DECISION MAKING: A MODEL FOR SMES IN ECUADOR

[1]GARCÍA TAMAYO GALO HERNAN, [2]CHICAIZA SANCHEZ OSCAR LENIN, [3]HERNÁNDEZ ARAUZ MARCO ANTONIO, [4]GUILLERMO STALIN ALVEAR SIZA, [5]SYLVIA ELIZABETH ZARATE FONSECA, [6]MARIA FERNANDA LARCO PACHACAMA, [7]MIGUEL MARCELO GUAMAN CALVOPIÑA

[1]ghgarcia1@espe.edu.ec, [2]olchicaiza@espe.edu.ec, [3]mahernandez@espe.edu.ec, [4]gsalvear@espe.edu.ec, [5]sezarate@espe.edu.ec, [6]mflarco@espe.edu.ec, [7]mmguaman11@espe.edu.ec

[1,2,3,4,5,6,7] Universidad de las Fuerzas Armadas de Ecuador

Abstract

The great majority of small and medium-sized companies in Ecuador, managed in their great majority by family nuclei, present inconveniences in terms of decision-making; this, due to several theoretical factors such as: size of the commitment, flexibility of the plans, certainty of the objectives and policies, quantification of the variables, and human impact. The objective of this article is to present a decision-making model that was developed from the factors indicated above. The methodology used was: study of the state of the art to determine the factors that will serve as input for the analysis, application of a questionnaire to managers of the different companies in Ecuador, statistical analysis of the data collected to model the research proposal. It was observed that the certainty of the objectives and policies, as well as the quantification of the variables, are preponderant when making decisions. As main conclusions, it can be indicated that these factors are rooted in companies with an age between one and ten years.

Keywords: Model; Decision making; SME.

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Introduction

The company is facing dizzying changes that affect continuity, companies as part of that group, adjudicate countless sudden changes that destabilize and lead to a crisis, which, increases its insolvency and reduces its level of sustainability (Bertello et al., 2022).

Given the high complexity and understanding of business processes, strategic efforts are needed to investigate the most relevant actors in the entity's behavior (Enkel et al., 2020); however, this premise is not a generality for all companies; Although it is true, stimulating collaboration and greater innovation performance allows the company to have a higher knowledge about its management, it is not always enough, which becomes a paradox (Parmentola et al., 2021).

In the case of SMEs, processes require high innovation, leaving aside static traditional aspects that do not allow the development of the same. Unlike large companies, SMEs do not have a high technological level that allows an interconnectivity with the whole company in general, due to the

limited resources to manage such processes, therefore, the actors involved in it, are at a very low level of associativity or relationship (Santoro et al., 2019).

In contrast to the above, there are several variables that assign an SME in a sustainable development category, which will become the axis of research. Salas-Arbeláez et al. (2020) points out that the more years the company has been in operation, the better its functioning and links with internal and external actors. Verduzco et al. (2108) deduces that, from the organizational perspective, the level of commitment experienced by employees and managers themselves is the basis of self-determination and optimal business competitiveness. Santos (2001) infers that flexibility conceives an increase in continuous improvement and condesciende to encompass more perspectives.

1. Literature Review

The globalization of the market and the large volume of transactions to which the decision maker is directed, has increased the interest in knowing the behavior of certain factors and their relationship with the financial decision-making made by the Manager.

Authors such as García et al. (2016) argue that business models are highly oriented to the economic part, although in the first instance it is more important to assess the organizational relevance, that is, the approach of objectives and policies, together with the means to satisfy them. Artieda (2015) says that in value chains it is essential to estimate costs and all related variables, which allows maximizing their profitability and continuous improvement.

Haro Sarango (2021) theorizes that companies should not only generate monetary resources, but that all their decisions should provide value to the actors related to the organization, In other words, their decisions should be conducive and promote interaction with the environmental and social environment.

Sarango (2021) on the other hand indicates, the decision theory analyzes how a decision maker chooses an alternative among a set of possibilities, which results in the best results from the established preferences. At this point, it is important to clarify that decisions of any kind are involved, from the simplest to the most complicated, analyzing in each of them: what to invest in, when to invest, where to invest, among others.

According to this theory, what really matters in decision making is that the chosen alternative satisfies certain basic criteria of logical consistency and not, in what the decision maker wants, that is, decisions are not based on wanting one thing instead of another Sarango (2021).

According to González (cited by Bonome, 2009) this theory poses three basic tasks from the methodological point of view: 1) to reach all the biases of the problem of decision-making, from the philosophy, psychology, sociology, 2) investigate how decision-makers in the real world decide in all their internal and external environment of the organization, economically, socially and others, and, 3) specify how they should decide according to fully rational guidelines.

Lately, this theory has been influenced by other disciplines such as psychology and economics, however, it has not yet been possible to address some deeper questions without knowledge of decision theory.

Herbert Simon representative of decision theory, began his interest in deepening this theory in order to determine what is the human decision-making process, especially in the process related to facing complexities, uncertainties and conflicts that are seen daily in companies. Simon states that human beings have limited capacities that influence their decisions, which concludes that human beings can achieve a limited rationality and as a result of their limitations, tend to identify with their objectives.

Under the same line, Simon states that traditional economic theory starts from an assumption: man is hedonistic, that is, acts with the ultimate objective of increasing profits.

Likewise, Simon seems to oppose the theory of the economic man, that is, that the human being rationally chooses the best alternative with the purpose of maximizing its yields, in the sense that, he thinks that this theory is not realistic, On the grounds that agents meet needs more than they maximize.

Following the common thread of this narrative, Simon indicates, that human beings satisfy their needs in an adjacent environment, that is, they move with a limited logic due to a limited body of knowledge, Which would mean the economy would help understand the phenomena rather than predict them.

With all this background according to Simon, the theory of the administrative man makes its appearance in replacement of the theory of the economic man. In short, while the theory of the economic man maximizes utility, by selecting the best alternative, the theory of the administrative man approaches a satisfactory decision.

Already in practice, the manager seeks to make decisions within a range of possible alternatives that may not necessarily be optimal, which means that organizations can also meet their objectives at sub-optimal rationality levels (Durán, 2017)This means that, in his deepening of decision theory, Simon tells us that people are limited, so we talk about satisfaction rather than maximization of the decisional value. This argument shows that the concept of selfish rationality is not sufficient and complete to analyze the decisions of managers.

Finally, this restricted rationality considers limitations of knowledge as of computational capacity, This means that all those who substitute one or more assumptions about rational behavior can be included as limited rationality models.

Recognizing the limitations of rationality, says Simon, leads to proposing another class of models based on cognitive sciences such as behavioral and intuitive.

With the aforementioned premises, the study aims to propose a model that shows the factors that influence most when making decisions in favor of SMEs, which increase assertiveness and organizational certainty. The assumption is that SMEs have a pattern of decision-making behaviour, and this pattern is given by influencing factors.

2. Methodology

This section details the technical processes established for the resolution of the study objective; is detailed:

3. Population and stratified sampling

For the study the companies that are in categories of SMEs were analyzed. According to the Superintendence of Securities and Insurance Companies (SUPERCIAS), "SMEs are considered to be companies that have an average income level higher than $100,000 and lower than $5`000,000 (US dollars)" (García, GH, 2016). In Ecuador, according to the open SUPERCIAS databases for the period 2020, there are a total of 23,516 SMEs, which becomes the study population; with a 50% heterogeneity, error margin of 5.9%, confidence level of 94.1%, grants a study sample of 273.

4. Categories of analysis

For the research work a survey was developed, based on theoretical premises imposed in the introductory section, details:

- **Part 1. Basic information:** Specifies the economic activity carried out by the organization.
- **Part 2. General considerations:** Details the number of years the company is operating.
- **Part 3. Enterprise size:** The SME contraction refers to two types of enterprises, small and medium.

- **Part 4. Key features of decision-making:** This section assesses "1) size of commitment, 2) flexibility of plans, 3) certainty of objectives and policies, 4) quantification of variables e, 5) human impact" (García, et al., 2022)

Study subjects will respond to a single option based on a scale with 5 (five) possibilities, (N) refers to the term nothing, (P) little, (M) medium, (B) fairly and (T) fully, subdivided into 3 (three) levels, where the (I) refers to the important term, (F) easy and (C) Be careful.

5. Cronbach's Alpha

This scale is used to quantify and validate the level of reliability of research instruments; based on classical theory, reliability is defined as the degree to which a developed instrument values the consistency, equivalence and stability of a population sample; the coefficient determines that the closer to 1 (one) the more reliable is the elaborated instrument (Oviedo & Campo-Arias, 2005).

According to Barragán Becerra & Manrique Abril (2010) the alpha for the social sciences environment must be higher 0.6 to consider the following study processes valid.

By considering variances, Cronbach's alpha is calculated as follows:

$$\propto = \left[\frac{k}{k-1}\right]\left[1 - \frac{\sum_{i=1}^{k} S_i^2}{S_t^2}\right]$$

Where;

- S_i^2 is the variance generated from the item i
- S_t^2 is the variance of the total observation
- k is the number of questions

6. Multiple Correspondence Analysis (ACM)

Algañaraz Soria (2016) explains that the ACM is a cutting-edge tool for data analysis in relational spaces, which seeks to induce the multiplicity conceived in an analytical way. The mathematical questions are detailed:

In the first instance, the proximity metric is evaluated, then the distribution of information in a treatment of rows and columns in a correspondence table is analyzed, the associativity is measured, finally, the standardised waste is calculated with the following equation:

$$r_{ij} = \frac{n_{ob} - n_{esp}}{\sqrt{n_{esp}}\sqrt{(1 - \frac{n_i}{N})(1 - \frac{n_j}{N})}}$$

The considerations arising from the methodology are therefore detailed:

- There is an association between the variables
- The coexistence of significant differences in the percentages of the explained variance of the different factors is deciphered in terms of associations of the variables.

The objective of this statistical tool is to observe the resulting segmentations in all aspects investigated and the highly associated elements working alienated to their assumptions are concluded.

Logit model

Used in the sense of belonging, it develops when the dependent type variable is a categorical equivalent of binary selection and consists of a natural logarithm calculation of probabilities; coefficients are developed by the least squares method or by the maximum likelihood method. The methodology may incur values of 0 and 1 because of its binary limitation; For the purpose of the study,

small enterprises are represented by (0), while medium enterprises with (1) (Rodríguez, 2008). The equation is as follows:

$$\ln\left(\frac{P_1}{1 - P_1}\right) = \beta_0 + \beta_1 x + \cdots \beta_1 x$$

7. Results

We proceed with the descriptive analysis of the instrument:

Table 1
Economic sector to which your company belongs

Row labels	Absolute Value	Relative margin
Activities Accommodation and food service	5	1,79%
Activities of Human Health Care	15	5,38%
Financial and Insurance Activities	6	2,15%
Real Estate	12	4,30%
Professional, Scientific and Technical Activities	7	2,51%
Activities Administrative and Support Services	2	0,72%
Public Administration and Defence	2	0,72%
Agriculture, Livestock, Forestry and Fishing	23	8,24%
Arts, Entertainment and Recreation	1	0,36%
Wholesale and retail trade	42	15,05%
Construction	17	6,09%
Teaching	1	0,36%
Exploitation of Mines and Quarries	3	1,08%
Manufacturing Industries	17	6,09%
Information and Communication	8	2,87%
Other Activities in Services	39	13,98%
Electricity, Gas, Steam and Air Supply	3	1,08%
Transport and Storage	76	27,24%
Total, general	**279**	**100%**

Source: Own development, based on tool developed

Segmented by economic activity, it is perceived that the majority belong to the transport and storage sector with a proportion of 27.24%, consequently, wholesale and retail trade 15.05%, other service activities 13.98%, Agriculture, Livestock, Forestry and Fisheries 8,24%, manufacturing and construction industries with 6.09% each.

Table 2
How many years the company is operating

Row labels	Absolute Value	Relative margin
> 20	63	22,58%
from 1 to 5	39	13,98%
from 10 to 15	53	19,00%
from 15 to 20	54	19,35%
from 6 to 10	70	25,09%
Total, general	**279**	**100%**

Source: Own development, based on tool developed

With regard to the question about the number of years the company is operating, we have that, 25.09% is between 6 to 10 years, 22.58% higher than 20 years, 19.35% from 15 to 20 years, 19% from 10 to 15 years, finally, 13.98% from 1 to 5 years. Según lo mencionado por Salas-Arbeláez et al. (2020), The older the company, the greater its control, which makes it a secure entity due to the expectations generated by the environment in which it operates.

Tabla 3

When I have to make decisions, the money that I have to invest is important to me

Row Labels	Absolute Value	Relative Margin
TI	169	60,57%
BI	91	32,62%
MI	16	5,73%
PI	3	1,08%
Grand Total	279	100,00%

Source: Own elaboration, based on the instrument elaborated

With regard to the question of the number of years they are running the company, we have the 25,09% between 6 to 10 years, 22,58% over 20 years, 19,35% of 15 to 20 years, 19% of 10 to 15 years, finally, 13,98% of 1 to 5 years. As mentioned by Salas-Arbeláez et al. (2020), the greater is the age of the company, the greater your control, therefore, becomes an entity trusted by the expectations generated in front of the environment where it takes place.

Table 4

When I have to make decisions it is important to me the money that I invest

Row labels	Absolute Value	Relative Margin
TI	169	60,57%
BI	91	32,62%
MY	16	5,73%
PI	3	1,08%
Grand Total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 60,57% of the study subjects confirm that is totally important to assess the money on an investment, whereas, the 32,62% contend that it is quite important, 5.73% in moderately important, finally, 1,08% believe that is the important bit. The value of the money in time is an aspect circumstantial in companies, due to the existence of external factors that have an impact on your trade-in value.

Table 5

In the decisions for my time is important I should invest in their analysis

Row labels	Absolute Value	Relative Margin
TI	149	53,41%
BI	99	35,48%
MY	28	10,04%
PI	3	1,08%
Grand Total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 53,41% of the study subjects considered important to make investment decisions prior analysis of the time, while the 35,48% says that it is quite important, 10,04% moderately important, finally, 1.08% remaining mentioned that is the important bit. The companies are highly exposed to external factors that induce its structure to disasters, which could mean a high risk of insolvency business, the valuation of the time it is circumstantial, because, to be scheduled investment at a certain time, the company during this period of time will not have that liquid courage, therefore, should seek to assess the level of satisfaction of the liquidity without that amount, and gaps of recovery of money, among these aspects, to search for an optimal point that does not generate problems or need to engage external suppliers.

Table 6
When I have to make decisions it is important to me the people who are part of the issue

Row labels	Absolute Value	Relative Margin
TI	168	60,22%
BI	89	31,90%
MY	20	7,17%
PI	2	0,72%
Grand Total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 60,22% of the study subjects considered that it is completely important to perceive the people who are part of the cases, while, the 31,90% affirm that it is quite important, 7,17% moderately important, finally, 0,72% not very important; the taking of decisions in the framework of the investment is considered relevant to address all the actors that are linked to the organization and its function is a factor important to the decision making, listening, organizational, is a key element for the development of enterprises, therefore, it is relevant to induce this action in the organization.

Table 7
When I make a decision, I consider it important and strategic that it has a definitive character, that is to say that the decision that I not be reversible

Row labels	Absolute Value	Relative Margin
TI	111	39,78%
BI	86	30,82%
MY	69	24,73%
PI	12	4,30%
OR	1	0,36%
Grand Total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 39,78% acknowledge that it is completely important that, when making a decision, that this is irreversible, the 30,82% infer that it is quite important, 24,73% moderately important, 4,30% not very important, finally, 0,36% not at all important. SMES by nature, they are considered flexible in their structures and in their operation, and therefore, this variable allows them to substantially improve the fit person-organization (Calderón Hernández, 2006).

Table 8
To make a decision, I consider it important that the effect on the objectives and the institutional policies of the decision making depends on how successful they are the same

Row labels	Absolute Value	Relative Margin
TI	135	48,39%
BI	98	35,13%
MY	41	14,70%
PI	5	1,79%
Grand total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 48,39% say that it is totally important to consider the effect of policies and institutional objectives in decisions, always and when they are successful, the 35,13% inferred that it is quite important to this proposition, the 14,70% moderately important, finally, the 1,79% not very important.

Table 9

When taking decisions that I consider important to the costs, since these can be defined in a precise manner, and facilitate the decision-making

Row labels	Absolute Value	Relative Margin
TF	114	40,86%
BF	76	27,24%
MF	63	22,58%
PF	18	6,45%
NF	8	2,87%
Grand total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 40,86% confirms that it is fully easy to take decisions about the costs, the 27,24% infer that it is quite easy, 22,58% moderately easy, 6,45% some easy, last, 2,87% not at all easy. Financial planning is a fundamental part of and incidental to the development of the entities, the optimal cost performance enables the company to the administrative development and to obtain a slack significant financial.

Table 10

You when making a decision take care that the same: Not to harm people

Row labels	Absolute Value	Relative Margin
TC	179	64,16%
BC	77	27,60%
MC	20	7,17%
PC	3	1,08%
Grand total	279	100,00%

Source: Own elaboration, based on the instrument developed

The 64,16% are acknowledging that you are fully careful when making decisions with respect to the harm that can generate a person's internal or external to the entity, the 27,60% mentioned that it is quite careful, 7,17% moderately careful, finally, 1,08% bit careful.

Table 11

Processing and analysis of reliability

Processing summary cases			
		N	%
Cases	Valid	279	100,0
	Excluded to	0	0,0
	Total	279	100,0
Statistical reliability			
Cronbach's alpha		N of items	
,664		9	

Source: Own elaboration, using SPSS v.21

In the first instance was to evaluate the behavior of the instrument under the concept of reliability, using Cronbach's Alpha is determined that the instrument developed is valid, with a level of 0,664, whereas 100% of the study subjects.

Table 12

Level of iterations and explanation

Iteration history			
Number of iterations	Variance explained		Loss
	Total	Increase	
13to	16,652605	,000004	24,347395

Model summary				
Dimension	Cronbach's alpha	Variance explained		
		Total (Eigenvalues)	Inertia	% Of variance
1	,976	20,852	,509	50,860
2	,943	12,453	,304	30,372
Total		33,305	,812	
Average	,963to	16,653	,406	40,616

Source: Own elaboration, using SPSS v.21

100% of the cases inserted are valid, the proof of convergence is stopped when you reach the 13 interactions, by using the segmentation and dimensions, the alpha for the pattern goes around in 0,976 for the first dimension, and 0,943 to the second, thus validating the method applied. The dimensions are asymmetric, due to the values of the inertia.
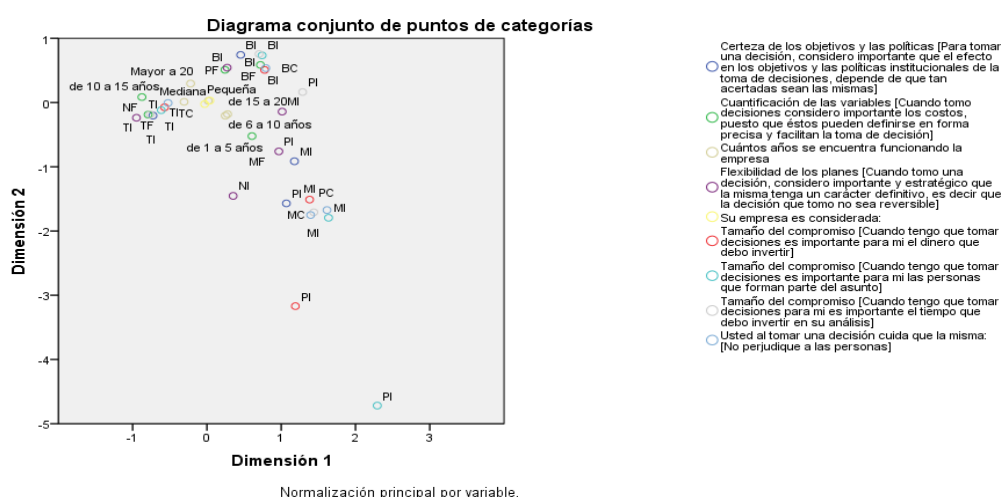

Figure 1. Diagram of points and category
Note: Own elaboration, using SPSS v.21

The diagram in set of points determines two intermediate spaces of observation between categories; in the case of medium-sized companies, we can observe a high associativity with the responses classified as totally and has similarity with companies of between 10 to 15 years, and greater than 20 years; in the case of small, are associated with responses pretty, adding the remaining elements of age.
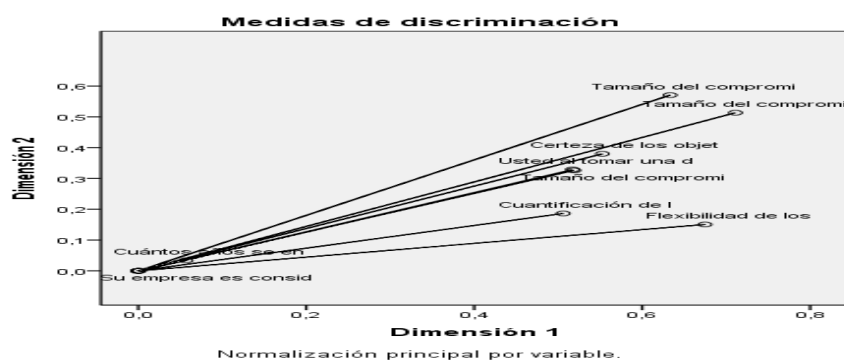
Figure 2. Diagram of points and category
Note: Own elaboration, using SPSS v.21

Under the insertion of variables, which stand out and explained in greater significance to the instrument and their respective data corresponds to the size of the commitment with a prevalence of 2 (two) 3 (three) questions in the measures of discrimination between dimensions.

Therefore, in measures scalars are produced in Logit model under categories, and is taken as a reference to the variables that ascribe a significance lower-equal to 0.01, therefore, a confidence level of 90%; details:

Table 13

Logit model categorical variables significant Y_1 medium

	B	E. T.	Wald	gl	Sig.	Exp(B)
$P2_{6-10}$	-1,152	,390	8,734	1	,003	,316
$P2_{1-5}$	-1,031	,456	5,113	1	,024	,357
$P6_{BI}$	2,995	1,429	4,394	1	,036	19,993
$P6_{TI}$	2,829	1,451	3,804	1	,051	16,937
$P7_{TF}$	1,400	,786	3,169	1	,075	4,055
$P7_{PF}$	1,666	,966	2,971	1	,085	5,289
$P7_{BF}$	1,381	,840	2,702	1	,100	3,980
$Constante$	12,560	40192,022	,000	1	1,000	284909,749

Source: Own elaboration, using SPSS v.21

- *Global model*

$$Y_i = 12,560 \mp P_1 \mp P_2 \mp P_3 \mp P_4 \mp P_5 \mp P_6 \mp P_7 \mp P_8 \mp P_9$$

- *Model validated*

$$Y_1 = 12,560 - P2_{6-10} - P2_{1-5} + P6_{BI} + P6_{TI} + P7_{TF} + P7_{PF} + P7_{BF}$$

  o Layered model (1) = 15,803

$$Y_1 = 12,560 - P2_{6-10} + P6_{BI} + P7_{TF}$$

  o Model stratified (2) = 16,069

$$Y_1 = 12,560 - P2_{6-10} + P6_{BI} + P7_{PF}$$

  o Layered model (3) = 15,784

$$Y_1 = 12,560 - P2_{6-10} + P6_{BI} + P7_{BF}$$

  o Layered model (4) = 15,637

$$Y_1 = 12,560 - P2_{6-10} + P6_{TI} + P7_{TF}$$

- o Layered model (5) = 15,903

$$Y_1 = 12,560 - P2_{6-10} + P6_{TI} + P7_{PF}$$

- o Layered model (6) = 15,903

$$Y_1 = 12,560 - P2_{6-10} + P6_{TI} + P7_{BF}$$

- o Layered model (7) = 15,87

$$Y_1 = 12,560 - P2_{1-5} + P6_{BI} + P7_{TF}$$

- o Layered model (8) = 15,618

$$Y_1 = 12,560 - P2_{1-5} + P6_{BI} + P7_{PF}$$

- o Layered model (8) = 15,924

$$Y_1 = 12,560 - P2_{1-5} + P6_{BI} + P7_{BF}$$

- o Layered model (10) = 16,19

$$Y_1 = 12,560 - P2_{1-5} + P6_{TI} + P7_{TF}$$

- o Layered model (11) = 15,905

$$Y_1 = 12,560 - P2_{1-5} + P6_{TI} + P7_{PF}$$

- o Layered model (12) = 15,758

$$Y_1 = 12,560 - P2_{1-5} + P6_{TI} + P7_{BF}$$

- o Layered model (13) = 11,408

$$Y_1 = 12,560 - P2_{6-10}$$

- o Layered model (14) = 11,529

$$Y_1 = 12,560 - P2_{1-5}$$

- o Layered model (15) = 15,555

$$Y_1 = 12,560 + P6_{BI}$$

- o Layered model (16) = 15,389

$$Y_1 = 12,560 + P6_{TI}$$

- o Layered model (17) = 13,96

$$Y_1 = 12,560 + P7_{TF}$$

- o Layered model (18) = 14,226

$$Y_1 = 12,560 + P7_{PF}$$
- o Layered model (19) = 13,941

$$Y_1 = 12,560 + P7_{BF}$$

- o Model stratified (20) = 12,560
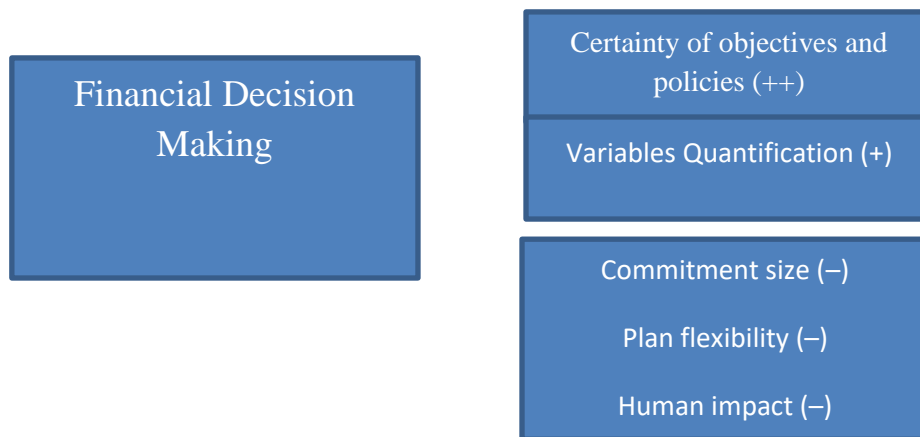
$$Y_1 = 12,560$$

Figure 3. Summary of the determinants of the financial decisions for the managers of SMES
Note: Own elaboration

8. Conclusions

Once we ran the model, it can be concluded that the managers to make a better decision in the financial field, they should focus the most effort on the certainty of objectives and policies, that is to say, the manager takes a lot into consideration the clarity in terms of these parameters, since the effect on the decision-making depends on how accurate and clear are these variables; therefore, be derived from the model, another of the key points for the manager to take decisions, it is the quantification of the variables, that is to say, according to the model, the decision-making is facilitated if the costs associated with that decision can be defined in a precise manner.

On the other hand, and derived from the model, it can be seen that the managers of companies that have an antiquity of between one and ten years, are the administrators that more emphasis given to these factors in their decision-making. In addition, we can deduce that the Managers who handle business with a minimum of one to five years, and the managers who handle business with a length of six to ten years, they have the same way of making decisions, that is to say, their decisions are based on the same factors analyzed.

Bibliographic References

[1]   Algañaraz Soria, V. H. (2016). "Analysis of Multiple Correlation" as a methodological tool of theoretical synthesis and empirical. Latin American journal of Methodology of Social Sciences, 6, nor 1. http://sedici.unlp.edu.ar/handle/10915/54585

[2]   Artieda, C. H. (2015). Analysis of the costing systems as tools for strategic management in small and medium-sized enterprises (SMES). Magazine Publishing, 2(3), 90-113. Retrieved from https://revistapublicando.org/revista/index.php/crv/article/view/31

[3]   Barragán Becerra, J. A., & Manrique April, F. G. (2010). Validity and reliability of the Servqhos for nursing in Boyacá, Colombia. Advances in Nursing, 28(2), 48-61. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0121-45002010000200005&lng=en&nrm=iso.

[4]   Bertello, A., Ferraris, A., Bernardi, P., & Bertoldi, B. (2022). Challenges to open innovation in traditional SMEs: An analysis of pre-competitive projects in university-industry-government collaboration. International Entrepreneurship and Management Journal, 18(1), 89-104. https://doi.org/10.1007/s11365-020-00727-1

[5]   Calderón Hernández, G. (2006). Competencies distinctive in SME: A contribution from human resource management. Innovate, 16(27), 57-72. Available in: https://www.redalyc.org/articulo.oa?id=81802705

[6]   Durán, Y. (2017). Explanatory model of the determinants of investment decisions in capital goods: An approach of logistic regression analysis for small and medium-sized entities in Venezuela. University of the Andes Venezuela. Available in: Doctoral Thesis Yosmary Duran.pdf (ula.ve).

[7]   Enkel, E., Bogers, M., & Chesbrough, H. (2020). Exploring open innovation in the digital age: A maturity model and future research directions. R&D Management, 50(1), 161-168. https://doi.org/10.1111/radm.12397

[8]   García, T. I. B., López, R. R., Iniesta, A. A., González, J. A., & Ávila, J. J. G. (2016). Logistical considerations that have an impact on the increase of the competitiveness of SME: A literature

review. Scientific   and   Technological   culture,   56,   Article 56. http://erevistas.uacj.mx/ojs/index.php/culcyt/article/view/816

[9] *García, H; Fonseca, M; (2016). Evaluation Of The Usefulness Of Financial Information: Evidence For Small And Medium Sized Businesses In Ecuador. CAPIC REVIEW, 13(1). 59-68. Available in: https://doi.org/10.35928/cr.vol13.2015.45*

[10] *García-Tamayo, H; Altamirano Haro; Proaño Altamirano, G; Moreno-Mejía, M; (2022). Model factors decision that influence the Managers of SMES. Journal of Research SIGMA. 9(01). 41-49. https://doi.org/10.24133/sigma.v9i01.2624*

[11] *González, W. (1996), "On the Theoretical Basis of Prediction in Economics", Journal of Social Philosophy, v. 27, n. 3, pp. 201-228. https://doi.org/10.1111/j.1467-9833.1996.tb00261.x*

[12] *Haro Sarango, A. F. (2021). Outputs sustainable poverty, an empirical observation from the perspective of the Credit of Human Development in the province of Tungurahua. https://repositorio.uta.edu.ec:8443/jspui/handle/123456789/33164*

[13] *Oviedo, H. C., & Campo-Arias, A. (2005). Approach to the use of the Cronbach's alpha coefficient. Colombian Journal of Psychiatry, 34(4), 572-580. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0034-74502005000400009&lng=en&nrm=iso*

[14] *Parmentola, A., Ferretti, M., & Panetti, E. (2021). Exploring the university-industry cooperation in a low innovative region. What differences between low tech and high-tech industries? International Entrepreneurship and Management Journal, 17(3), 1469-1496. https://doi.org/10.1007/s11365-020-00671-0*

[15] *Rodriguez, E. M. (2008). Logit Model as a discrete choice model: Origin and evolution. Yearbook legal and economic escurialense, 41, 469-484. Dialnet-LogitModelComoModeloDeEleccionDiscreta-2652092.pdf*

[16] *Rooms-Arbeláez, L., García-Solarte, M., Azuero-Rodríguez, A. R., Salas-Arbeláez, L., García-Solarte, M., & Azuero-Rodríguez, A. R. (2020). Effect of corporate social responsibility on the post-conflict Colombia: The case of SMES. Studies Management, 36(154), 80-90. https://doi.org/10.18046/j.estger.2020.154.3547*

[17] *Santoro, G., Ferraris, A., & Winteler, D. J. (2019). Open innovation practices and related internal dynamics: Case studies of Italian ICT SMEs. Euro Med Journal of Business, 14(1), 47-61. https://doi.org/10.1108/EMJB-05-2018-0031*

[18] *Santos, C. R. (2001). The flexibility in the organizational structure of SMES. An empirical approach [Http://purl.org/dc/dcmitype/Text, University of Murcia]. https://dialnet.unirioja.es/servlet/tesis?codigo=169723*

[19] *Simon, H. (1972). Theories of Bounded Rationality; Decision and Organization, Amsterdam, North Holland Publishing Company, p. 161-172, Amsterdam. https://doi.org/10.7551/mitpress/4709.003.0026*

[20] *Verduzco, R. O. F., Hernández, C. G., Grace, K. D. E., Ibarra, S. M. M., & Ávila, E. O. (2018). Organizational commitment in Employees of Small and Medium-sized Enterprises. Scientific and Technological culture, 66, Article 66. https://doi.org/10.20983/culcyt.2018.3.4*