887.00
Guanajuato	1,471,767.00	936,311.00
Guerrero	913,908.00	550,782.00
Hidalgo	760,743.00	438,220.00
Jalisco	2,183,909.00	1,392,319.00
Estado de México	4,372,303.00	2,546,062.00
Michoacán	1,208,858.00	672,436.00
Morelos	492,315.00	337,144.00
Nayarit	387,960.00	251,606.00
Nuevo León	1,493,955.00	914,900.00
Oaxaca	1,010,400.00	723,291.00
Puebla	1,627,074.00	1,006,393.00
Querétaro	492,508.00	313,878.00
Quintana Roo	445,411.00	264,040.00
San Luis Potosí	747,638.00	426,777.00
Sinaloa	745,971.00	447,970.00
Sonora	763,359.00	459,353.00
Tabasco	571,860.00	281,583.00
Tamaulipas	957,011.00	595,669.00
Tlaxcala	328,569.00	208,307.00
Veracruz	2,045,152.00	1,149,142.00
Yucatán	655,732.00	382,893.00
Zacatecas	427,877.00	232,562.00

exploitation, in the case of Campeche; in general it is a region with high activity in tourist services.

In Mexico, according to indicators, such as illiteracy, migration, level of schooling, among others, they show inequality between the states, which persists in the grouping by regions. Even though there are regions that may have similarities in economic and well-being aspects, such as the Northwest, Northeast and West, when comparing them with the Southwest, the gap that exists is evident, as the latter is the one with the highest rate of illiterate population and emigration. However, it is well known that the development that has triggered the North American Free Trade Agreement since the 1990s to date, has benefited only border regions such as the Northeast to a greater extent, and the shoal composed of the Central region. North, and in contrast, those regions with greater indigenous ancestry, such as the Southwest region, have lagged behind over the years.

Step 3. The results of each Region are obtained based on the weighted importance of the States that compose each of them. To obtain the weights

Table 3. Northwest Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Baja California	980,600.00	628,472.00	23.02%	24.08%
Baja California sur	228,058.00	143,223.00	5.35%	5.49%
Chihuahua	1,051,120.00	652,996.00	24.67%	25.02%
Durango	491,079.00	277,887.00	11.53%	10.65%
Sinaloa	745,971.00	447,970.00	17.51%	17.16%
Sonora	763,359.00	459,353.00	17.92%	17.60%
Total	4,260,187.00	2,609,901.00		

the total employed population for each is used (See Table 2). In each State the employed population for men and women is obtained, divided by the sum of the Region, and then multiplied by 100. The same process is done to obtain the weight for each Region in the National results (See Tables 3–11).

Step 4. The information is unified based on the weights that were obtained using different aggregation operators. For this application, the WA, $OWA_{Region-max}$, $OWA_{Region-min}$ $OWA_{National-max}$, and $OWA_{National-min}$ operators are used. The results are presented in Tables 12–20. Also, an analysis of each result is done to understand the general results of each region, this is the following. Also, because the results with the OWA_{max} and OWA_{min} operators are not equal to 100% a normalization was done. The process was to obtain the sum of each indicator (economic activity sector, income level and duration of the working day) then divide the data of each component between the total sum of the indicator and multiplicate it by 100 (Considering thge length of the article, only the specific results for the Northwest region will be presented, see Table 12)

Step 5. An analysis of the different results based on Tables 12–20 is done. This analysis was done by regions to be more precise and easier to understand.

Northwest Region (Baja California, Baja California Sur, Chihuahua, Durango, Sinaloa, and Sonora)

In each of the entities that make up the Northwest region, there is a labor gap between men and women of a little more than 20%, being the male gender the one with the most participation in the productive sectors. In addition to the above, when the breakdown is presented by the different economic activities, in this region the top five or with the highest percentage are those related to the manufacturing industry, commerce, agricultural activities, services and to a lesser extent those related to the building.

Performing the gender analysis in the different economic activities (Table 12), although there is a difference in favor of men, there are activities where it is interpreted that they are dominated by women, such is the case of services, which INEGI divides between social and miscellaneous, with the participation of women a little more than double that of men. In this

Table 4. Northeast Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Coahuila	792,238.00	478,182.00	24.43%	24.04%
Nuevo León	1,493,955.00	914,900.00	46.06%	46.00%
Tamaulipas	957,011.00	595,669.00	29.51%	29.95%
Total	3,243,204.00	1,988,751.00		

Table 5. West Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Colima	214,286.00	136,070.00	5.36%	5.55%
Jalisco	2,183,909.00	1,392,319.00	54.67%	56.77%
Michoacán	1,208,858.00	672,436.00	30.26%	27.42%
Nayarit	387,960.00	251,606.00	9.71%	10.26%
Total	3,995,013.00	2,452,431.00		

Table 6. East Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Hidalgo	760,743.00	438,220.00	15.98%	15.64%
Puebla	1,627,074.00	1,006,393.00	34.17%	35.92%
Tlaxcala	328,569.00	208,307.00	6.90%	7.43%
Veracruz	2,045,152.00	1,149,142.00	42.95%	41.01%
Total	4,761,538.00	2,802,062.00		

Table 7. North central Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Aguascalientes	342,972.00	211,979.00	9.85%	9.99%
Guanajuato	1,471,767.00	936,311.00	42.26%	44.13%
San Luis Potosí	747,638.00	426,777.00	21.47%	20.12%
Querétaro	492,508.00	313,878.00	14.14%	14.80%
Zacatecas	427,877.00	232,562.00	12.29%	10.96%
Total	3,482,762.00	2,121,507.00		

Table 8. South central Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Ciudad de México	1,915,094.00	1,492,639.00	28.25%	34.11%
Estado de México	4,372,303.00	2,546,062.00	64.49%	58.18%
Morelos	492,315.00	337,144.00	7.26%	7.70%
Total	6,779,712.00	4,375,845.00		

Table 9. Southwest Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Chiapas	1,391,514.00	555,187.00	41.97%	30.35%
Guerrero	913,908.00	550,782.00	27.56%	30.11%
Oaxaca	1,010,400.00	723,291.00	30.47%	39.54%
Total	3,315,822.00	1,829,260.00		

Table 10. Southeast Region weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Campeche	251,444.00	140,075.00	13.07%	13.11%
Quintana Roo	445,411.00	264,040.00	23.14%	24.71%
Tabasco	571,860.00	281,583.00	29.72%	26.35%
Yucatán	655,732.00	382,893.00	34.07%	35.83%
Total	1,924,447.00	1,068,591.00		

Table 11. National weights.

State	Employed Men	Employed Women	Weights Men	Weights Women
Northwest	4,260,187.00	2,609,901.00	13.41%	13.56%
Northeast	3,243,204.00	1,988,751.00	10.21%	10.33%
West	3,995,013.00	2,452,431.00	12.58%	12.74%
East	4,761,538.00	2,802,062.00	14.99%	14.56%
North central	3,482,762.00	2,121,507.00	10.96%	11.02%
South central	6,779,712.00	4,375,845.00	21.34%	22.73%
Southwest	3,315,822.00	1,829,260.00	10.44%	9.50%
Southeast	1,924,447.00	1,068,591.00	6.06%	5.55%
Total	31,762,685.00	19,248,348.00		

Table 12. Results based on different aggregation operators for Northwest Region.

	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
Indicator	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	13.95%	4.03%	17.17%	4.52%	15.55%	4.12%	11.70%	3.45%	13.14%	3.84%
Extractive and electricity industry	2.47%	0.36%	2.64%	0.45%	2.39%	0.41%	2.14%	0.34%	2.41%	0.38%
Manufacturing industry	20.07%	21.94%	20.35%	22.24%	18.42%	20.27%	15.20%	15.69%	17.07%	17.44%
Construction	12.95%	0.93%	14.29%	1.12%	12.94%	1.02%	12.62%	0.84%	14.17%	0.93%
Trade	14.47%	22.98%	14.87%	24.74%	13.47%	22.55%	13.41%	21.82%	15.06%	24.26%
Restaurants and accommodation services	4.19%	8.45%	6.24%	10.90%	5.65%	9.94%	4.06%	8.45%	4.56%	9.39%
Transportation, communications, mail and storage	6.29%	1.52%	6.74%	1.53%	6.10%	1.40%	6.02%	1.44%	6.76%	1.60%
Professional, financial and corporate services	6.87%	7.38%	7.57%	8.02%	6.86%	7.31%	6.38%	7.07%	7.17%	7.86%
Social services	4.37%	14.99%	5.09%	16.15%	4.60%	14.72%	4.33%	14.39%	4.87%	15.99%
Miscellaneous services	8.02%	10.99%	8.34%	12.67%	7.55%	11.55%	7.58%	10.68%	8.52%	11.87%
Government and international organizations	4.59%	5.16%	5.36%	6.01%	4.85%	5.48%	4.56%	5.14%	5.12%	5.71%
Not specified	1.76%	1.26%	1.79%	1.34%	1.62%	1.23%	1.04%	0.65%	1.16%	0.72%
Total	100.00%	100.00%	110.43%	109.71%	100.00%	100.00%	89.05%	89.96%	100.00%	100.00%
Income level										
Up to a minimum wage	15.85%	23.58%	16.96%	24.77%	15.37%	22.55%	14.58%	21.77%	16.28%	24.12%
More than 1 to 2 minimum wages	38.98%	38.21%	39.93%	38.69%	36.18%	35.21%	35.12%	35.38%	39.21%	39.19%
More than 2 to 3 minimum wages	15.78%	12.76%	18.71%	15.70%	16.95%	14.29%	15.22%	12.10%	16.99%	13.40%
More than 3 to 5 minimum wages	7.61%	5.82%	9.97%	8.00%	9.03%	7.28%	7.22%	5.37%	8.07%	5.95%
More than 5 minimum wages	3.50%	1.98%	4.52%	2.71%	4.09%	2.47%	3.19%	1.85%	3.56%	2.05%
No income	1.53%	2.42%	2.32%	3.66%	2.11%	3.33%	1.20%	2.39%	1.34%	2.64%
Not specified	16.75%	15.23%	17.97%	16.33%	16.28%	14.86%	13.03%	11.42%	14.55%	12.65%
Total	100.00%	100.00%	110.38%	109.87%	100.00%	100.00%	89.58%	90.27%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	4.51%	8.19%	5.67%	9.40%	5.35%	8.81%	4.41%	7.91%	4.69%	8.50%
Less than 15 hours	4.33%	9.14%	5.05%	11.35%	4.77%	10.63%	4.11%	9.00%	4.37%	9.68%
From 15 to 34 hours	14.46%	18.55%	15.63%	19.83%	14.75%	18.57%	13.84%	18.54%	14.71%	19.94%
35 to 48 hours	49.00%	49.97%	49.62%	50.37%	46.85%	47.18%	46.66%	45.34%	49.60%	48.76%
More than 48 hours	25.60%	12.74%	27.81%	14.34%	26.25%	13.43%	23.73%	11.58%	25.23%	12.46%
Not specified	2.11%	1.42%	2.15%	1.47%	2.03%	1.38%	1.31%	0.62%	1.40%	0.66%
Total	100.00%	100.00%	105.93%	106.75%	100.00%	100.00%	94.08%	92.98%	100.00%	100.00%

same circumstance are commercial activities, whose difference between genders also leans toward women. One point to consider in this regard is that these activities are generally found in what is known as informality, that is, most workers do not have social security and health services.

About agricultural and construction activities, they are practically dominated by men. It should be noted that the Northwest region has an

Table 13. Results based on different aggregation operators for Northeast Region.

	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
Indicator	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	6.16%	0.61%	7.02%	0.76%	6.78%	0.74%	6.05%	0.61%	6.27%	0.62%
Extractive and electricity industry	1.35%	0.30%	1.43%	0.30%	1.38%	0.29%	1.35%	0.27%	1.40%	0.28%
Manufacturing industry	25.67%	22.17%	26.81%	23.33%	25.89%	22.68%	24.75%	22.17%	25.65%	22.81%
Construction	12.39%	1.15%	12.42%	1.15%	11.99%	1.12%	12.17%	0.90%	12.62%	0.93%
Trade	13.63%	23.77%	13.63%	24.11%	13.16%	23.44%	13.29%	23.77%	13.78%	24.45%
Restaurants and accommodation services	5.19%	9.52%	5.24%	9.70%	5.06%	9.43%	5.07%	9.52%	5.25%	9.79%
Transportation, communications, mail and storage	9.57%	2.63%	9.89%	2.77%	9.55%	2.70%	9.26%	2.48%	9.60%	2.55%
Professional, financial and corporate services	8.12%	7.94%	8.24%	8.06%	7.95%	7.83%	7.10%	6.31%	7.36%	6.49%
Social services	5.20%	15.84%	5.41%	15.86%	5.22%	15.42%	4.90%	15.26%	5.08%	15.70%
Miscellaneous services	8.26%	11.23%	8.63%	11.72%	8.33%	11.40%	8.22%	11.23%	8.52%	11.55%
Government and international organizations	3.55%	4.38%	3.71%	4.46%	3.58%	4.34%	3.47%	4.27%	3.60%	4.39%
Not specified	0.92%	0.46%	1.14%	0.62%	1.10%	0.61%	0.83%	0.42%	0.86%	0.43%
Total	100.00%	100.00%	103.55%	102.86%	100.00%	100.00%	96.48%	97.19%	100.00%	100.00%
Income level										
Up to a minimum wage	15.02%	24.56%	18.23%	28.18%	26.45%	26.45%	14.11%	23.66%	25.22%	25.22%
More than 1 to 2 minimum wages	35.52%	36.40%	38.95%	38.63%	36.26%	36.26%	35.52%	36.40%	38.80%	38.80%
More than 2 to 3 minimum wages	22.78%	16.57%	23.36%	16.90%	15.87%	15.87%	19.43%	14.60%	15.56%	15.56%
More than 3 to 5 minimum wages	11.49%	7.93%	11.78%	8.20%	7.70%	7.70%	9.86%	6.78%	7.22%	7.22%
More than 5 minimum wages	5.77%	3.85%	5.90%	3.93%	3.69%	3.69%	4.99%	3.29%	3.50%	3.50%
No income	1.75%	3.69%	1.75%	3.69%	3.46%	3.46%	1.59%	3.49%	3.72%	3.72%
Not specified	7.67%	7.00%	7.67%	7.00%	6.57%	6.57%	6.61%	5.61%	5.98%	5.98%
Total	100.00%	100.00%	107.65%	106.54%	100.00%	100.00%	92.12%	93.82%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	3.95%	7.24%	4.22%	8.06%	4.07%	7.84%	3.85%	7.00%	4.00%	7.21%
Less than 15 hours	5.42%	11.40%	6.13%	12.67%	5.90%	12.32%	5.03%	11.14%	5.22%	11.47%
From 15 to 34 hours	13.88%	18.23%	15.14%	18.32%	14.58%	17.81%	13.54%	18.15%	14.04%	18.70%
35 to 48 hours	49.99%	47.34%	50.52%	47.92%	48.66%	46.59%	47.49%	45.48%	49.24%	46.84%
More than 48 hours	26.02%	15.44%	26.74%	15.44%	25.76%	15.01%	25.83%	15.00%	26.79%	15.45%
Not specified	0.75%	0.35%	1.07%	0.44%	1.03%	0.43%	0.68%	0.32%	0.71%	0.33%
Total	100.00%	100.00%	103.83%	102.85%	100.00%	100.00%	96.44%	97.11%	100.00%	100.00%

important national presence in agricultural activities, mainly in agriculture where most of the workers are temporary and from the south of the country. Unlike the aforementioned activities, the manufacturing industry is the only economic activity that presents a balance between both genders, which, although the majority are male employees, the difference is minimal in relation to women.

On the other hand, in terms of income and duration in working hours, there is no real correspondence between the two indicators, since in general it is men who have the highest income, unlike women, who most have an income of barely a minimum wage. On the other hand, in the hours worked, it is women who work the most, with working hours of 15 or more hours.

Northeast Region (Coahuila, Nuevo León, and Tamaulipas)

The Northeast region presents a considerable labor participation gap between men and women (Table 4), where a little more than 60% of the

total workers in the region are men. The Northeast region, for its part, characterized by being an industrial area mainly, with regard to the information on activities according to the economic sector, income level, and hours worked (Table 13), is the manufacturing activity the main one, where the participation of men and women is very similar, that is, there is not a wide gap between both genders; in the same way, with regard to the salary received and the hours worked, equality between men and women is shown. The other two activities that stand out in the Northeast region are commerce and services, showing an inclination of the participation of women in relation to men, in a ratio of 2 to 1; It should be noted that this branch of economic activities has a higher percentage of informality.

West Region (Colima, Jalisco, Michoacán, and Nayarit)

The West region has a particularity, of the four federative entities that compose it, only one state (Jalisco) concentrates more than 50% of the working population of the region; Jalisco, for its part, at the national level represents 7% of employees, being one of the three entities with the highest concentration of workers. Considering the West region as a whole, according to Table 5, more than 60% of the workers are male, which is consistent with what is presented at the national level, highlighting the labor gap between men and women.

One of the main economic activities of the region are those corresponding to agriculture and livestock activities, this agrees with what was previously mentioned as one of the states of this region, the first place at the national level in the agricultural branch; in relation to gender in this economic sector, it is men who have a greater presence compared to women. Regarding trade and continuing with the analysis of Table 14, unlike the agricultural sector, there is a greater presence of female workers, being an economic area led by women, in the same way in services. On the contrary, in the manufacturing industry sector, the number of employees is balanced in terms of male and female gender, noting that this behavior only occurs in this sector and as regards economic activities of a governmental nature.

Moving on to the income level, in the western region the majority is in the income of 1 to 3 minimum wages, and also to some extent it is equitable between men and women. Regarding the working day, the highest percentage is around 35–48 hours of work, presenting themselves in the same way without distinction of gender.

East Region (Hidalgo, Puebla, Tlaxcala, and Veracruz)

In the Eastern region, the distribution by gender of employees is in the same proportion as the national average, 63% are men and 37% are women

Table 14. Results based on different aggregation operators for West Region.

Indicator	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	19.91%	5.77%	28.20%	10.51%	22.86%	9.04%	15.81%	4.81%	20.00%	5.70%
Extractive and electricity industry	0.64%	0.15%	1.39%	0.19%	1.12%	0.17%	0.63%	0.12%	0.80%	0.15%
Manufacturing industry	15.90%	12.47%	15.90%	12.91%	12.89%	11.10%	10.00%	7.15%	12.65%	8.47%
Construction	12.79%	0.71%	13.14%	0.80%	10.65%	0.68%	11.01%	0.37%	13.92%	0.44%
Trade	16.12%	27.43%	16.34%	27.43%	13.25%	23.58%	11.17%	23.51%	14.13%	27.85%
Restaurants and accommodation services	4.86%	10.03%	5.41%	13.09%	4.38%	11.26%	4.64%	7.77%	5.86%	9.21%
Transportation, communications, mail and storage	5.71%	1.84%	8.28%	2.83%	6.71%	2.43%	4.75%	1.57%	6.01%	1.86%
Professional, financial and corporate services	6.56%	8.60%	8.58%	9.57%	6.95%	8.23%	5.11%	6.92%	6.46%	8.19%
Social services	5.18%	14.33%	5.92%	15.67%	4.80%	13.47%	4.87%	13.90%	6.17%	16.47%
Miscellaneous services	7.59%	14.04%	10.19%	15.05%	8.26%	12.94%	6.70%	13.80%	8.48%	16.34%
Government and international organizations	4.23%	4.50%	8.20%	7.52%	6.65%	6.46%	3.96%	4.38%	5.00%	5.19%
Not specified	0.51%	0.14%	1.81%	0.74%	1.47%	0.64%	0.41%	0.11%	0.52%	0.14%
Total	100.00%	100.00%	123.34%	116.31%	100.00%	100.00%	79.06%	84.42%	100.00%	100.00%
Income level										
Up to a minimum wage	11.57%	22.45%	16.41%	27.80%	14.30%	24.35%	10.69%	21.26%	12.50%	24.45%
More than 1 to 2 minimum wages	35.84%	37.56%	36.21%	37.76%	31.56%	33.07%	31.11%	32.66%	36.38%	37.57%
More than 2 to 3 minimum wages	26.22%	16.44%	27.29%	18.83%	23.79%	16.50%	22.49%	13.42%	26.30%	15.43%
More than 3 to 5 minimum wages	10.18%	7.90%	11.23%	8.04%	9.78%	7.04%	7.42%	6.37%	8.68%	7.32%
More than 5 minimum wages	3.69%	1.83%	4.83%	2.06%	4.21%	1.80%	3.13%	1.46%	3.67%	1.68%
No income	4.27%	6.77%	6.71%	10.60%	5.85%	9.28%	2.76%	5.68%	3.23%	6.53%
Not specified	8.22%	7.06%	12.06%	9.09%	10.51%	7.96%	7.90%	6.11%	9.24%	7.03%
Total	100.00%	100.00%	114.73%	114.17%	100.00%	100.00%	85.51%	86.94%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	3.56%	5.89%	5.03%	7.34%	4.40%	6.43%	3.51%	5.63%	4.08%	6.51%
Less than 15 hours	3.44%	9.64%	6.41%	14.25%	5.61%	12.49%	3.26%	9.56%	3.79%	11.05%
From 15 to 34 hours	15.14%	24.49%	18.69%	30.00%	16.36%	26.31%	14.66%	23.39%	17.02%	27.03%
35 to 48 hours	54.73%	47.04%	54.84%	47.49%	48.01%	41.64%	43.00%	35.96%	49.92%	41.57%
More than 48 hours	21.73%	11.96%	27.19%	14.00%	23.80%	12.27%	21.08%	11.84%	24.47%	13.68%
Not specified	1.41%	0.98%	2.06%	0.98%	1.80%	0.86%	0.63%	0.13%	0.73%	0.15%
Total	100.00%	100.00%	114.21%	114.06%	100.00%	100.00%	86.14%	86.51%	100.00%	100.00%

(Table 6). This gap between both sexes is even more marked in the states of Hidalgo and Veracruz, the latter state being the fourth with the largest number of workers in Mexico (Table 2) and which also contributes more than 40% of the region's employees East.

Continuing with the analysis of the information, the three main economic sectors of the East region are agricultural activities, commerce, and the manufacturing industry (Table 15), this last sector being the one that presents a balance of participation between men and women. On the other hand, the agricultural sector is worked mostly by men; trade, for its part, is led by women. With regard to construction, it is men who monopolize this productive sector and women have no participation. This region is among those with the lowest income level, since a large number of workers receive up to two minimum wages for the working day. With reference to the latter, in the eastern region of the country, there is a marked tendency for the highest percentage of the economically active population to have working hours of 35 hours or more.

Table 15. Results based on different aggregation operators for East Region.

Indicator	WA		OWA$_{Region-max}$		Normalized OWA$_{Region-max}$		OWA$_{Region-min}$		Normalized OWA$_{Region-min}$	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	29.98%	6.58%	29.98%	8.10%	26.84%	7.21%	24.23%	4.92%	27.43%	5.62%
Extractive and electricity industry	0.82%	0.33%	1.02%	0.40%	0.91%	0.35%	0.50%	0.14%	0.57%	0.16%
Manufacturing industry	13.50%	15.37%	19.74%	21.47%	17.67%	19.08%	13.45%	15.37%	15.23%	17.55%
Construction	11.56%	0.60%	15.37%	0.61%	13.76%	0.55%	11.51%	0.36%	13.03%	0.42%
Trade	14.02%	26.53%	14.16%	27.12%	12.68%	24.11%	13.44%	24.35%	15.22%	27.82%
Restaurants and accommodation services	2.55%	9.90%	2.78%	10.83%	2.49%	9.63%	2.33%	7.67%	2.64%	8.76%
Transportation, communications, mail and storage	7.47%	0.99%	7.47%	1.04%	6.69%	0.93%	4.92%	0.82%	5.57%	0.94%
Professional, financial and corporate services	3.92%	3.85%	4.41%	4.89%	3.95%	4.35%	3.51%	3.59%	3.98%	4.10%
Social services	3.84%	13.04%	4.23%	14.65%	3.78%	13.03%	3.59%	12.16%	4.06%	13.89%
Miscellaneous services	7.28%	16.41%	7.28%	16.41%	6.52%	14.59%	6.32%	13.43%	7.16%	15.34%
Government and international organizations	4.42%	6.19%	4.52%	6.68%	4.05%	5.94%	3.88%	4.55%	4.39%	5.20%
Not specified	0.65%	0.22%	0.73%	0.25%	0.65%	0.23%	0.64%	0.19%	0.72%	0.22%
Total	100.00%	100.00%	111.69%	112.48%	100.00%	100.00%	88.31%	87.55%	100.00%	100.00%
Income level										
Up to a minimum wage	28.71%	36.03%	29.09%	39.06%	27.28%	36.33%	26.73%	35.65%	28.63%	38.58%
More than 1 to 2 minimum wages	31.39%	30.06%	36.27%	31.11%	34.01%	28.93%	31.39%	29.02%	33.63%	31.41%
More than 2 to 3 minimum wages	11.86%	9.27%	12.24%	9.34%	11.48%	8.68%	11.44%	7.52%	12.26%	8.13%
More than 3 to 5 minimum wages	4.08%	4.57%	4.09%	4.66%	3.84%	4.33%	3.95%	3.54%	4.23%	3.84%
More than 5 minimum wages	1.82%	1.41%	1.87%	1.44%	1.75%	1.34%	1.52%	0.81%	1.63%	0.88%
No income	8.76%	8.66%	9.31%	10.53%	8.73%	9.80%	7.63%	7.43%	8.18%	8.05%
Not specified	13.38%	9.99%	13.76%	11.39%	12.91%	10.59%	10.68%	8.42%	11.44%	9.11%
Total	100.00%	100.00%	106.65%	107.53%	100.00%	100.00%	93.35%	92.39%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	4.12%	3.75%	4.44%	4.50%	4.20%	4.28%	3.37%	3.75%	3.57%	3.95%
Less than 15 hours	4.69%	12.07%	5.05%	14.14%	4.78%	13.46%	4.61%	11.84%	4.89%	12.47%
From 15 to 34 hours	20.17%	27.29%	21.27%	28.94%	20.11%	27.54%	19.25%	25.38%	20.44%	26.73%
35 to 48 hours	40.58%	36.12%	40.83%	36.12%	38.59%	34.37%	36.92%	34.34%	39.20%	36.17%
More than 48 hours	29.86%	20.37%	33.51%	20.94%	31.67%	19.93%	29.86%	19.52%	31.71%	20.56%
Not specified	0.57%	0.40%	0.70%	0.44%	0.66%	0.42%	0.18%	0.12%	0.19%	0.12%
Total	100.00%	100.00%	105.81%	105.08%	100.00%	100.00%	94.18%	94.95%	100.00%	100.00%

Central North Region (Querétaro, San Luis Potosí, Guanajuato, Aguascalientes, and Zacatecas)

In this north-central region, the distribution by gender of employees is a reflection of the national one, that is, 62% men and 38% women. The main economic activities according to the number of employees in the region are Industry and manufacturing, Commerce, Agriculture and livestock, social services, and construction. The most important sector is industry and manufacturing where the percentage of dedicated men and women is similar with a difference of less than one percentage point. The second most represented activity is commerce, which is dominated by women and double the number of men. In order of importance, it is followed by agricultural and livestock activities, dominated by men in a ratio of 3 to 1. In the case of social services and construction, fourth and fifth, respectively, the first is inclined toward the female labor force, and the second toward the manly.

The wage perception in the north-central zone is between 1 and 2 minimum wages for a third of the working-age population, and they account

Table 16. Results based on different aggregation operators for North Central Region.

Indicator	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	17.31%	5.01%	24.93%	8.70%	21.70%	7.80%	13.95%	8.70%	16.33%	7.80%
Extractive and electricity industry	0.93%	0.21%	1.43%	0.22%	1.24%	0.20%	0.87%	0.22%	1.02%	0.20%
Manufacturing industry	22.87%	21.38%	23.51%	21.46%	20.47%	19.24%	18.25%	21.46%	21.38%	19.24%
Construction	14.60%	0.66%	15.44%	0.83%	13.44%	0.74%	13.18%	0.83%	15.43%	0.74%
Trade	14.38%	25.25%	14.58%	25.93%	12.69%	23.25%	13.06%	25.93%	15.29%	23.25%
Restaurants and accommodation services	3.93%	10.50%	4.31%	11.40%	3.75%	10.22%	3.49%	11.40%	4.09%	10.22%
Transportation, communications, mail and storage	4.76%	1.17%	5.69%	1.75%	4.96%	1.57%	4.06%	1.75%	4.75%	1.57%
Professional, financial and corporate services	6.04%	6.69%	7.42%	8.24%	6.46%	7.39%	4.90%	8.24%	5.74%	7.39%
Social services	3.82%	12.73%	4.93%	14.81%	4.29%	13.27%	3.72%	14.81%	4.36%	13.27%
Miscellaneous services	6.98%	11.76%	7.12%	12.24%	6.19%	10.98%	5.78%	12.24%	6.77%	10.98%
Government and international organizations	4.07%	4.48%	5.02%	5.76%	4.37%	5.17%	3.91%	5.76%	4.57%	5.17%
Not specified	0.29%	0.15%	0.50%	0.20%	0.44%	0.18%	0.22%	0.20%	0.26%	0.18%
Total	100.00%	100.00%	114.88%	111.54%	100.00%	100.00%	85.38%	111.54%	100.00%	100.00%
Income level										
Up to a minimum wage	14.55%	25.46%	16.89%	27.34%	15.01%	24.48%	11.43%	6.55%	12.93%	13.09%
More than 1 to 2 minimum wages	32.75%	33.33%	34.02%	33.59%	30.23%	30.07%	29.55%	17.06%	33.45%	34.08%
More than 2 to 3 minimum wages	16.95%	10.44%	17.32%	10.74%	15.39%	9.62%	14.73%	8.38%	16.67%	16.74%
More than 3 to 5 minimum wages	5.94%	5.20%	7.22%	6.53%	6.41%	5.84%	5.50%	3.06%	6.22%	6.11%
More than 5 minimum wages	2.75%	1.99%	2.92%	2.36%	2.60%	2.11%	2.42%	1.41%	2.74%	2.81%
No income	4.95%	5.43%	7.19%	7.19%	6.39%	6.44%	3.72%	1.92%	4.21%	3.83%
Not specified	22.10%	18.14%	26.97%	23.95%	23.97%	21.44%	21.01%	11.68%	23.78%	23.34%
Total	100.00%	100.00%	112.53%	111.71%	100.00%	100.00%	88.35%	50.06%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	3.33%	4.82%	4.17%	6.31%	3.78%	5.78%	3.01%	1.66%	3.36%	3.25%
Less than 15 hours	4.43%	11.10%	4.91%	12.14%	4.45%	11.12%	3.40%	1.95%	3.80%	3.82%
From 15 to 34 hours	14.62%	20.57%	16.10%	22.36%	14.59%	20.47%	11.85%	6.89%	13.21%	13.47%
35 to 48 hours	42.08%	41.82%	46.79%	46.27%	42.39%	42.37%	40.46%	22.96%	45.12%	44.91%
More than 48 hours	35.00%	21.32%	37.58%	21.58%	34.05%	19.76%	30.48%	17.39%	33.98%	34.00%
Not specified	0.53%	0.37%	0.81%	0.53%	0.73%	0.49%	0.48%	0.28%	0.54%	0.54%
Total	100.00%	100.00%	110.37%	109.20%	100.00%	100.00%	89.68%	51.14%	100.00%	100.00%

for 30% of each sex. Despite being a predominantly industrial region, salaries correspond to jobs and positions with low technical and academic knowledge. The working period for just under half of the working population is 35–48 hours, and is in line with applicable laws.

Central South Region (Mexico City, State of Mexico, and Morelos)

The South Central Region is the one with the highest population density, and its total economically active population is therefore the highest in the country, with 11,155,557 people. The similarity with the national gender distribution persists with 61% men and 39% women. The main economic activities are Commerce, Industry and manufacturing, professional and financial services, social services and construction. The commercial sector brings together the largest number of men and women, being they the ones who present the greatest presence.

Table 17. Results based on different aggregation operators for South Central Region.

Indicator	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	5.07%	0.84%	12.06%	1.88%	10.10%	1.66%	3.13%	0.58%	3.84%	0.66%
Extractive and electricity industry	0.56%	0.48%	0.71%	0.54%	0.60%	0.48%	0.41%	0.21%	0.51%	0.24%
Manufacturing industry	17.86%	13.37%	18.12%	13.62%	15.18%	12.08%	12.41%	10.46%	15.26%	12.00%
Construction	12.45%	1.66%	15.03%	1.66%	12.59%	1.47%	10.65%	1.10%	13.10%	1.26%
Trade	17.27%	24.53%	17.32%	27.80%	14.51%	24.66%	15.14%	22.47%	18.62%	25.78%
Restaurants and accommodation services	4.37%	9.59%	5.43%	12.31%	4.55%	10.92%	4.29%	9.59%	5.27%	11.01%
Transportation, communications, mail and storage	10.11%	2.70%	11.45%	3.31%	9.59%	2.93%	8.68%	1.67%	10.68%	1.92%
Professional, financial and corporate services	12.40%	10.17%	14.83%	11.65%	12.42%	10.33%	8.61%	6.52%	10.60%	7.48%
Social services	5.72%	15.97%	6.85%	16.68%	5.74%	14.79%	5.14%	15.18%	6.33%	17.42%
Miscellaneous services	7.58%	14.28%	9.97%	15.75%	8.35%	13.97%	7.58%	14.14%	9.33%	16.23%
Government and international organizations	6.16%	6.14%	7.11%	7.28%	5.95%	6.46%	4.92%	5.09%	6.06%	5.84%
Not specified	0.46%	0.28%	0.51%	0.28%	0.43%	0.25%	0.33%	0.16%	0.41%	0.18%
Total	100.00%	100.00%	119.39%	112.74%	100.00%	100.00%	81.30%	87.16%	100.00%	100.00%
Income level										
Up to a minimum wage	18.62%	27.54%	19.02%	27.54%	16.20%	23.78%	16.06%	24.86%	19.25%	29.58%
More than 1 to 2 minimum wages	34.58%	30.64%	34.58%	30.64%	29.46%	26.45%	29.23%	25.81%	35.03%	30.72%
More than 2 to 3 minimum wages	16.56%	12.13%	16.56%	12.91%	14.10%	11.14%	12.32%	7.98%	14.76%	9.50%
More than 3 to 5 minimum wages	6.07%	6.37%	7.00%	6.52%	5.96%	5.62%	3.61%	3.78%	4.32%	4.49%
More than 5 minimum wages	2.76%	1.94%	3.90%	2.75%	3.32%	2.37%	1.29%	0.74%	1.55%	0.88%
No income	1.97%	4.07%	2.98%	5.73%	2.54%	4.95%	1.49%	3.56%	1.79%	4.23%
Not specified	19.43%	17.31%	33.36%	29.76%	28.42%	25.69%	19.43%	17.31%	23.29%	20.60%
Total	100.00%	100.00%	117.41%	115.84%	100.00%	100.00%	83.43%	84.04%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	3.88%	5.66%	4.49%	7.34%	4.27%	7.06%	3.08%	4.90%	3.25%	5.10%
Less than 15 hours	4.37%	9.21%	5.02%	9.82%	4.78%	9.45%	3.62%	9.14%	3.82%	9.52%
From 15 to 34 hours	15.65%	21.80%	17.72%	23.20%	16.86%	22.32%	15.65%	21.25%	16.52%	22.13%
35 to 48 hours	43.99%	45.20%	45.68%	45.34%	43.45%	43.62%	42.28%	43.18%	44.64%	44.95%
More than 48 hours	31.72%	17.78%	31.72%	17.88%	30.17%	17.21%	29.87%	17.43%	31.53%	18.15%
Not specified	0.39%	0.36%	0.50%	0.36%	0.47%	0.34%	0.23%	0.15%	0.24%	0.16%
Total	100.00%	100.00%	105.13%	103.94%	100.00%	100.00%	94.73%	96.05%	100.00%	100.00%

Second, there is industrial and manufacturing activity with the sum of a percentage similar to that of commerce, but without having a dominance by either of the two sexes. In third place, professional and financial services are positioned with a minimum difference of 2 percentage points between men and women. Social services and construction are widely dominated by women and men, respectively. More than a quarter of the economically active population in this region receives a remuneration between 1 and 2 minimum wages, the percentage between men and women is different by only 3 percentage points. The working day is between 35 and 48 hours for almost half of the population, and the percentage is the same (43%) for both sexes.

Southeast Region (Tabasco, Campeche, Quintana Roo, and Yucatán)

A region known for its vast jungles and beautiful beaches, it is positioned as the last in number of economically active population with 2,993,038

Table 18. Results based on different aggregation operators for Southwest Region.

Indicator	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	41.34%	13.11%	41.28%	13.72%	41.93%	13.35%	41.63%	12.19%	41.64%	12.53%
Extractive and electricity industry	0.40%	0.30%	0.38%	0.33%	0.38%	0.32%	0.40%	0.30%	0.40%	0.31%
Manufacturing industry	6.84%	13.65%	7.00%	13.66%	7.11%	13.28%	7.49%	12.55%	7.49%	12.90%
Construction	12.34%	0.19%	11.54%	0.23%	11.72%	0.23%	12.12%	0.19%	12.12%	0.20%
Trade	12.66%	28.06%	12.12%	28.93%	12.31%	28.14%	12.64%	28.04%	12.64%	28.82%
Restaurants and accommodation services	4.12%	13.25%	3.56%	13.47%	3.62%	13.11%	3.63%	13.25%	3.63%	13.61%
Transportation, communications, mail and storage	5.91%	0.69%	5.53%	0.74%	5.61%	0.72%	5.87%	0.69%	5.87%	0.71%
Professional, financial and corporate services	2.49%	2.96%	2.51%	3.07%	2.54%	2.98%	2.56%	2.93%	2.57%	3.01%
Social services	4.36%	11.04%	4.49%	11.17%	4.56%	10.86%	4.27%	10.70%	4.27%	11.00%
Miscellaneous services	4.62%	11.44%	4.68%	12.08%	4.75%	11.75%	4.54%	11.25%	4.54%	11.56%
Government and international organizations	4.84%	5.23%	5.30%	5.30%	5.38%	5.15%	4.75%	5.13%	4.75%	5.27%
Not specified	0.08%	0.09%	0.09%	0.11%	0.09%	0.10%	0.07%	0.09%	0.07%	0.09%
Total	100.00%	100.00%	98.46%	102.80%	100.00%	100.00%	99.99%	97.32%	100.00%	100.00%
Income level										
Up to a minimum wage	30.12%	42.57%	33.65%	43.47%	32.39%	42.49%	30.12%	41.97%	31.30%	43.16%
More than 1 to 2 minimum wages	26.88%	21.30%	26.88%	22.13%	25.88%	21.63%	26.64%	21.30%	27.68%	21.91%
More than 2 to 3 minimum wages	10.21%	6.82%	10.21%	6.82%	9.83%	6.67%	9.63%	6.70%	10.01%	6.89%
More than 3 to 5 minimum wages	2.96%	4.41%	3.15%	4.42%	3.03%	4.32%	2.96%	4.11%	3.08%	4.23%
More than 5 minimum wages	1.37%	0.96%	1.42%	1.01%	1.37%	0.99%	1.32%	0.91%	1.37%	0.93%
No income	24.18%	18.93%	24.18%	19.47%	23.28%	19.03%	22.00%	17.97%	22.86%	18.48%
Not specified	4.27%	5.00%	4.37%	5.00%	4.21%	4.89%	3.57%	4.28%	3.71%	4.40%
Total	100.00%	100.00%	103.87%	102.32%	100.00%	100.00%	96.25%	97.25%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	5.89%	8.17%	6.00%	8.17%	5.81%	8.06%	5.22%	7.87%	5.40%	7.99%
Less than 15 hours	3.85%	15.16%	4.31%	15.16%	4.17%	14.95%	3.75%	14.41%	3.88%	14.62%
From 15 to 34 hours	18.03%	25.46%	18.66%	25.46%	18.06%	25.12%	17.46%	25.06%	18.06%	25.43%
35 to 48 hours	43.78%	29.94%	45.77%	30.71%	44.29%	30.30%	42.57%	29.94%	44.02%	30.38%
More than 48 hours	28.01%	21.12%	28.15%	21.69%	27.24%	21.40%	27.41%	21.12%	28.35%	21.44%
Not specified	0.45%	0.15%	0.45%	0.17%	0.43%	0.16%	0.30%	0.14%	0.31%	0.14%
Total	100.00%	100.00%	103.33%	101.36%	100.00%	100.00%	96.71%	98.54%	100.00%	100.00%

people between men and women. The distribution varies with respect to the national average, being 64% men and 36% women. The main economic activities are Commerce, Restaurants and hotels, Agriculture and livestock, miscellaneous services, and social services. Commerce is the activity with the highest employability; however, it is dominated by women, almost doubling the percentage of men.

Second in order, but with a percentage similar to third place, the activity of the hotel and restaurant sector shows a comparable percentage distribution, but dominated by women. While the agricultural and livestock activity represents a greater job opportunity for men. The miscellaneous and social service sectors are clearly dominated by women. The working hours in the southeast region are between 35 and 48 hours for more than a third of the economically active population, and their remuneration includes between 1 and 2 minimum wages in the same way for more than a third of the employees, and that they are the most important segment.

Table 19. Results based on different aggregation operators for Southeast Region.

Indicator	WA		$OWA_{Region-max}$		Normalized $OWA_{Region-max}$		$OWA_{Region-min}$		Normalized $OWA_{Region-min}$	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	24.23%	2.26%	24.23%	2.52%	21.24%	2.28%	16.11%	1.87%	18.76%	2.09%
Extractive and electricity industry	3.13%	1.49%	3.13%	1.49%	2.74%	1.35%	1.42%	0.42%	1.65%	0.47%
Manufacturing industry	8.84%	10.70%	10.97%	13.42%	9.61%	12.18%	7.45%	8.21%	8.67%	9.16%
Construction	10.70%	1.44%	11.17%	1.48%	9.79%	1.34%	10.61%	1.20%	12.36%	1.34%
Trade	13.58%	25.65%	14.30%	26.68%	12.53%	24.21%	12.90%	24.95%	15.02%	27.84%
Restaurants and accommodation services	6.03%	12.96%	10.42%	16.15%	9.13%	14.65%	5.79%	12.21%	6.75%	13.62%
Transportation, communications, mail and storage	6.66%	1.22%	8.03%	1.53%	7.04%	1.38%	6.55%	1.04%	7.62%	1.16%
Professional, financial and corporate services	6.84%	5.18%	8.76%	7.74%	7.68%	7.02%	6.68%	5.17%	7.77%	5.77%
Social services	5.68%	15.35%	6.17%	15.35%	5.41%	13.93%	4.81%	13.57%	5.60%	15.14%
Miscellaneous services	6.84%	16.22%	8.96%	16.31%	7.86%	14.80%	6.74%	14.64%	7.85%	16.34%
Government and international organizations	6.90%	7.31%	7.20%	7.32%	6.31%	6.64%	6.50%	6.23%	7.57%	6.95%
Not specified	0.57%	0.21%	0.75%	0.22%	0.66%	0.20%	0.31%	0.11%	0.36%	0.12%
Total	100.00%	100.00%	114.11%	110.21%	100.00%	100.00%	85.87%	89.62%	100.00%	100.00%
Income level										
Up to a minimum wage	26.01%	38.25%	26.15%	39.68%	24.62%	37.75%	23.74%	36.18%	25.31%	38.15%
More than 1 to 2 minimum wages	36.68%	28.09%	36.71%	29.28%	34.57%	27.86%	35.31%	27.80%	37.64%	29.31%
More than 2 to 3 minimum wages	15.23%	12.27%	16.73%	12.69%	15.75%	12.07%	15.10%	12.22%	16.09%	12.89%
More than 3 to 5 minimum wages	6.07%	6.14%	6.96%	6.86%	6.56%	6.53%	5.95%	5.91%	6.34%	6.23%
More than 5 minimum wages	3.26%	2.49%	4.31%	2.92%	4.06%	2.78%	3.26%	2.35%	3.48%	2.48%
No income	5.60%	6.67%	7.09%	6.80%	6.68%	6.47%	5.23%	6.01%	5.58%	6.33%
Not specified	7.15%	6.10%	8.24%	6.87%	7.76%	6.54%	5.22%	4.38%	5.56%	4.62%
Total	100.00%	100.00%	106.19%	105.10%	100.00%	100.00%	93.82%	94.85%	100.00%	100.00%
Duration of the working day										
Temporary absent with employment relationship	5.31%	9.73%	5.38%	9.99%	5.10%	9.36%	5.26%	9.20%	5.57%	9.89%
Less than 15 hours	5.34%	17.26%	6.37%	18.73%	6.03%	17.54%	5.21%	14.95%	5.51%	16.06%
From 15 to 34 hours	19.50%	24.25%	19.83%	25.04%	18.79%	23.45%	17.66%	22.82%	18.70%	24.52%
35 to 48 hours	39.60%	32.23%	43.19%	36.41%	40.92%	34.10%	38.59%	31.62%	40.85%	33.97%
More than 48 hours	29.91%	16.42%	30.13%	16.42%	28.54%	15.38%	27.48%	14.39%	29.10%	15.46%
Not specified	0.34%	0.11%	0.66%	0.18%	0.62%	0.17%	0.26%	0.10%	0.27%	0.11%
Total	100.00%	100.00%	105.55%	106.77%	100.00%	100.00%	94.45%	93.08%	100.00%	100.00%

Southwest Region (Chiapas, Guerrero, and Oaxaca)

A region with a large percentage of indigenous population and a total of 5,145,082 economically active people, shows a gender distribution of 64% men and 36% women, in line with the national average. The economy of this part of the country revolves around agricultural and livestock production, commerce, manufacturing, restaurants and hotels, and finally social services. Owing to the large number of ethnic groups and of indigenous origin, most of the population is dedicated to agricultural and livestock production, being dominated by 4 to 1 men, and representing almost half of economically active people from the same region.

Trade with a female domain is positioned as the second productive activity, followed by industry and manufacturing with a representative percentage, but clearly inclined toward the male. Trades in the restaurant and hotel sectors, as well as social services, with a similar percentage, are both dominated by women. About working hours, both men and women tend

Table 20. Results based on different aggregation operators for Mexico.

	WA		OWAmax		OWAmax-norm		OWAmin		OWAmin-norm	
Indicator	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Economic activity sector										
Agriculture, livestock, forestry, hunting and fishing	18.26%	4.42%	21.95%	6.19%	19.65%	5.64%	17.49%	4.68%	19.84%	5.02%
Extractive and electricity industry	1.13%	0.39%	1.55%	0.42%	1.39%	0.38%	0.92%	0.27%	1.04%	0.29%
Manufacturing industry	16.91%	16.38%	18.83%	18.75%	16.85%	17.07%	12.64%	13.25%	14.34%	14.23%
Construction	12.54%	0.97%	13.72%	0.98%	12.29%	0.89%	11.59%	0.77%	13.14%	0.82%
Trade	14.87%	25.38%	14.70%	26.27%	13.16%	23.91%	13.13%	24.69%	14.90%	26.50%
Restaurants and accommodation services	4.24%	10.16%	5.23%	11.75%	4.68%	10.70%	4.30%	10.48%	4.88%	11.25%
Transportation, communications, mail and storage	7.36%	1.73%	7.84%	1.96%	7.02%	1.78%	6.30%	1.35%	7.14%	1.45%
Professional, financial and corporate services	7.15%	7.09%	7.70%	7.75%	6.90%	7.06%	5.61%	5.64%	6.37%	6.05%
Social services	4.78%	14.33%	5.31%	15.24%	4.75%	13.87%	4.49%	13.61%	5.09%	14.61%
Miscellaneous services	7.25%	13.36%	8.20%	13.75%	7.34%	12.52%	6.56%	13.01%	7.44%	13.96%
Government and international organizations	4.86%	5.42%	5.64%	6.18%	5.05%	5.63%	4.72%	5.23%	5.35%	5.62%
Not specified	0.66%	0.37%	1.05%	0.60%	0.94%	0.55%	0.41%	0.19%	0.47%	0.21%
Total	100.00%	100.00%	111.71%	109.85%	100.00%	100.00%	88.14%	93.17%	100.00%	100.00%
Income level										
Up to a minimum wage	19.71%	29.08%	21.07%	30.67%	32.77%	31.14%	19.55%	28.12%	21.54%	32.48%
More than 1 to 2 minimum wages	34.07%	32.33%	36.09%	34.10%	16.69%	12.46%	31.61%	27.09%	34.84%	31.29%
More than 2 to 3 minimum wages	16.90%	12.12%	18.38%	13.64%	7.43%	6.29%	14.68%	10.18%	16.18%	11.76%
More than 3 to 5 minimum wages	6.71%	6.06%	8.18%	6.89%	3.51%	2.24%	5.54%	4.83%	6.11%	5.58%
More than 5 minimum wages	3.03%	2.00%	3.87%	2.45%	6.20%	7.09%	2.57%	1.60%	2.83%	1.85%
No income	6.06%	6.53%	6.83%	7.76%	14.27%	12.77%	6.44%	6.58%	7.10%	7.60%
Not specified	13.52%	11.89%	15.72%	13.99%	100.00%	100.00%	10.36%	8.18%	11.41%	9.45%
Total	100.00%	100.00%	110.14%	109.51%	180.87%	171.99%	90.75%	86.59%	100.00%	100.00%
Duration of the working day										

to be placed in jobs with a working day between 35 and 48 hours, that is, in line with the provisions of the law. With regard to salary perception, both sexes are at the lowest level, since only 32% of men and 42% of women receive the minimum wage. These last two data make the Southwest region the one with the lowest remuneration in the country.

Mexico

The analysis of the national information based on the aggregation of the regional information it is possible to observe that most of the men works for agriculture, livestock, forestry, hunting and fishing economic sector. In the case of the women, they are most presented in trade activities. For the income level is possible to analyze that for both men and women they have between 1 and 2 minimum wages, but in up to the minimum there is a high difference because men have 19% and women 29%. Finally, it is important to visualize that both men and women work between 35 and 48 hours, but if an analysis of the workers that their labor week is more than 48 hours for men it is 28% and for women 17%.

Conclusions

The main objective of this document is to present the process to build a regional employability indicator based on ordered weighted average operators. The main feature of the proposition is to combine the OWA operator in the analysis of the information and divide the whole nation in different regions that will use different weighting vectors. With this new idea is possible to analyze the information based on the specific characteristics of the regions and with the reordering process obtain the maximum and minimum results.

An application of the proposed method was done using the ENOE survey made by the INEGI in Mexico. The main idea was to show how the process can be done based on 32 States divided in 8 Regions and then obtain the Nation results. Among the main results can be seen that men mostly work in agriculture, livestock, forestry, hunting and fishing and women in trade jobs. Also, it is possible to visualize those men tend to earn more salary that women, but this can be related those men tend to have higher labor hours than women. An interesting thing to analyze is the results based on specific regions because the national results can vary drastically depending on the region. For example, in the northeast and northwest region of Mexico, both men and women, has a high presence in manufacturing industry something that in southwest and southeast is not presented at all.

For future research, more applications and indicators based on the OWA operators, and its extensions can be proposed, for example, using distance operators (Alfaro-García et al. 2019; Blanco-Mesa and Merigó 2020), heavy operators (Blanco-Mesa, León-Castro, and Merigó 2018; Leon-Castro et al. 2019), prioritized operators (Perez-Arellano et al. 2021a; Pérez-Arellano et al. 2019; Yager 2009), or logarithmic operators (Alfaro-García et al. 2018; Zhou, Chen, and Liu 2012).

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