

## Article

# Conditions Influencing Salary of the Automotive Industry in Mexico City—A Linguistic Fuzzy-Set Approach

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**Abstract:** Decision making in wages is generally a hard task. The aim of this work is to identify government conditions, personal conditions of the businessperson, and organizational circumstances that affect wage levels in the automotive industry in Mexico City using a linguistic fuzzy-set approach. We conducted a questionnaire, consisting of 23 observation variables with a five-point Likert scale. Independent variables were measured from 1 (“not important”) to 5 (“very important”). Based on the literature review and results of interviews, a total of 169 questionnaires were sent to participants using Google Forms. The results of the linguistic fuzzy-set approach identify three main conditions influencing the salary levels in the automotive industry in Mexico City, including unskilled manpower, the neoliberal economic model, and political and trade reforms. On the other hand, organizational conditions are not considered relevant in determining wage levels. Based on the findings, some recommendations have been proposed to help government, firm leaders, and businesspeople design appropriate personnel policies to achieve better salary satisfaction for employees in the future. This work shows a model based on the fuzzy-set approach that is a potential tool to overcome the difficulties posed by a complex environment.

**Keywords:** automotive industry; business; fuzzy set; employees; wages; conditions



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## 1. Introduction

Foreign trade is the main activity of Mexico in its internationalization process, and the automotive industry is one of the largest sectors generating income and growth. In 2021, Mexico produced a total of 2,979,276 vehicles. The automotive sector went through a series of difficulties, such as the pandemic crisis, which caused a stoppage of production; the semiconductor crisis, which was caused by the trade war between the United States and China; and the updating of the Mexico–United States–Canada T-MEC. These events resulted in the production of hundreds of thousands of units fewer than projected, that is, a drop in production of −2% compared to 2020. Despite the above, Mexico is among the most prominent countries in the production and export of automobiles. It has become the seventh largest producer and fourth largest exporter of automobiles worldwide, according to García Yañez and Bonales Valencia [1].

García-Remigio et al. [2] state that the Mexican automotive industry has become one of the strongest globally; it generates significant contributions to the gross domestic product (GDP) and creates direct and indirect employment by promoting the inflow of foreign direct investment (FDI).

In the context of the renegotiation of the North American Free Trade Agreement (NAFTA), the issue of wages was discussed. Unions in both the USA and Canada have pressured their governments to deal with the social dumping associated with Mexico. More precisely, large automotive firms and car part providers have delayed their investments and shown caution as Mexico faces a juncture regarding the rules of origin, supply chain characteristics, and above all, the petition of North American governments for Mexico to modify workers' wages by up to USD 16 per working hour [3].

This shows that wage allocation has always been a delicate topic among organizations, especially when the parameters have not been previously established. A failure in the application or negotiation of the parameters can be interpreted as an act of discrimination.

Several studies have determined the relevant factors that set wages. Using exploratory factor analysis (EFA) and multiple regression analysis (MRA) models, Thi Tuoi Do [4] found that the paying views of business leaders, financial ability of the enterprise, capacity of workers, capacity of the contingent of employees engaged in salary work, role of grass-roots trade unions, and state policies and laws on labor salaries influenced the salaries of employees in manufacturing enterprises in Hanoi. Sheila Kaminchia [5], in another study, found that the key to higher-wage employment in Kenya was to improve broader levels of socio-economic development with a view to increasing the value of Kenya's exports, and keeping domestic inflation low using an error correction model. Using a Cobb–Douglas production function, Fingleton [6] showed that the higher wages in Greater London, in particular, are linked to increasing returns and enhanced worker efficiency.

According to the results, the conditions that affect wages can be classified into three categories: (1) government, which means that there are state policies and laws regarding labor salaries that must be considered before fixing the wage levels; (2) the personal conditions of the businessperson, which include the paying views of business leaders, capacity of workers, age and gender [7], and education and experience [8]; and finally, (3) organizational conditions, which include increasing returns and enhanced worker efficiency. Furthermore, there are several models to determine the factors that affect salary; the discussion regarding which is better continues, and the problems remain the same, especially in the automotive sector, as noted above.

This research seeks to include qualitative results on decision making by managers. Therefore, we propose a linguistic fuzzy-set approach as another way to identify the determinants of the decisions on wage allocation in the automotive industry in Mexico. The approach is fuzzy because it is built on fuzzy-set theory. It is also linguistic because it uses linguistic labels as variables, not numbers.

The following question arises: What are the labor, government, and personal conditions that affect the wage level of employees in the automotive sector in Mexico City? The aim of this work is to identify the government conditions (supports, services, and reforms), businesspeople's personal situations (personality and manpower), and organizational circumstances (job security, trade association, and development) that affect wage levels in the automotive industry in Mexico City.

This work is structured as follows: Section 2 analyzes the conditions affecting the evolution of wage levels. Section 3 details the methodology used in this investigation, along with the research model proposed for decision making regarding wages, and the creation of the questionnaire that allowed us to obtain the data for the model proposed. In addition, this section introduces fuzzy triangular sets and linguistic labels, and the method for ranking triangular fuzzy numbers is given. Section 4 discusses the implications of the model. Finally, the conclusions of this work are presented.

Fuzzy models have been previously created regarding wages. In that sense, Ailenei et al. [9] propose a fuzzy model to describe the behavior of companies facing increases in the minimum wage. Mobasshera et al. [10] propose the use of fuzzy logic in the wage increase model. In the steel industry, Eraslan and Atalay use the theory of fuzzy sets as part of the process of position evaluation [11]. Still, the model proposed in this work uses highly simple concepts from set theory, which can be implemented at a low cost and are numerically easy to handle.

The relevance of this research lies in the use of the linguistic fuzzy-set approach in decision making regarding wages. This work could be of interest for businesspeople when making decisions on wage matters, and for government, which aims to reestablish the minimum wage for workers in the country. The contribution to the automotive industry is highlighted.

## 2. Literature Review

Several studies and authors have been interested in the problems linked to the setting of wages, as well as the factors that influence this process. Wages are the main source of income for workers. Wages help workers and their families improve their lives, meet their material and spiritual needs, and constantly reproduce and expand labor. This section will address the factors that affect the setting of salary levels. For that, it will be divided into three segments or subparts, each with its own factors. The first is organizational conditions (OC), which is made up of factors such as freedom of association or right to bargain (OC1), access to social or job security (OC2), and development of intra- and inter-industry trade (OC3). The second is personal conditions (PC), with factors such as employees' personality and attitude (PC1), skilled manpower (PC2), unskilled manpower (PC3), and innovation in productive processes/technology introduction (PC4). Finally, government conditions (GC) includes factors such as export support programs (GC1), subsidies and financial support (GC2), political and trade reforms (GC3), and economic model (GC4).

### 2.1. Government Conditions

The government has a very important role in the evolution of markets. According to Hernán Muñoz [12], the formulation of public policies aimed at improving the conditions of the labor market in relation to the generation of new jobs and improving the level of remuneration of workers, among other objectives, must start from a deeper understanding of the characteristics of the labor market according to the economic model of the country or region. In this regard, starting in the second half of the 1980s, there has been a growth in wage disparity, which coincides with the implementation of economic policies tending to make Mexico a country with greater commercial openness, less participation of the state in the economy, and the growing presence of market laws.

Related to the remuneration of workers, Joskow, Rose, and Wolfram [13], in a study whose objective was to explore the effect of regulatory and political constraints on the level of CEO compensation for 87 state-regulated electric utilities during 1978–1990, found that political pressures may constrain top executive pay levels in this industry.

Other factors related to salary levels are shown in a study realized by Sheila Kaminchia [5], whose results show that the key to higher-wage employment in Kenya is to improve broader levels of socio-economic development with a view to increasing the value of Kenya's exports, and keeping domestic inflation low. López-Noria [14], in his own way, analyzed the impact of NAFTA and FDI on inter-industry wage differences in Mexico and reported a non-linear significant positive effect of FDI on inter-industry wage differences; however, NAFTA did not show a similar impact.

Finally, in order to survive in the fierce competition today, businesses need to develop a reasonable wage policy, and an appropriate remuneration system. Thus, they can attract and retain employees, encourage employees to actively work, increase labor productivity, and raise efficiency and profitability for businesses. Government conditions can help with state policies and laws on labor salaries to protect employees. However, cost-of-living differences do not appear to influence a state's decision to increase its minimum wage above the federal level. This result is interesting, since proponents of raising the minimum wage cite the rising cost of living as a principal justification for an increase [15].

### 2.2. Organizational Conditions

Salaries are a top concern for managers because they have a close relationship with the production and business activities in an enterprise. Salary is an input cost of the production process, accounting for a large proportion of the company's production and business costs. In a study done by Mukesh Mehta [16], the goal was to understand the relationships between salary, non-monetary factors, and job satisfaction in the labor market. The results show that in a regression comparing salary and non-monetary factors, only 2 out of 16 dummy variables are statistically significant. Both are positive work conditions, but benefits (positive) decrease salary, while long hours (positive) increase it.

In terms of social and job security, Elshoryi, Alathamneh, Mahmoud, and Hammad [17] developed a study to determine job satisfaction among Jordanian dietitians, factors associated with job satisfaction, and the relationship between job satisfaction and intent to stay. The results showed that participants with higher monthly salaries were 1.53 times more likely to have higher job satisfaction than those with lower monthly salaries (CI 95%, 0.503–2.55). Intention to stay was also positively correlated with total job satisfaction. This implies that the higher the salary, the greater the stability for the worker.

In another study, Castro Lugo [18] stated that the National Commission of Minimum Wage (Comisión Nacional de Salarios Mínimos), together with unions and the government, negotiates the yearly increase in the minimum wage. This salary increase sets the floor in the employees' bargaining in a business environment. With NAFTA and the consolidation of the export economic model, wage determination in competitive industrial companies is fundamentally defined at the plant level, based on a productivity scheme and with a decreasing union presence.

Contrary to the previous approach, Zendejas and Raess [19] found that the setting of wage levels derives from negotiations between employers and unions. The latter affirm that labor legislation and regulations are internal matters that must be kept outside of the treaties and agreements that the government may sign with other countries.

### 2.3. Business Conditions

Innovation has been a key factor in the internationalization of companies. There is evidence of a positive correlation between innovation and export. In a study on the relevance of innovation in the international market, Estrada, Heijs, and Buesa [20] show that companies with the lowest innovation level have the lowest export probability, followed by highly innovative companies. Meanwhile, those with an intermediate innovation level are competitive in the global market. Some products show more standardization (not innovation), and their production is relocated to countries like Mexico, which provides advantages stemming from lower wages and the availability of natural resources.

Varela Llamas, Ocegueda Hernandez, Castillo Ponce, and Huber Bernal [21] show that income increases and the dynamics of job relationships are defined by the following: schooling, through its effect on productivity; job experience [22]; and income of the heads of households, controlled by attributes such as type of contract, gender [23], population group, unionization, and territory.

Groundbreaking studies on human capital, such as those by Schultz [24], Becker [25], Ampudia [26], and Barceinas, Raymond, and Roig [27], showcase the link between education, productivity, and income. This means that wage differences between employee groups might be explained by human capital theory, which considers education to be a form of investment that generates positive returns through new knowledge, skills, and abilities.

The works by Huesca [28] and Cabrera et al. [29] are also worth presenting. The first analyzes the period 1984–2000 with information from ENIGH (the National Household Income and Expense Survey), while the second uses data from ENEU (Employment Survey) to estimate an income function for the period 1994–2001. Huesca [28] warns that the accumulation of human capital is key for a country to adapt to technological change and, therefore, improve the life quality of potential manpower when returning to the path of growth. The second stresses that schooling is an important variable in the determination of income, which involves a high demand of the local job market. It shows the need to constantly strengthen the link between production centers and elementary, secondary, and higher education.

The above suggests that a higher level of schooling is related to higher wages, just as unionization positively affects wage levels. This result opposes the findings in the garment industry by Hualde Alfaro [30], who states the following:

“In the garment industry [...], successive crises, [and] the global competition to lower prices determine the working conditions, among others [...]. Although the educational level does not go beyond high school, this degree often constitutes an advantage to be

promoted to manager, which seems the highest echelon to pursue. [...] Still, it must be noted that a higher schooling does not guarantee a more stable career, with better income and benefits" (pp. 82–83).

In fact, Encalada Jumbo and Maldonado Granda [31] consider that different educational levels, the characteristics of the job structure, and experience explain the differences between people's incomes, since an extra year of experience increases a person's income by 3.94%.

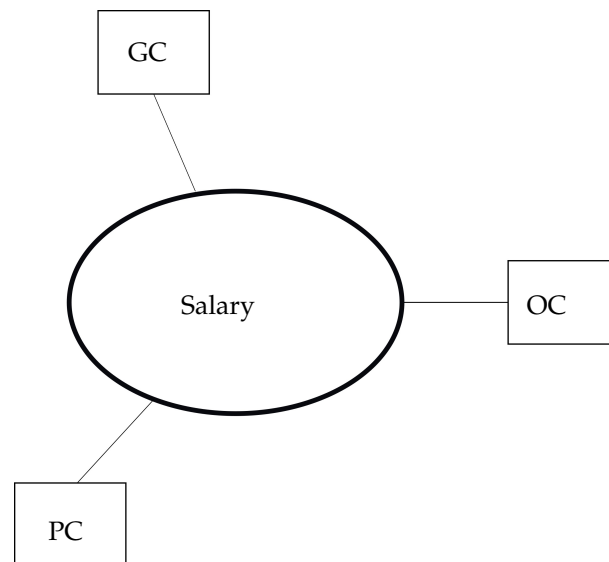
Related to employees' personality and attitude, Lopresti and Mumford [7] found little evidence of heterogeneity in the effects of age, gender, income, and race on the wage a worker would have if there had been no minimum wage increase. In addition, Borah Bortamuly and Goswami [8] found in another study that factors such as education and experience do not have any significant influence on the wage structure of workers in the handloom industry in Assam.

Finally, Dewen, Fang, and Guoqing [32], in a simple Mincer earnings regression, show that the rate of return to schooling for wage earners is two percentage points higher than that for the self-employed. After correcting for bias in sample selection, the expanded Mincer earnings equation estimated the rate of return to schooling for wage earners at between 5.3 and 6.8 percent. The simplest form of training did not have a significant effect on earnings, whereas short-term and formal training played an important determining role in this respect.

### 3. Materials and Methods

#### 3.1. Research Model

In this section, a new salary model is proposed for the automotive industry in Mexico. The usability of the proposed fuzzy model is tested in several companies. For this purpose, we use data generated by a questionnaire from employees in the automotive industry. The model proposed to identify the factors that come into play regarding wage levels in the automotive industry in Mexico City is shown in Figure 1.



**Figure 1.** Salary model to identify the government conditions, businesspeople's personal situations, and organizational circumstances that affect wage levels of the automotive industry in Mexico City.

In developing a model to identify the government conditions, businesspeople's personal situations, and organizational circumstances that affect wage levels in the automotive industry, we set a main goal that we believe was not met by the existing literature. The dependent variable is the salary, and the independent variables are the independent attributes are inherited from previous studies. These variables are described in Table 1.

**Table 1.** Summary table for variables.

Code	Variables	Sources
Government Conditions (GC)		
GC1	Export support programs	[5,13,14]
GC2	Subsidies and financial support	[4,6,12,15]
GC3	Political and trade reforms (FDI law)	[16]
GC4	Economic model (privatizations, industry deregulation, and FDI)	
Personal Conditions (PC)		
PC1	Employees' personality and attitude	[7,20,31,32]
PC2	Skilled manpower	[4,8]
PC3	Unskilled manpower	
PC4	Innovation in productive processes/technology introduction	
Organizational Conditions (OC)		
OC1	Freedom of association or right to bargain	[17–19,33]
OC2	Access to social or job security	[4]
OC3	Development of intra- and inter-industry trade	

### 3.2. Research Methods and Sample

The sample size was estimated considering a 10% margin of error and a 99% confidence level. Then, the questionnaire was applied to  $N = 169$  participants.

The measuring instrument includes 23 items and is structured in five sections. The first one, consisting of four items, deals with items on the employee's general information. The second section includes (a) freedom of association or right to bargain, (b) access to social or job security, and (c) development of intra- and inter-industry trade [34].

Section 3 covers (a) employees' personality and attitude, (b) skilled manpower, (c) unskilled manpower, and (d) innovation in productive processes/technology introduction [35]. Section 4 considers (a) export support programs, (b) subsidies and financial support, (c) political and trade reforms (FDI law), and (d) economic model (privatizations, industry deregulation, and FDI). Section 5 looks at (a) annual average of sales growth in the last two years, (b) sales percentage related to new products in the past two years, and (c) market growth percentage regarding competition in the past two years [36].

Therefore, there are fourteen variables, each of which was collected in the questionnaire according to the government conditions, businesspeople's personal situations, and organizational circumstances.

### 3.3. Fuzzy Set Theory

In 1965, Lofti Zadeh developed fuzzy logic, which assigns grades of membership to each proposition. In this research, we present a model based on fuzzy logic for decision making applied to salary in several enterprises [37].

The idea is to consider methods for decision making based on fuzzy sets and fuzzy logic. Applications are made to various real-life situations requiring selection or evaluation decisions. Fuzzy logic provides methods for decision making for real-life situations that require making evaluation decisions.

Now, we define a fuzzy set. According to Bojadziev and Bojadziev [38], the fundamental concept of fuzzy logic is the membership degree. Let  $U$  be a universal set. A fuzzy set  $A \subset U$  is identified by its membership function  $\mu_A : X \rightarrow [0, 1]$ . For each point belonging to  $X$ , there exists a real number in  $[0, 1]$ . The value  $\mu_A(x)$  is called the grade of membership function of the value  $x \in A$ .

According to Brunelli and Mezei [39], the triangular- and trapezoidal-shaped fuzzy numbers are the most widely used. Triangular and trapezoidal shapes are piecewise linear functions, and thus allow simpler calculations and make concrete applications more easily realizable. Moreover, they seem able to represent uncertainty sufficiently well in many real-world situations.

A particular case of a fuzzy set is the triangular fuzzy set, that is,  $(a, m, b)$ , where  $a \leq m \leq b$ . The membership function is given by the following formula:

$$\mu_A(x) = \begin{cases} 0, & x < a \\ \frac{x-a}{m-a} & a < x \leq m \\ \frac{b-x}{b-m}, & m < x \leq b \\ 0, & x > b. \end{cases} \quad (1)$$

Arithmetic operations with fuzzy numbers are established in the following way. Let  $A = (a_1, m_1, b_1)$  and  $B = (a_2, m_2, b_2)$  represent two triangular fuzzy numbers, and  $k$  a real number. Then, the sum and product are given by the following:

$$\begin{aligned} A + B &= (a_1, m_1, b_1) + (a_2, m_2, b_2) \\ &= (a_1 + a_2, m_1 + m_2, b_1 + b_2) \\ kA &= (ka_1, km_1, kb_1). \end{aligned}$$

These operations yield triangular fuzzy numbers as a result. In addition, we define the fuzzy triangular average by the following equation:

$$A_{ave} = \frac{A_1 + A_2 + \dots + A_n}{n}.$$

This yields a new fuzzy triangular set:

$$A_{ave} = \frac{1}{n} \left( \sum_{i=1}^n a_i, \sum_{i=1}^n m_i, \sum_{i=1}^n b_i \right) \quad (2)$$

for  $n$  triangular numbers  $A_i = (a_i, m_i, b_i)$ ,  $i = 1, \dots, n$ .

### 3.4. Ranking Fuzzy Sets

Methods for ordering fuzzy numbers do actually rank them, and consequently, the literature regards them simply as ranking methods. Burnelli and Mezei investigated the differences and similarities between ranking methods that can be considered as centrality measures—integral of means, centroid index, and the median value of a fuzzy number, for instance. They found some equivalences between these different ranking methods [39]. However, in this research, triangular fuzzy numbers are compared with the viewpoint given by employees in the automotive industry. Then, fuzzy numbers are put into a sequence according to the degrees evaluated in the first step.

On the other hand, rating items in a questionnaire is a difficult undertaking. Differences in codes cannot be understood as differences in size when values are encoded by their relative location in accordance with a given ranking, which is a disadvantage. This means that only statistical conclusions based on ordinal data may be trusted, and important data may be lost. Another key issue with the use of Likert scales is the weighting of different characteristics, which is frequently not equal for the raters. Furthermore, when it comes to statistical analysis of Likert-type data, the methodologies available are relatively limited. The fuzzy approach can simulate the imprecision of human rating evaluations, formalize them mathematically, continuously “precisiate” them, and construct mathematical computations with them (see, for example [40–42]).

In order to rank triangular fuzzy numbers, we associate fuzzy numbers with triples instead of real numbers. Akyar et al. [43], in 2012, presented a new method for ranking triangular fuzzy numbers that considers the incircle of a triangular fuzzy number. The incircle of a triangle is the circle that just touches all three sides of the triangle. For a triangular fuzzy number  $A = (a, m, b)$ , the inradius  $R$  of the incircle is

$$r_A = \frac{b - a}{(b - a) + \sqrt{1 + (b - m)^2} + \sqrt{1 + (m - a)^2}}. \quad (3)$$

In addition, the incenter  $I$  of the incircle is the point on the interior of the triangle that is equidistant from the triangle's three sides. From this, we get the following:

$$I(x_A, y_A) = \frac{(b-a)(m, 1) + \sqrt{1 + (b-m)^2}(a, 0) + \sqrt{1 + (m-a)^2}(b, 0)}{(b-a) + \sqrt{1 + (b-m)^2} + \sqrt{1 + (m-a)^2}}. \quad (4)$$

Then,

$$x_A = \frac{(b-a)m + a\sqrt{1 + (b-m)^2} + b\sqrt{1 + (m-a)^2}}{(b-a) + \sqrt{1 + (b-m)^2} + \sqrt{1 + (m-a)^2}}, \quad y_A = r_A.$$

We define the rank of the triangular fuzzy set  $A = (a, m, b)$  as

$$\text{Rank}(A) = \left( x_A - \frac{1}{2}y_A, 1 - y_A, m \right). \quad (5)$$

Let  $A = (a_1, m_1, b_1)$  and  $A = (a_2, m_2, b_2)$  be two triangular fuzzy sets. Then,  $A < B$  if and only if  $\text{Rank}(A) < \text{Rank}(B)$ , where the symbol  $<$  denotes the lexicographical order.

On the other hand, according to Bellman and Zadeh [44], fuzzy goals and fuzzy constraints can be defined precisely as fuzzy sets in the space of alternatives. A fuzzy decision, then, may be viewed as an intersection of the given goals and constraints. A maximizing decision is defined as a point in the space of alternatives at which the membership function of a fuzzy decision attains its maximum value.

Decision making is characterized by selection from alternatives. In this process, goals must be specified. A decision is a fuzzy set  $D$  with membership function  $\mu_D(x)$  and is given by the intersection of the goals  $G_1, G_2, \dots, G_m$  and their membership functions  $\mu_1(G_1), \dots, \mu_m(G_m)$  [44].

Using the membership functions and intersection of sets, we can obtain a process of decision making. For  $n$  variables  $v_1, v_2, v_3, \dots, v_n$ , which are presented by fuzzy triangular number  $A_1, A_2, \dots, A_n$ , and  $m$  evaluations proposed by the subjects  $E_1, E_2, \dots, E_m$ , the decision is chosen by the following method:

1. Calculate the triangular average of  $n$  triangular sets  $A_1, A_2, \dots, A_n$ .
2. Determine the decision

$$D = A_1 \cap A_2 \cap \dots \cap A_n.$$

3. The membership function of  $D$  is

$$\mu_D(x) = \min\{\mu_{A_1}(x), \mu_{A_2}(x), \dots, \mu_{A_n}(x)\}.$$

Using the last formula, it is possible to obtain the solution to the optimization problem. As part of the model, a questionnaire was designed to identify government conditions, personal businesspeople's conditions, and those organizational aspects that affect wage levels in the automotive industry in Mexico City. In this analysis, we considered  $m$  enterprises (evaluation subjects). We denoted them by

$$E = \{E_1, E_2, \dots, E_m\}.$$

Now, for each enterprise we will assign a fuzzy triangular set according to Table 2.



**Table 2.** Fuzzy linguistic scale.

Value	Fuzzy Set
Not important	(0, 16.66, 33.33)
Slightly important	(16.70, 33.33, 50)
Moderately important	(33.3, 50, 66.7)
Important	(50, 66.7, 83.40)
Very important	(66.70, 83.40, 100)

### 3.5. Linguistic Labels

A linguistic variable is different from a numerical one since it considers words instead of numbers. A linguistic variable is a concept of a higher order than that of a fuzzy variable; therefore, it considers fuzzy variables as values. Linguistic variables become the means for the approximate characterization of phenomena that are too complex or badly defined to be described in precise terms. The use of linguistic variables in several applications reduces the overall calculation complexity of application [45–47]. It has been proven that linguistic variables are particularly useful in non-linear complex applications.

We define the linguistic variables through the following terms:

1. The name of the linguistic label.
2. The values of the linguistic label.
3. Universe set.
4. Syntactic rule of the linguistic terms.
5. Semantic rule, which assigns to each value of a linguistic variable its mean in  $U$ .

The use of Likert scales in the context of fuzzy sets was introduced in 1988, since the fuzzy approach can provide a more realistic framework for decision making with ordinal (linguistic) variables. Likert scales are usually represented by triangular fuzzy numbers. A Likert scale is very popular among researchers for work that involves questionnaires. An opinion should have five levels based on the Likert scale. All these levels cannot be categorically separated. In other words, one level overlaps with others where there is an ambiguous opinion. In addition, the ambiguity of opinion depends on the quality of the question in terms of validity and discrimination [48,49]. Therefore, in this research, we used a five-point Likert scale. Independent variables were measured from 1 (“not important”) to 5 (“very important”).

Therefore, the name of the linguistic variable is defined in terms of the study variables. The set  $T(x) = \{\text{not important, slightly important, moderately important, important, and very important}\}$  is the set with the linguistic values. The set  $[0, 1]$  is the universe of discourse. The corresponding membership functions are illustrated in Figure 2, according to Equation (1).

Table 2 illustrates an example of a fuzzy linguistic scale. This representation corresponds to the syntactic rule of the linguistic terms. The values that we will consider for the analysis are given by Table 2. To obtain results in the interval  $[0, 1]$ , the final results are divided by 100.

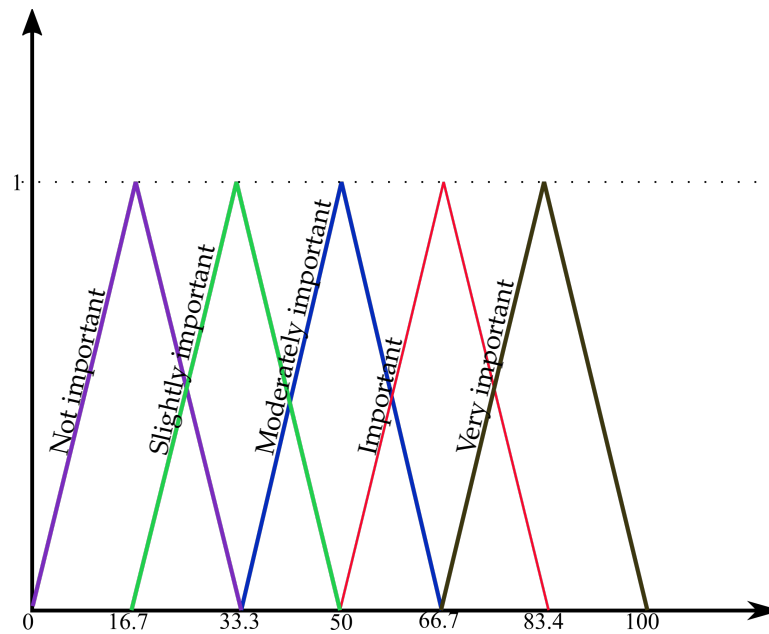


Figure 2. The graph of the membership functions.

#### 4. Results

##### 4.1. Descriptive Statistics

To compute the internal consistency, we used the Cronbach's alpha, which is usually used to assess the internal consistency of a questionnaire that uses a multiple-value Likert-type scale. Values between 0.70 and 0.95 are considered good. Since  $\alpha = 0.871$ , we conclude that the internal consistency of the entire questionnaire was good.

Figure 3 shows the gender distribution of the participants. It is observed that 57% of the respondents are men, and 43% are women. This means that of every 10 people who work in the automotive sector in Mexico City, 6 are men.

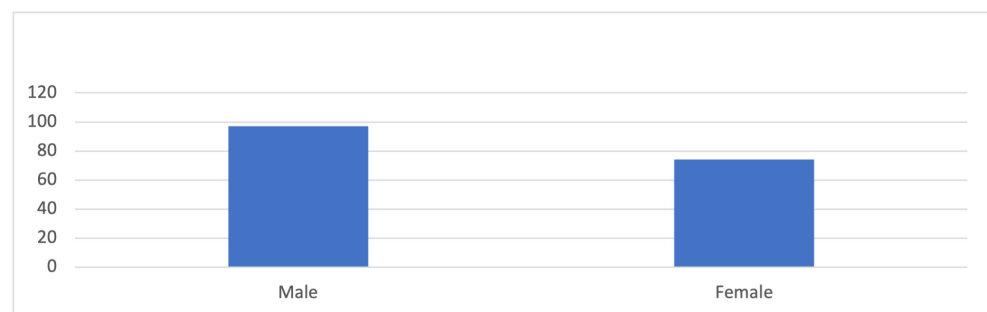
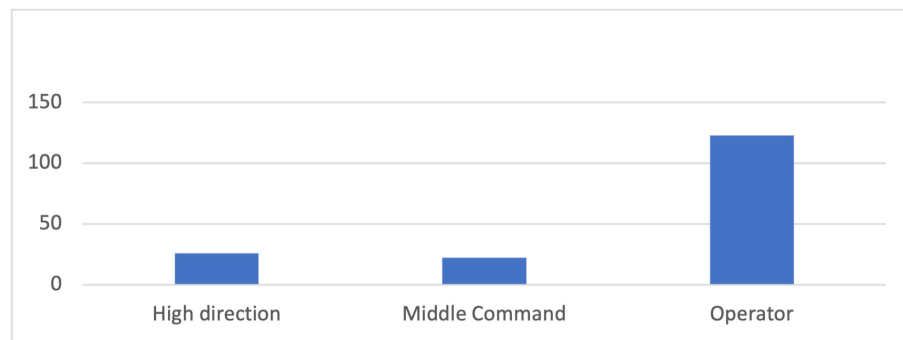


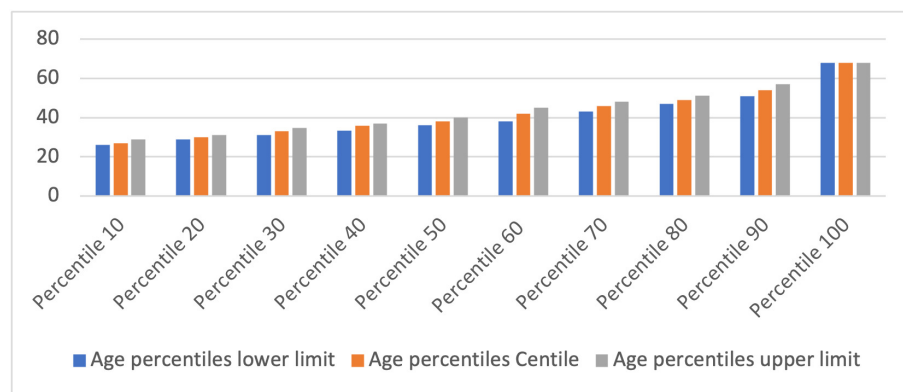
Figure 3. Respondent's gender.

Figure 4 presents the different positions held by the participants. It is observed that 72%, that is, 123 people, have the position of operator; 15%, that is, 26 people, are from Senior Management; and 13%, that is, 22 people, are from Command. Seven out of ten people surveyed are operators.



**Figure 4.** Respondent's position.

Figure 5 shows the distribution of the ages of the participants. It is observed that in the Mexico City automotive industry, the average age is between 36 and 40 years old, with a 95% confidence level. On the other hand, 90% of the population in the studied sector is 57 years old, which is relatively young and before retirement.



**Figure 5.** Age percentile.

#### 4.2. Fuzzy Model Analysis

As stated above, 169 responses were obtained from the questionnaire. Therefore, the model was built with  $m = 169$  evaluation subjects.

$$E = \{E_1, E_2, \dots, E_{169}\}.$$

The responses obtained corresponded to government conditions (supports, services, and reforms), personal conditions of the businessperson (personality and workforce), and organizational conditions (job security, trade association, and development).

Then, the averages between the fuzzy triangular numbers obtained in the previous step were calculated. In doing so, each variable obtained a unique triangular fuzzy number, and we followed the procedure shown in the previous section to find the solution to the optimization process.

Each of the responses by the subjects of the evaluation were assigned a fuzzy triangular number, according to Table 2. We show the evaluation of the conditions for each enterprise  $E_i$ ,  $i = 1, 2, 3, \dots, 169$ . See Appendix A.

Then, using Formula (2), we obtained the average for the variables analyzed. The results are shown in Table 3.

**Table 3.** Average for the variables.

Variable	Fuzzy Triangular Average
OC1	(0.49, 0.65, 0.82)
OC2	(0.47, 0.64, 0.80)
OC3	(0.44, 0.60, 0.77)
PC1	(0.53, 0.69, 0.86)
PC2	(0.53, 0.69, 0.86)
PC3	(0.36, 0.53, 0.69)
PC4	(0.50, 0.66, 0.83)
GC1	(0.40, 0.57, 0.73)
GC2	(0.38, 0.55, 0.71)
GC3	(0.37, 0.54, 0.71)
GC4	(0.37, 0.53, 0.70)
GC	(0.52, 0.69, 0.86)
PC	(0.51, 0.68, 0.85)
OC	(0.53, 0.70, 0.86)

Associating a fuzzy number with a real number and comparing fuzzy numbers on associated real numbers is a simple way for sorting fuzzy numbers. However, converting a fuzzy number to a real number results in the loss of crucial information for decision-making. In the proposed method, we correlate fuzzy numbers with triplets instead of real numbers to save the majority of the information from fuzzy numbers [43].

With (3)–(5), it is easy to quickly calculate the ranking value of each fuzzy triangular average. The results obtained by the method are given in Table 4.

**Table 4.** Obtained results.

Variable	$r_{A_i}$	$x_{A_i}$	$y_{A_i}$	$Rank(A_i)$
OC1	0.14	0.73	0.14	(0.65925466, 0.8587383, 0.65222544)
OC2	0.14	0.72	0.14	(0.64967054, 0.85873118, 0.63542663)
OC3	0.14	0.70	0.14	(0.63163545, 0.85871778, 0.60382485)
PC1	0.14	0.75	0.14	(0.68350936, 0.85877704, 0.69470592)
PC2	0.14	0.75	0.14	(0.68352677, 0.85879422, 0.69472367)
PC3	0.14	0.66	0.14	(0.58711639, 0.85869936, 0.52578107)
PC4	0.14	0.74	0.14	(0.66490065, 0.85875547, 0.66210000)
GC1	0.14	0.68	0.14	(0.61021203, 0.85869873, 0.56627633)
GC2	0.14	0.67	0.14	(0.59840121, 0.85871339, 0.54555148)
GC3	0.14	0.67	0.14	(0.5950218, 0.85871213, 0.53963491)
GC4	0.14	0.66	0.14	(0.59163254, 0.85870271, 0.53370769)
GC	0.14	0.75	0.14	(0.68011045, 0.85875673, 0.6887716)
PC	0.14	0.75	0.14	(0.67444738, 0.85872574, 0.67887929)
OC	0.14	0.76	0.14	(0.68461697, 0.85876071, 0.69666095)

As explained in Section 3.4, a fuzzy decision can be viewed as an intersection of the given goals and constraints. A maximizing decision is defined as a point in the space of alternatives at which the membership function of a fuzzy decision attains its optimum value. Therefore, the membership functions are given by the intersection of the triangular functions. The ranking order of fuzzy numbers is shown in Table 5.

The key factors that affect wage allocation are unskilled labor, the neoliberal economic model, and political and trade reforms. In contrast, factors related to personal, government, and organizational matters are the least important for wage allocation. The key factors that affect wage allocation are unskilled labor, the neoliberal economic model, and political and trade reforms. In contrast, factors related to personal, government, and organizational matters are the least important for wage allocation.

**Table 5.** Results for analysis variables.

Position	Variable
1	PC3 Unskilled manpower
2	GC4 Economic model (privatizations, industry deregulation, and FDI)
3	GC3 Political and trade reforms (FDI law)
4	GC2 Subsidies and financial support
5	GC1 Export support programs
6	OC3 Development of intra- and inter-industry trade
7	OC2 Access to social or job security
8	OC1 Freedom of association or right to bargain
9	PC4 Innovation in productive processes/technology introduction
10	PC Personal conditions of the entrepreneur
11	GC Government conditions
12	PC1 Employees' personality and attitude
13	PC2 Skilled manpower
14	OC Organizational conditions.

## 5. Discussion

Nowadays, decision making is done in environments and organizations with increasingly complex structures, and the automotive industry is not an exception. Again, the experts' opinions remain key in the wage allocation process of the automotive industry. This is evident based on the data provided by experts through the questionnaire designed and applied as part of this study.

On the one hand, the results show that the major condition to set wage levels is unskilled manpower [30]. This should be carefully treated and is not to be extended to the whole job market, given that only one case study (that of the automotive industry) is considered. It could be explained by the large number of workers who participated in the survey, the workers' years of experience [31], the medium technology level, and the volatility or job insecurity of the sector studied.

In addition, our results indicate other conditions more relevant to wage levels: the neoliberal economic model [20], political and trade reforms [50,51], and the United States–Mexico–Canada agreement (USMCA), which includes a chapter on labor rights among its negotiations.

On the other hand, organizational conditions are not considered relevant to determine wage levels. This result agrees with what Maloney and Pontual [52] state regarding unions: they seem to have a low priority in wage determination beyond setting a floor for workers who are less trained.

Quantitative research's internal validity is the measured validity. As a result, the instrument used to collect data on the variables being measured is critical. Subjective variables are hidden features that cannot be seen or measured directly [48]. Feelings, behaviors, expressions, and personal beliefs are all measurable, and data can be collected via a questionnaire. One of the most widely used measures for assessing latent features is the Likert scale. However, employing addition, subtraction, division, or multiplication to interpret the data is incorrect. Furthermore, utilizing the arithmetic mean and standard deviation to examine such data is improper [53]. As a result, summing the scores of all the questions on a Likert scale to assess the latent variables is improper. Numerous attempts have been made to address the problem and establish an appropriate scale. Fuzzy logic is one of these ways. Li [54] also compared the effectiveness of this scale to the Likert scale and discovered that measuring variables with the fuzzy Likert scale was more accurate than assessing variables with the general Likert scale. Vonglao [48], for example, found out how to apply fuzzy logic to the Likert scale in order to measure latent variables more accurately and efficiently. To consider human perceptions, fuzzy set theory is increasingly applied, as it can successfully improve the reliability of decision-making process measurements and evaluations.

This work shows a model based on the fuzzy-set approach that is a potential tool to overcome the difficulties posed by a complex environment. It can also aid businesspeople

and/or managers to make more precise decisions regarding wages in the automotive industry. This model could be easily used to accurately identify the government conditions (supports, services, and reforms), the personal situations of businesspeople (personality and workforce), as well as the organizational status (job security, trade association and development) that affect wage levels in the automotive industry of Mexico City.

## 6. Conclusions

Decision making in terms of setting salary levels is not an easy task, even more so when it comes to countries with a liberal economic model, in this case Mexico, which prescribes that the market determines salary levels. It also specifies that the availability of work depends on the supply and demand of the same, and the negotiations to determine salary levels are carried out between the owners of the companies and the unions. The latter affirm that labor legislation and regulations are internal matters that must be kept outside of the treaties and agreements that the government may sign with other countries. These predispositions reduce the abilities of employees to intervene directly in this process. In addition, government participation is limited.

The results of the linguistic fuzzy-set approach identify three main conditions influencing the salary levels in the automotive industry in Mexico City, including unskilled manpower, the neoliberal economic model, and political and trade reforms. In contrast, organizational conditions, and some personal conditions such as personality and attitude, are not considered relevant in determining wage levels.

Although the government has already begun to provide solutions in terms of wages by increasing the minimum wage, there is much to be done to revalue wages more in the automotive sector, which represents about 4% of the national GDP. A healthy government–employer–union relationship will be beneficial for the employees, since the salary represents the main source of income for workers. It helps workers and their families improve their lives, meet their material and spiritual needs, and constantly reproduce and expand labor.

There are numerous benefits to employing the proposed method for ranking fuzzy numbers. For the purposes of calculation and comparison, the ranking procedure is straightforward and efficient. As a result, the proposed ranking system can be used more effectively.

The results of this research can serve as a basis for decision makers in organizations to revalue the salary of the worker with a lower level of education who performs a trade. It is time to ask about the need to accumulate titles without having a significant impact on the problems facing the country, such as inflation, which has reached a record number and is increasing insecurity.

Finally, although there are several methods to determine the relevant factors in setting salaries, it is important to look at alternatives such as the linguistic fuzzy-set approach, which has a quantitative and qualitative character. The use of this tool will be of the utmost importance for entrepreneurs in their business decision-making process.

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## Appendix A. Evaluations Given by Employees in the Automotive Industry

**Table A1.** Triangular numbers corresponding to evaluations to Organizational Conditions (OC) and Personal Conditions (PC).

$E_i$	OC1	OC2	OC3	PC1	PC2	PC3	PC4
1	(33,33,50,66,7)	(16,66,33,33,50)	(50,66,7,83,4)	(50,66,7,83,4)	(16,66,33,33,50)	(33,33,50,66,7)	(33,33,50,66,7)
2	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)
3	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(33,33,50,66,7)	(66,7,83,4,100)
4	(16,66,33,33,50)	(16,66,33,33,50)	(50,66,7,83,4)	(16,66,33,33,50)	(16,66,33,33,50)	(16,66,33,33,50)	(16,66,33,33,50)
5	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(33,33,50,66,7)	(66,7,83,4,100)
6	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)
7	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)
8	(33,33,50,66,7)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)
9	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)
10	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)
11	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(33,33,50,66,7)	(66,7,83,4,100)
12	(33,33,50,66,7)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(16,66,33,33,50)	(66,7,83,4,100)
13	(33,33,50,66,7)	(33,33,50,66,7)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)
14	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(33,33,50,66,7)	(33,33,50,66,7)
15	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(0,16,66,33,33)	(66,7,83,4,100)
16	(0,16,66,33,33)	(33,33,50,66,7)	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(33,33,50,66,7)	(66,7,83,4,100)
17	(16,66,33,33,50)	(33,33,50,66,7)	(33,33,50,66,7)	(50,66,7,83,4)	(50,66,7,83,4)	(33,33,50,66,7)	(33,33,50,66,7)
18	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)
19	(33,33,50,66,7)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)
20	(66,7,83,4,100)	(33,33,50,66,7)	(33,33,50,66,7)	(16,66,33,33,50)	(16,66,33,33,50)	(33,33,50,66,7)	(33,33,50,66,7)
21	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(33,33,50,66,7)	(50,66,7,83,4)
22	(16,66,33,33,50)	(33,33,50,66,7)	(50,66,7,83,4)	(33,33,50,66,7)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)
23	(33,33,50,66,7)	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(16,66,33,33,50)	(50,66,7,83,4)
24	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)
25	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(16,66,33,33,50)	(50,66,7,83,4)	(16,66,33,33,50)
26	(16,66,33,33,50)	(33,33,50,66,7)	(50,66,7,83,4)	(0,16,66,33,33)	(16,66,33,33,50)	(33,33,50,66,7)	(33,33,50,66,7)
27	(16,66,33,33,50)	(33,33,50,66,7)	(16,66,33,33,50)	(16,66,33,33,50)	(16,66,33,33,50)	(16,66,33,33,50)	(33,33,50,66,7)
28	(16,66,33,33,50)	(33,33,50,66,7)	(33,33,50,66,7)	(0,16,66,33,33)	(0,16,66,33,33)	(33,33,50,66,7)	(0,16,66,33,33)
29	(0,16,66,33,33)	(16,66,33,33,50)	(0,16,66,33,33)	(16,66,33,33,50)	(16,66,33,33,50)	(0,16,66,33,33)	(0,16,66,33,33)
30	(33,33,50,66,7)	(66,7,83,4,100)	(50,66,7,83,4)	(16,66,33,33,50)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)
31	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(0,16,66,33,33)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)
32	(16,66,33,33,50)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)
33	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(33,33,50,66,7)	(33,33,50,66,7)
34	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)
35	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)	(33,33,50,66,7)	(66,7,83,4,100)
36	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)
37	(16,66,33,33,50)	(0,16,66,33,33)	(50,66,7,83,4)	(66,7,83,4,100)	(16,66,33,33,50)	(16,66,33,33,50)	(50,66,7,83,4)
38	(33,33,50,66,7)	(33,33,50,66,7)	(50,66,7,83,4)	(33,33,50,66,7)	(66,7,83,4,100)	(0,16,66,33,33)	(33,33,50,66,7)
39	(50,66,7,83,4)	(33,33,50,66,7)	(33,33,50,66,7)	(50,66,7,83,4)	(66,7,83,4,100)	(33,33,50,66,7)	(66,7,83,4,100)
40	(50,66,7,83,4)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)
41	(33,33,50,66,7)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(16,66,33,33,50)	(16,66,33,33,50)	(50,66,7,83,4)
42	(33,33,50,66,7)	(66,7,83,4,100)	(66,7,83,4,100)	(33,33,50,66,7)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)
43	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)
44	(0,16,66,33,33)	(16,66,33,33,50)	(66,7,83,4,100)	(66,7,83,4,100)	(66,7,83,4,100)	(0,16,66,33,33)	(50,66,7,83,4)
45	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)
46	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)
47	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(33,33,50,66,7)	(66,7,83,4,100)
48	(16,66,33,33,50)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(16,66,33,33,50)	(50,66,7,83,4)	(66,7,83,4,100)
49	(66,7,83,4,100)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(33,33,50,66,7)	(50,66,7,83,4)
50	(33,33,50,66,7)	(50,66,7,83,4)	(50,66,7,83,4)	(50,66,7,83,4)	(16,66,33,33,50)	(50,66,7,83,4)	(33,33,50,66,7)
51	(50,66,7,83,4)	(50,66,7,83,4)	(33,33,50,66,7)	(50,66,7,83,4)	(16,66,33,33,50)	(33,33,50,66,7)	(50,66,7,83,4)
52	(50,66,7,83,4)	(66,7,83,4,100)	(50,66,7,83,4)	(66,7,83,4,100)	(66,7,83,4,100)	(33,33,50,66,7)	(50,66,7,83,4)
53	(33,33,50,66,7)	(33,33,50,66,7)	(33,33,50,66,7)	(33,33,50,66,7)	(16,66,33,33,50)	(33,33,50,66,7)	(33,33,50,66,7)







**Table A2.** Triangular numbers corresponding to evaluations to Government Conditions (GC), Personal Conditions (PC) and Organizational Conditions (OC).

E	GC1	GC2	GC3	GC4	GC	PC	OC
1	(16.66,33.33,50)	(0,16.66,33.33)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(33.33,50,66.7)	(33.33,50,66.7)
2	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)
3	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(33.33,50,66.7)	(50,66.7,83.4)
4	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
5	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)
6	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)
7	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)
8	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
9	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)
10	(50,66.7,83.4)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)
11	(66.7,83.4,100)	(33.33,50,66.7)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)
12	(16.66,33.33,50)	(33.33,50,66.7)	(0,16.66,33.33)	(0,16.66,33.33)	(66.7,83.4,100)	(66.7,83.4,100)	(33.33,50,66.7)
13	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(66.7,83.4,100)	(66.7,83.4,100)
14	(33.33,50,66.7)	(50,66.7,83.4)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)
15	(16.66,33.33,50)	(33.33,50,66.7)	(33.33,50,66.7)	(16.66,33.33,50)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
16	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)
17	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(16.66,33.33,50)	(16.66,33.33,50)	(16.66,33.33,50)	(0,16.66,33.33)
18	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(16.66,33.33,50)	(0,16.66,33.33)	(66.7,83.4,100)	(66.7,83.4,100)
19	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)
20	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(50,66.7,83.4)	(33.33,50,66.7)	(33.33,50,66.7)
21	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)
22	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(50,66.7,83.4)	(16.66,33.33,50)	(66.7,83.4,100)	(66.7,83.4,100)
23	(50,66.7,83.4)	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(33.33,50,66.7)
24	(16.66,33.33,50)	(16.66,33.33,50)	(16.66,33.33,50)	(16.66,33.33,50)	(16.66,33.33,50)	(66.7,83.4,100)	(66.7,83.4,100)
25	(50,66.7,83.4)	(16.66,33.33,50)	(33.33,50,66.7)	(50,66.7,83.4)	(16.66,33.33,50)	(16.66,33.33,50)	(50,66.7,83.4)
26	(0,16.66,33.33)	(0,16.66,33.33)	(16.66,33.33,50)	(16.66,33.33,50)	(33.33,50,66.7)	(50,66.7,83.4)	(50,66.7,83.4)
27	(33.33,50,66.7)	(16.66,33.33,50)	(16.66,33.33,50)	(16.66,33.33,50)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
28	(33.33,50,66.7)	(16.66,33.33,50)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)
29	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(0,16.66,33.33)	(16.66,33.33,50)	(16.66,33.33,50)	(33.33,50,66.7)
30	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(16.66,33.33,50)	(33.33,50,66.7)
31	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(16.66,33.33,50)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)
32	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
33	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)
34	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)
35	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(66.7,83.4,100)	(50,66.7,83.4)
36	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
37	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(33.33,50,66.7)
38	(16.66,33.33,50)	(50,66.7,83.4)	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)
39	(50,66.7,83.4)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(16.66,33.33,50)	(66.7,83.4,100)	(66.7,83.4,100)
40	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)
41	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(33.33,50,66.7)	(50,66.7,83.4)	(16.66,33.33,50)	(33.33,50,66.7)
42	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)
43	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)
44	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(16.66,33.33,50)
45	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
46	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
47	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(33.33,50,66.7)	(66.7,83.4,100)	(50,66.7,83.4)	(33.33,50,66.7)
48	(0,16.66,33.33)	(50,66.7,83.4)	(33.33,50,66.7)	(16.66,33.33,50)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)
49	(66.7,83.4,100)	(50,66.7,83.4)	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(66.7,83.4,100)	(50,66.7,83.4)
50	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(33.33,50,66.7)	(50,66.7,83.4)	(50,66.7,83.4)
51	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(33.33,50,66.7)
52	(50,66.7,83.4)	(50,66.7,83.4)	(66.7,83.4,100)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)	(50,66.7,83.4)
53	(16.66,33.33,50)	(33.33,50,66.7)	(16.66,33.33,50)	(16.66,33.33,50)	(16.66,33.33,50)	(33.33,50,66.7)	(16.66,33.33,50)





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