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Research article

The usage of total knowledge by entrepreneurs in business decision-making

El uso de conocimiento total por parte de los emprendedores en la toma de decisiones empresariales

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Abstract
Introduction: This paper proposes the identification of those attributes of knowledge that entrepreneurs consider most important in the process of making their business decisions. **Methodology**: This main objective is finally described by obtaining a ranking, which, through the application of the analytic hierarchy process (AHP), will allow them to establish their priorities with respect to these attributes through a multi-criteria decision process. In order to obtain this priority ranking, a survey with a sample of 362 valid entrepreneurs' responses in the Spanish metropolitan regions of Madrid and Barcelona was conducted. Furthermore, data validation was supervised by a panel of experts formed with 40 entrepreneurs. **Results:** The results of this research indicate that explicit and tacit knowledge form the same unit of knowledge necessary for decision making, instead of the weight that one dimension may have over the other one in the decisions of the entrepreneurs surveyed. **Discussions:** The ranking

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obtained will serve as a basis for the implementation of future specific proposals to this group. **Conclusions**: This research could be extrapolated to other geographical areas or types of entrepreneurs in different countries to obtain possible differences between entrepreneurial cultures. This also could identificate differences between professionals with different levels of training.

Keywords: Knowledge; Information; Entrepreneurs; Decision-making; Cognitive biases; Artificial Intelligence.

Resumen
Introducción: El presente artículo propone la identificación de aquellos atributos del conocimiento que los emprendedores consideran más importantes en el proceso de toma de decisiones para su negocio. **Metodología**: Este objetivo principal se describe finalmente por la obtención de un ranking, que mediante la aplicación del método de jerarquías analíticas (AHP), permite establecer prioridades respecto a estos atributos mediante un proceso de decisión multicriterio. Para obtener estie ranking, se realizó una encuesta con una muestra de 362 respuestas válidas de emprendedores en las áreas metropolitanas de Madrid y Barcelona, España. La validación de los datos fue supervisada por un panel de expertos formado por 40 emprendedores. **Resultados:** Los resultados de esta investigación indican que el conocimiento explícito y tácito forman la misma unidad de conocimiento necesaria para la toma de decisiones, sin influir el peso que una dimensión pueda tener sobre la otra en las decisiones de los emprendedores. **Discusión**: La clasificación obtenida servirá de base para la implementación de futuras propuestas específicas para este colectivo. **Conclusiones**: Esta investigación podría extrapolarse a otras áreas geográficas o tipos de emprendedores en diferentes países para obtener posibles diferencias entre culturas emprendedoras. Esto también podría identificar diferencias entre profesionales con diferentes niveles de formación.

Palabras clave: Conocimiento; Información; Emprendedores; Toma de decisiones; Sesgos cognitivos; Inteligencia artificial.

1. Introduction

Back in 1993, Peter Drucker warned that the world was entering a new era, which he did not hesitate to call that of information and knowledge. In fact, he pointed out that it would be the knowledge workers who would really make the difference between one company and another (Drucker, 2009). Thus, knowledge, as pointed out by Barney (1995), Bigelow & Barney (2020), becomes that resource: rare, valuable, difficult to imitate and difficult to replace, which allows companies to generate competitive advantages and to make them sustainable over time.

The uncertainty of the environment and the breakneck speed with which changes are occurring (Rodríguez-Castellanos & San-Martín-Albizuri, 2020) force companies to implement increasingly timely strategies; which implies an ever-greater prominence of the resource knowledge as the basis and support of all their strategic decisions (Barney, 1995; Bigelow & Barney, 2020). To make these strategic decisions, entrepreneurs' usage two types of knowledge; explicit and tacit (Nonaka & Takeuchi, 1995; Bratianu et al. 2020). According to Nonaka & Takeuchi (1995) the usage of these two types of knowledge can be compared to an iceberg so that the visible part would be the explicit knowledge, while the part that remains under the water and therefore not seen from the outside, would be the tacit knowledge.

Some authors, such as Viguri (2011), Soyer & Hogarth (2020), Manley (2022), or Mitchell et al. (2022), highlight the importance of tacit knowledge, noting that it is the real driver of decisions. This is, according to Sikombe & Phiri (2019), Ganguly et al. (2019), and Thomas & Gupta (2022),

caused by mental schemes and these, in turn, are represented among others by values, beliefs, perceptions, intuitions and visions, which have their origin mainly in the individual "experiences" of each person.

1.1. Hypothesis

H1: The total knowledge used by entrepreneurs to make strategic decisions is a multidimensional construct configured from two main areas: knowledge (explicit and tacit), and self-knowledge.

H2: The *variables/alternatives* that compose the dimension (self-knowledge) are the most important ones of the total knowledge resource.

1.2. Research objectives

The main objective of this research is the entrepreneurs' identification of the variables of the total knowledge that they consider most and least important for decision making. This objective is achieved in the last phase of the process, with the obtaining of a hierarchy or ranking that, through the application of the analytic hierarchy process (AHP), will make it possible to establish the entrepreneurs' priorities with respect to these variables.

On the other hand, specific objectives are:

- SO1: To identify from the literature review the dimensions or factors in which the variables are grouped.

- SO2: To obtain the explanatory variables corresponding to the types of knowledge usaged in entrepreneurs' decision making.

- SO3: To analyze the decision-making process through the entrepreneurs' priorities.

2. Literature review

2.1. Entrepreneurs and the usage of knowledge

2.1.1. Usage of information in decision-making

According to Bharati (2006), as cited in Rantapuska & Ihanainen (2008), small firms do not compete on equal terms with large firms. Their accessibility to talent and, therefore, to knowledge to build their competitive advantages, is much lower than that of large companies (Fonseca-Feris & Fleitas-Alvarez, 2020). Which, according to Thorpe et al. (2005), as cited in Rantapuska & Ihanainen (2008) causes the usage of knowledge to generate differences in small companies with respect to large ones. The usage of knowledge in small firms, according to Thorpe et al. (2005) is much more flexible, unstructured, and socially embedded in the manager's own experiences and relationships. This implies that, the role played by tacit knowledge and, therefore, the subjectivity it implies (Kour et al., 2019; Lazazzara & Za, 2020) in smaller companies is greater than in larger ones (Rantapuska & Ihanainen, 2008). Tacit knowledge is usaged by the entrepreneur as a tool to simplify (De la Puente, 2010) and, above all, interpret the surrounding reality (El-Den & Sriratanaviriyakul, 2019). And it is precisely this reality that the entrepreneur must be able to interpret objectively (Frishammar, 2003).

Minsky & Aron (2021) emphasize the enormous difficulty involved in making assessments

prior to decision making and how complicated it is to define what is a strength and what is a weakness; all this, in order to be able to make strategic decisions.

Along these lines, Moreno (2002, p. 24) points out, "(...) that the usage of information for a given purpose requires an interpretation of it that is personal and, therefore, subjective and intangible".

The strategy based on knowledge, emphasizes the importance of knowledge as a differentiating factor and, therefore, as the main variable for companies to generate competitive advantages (Butt et al., 2019).

As Grant (2022) points out, knowledge is the resource that, in the form of capacity, contributes the most value in a company since, according to Azimzadeh et al. (2021) the maturity and saturation of markets makes it increasingly difficult for companies to find competitive advantages and new opportunities. At this point, according to Liberti & Petersen (2019) we can consider that information is classified as follows:

- Hard information: this information is considered the generator of explicit knowledge (Nonaka & Takeuchi, 1995) and refers to all information and data that has been obtained in a regulated way. According to Liberti & Petersen (2019) it therefore corresponds to "structured" information and data in the form of statistics and all kinds of numerical figures. This information is easily classifiable and storable.

- Soft information: consists mainly of images, visions, and ideas, among others. Soft information is linked to the person and therefore, according to Jiang et al. (2018) is considered very subjective.

Because of the type of information used, according to Gamble (2020), knowledge can be classified into two types:

- Explicit knowledge. This type of knowledge comes from obtaining Hard information. This type of knowledge is classified as: formal, regulated, and systematic (Nonaka & Takeuchi, 1995; Gamble, 2020). That is why this type of knowledge is considered easy to communicate, transmit and teach (Nonaka & Takeuchi, 1995; Gamble, 2020).

- Tacit knowledge. Tacit knowledge, unlike explicit knowledge, being mainly based on the manager's experiences (Manley, 2022) cannot be explicitly communicated or transmitted through words; and that is why Polanyi (1966, p.4) pointed out: "We know more than we can or are able to express". Along these lines, Castellani et al. (2021) points out that, because of the importance of the manager's experience in his decisions, tacit knowledge ultimately becomes the great driver of his actions and improvements.

The reason for this lies in the very character that tacit knowledge has in everyone. Tacit knowledge, according to Ganguly et al., (2019) and Thomas & Gupta (2022), is formed by mental schemas, which are in turn represented, among others, by: values, beliefs, perceptions, intuitions, and visions; and these, in turn, are mainly based on the individual "experiences" of each person (Soyer & Hogarth, 2020). Therefore, when making decisions, entrepreneurs first obtain information and data (explicit knowledge) and then their interpretation (tacit knowledge) and, to these two types of knowledge indicated by the scientific community, it is considered necessary to add a third type of knowledge to the equation of "total knowledge": self-knowledge, which tries to submit the interpretative process performed by tacit knowledge to reality.

2.2. *Elements that affect objectivity in decision making. Cognitive biases*

According to several authors, information and data are objective, but their interpretation is nevertheless subjective (Novicevic & Harvey, 2004; El-Den & Sriratanaviriyakul, 2019). Therefore, it is one thing to have information and data, and another to be able to convert them into knowledge that, in turn, allow decisions to be made. Any information, wherever it comes from, is subject to the interpretative process of the person who receives it. When making strategic decisions, entrepreneurs first obtain and filter information (explicit knowledge), then interpret the information and data previously obtained and filtered (tacit knowledge) and, finally, subject this interpretative process to reality (self-knowledge). However, according to Kahneman (2011) & Viguri (2011) this process is not and has never been without difficulties, as entrepreneurs face their own cognitive limitations and biases. In this respect, Ahmad et al. (2021) points out the relationship between heuristic-driven biases and entrepreneurial strategic decision-making. They consider that heuristic-driven biases have negative influence on the strategic decisions made by entrepreneurs, then, they can impair the quality of their strategic decision-making process.

Kahneman (2012) for his part, considers that cognitive biases are psychological effects that generate a distortion in the processing of information, which can lead to an erroneous judgment, or a distorted interpretation of the information analyzed. He adds in this regard that we cannot assume that our judgments, that our evaluations are a good set of solidly structured blocks on which to support our decisions, since those judgments, those evaluations can be defective because of our cognitive biases. In line with the above, Goleman (2003) points out that it is often the unconscious that controls what should or should not access the consciousness. This means that, when making decisions, we have previously discarded (unconsciously) much valuable information that would have made an important contribution to objectivity. However, despite all the above, the use of artificial intelligence in decision-making by entrepreneurs adds a further degree of difficulty in the search for objectivity because, despite the undoubted benefits of AI in the complex process of obtaining and filtering information and data "explicit knowledge". Hermann (2022) considers that both senders and receivers of content are not immune to cognitive biases. In the same vein, Han-cock et al. (2020) and Morley et al. (2021) warn that the quality and integrity of the data are decisive, so that inaccuracies and errors inherent in the information itself and in the data obtained could also bias the results and lead to false conclusions. Therefore, since artificial intelligence cannot detect biases in the information it learns from, its input will also be biased. Acording to Ramge and Mayer-Schönberger (2023), ChatGPT can support executives in making informed management decision by providing them information, facts, analysis, and perspectives. On the order hand, these authors ChatGPT immediately follows up with a limitation of its own competence. Therefore human beings, still have to make the final decision based on their own experience, knowledge, and assessment of the situation.

2.3. *Self-knowledge and its contribution to the entrepreneur's decision-making process*

According to Stokes (2018), from the inscription *know theyself* that figured at the entrance of Delphi, Socrates obtained the basis on which he founded all his philosophical thought. Brînzea (2022) highlights self-knowledge, mentioned by Socrates, is the cornerstone of Emotional Intelligence. Goleman & Boyatzis (2017) highlight self-knowledge as the main personal aptitude, pointing out that it is the ability we have to interpret our internal states, such as: mood, feelings, fears, tastes and intuitions, among others; and in turn the effects that these can have on others and on ourselves. Also, from the field of management, authors such as Whetten & Cameron (2005), Boyatzis & Mc Kee (2005), Bennis & Nanus (2008), Drucker (2009) point out

self-knowledge as the main variable for a manager to become a good leader and manager. Acording to Ahmad et al. (2021), entrepreneurs as every person could improve the quality of their decision-making by recognizing their behavioral and cognitive biases and errors of judgment, resulting then in a more appropriate selection of their entrepreneurial opportunities. The inclusion of self-knowledge in the total knowledge resource is therefore supported by the literature review, which attributes significant importance to it as a way for entrepreneurs to become aware of their own cognitive biases and limitations, thus preventing them from negatively influencing the interpretation that tacit knowledge makes of the information and data obtained (explicit knowledge). In this regard, acording to Chamorro-Premuzic and Akhtar (2023, p.1), warns of the risks that AI has for self-knowledge highlighting that, "AI lulls us into a false sense of security by serving us only the content we want to see and the ideas we already agree with: it's classic groupthink and confirmation bias. If left unchallenged, it can lead to stagnation and overconfidence".

3. Methodology

3.1. Introduction and justification of the use of the Analytical Hierarchy Process (AHP)

As a result of the literature review[2], it is taken as a starting point that entrepreneur's usage, to a greater or lesser degree, three types of knowledge when making decisions: explicit knowledge, tacit knowledge and, as a new contribution to the total knowledge equation, self-knowledge. The sum of the three therefore represents the total knowledge that entrepreneur's usage for decision making. Therefore, from the theoretical foundations outlined above, it is possible to maintain the previously stated hypotheses:

H1: The total knowledge resource that entrepreneur's usage to make strategic decisions is a multidimensional construct configured from two major areas: knowledge (explicit and tacit), and self-knowledge.

H2: The *variables/alternatives* that compose the dimension (self-knowledge) are the most important ones of the total knowledge resource.

The final objective of this research consists of obtaining a ranking of priorities with respect to the set of explanatory variables obtained from the literature and subsequently validated. These variables, with the application of the AHP (Analytic Hierarchy Process) method, are referred to as *variables/alternatives*. Entrepreneurs are a group that is constantly making decisions in increasingly complex, changing, and competitive environments, which forces them to usage total knowledge to generate competitive advantages (Fonseca-Feris & Fleitas-Alvarez, 2020). According to Calabrese et al. (2019). & Darko et al. (2018) the AHP method, allows achieving an objective treatment of the subjective, which, justifies its use and suitability as a qualitative research methodology for this work. According to Moreno (2002) the AHP is a general theory on judgments and valuations that, "(...) based on scales of reason, allows to combine the scientific and rational with the intangible to help synthesize human nature with the concrete of our experiences captured through science" (Moreno, 2002, p.10). It should be noted that the use of multi-criteria decision methods is very appropriate in those cases in which very subjective aspects are involved (Shih, 2022).

3.2. Identification of the explanatory variables of the study phenomenon

2 This work is a new application of the statistical data of broader research collected in the PhD thesis: Giner, V. (2015). *Factores emocionales del conocimiento que influyen sobre la objetividad del diagnóstico de la situación en el proceso de planificación estratégica.* Universidad Rey Juan Carlos (Madrid).

First, in the development of this work, an extensive review of the existing literature on the study phenomenon, which involves the three types of knowledge mentioned above, was carried out. In this phase, 20 variable-statements were obtained, as will be described below.

3.3. Main component analysis

A survey was initially launched to a sample of more than 400 entrepreneurs, of which a total of 362 were finally considered complete, most of them being from the regions of Madrid and Barcelona, these being considered the regions with the greatest economic weight in the country (Expansión-Diario Económico, 2019). This survey contained the twenty explanatory variables asking the respondents to show, for each of them, their greater or lesser degree of agreement. A Likert scale was used and, for each of these variables, entrepreneurs could choose between the following options: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree. By applying factor analysis to these initial variables, it was possible to find groups of variables with common meaning and reduce the number of dimensions (criteria) needed to explain the responses of the experts surveyed. Finally, when Cronbach's Alpha was obtained on the results, one variable (X1) was discarded for the following phases of the research. After the principal component analysis, a chi-square test was performed to measure the degree of dependence between the two dimensions or factors resulting from the component analysis. These two factors/dimensions were, on the one hand, <explicit knowledge> and <tacit knowledge>, which were grouped in the same dimension, and on the other hand, <self-knowledge>. From the chi-square it was obtained that both dimensions were quite independent of each other, which attributed a higher degree of importance to the usage of the AHP to achieve the research objective. In this regard, it is emphasized that, in the application of the AHP, it is preferable that the dimensions or criteria are independent of each other and, therefore, have the same degree of importance for the experts surveyed.

3.4. Panel of Experts for content validation

In accordance with De la Cuesta et al. (2014) we proceeded to the validation of the content of the questionnaire formed by the remaining 19 explanatory variables, which were obtained from the literature and subjected in the previous phase to component analysis and chi-square test. This validation was subjected to the review of a broad panel of experts made up of 40 entrepreneurs. The requirements to be part of this panel were the same as in the previous phase, that is, to be an entrepreneur. In addition, by means of a prior internal evaluation, we ensured that their companies had survived the first five years of life, which, according to the statistics, implies that they would be part of that minority of new companies that survive beyond that part of time. The 19 variables were rated on a scale of 1 to 5, where 1 implied that the variable was of practically no importance to the expert, and 5 implied that it was of very high importance. As noted above, all variables corresponded to the three types of the total knowledge equation; explicit, tacit and self-knowledge used according to the literature for decision making. The review of the variables by the 40 experts showed that some of these variables, mainly those that were rated with scores between 4 and 5, were considered significantly more important than the others.

3.5. Application of the Analytic Hierarchy Process method

According to Hills (2019) & Manoochehri (2021), there is a limit to the amount of information our mind can handle. Miller (1956) places it at number seven, plus minus two. For this reason, we decided that for the application of the AHP multi-criteria decision method, the final

number of variables that from now on and with the application of this methodology would be called *alternatives/priorities*, should be approximately in this range. Thus, and because of the previous phase, a definitive list of nine variables/alternatives was obtained, represented by those that obtained higher ratings, therefore, values of 4 and 5, and which were distributed as we shall see in point 4.2, according to each type of knowledge. These *variables/alternatives* were submitted to the evaluation of 15 entrepreneurs who, complying with the same previously established requirements, carried out an evaluation which, by means of Thurstone's method of binary comparisons and, specifically, using Saaty's (1977) AHP analytic hierarchy process, made it possible to obtain a definitive hierarchy/ranking of priorities which, in the opinion of the experts consulted, influence their decisions to a greater and lesser degree. The final number of 15 entrepreneurs for the application of the analytic hierarchy method was decided according to the maximum and minimum number recommended by the experts in this type of multi-criteria decision analysis and, in this case, the number used was double the minimum number, which gives a higher degree of goodness to the results obtained.

4. Results

This research was finally carried out on a sample of 362 entrepreneurs with valid information, mainly belonging to the regions of Madrid and Barcelona. Considering that, according to sources, these two areas account for around 74% of entrepreneurial activity in Spain, so it is considered representative. The sample was obtained through the alumni association of a business school based in both cities. Regarding the profile of the respondents, they were mainly people with higher education and with at least five years of entrepreneurial experience.

4.1 Results of principal component analysis

Once Cronbach's Alpha was performed to see sample's degree of consistency, two main factors or dimensions were obtained. One of them agglutinated almost all the variables corresponding to the dimension knowledge, which grouped the variables corresponding to explicit and tacit knowledge, obtaining a Cronbach's Alpha of 0.72. The other grouped the variables corresponding to the self-knowledge dimension, with a Cronbach's Alpha of 0.73. Variable X1 was discarded.

Table 1.

Variables corresponding to explicit knowledge

Scale	Scale Mean	Corrected Variance	Item total correlation	Alpha
X2	49.0466	27.0628	.3640	.7008
X3	49.3264	27.0049	.2829	.7168
X4	49.8161	27.1167	.3857	.6975
X5	48.5207	28.3489	.2865	.7104
X6	48.2720	29.2063	.2579	.7126
X14	49.1891	27.7486	.3126	.7078

Source: Adapted from Giner (2015).
Reliability Coefficients. Alpha= .7197

Table 2.

Variables corresponding to tacit knowledge

Scale	Scale Mean	Corrected Variance	Item total correlation	Alpha
X7	48.1813	29.2605	.3609	.7033
X8	48.2176	28.9188	.3887	.7003
X9	48.5596	29.0575	.2758	.7106
X10	48.83912	28.2596	.3897	.6983
X11	48.3860	28.8091	.3700	.7013
X12	48.6010	27.9651	.3640	.7005
X13	48.0984	29.3981	.3923	.7021
X15	48.3446	29.0524	.3830	.7012

Source: Adapted from Giner (2015).
Reliability Coefficients. Alpha= .7197

Table 3.

Variables corresponding to self-knowledge

Scale	Scale Mean	Corrected Variance	Item total correlation	Alpha
X16	16.2552	4.8485	.2313	.7741
X17	16.4115	3.9817	.5357	.6748
X18	16.7188	3.6439	.5434	.6708
X19	16.6120	3.6428	.6088	.6430
X20	16.4609	3.8470	.5758	.6588

Source: Adapted from Giner (2015).
Reliability Coefficients. Alpha= .7197

Thus, the two dimensions obtained were also used to establish the criteria and sub criteria for the application of the AHP method. Likewise, the chi-square test was performed between both factors, and it was found that there was no dependence between them Therefore, both dimensions started from the same degree of importance for the entrepreneurs, with a view to the subsequent application of the AHP method.

4.2 Results of the panel of experts for content validation

Once all the ratings had been obtained and added up, we obtained the mean values assigned by the panel to each of them for each type of knowledge. Next, we grouped those variables that had obtained higher values, always close to 5. Finally, we obtained a list of 3 variables for each type of knowledge, with higher levels of importance, leaving a total of 9 variables. The results corresponding to the content validation process carried out by the panel of experts made up of 40 entrepreneurs are presented below.

Table 4.

Results of the panel of expert's validation

Dimension	Variable	Description	Score
Explicit	x2	The haste and speed with which we must make decisions rarely allow us to (…)	3.45
Explicit	x3	The fact of having more information and data does not guarantee we will make better (…)	3.26
Explicit	x4	We are reluctant to try to obtain more information, because we rely more on (…)	2.94
Explicit	x5	There is a limit to the amount of information that each person can assimilate either when taking (…)	4.35
Explicit	x6	It is more important to objectively interpret the information and data we handle than to (…)	4.50
Tacit	x7	Entrepreneur-managers need to objectively interpret the data and information they handle (…)	4.20
Tacit	x8	Entrepreneur-managers and people in general can make different (…)	4.30
Tacit	x9	Interpretations we make of the information and data obtained are subject to (…)	4.39
Tacit	x10	Managers rely mainly on their experience when making decisions (…)	3.87
Tacit	x11	Our professional and personal experience cannot guarantee the (…)	4.68
Tacit	x12	Our professional and personal experience can generate an excess of (…)	4.58
Tacit	x13	When we make quick decisions, something that happens too often (…)	4.22
Explicit	x14	Not all people judge and evaluate the information and data the handle with the same (…)	4.98
Tacit	x15	When making decisions, we often discard information (…)	3.45
Self	x16	Self-knowledge helps us to identify our limitations and to define (…)	4.97
Self	x17	Self-knowledge allows us to evaluate ourselves objectively (…)	4.10
Self	x18	Self-knowledge is the first step to be objective and avoid prejudices (…)	4.71
Self	x19	Commonly, the knowledge we have of ourselves (…)	4.08
Self	x20	A higher degree of Self-knowledge helps us to be more objective with (…)	4.97

Source: Adapted from Giner (2015).

Final 9 variables were renamed as Variables/alternatives for the purpose of applying the AHP, and, therefore, priorities, once the AHP has been applied.

Figure 1.

Final variables/alternatives obtained.

Regarding Explicit Knowledge:			
Variable	X5	is	renamed (variable/alternative) A1.
Variable	X6	is	renamed (variable/alternative) A2.
Variable	X14	is	renamed (variable/alternative) A3.
Regarding Tacit knowledge:			
Variable	X11	is	renamed (variable/alternative) A4.
Variable	X9	is	renamed (variable/alternative) A5.
Variable	X12	is	renamed (variable/alternative) A6.

Regarding Self-knowledge:			
Variable	X16	is	renamed (variable/alternative) A7.
Variable	X18	is	renamed (variable/alternative) A9.
Variable	X20	is	renamed (variable/alternative) A8.

Source: Adapted from Giner (2015).

4.3 Application of the AHP method

The application of the AHP involves the pairwise comparison of the 9 variable/alternatives obtained previously, with the objective of establishing a ranking of priorities among them. The results corresponding to the application of the last phase of the research, by means of the analytical hierarchies' method (AHP), are presented below. Likewise, the ranking of priorities ordered by the degree of importance assigned by the panel of experts to each alternative considered is presented. In the ranking of priorities established by the experts consulted, the three variables/alternatives representative of self-knowledge, A7, A8 and A9, obtain the first three positions. Likewise, these variables/alternatives achieve a higher relative weight over the total. The summary of the relative weights corresponding to the variables of each type of knowledge is shown below.

Table 5.

Relative weights of each type of knowledge

Self-knowledge	Explicit knowledge	Tacit knowledge
0.515	0.268	0.217

Source: Adapted from Giner (2015)

The relative weights corresponding to each variable/alternative, in order of highest to lowest importance given by the expert panel, are shown below.

Figure 2.

Relative weights for the variables/alternatives selected, after the AHP.

18,8%	A7 "Self-knowledge helps to identify our limitations and objectively define our strengths".	7,6%	A4 "Our experience, both professional and personal by itself, does not guarantee the objectivity of the decisions we make."
17,5%	A8 "A higher degree of Self-knowledge helps to be more objective with ourselves and with the competition and, therefore, helps to make better decisions".	7,5%	A5 "The interpretations we make of the information and data obtained are subject to our own experiences, both professional and personal".
15,2%	A9 "Self-knowledge is the first step in being objective and avoiding bias in decision making and when making evaluations of any situation both personal and professional".	6,6%	A6 "Our professional and personal "experiences" can generate overconfidence and prejudices that can lead to errors in decision making and in making a diagnosis of the situation".
10,1%	A2 "It is more important to objectively interpret the information and data we handle than to obtain larger amounts of information".	6,6%	A1 "There is a limit to the amount of information that each person can assim ilate, either in making a decision or in making a diagnosis of the situation".
10.10%	A3 Not all people judge and evaluate the information and data they handle with the same degree of objectivity.		

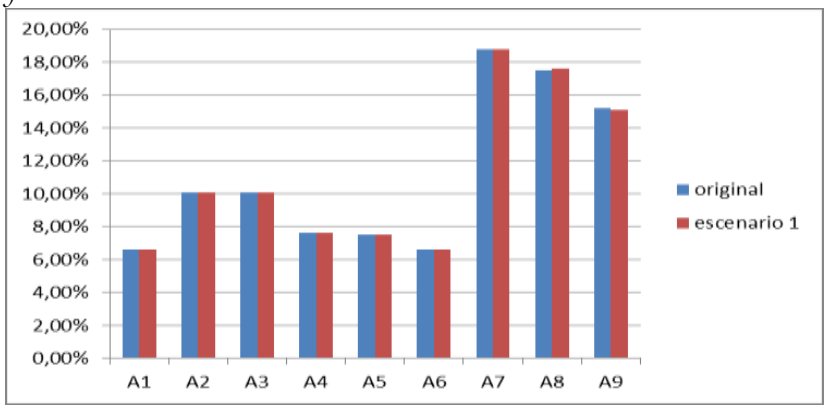
Source: Adapted from Giner (2015).

4.4 Consistency and sensitivity analysis

To validate the results obtained in this study, two possible scenarios were established and in both a variation in the relative weight of the criteria of +20% was made. The variations -both in the hierarchy or position in the ranking of the variables/alternatives, and in their relative weights with respect to the total- underwent hardly any variations. It was also observed from the results of applying the sensitivity analysis, that the experts' evaluations regarding the priorities assigned to each variable/alternative remained practically unchanged in both scenarios, thus providing the necessary robustness with respect to the proposal.

Figure 3

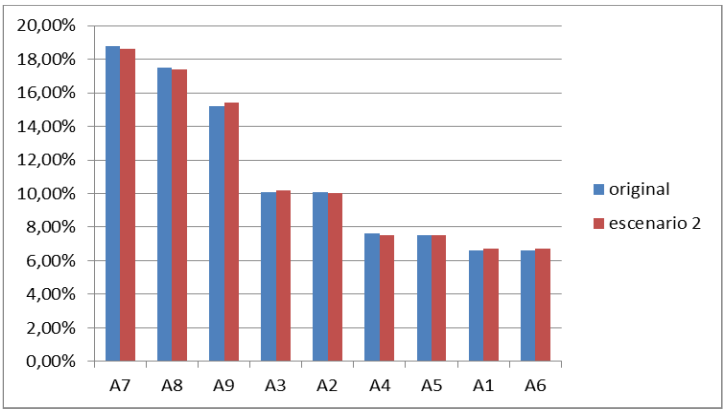
Sensitive analysis – Scenario 1



Source: Adapted from Giner (2015).

Figure 4.

Sensitive analysis – Scenario 2



Source: Adapted from Giner (2015).

With respect to the inconsistency analysis, it was observed that the overall inconsistency index of the whole group was equal to 0, and the maximum allowed index of 10% was not exceeded in any of the individual judgments. From the results obtained in this work, it was possible to answer the two hypotheses formulated, accepting both.

5. Discussion

Therefore, it is necessary to highlight the contribution of this research makes to the field of study, since *self-knowledge* was not initially included in the literature as part of the knowledge necessary for decision-making. These results help to conclude that explicit and tacit knowledge form the same unit of knowledge necessary for decision-making, regardless of the weight that one may have over the other in the decisions of the entrepreneurs surveyed. In other words, although the usage of tacit knowledge may be greater according to the literature in some entrepreneurs than in others, both types of knowledge are valued in similar proportions by the entrepreneurs: explicit knowledge: 26.8%; tacit knowledge: 21.7%. It was therefore surprising to see that, among these two types of knowledge, explicit knowledge obtains a slightly higher percentage of appreciation, since, as mentioned above, entrepreneurs usually abuse the use of tacit knowledge, relying more on their experience as a way of simplifying and therefore speeding up decision making. This slight advantage given by entrepreneurs in the ranking of priorities to explicit knowledge over tacit knowledge could be due to their need to obtain more information and data to face the uncertainty generated by increasingly competitive markets.

5. Conclusions

During this research, the proposed objectives have been achieved. Firstly, the dimensions in which the variables are grouped have been obtained from the literature review (SO1). Likewise, the variables that identifies the different types of knowledge use in entrepreneurs' decision-making were detected (SO2). Finally, an analysis of the decision-making process has been carried out, based on the responses provided by the entrepreneurs (SO3).

In relation to this, it is possible to settle that confirmation of H1 comes from the principal component analysis. The variables were grouped into two dimensions or factors. First dimension, *knowledge*, group the variables corresponding to explicit and tacit knowledge, and

the other unique dimension was *self-knowledge*. Both dimensions obtained a degree of consistency of 0.72 and 0.73 respectively. As it was exposed, objective SO1 is achieved.

Furthermore, confirmation of H2 can be seen in terms of the relative weights obtained according to the ranking of priorities given in the AHP for each of the variables, corresponding to self-knowledge by itself more than 50% of the total. These 3 variables, A7, A8 and A9, add up to a percentage of 51.5% of the total. The importance given by the entrepreneurs to self-knowledge also contributes to its incorporation in a novel way by means of this work, as a new dimension of total knowledge. It is also noteworthy that in the evaluations carried out by the panel of experts for the validation of the content prior to the application of the AHP, the 3 variables/alternatives corresponding to self-knowledge also obtained almost the highest scores, with two of them achieving a score of 4.97 and the third one of 4.71. For instance, SO2 and SO3 are finally accomplished.

5.1 Limitations and future proposals

The first limitation outlined is that this research was carried out on a sample of entrepreneurs belonging mainly to the regions of Madrid and Barcelona. The second limitation is about the sample, as it was obtained through the alumni association of a business school based in both areas and consisted exclusively of alumni who were entrepreneurs. It should be noted that these entrepreneurs, having taken some of the programs offered by this international business school, are well-trained professionals and, therefore, mainly carry out their business activity in sectors with high added value. With a view to future lines of research, a study of these characteristics could also be extended to other samples within this same group, entrepreneurs, but with different levels of training.

5.2 Management implications for stakeholders

Finally, and analyzing in detail the greater importance attributed by the entrepreneurs to the variables/alternatives corresponding to self-knowledge, we will point out with respect to each of them that:

1. Variable A7 asks for the awareness that a greater or lesser degree of self -knowledge on the part of the entrepreneur will influence the objectivity of his strategic decisions. That is to say; that if self-knowledge helps to identify our strengths and weaknesses, a higher degree of knowledge of oneself will help in the realization of more objective interpretations and, therefore, more realistic decisions. The relative weight that entrepreneurs have assigned to this variable says that, when it comes to being more objective and minimizing as much as possible the cognitive biases and limitations that all human beings inevitably suffer from, we should become aware of the importance of this variable and proceed to improve this very important capability.

2. Variable A8 warns of the importance of including competitors in the equation of the objective analysis of strengths and weaknesses. In other words, if we do not know our competitors well, we cannot know ourselves well either. This would be because, in a business context, the objective assessment of our strengths and weaknesses should be based on the same analysis of our competitors, so that entrepreneurs ensure that a strength of their own should be due to an equivalent weakness of their competitors; and, likewise, a weakness of their own should be due to an equivalent strength of their competitors.

3. Variable A9 warns of the threat that biases always pose when seeking objectivity in strategic decision making. And it stresses that self-knowledge helps, if not to avoid them, at least to identify them and try to minimize them. Along these lines, and as mentioned in the theoretic al framework, prejudices or cognitive biases are an undeniable part of people; that is why the first requirement that this variable invite entrepreneur to meet is to become aware of their existence and, therefore, to put the means in place to prevent these biases from negatively influencing their strategic decisions.

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