

Decision-Making Process By Multi-Criteria Hierarchical Analysis for The Appraisal of Entrepreneurial Projects

Processo de Tomada de Decisão Através de Análise Hierárquica Multicritério na Avaliação de Projetos de Empreendimento

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ABSTRACT

This research aims to develop a design for the selection of entrepreneurship projects using a multi-criteria decision method. The Design Science Research (DSR) approach is used through the Analytic Hierarchy Process (AHP) as a methodology applied to entrepreneurship projects in accounting. The results obtained correspond to the hierarchical multi-criteria design, the application of which has allowed the establishment of a ranking of the best entrepreneurial projects analyzed. The work systematizes the decision-making process by proposing a structure of criteria and sub-criteria that applies David McClelland's characteristics of entrepreneurial success and the stages to be followed for the evaluation of projects, avoiding decision-making processes that rely on intuition or that oversimplify the variables to be considered. The relevance and originality of the work focuses on the study of the decision-making process in a relatively unstudied area such as entrepreneurship, considering the greater organizational complexity. This work enables the optimization of the decision-making process in the entities and bodies responsible for evaluating and granting funding to this type of project.

Keywords: Entrepreneurial criteria; Entrepreneurial project selection; AHP; Multicriteria decision-making.

RESUMO

Esta pesquisa tem como objetivo desenvolver um *design* para a seleção de projetos de empreendimento usando um método de decisão multicritério. A abordagem de *Design Science Research (DSR)* é utilizado através do Processo Analítico Hierárquico (*AHP*) como uma metodologia aplicada a projetos de empreendedorismo em contabilidade. Os resultados obtidos correspondem ao desenho hierárquico multicritério, cuja aplicação permitiu o estabelecimento de um *ranking* dos melhores projetos empreendedores analisados. O trabalho sistematiza o processo decisório, propondo uma estrutura de critérios e subcritérios que aplica as características de sucesso empreendedor de David McClelland e as etapas a serem seguidas para a avaliação dos projetos, evitando processos decisórios que se baseiam na intuição ou que simplificam em demasia as variáveis a serem consideradas. A relevância e originalidade do trabalho se concentra no estudo do processo decisório em uma área pouco estudada como o empreendedorismo, levando em conta a maior complexidade organizacional. Este trabalho permite a otimização do processo de tomada de decisão nas entidades e organismos responsáveis pela avaliação e concessão de financiamento para este tipo de projeto.

Palavras-chave: Critérios de empreendedorismo; Seleção de projetos empreendedores; AHP; Tomada de decisão multicritério.

1. INTRODUCTION

Decisions are often taken or effected in an empirical manner and based on experiences, feelings, hunches, among many other more intangible reasons. For Isenman (2018), intuition can be considered a thought process characterized by being closely linked to the unconscious intelligence of the manager. Everything is valid, it helps the decision-making process because when a manager decides, he already has certain knowledge that has been developed throughout his professional career. Bragé and Da Costa (2020) corroborate with it, when they identify in their research that decision making based on the manager's intuition considers the analysis of

the situation that presents itself, his learning, knowledge, and experience. However, this should not be definitive since these intangibles and more emotional (SIMON, 1967) forms of deciding, choosing alternatives, should simply subsidize a more rational and multicriteria decision making process and thus avoid disastrous consequences that jeopardize even the survival of companies when they involve project selection, important resource investments, financial portfolio selection, even the manner one selects professionals to work at the company.

The Multiple Criteria Decision Making (MCDM) process directs the manager to a definition of criteria, sub-criteria, and alternatives in the selection of its alternatives that together, integrated in a Hierarchical Design, act so that the decision-making process is much more effective since the most emotive human decision is made with a series of inconsistencies. This type of MCDM approach using the Analytic Hierarchy Process (AHP) technique performs "Pairwise" comparisons between criteria and alternatives to achieve a greater objective or solve a problem.

The problem that this work refers to with the proposition of the Multicriteria Hierarchy Design is defined as: What is the multicriteria hierarchy design to improve the selection of entrepreneurial projects? This design contributes directly to the direction of public resources and is relevant because it makes the best use of them. The objective was to develop a multicriteria hierarchical design to improve the selection of entrepreneurial projects.

The search for the resolution of this problem, when applied as it was done in this work, also makes it possible through this design not only to understand the best way to select entrepreneurial projects, but also to prioritize them in a competitive ranking, showing positions from first to last place in the same selection and thus redefining the best use of funding resources.

The contributions that this research brings to the study area and/or to society, are related to the awareness of development and implementation of a more effective mechanism for multicriteria decision making, bringing closer more technical and complex approaches that often become complicated by moving away from the management context to this business administration and entrepreneurial environment in which the decision maker can lead the decision making process, reducing intangibles and emotion, and inserting greater rational rigor in their day-to-day decisions and, especially, that in this application approach involves targeting the proper use of public resources.

The article presents its originality in the selection of projects in a theoretical-practical way with methodological rigor, seeking, this way, to effectively contemplate entrepreneurial

projects that meet the best practices among the 10 main entrepreneurial characteristics analysed in a joint "pair by pair" way and not defining one or some of them in an isolated and often mistaken way.

Methodologically, the approach was Design Science Research (DSR), and an artifact was generated through AHP considering the 10 entrepreneurial characteristics of David McClelland, consolidated in an international study, and used by the UN in the development and orientation of entrepreneurial development courses.

2. THEORETICAL REFERENCE

Entrepreneurship is a theme that continues to be important and relevant in scientific research but it is currently of greater concern because it is not known which paths are most viable for new entrepreneurial behaviors and new businesses in this new world order emerging from the post-Covid era¹⁹ era 19 (ZAHRA, 2021). In a more rational view, it is certainly worth the approach that "every problem also represents an opportunity" and that there will be new dives to the basis of support of any business as culture (beliefs, rites, myths etc.), organizational values that increase the legitimacy of new, more humanitarian actions such as discipline and own research with a high degree of maturity of international entrepreneurship in services supported by this digital economy adapted to the country where services are marketed (FU; EMES; HOU, 2021) In order to face the new uncertainties that the political environment may provide with greater market protectionism, populism/ nationalism and virtual re-engineering of new businesses (ZUCHELLA, 2021) in which the service sector in the digital economy may generate greater economic developments.

Many works have been developed on entrepreneurship and related topics such as the classic one by Schumpeter (1928), who provided us with a pioneering approach to innovation and economic development to the term entrepreneurship, passing through hundreds of works (see BESSANT; TIDD, 2019; DA SILVA et al., 2020; DORNELAS, 2008; HISRICH; PETERS; SHEPHERD, 2014) and as in the view of Rocha and Freitas (2014) and Lima, Ceglia, Rebouças and Teixeira (2016) this local and national economic development and structural and emerging factors with full knowledge transfer (FU; EMES; HOU, 2021) are factors that have driven this advancement of research and practice in this field in which multidisciplinary competencies in the educational training of digital entrepreneurship and open innovation are

significant. Even institutions that operate in the third sector will face greater pressure to exercise a more legitimized leadership in this type of more hybrid organization (ADRO; FERNANDES, 2021).

In reference to the classics, it can be stated that it was a reference that leaves no doubt and that provided a focus of innovation and development of the economy to the term entrepreneurship, relating it to the search for opportunities in the business context by creating and practicing with something new.

In Weber (1930), the focus started in a more behaviourist way related to creativity, persistence, and risk among other elements, to the way people can recognize in themselves entrepreneurial competences or even develop them since it is argued that one can develop a systematic entrepreneurial behaviour and not only accept that it is part of a natural talent.

The authors vary their approaches according to their own backgrounds, and the range of characteristics that make it possible to undertake an entrepreneur is vast, varying from 4 to 5 to 50 to 60 (also an empirical finding of the researchers), and it is even believed that an entrepreneur is often not as creative as we all imagine him to be. Pinchot, Filion, Clark, Leibenstein, Patel, Miner and many others have defined the entrepreneur. Another referential author on the subject is McClelland (1985), who separated the entrepreneurial person and the generation of entrepreneurial activity generated since more markedly the 1960s, establishing that the result of undertaking is a production that goes beyond a craft activity, of self-consumption and that possesses a certain intensity of risk.

McClelland was chosen to be used in this research because his set of characteristics is internationally accepted as follows: persistence, taking calculated risks, demanding quality and efficiency, commitment, seeking opportunities and initiative, seeking information, goal setting, systematic planning and monitoring, persuasion and networking, and independence and self-confidence.

Seeking opportunities and initiative refers to the spontaneous impulse of each person to carry out challenging activities, visualising opportunities. Persistence refers to the insistence to overcome challenges. One cannot logically insist on situations that obviously do not generate positive results. To take calculated risks, refers to facing situations having control of the risks, not taking risks for nothing and not being too much and losing what one has. Whoever possesses the "risk everything" behaviour is usually the one who has nothing because there is a probability of success using third party resources.

Demand for quality and efficiency refers to continuous improvements such as kaizen, making an improvement every day on how you do things, doing them faster, better, and currently meeting compliance standards, transparency and seeking excellence with an ethical sense. Search for information refers to the continuous examination of information in the market, improving technically, advising, but above all, being critical and performing filters of information that one has access.

Goal setting refers to quantifying time-bound objectives, it is a Balanced Score Card (BSC) view managed with indicators. Systematic planning and monitoring refer to the conscious planning of activities that seek to solve problems. Persuasion and networking refer to the way of relating to others to achieve one's own goals and attention, which are also those of others.

Independence and self-confidence, which refer to the search for, achievement and control of one's own activities with confidence, without waiting for third parties to advance in one's entrepreneurial capacity. Commitment, which refers to the dedication to conclude activities with respect to the clients one may serve and the partners of the entrepreneurial activity, whether established by projects or in a more consolidated organizational structure.

Lee, Lee and Shim (2016), on the other hand, studied entrepreneurial competencies and characteristics, classifying them into: opportunity competencies (identification, evaluation and exploitation of market opportunities); administrative competencies (management, financial and marketing competencies, establishment and application of strategies); relationship competencies (leadership, communication, human relations, construction and use of networks); personal competencies (knowledge, effectiveness, autonomy, innovation capacity) and commitment competencies (propensity to take risks, tenacity / perseverance, stress tolerance).

One of the effects of the economic crisis has been the drastic reduction of staff in different sectors, which in turn, highlights the need for self-employment and the creation of new businesses to support the creation of wealth, employment, and well-being. In this context, motivation is presented as a highlighted characteristic when explaining self-employment and the ability of the entrepreneur to start a business (BARBA-SÁNCHEZ; ATIENZA-SAHUQUILLO, 2017).

In the view of Cantner, Goethner and Silbereisen (2017), entrepreneurial intention can be characterised as an amalgamation of the effort and stimulus that an individual possesses to execute entrepreneurial behaviour.

The psychological characteristics that influence entrepreneurial intention are related to the capacity for innovation, self-confidence, propensity to take risks, need for achievement, and tolerance for ambiguity (NASIP; AMIRUL; SONDOH; TANAKINJAL, 2017). It is also worth mentioning, that the process of entrepreneurship, is affected by sociodemographic and behavioural factors (TORRES et al., 2017). Even for Marcon, Silveira, and Frizon (2020, p. 65), "the behavioural factors are those with the greatest explanatory power in entrepreneurial intentions".

Research such as the one conducted by Kim, Kim and Jeon (2018), in the design industry sector, also highlights the commercialisation of ideas as an important factor for the success of startups. Bernoster, Rietveld, Thurik and Torrès (2018), point to overconfidence as a characteristic also related to the intention to enter the entrepreneurial world.

Logically, the comprehensiveness and amplitude of other entrepreneurial characteristics can be identified in many authors' work, but we opted for those that were considered adequate by the authors and seem relatively complete and systematized.

3. METHODOLOGY

In a classical way we find many works that methodologically in management are structured as qualitative or quantitative. This "or" has always been controversial, but fortunately some ardent defenders of the "or" in the area of Management Information Systems and have managed to limit advances in research, currently discreetly accept these approaches and others using such as fuzzy logic.

It was in these spaces that Design Science was establishing itself and, without discussing whether it was qualitative or quantitative, it was developing as a research paradigm to solve practical problems (HEVNER; MARCH; PARK; RAM, 2004), prescribing feasible solutions for the real world to management, thus extending the broader and well-accepted approaches of the information systems field.

Design Research (DR), as it is operationally called, follows guidelines of science of the artificial and nonnatural (SIMON, 1996; TAKEDA; VEERKAMP; TOMIYAMA; YOSHIKAWAM, 1990). Gregor and Hevner (2013) also assist researchers, understand the artifacts, and take position with this approach, achieving results with a new artifact that can also be used in other applications.

Based on DR, the AHP (SAATY, 1980) can generate new artifacts, making compatible the integration of different techniques as it occurs with fuzzy logic to improve the decision-making process with MCDM (YU; ZHANG; LIAO; QI, 2018). With this method it is possible to solve problems, improve the decision-making process, understand the hierarchies of informational flows and, in this work, understand and hierarchize the selection process of entrepreneurial projects to better apply public resources.

It was then systematized into an AHP process sequence (SAATY, 1980) that starts at:

- (1) to define the overall objective which is to develop multicriteria hierarchization design to improve the selection of entrepreneurial projects;
- (2) define a set of criteria regarding entrepreneurial characteristics;
- (3) define alternatives related to the entrepreneurial projects;
- (4) perform comparisons between pairs of decision elements forming comparison matrices based on relative importance between factors at each hierarchical level;
- (5) estimate weights of decision elements to achieve the overall objective;
- (6) check consistency properties of matrices with an error level smaller than 0.1;
- (7) generate a ranking of entrepreneurial projects that may compete for public resources.

Thus, the hierarchical structure was established with the different levels, and it was possible to apply through criteria (the entrepreneurial characteristics) of persistence, calculated risk-taking, demand for quality and efficiency, commitment, information seeking, goal setting, opportunity seeking and initiative, systematic planning and monitoring, persuasion and networking and independence and self-confidence to four projects put forward by accounting professionals.

Henceforth, the design could be revised for applications to other entrepreneurial projects that could logically be students, startup entrepreneurs or any other type of configuration that selects projects identified with this context.

The recommended scale of weights for Pairwise comparisons between criteria, sub-criteria and alternatives were used in accordance with Professor Saaty's studies. This scale, as shown in Table 1, considers intervals from 1 to 9 and intermediate values of 2, 4, 6 and 8.

Table 1 – AHP scale for defining weights.

Weight	Definition	Description
1	Equal importance	Factor i has the same importance as factor j
3	Moderate importance	Factor i is moderately more important than factor j
5	Great importance	Factor i is significantly more important than factor j
7	Very great importance	Factor i is strongly more important than factor j
9	Extreme importance	Factor i is extremely more important than factor j
2, 4, 6, 8	Intermediate values when necessary	

Source: Compiled by the authors, based on Saaty (1980).

Then, for the implementation of the design it was considered as the main objective to seek the development of the entrepreneurial profile, following the coming details.

The main objective is to develop the entrepreneurial profile, directly associated with the improvement of the selection of entrepreneurial projects that makes it possible to prioritize the entrepreneurial characteristics (criteria in AHP terminology) of each of the competitors with their projects.

Each entrepreneurial characteristic will be defined based on McClelland's studies and systematized in Oliveira, Silva and Araújo (2014). Table 2 summarizes the criteria and sub-criteria to be considered in the project selection process.

Table 2 – Entrepreneurial profile for project selection.

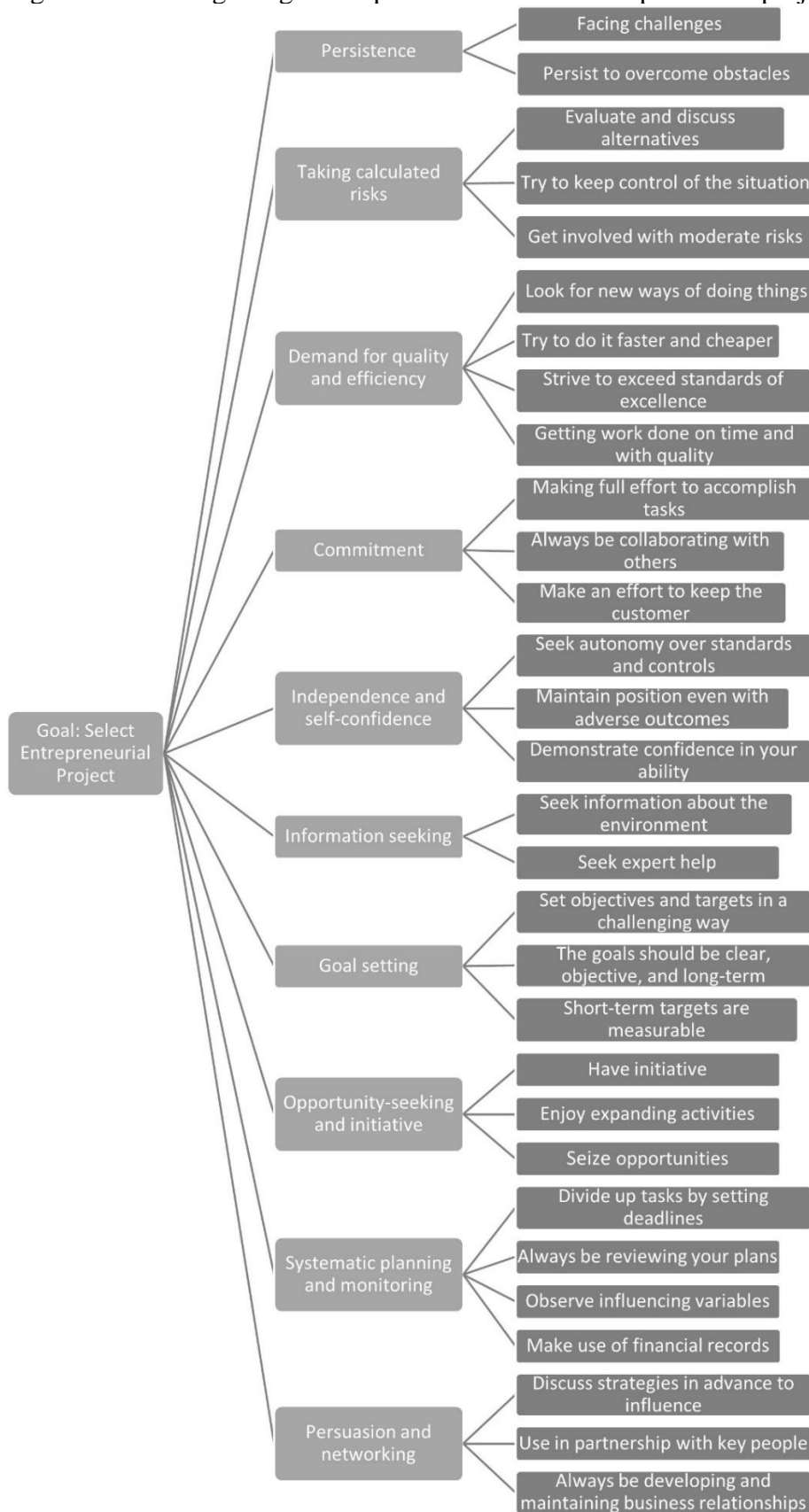
Entrepreneurial criteria	Definition	Associated sub-criteria
Persistence.	Face the challenges in different shapes and as many times as needed to overcome the challenges.	Facing challenges and persist to overcome obstacles.
Taking calculated risks.	Evaluates different options, tries to maintain control to reduce risks and acts in situations of limited risk.	Evaluate and discuss alternatives, try to keep control of the situation, and get involved with moderate risks.
Demand for quality and efficiency.	Find ways to do things better, faster, or cheaper, do things trying to exceed standards of excellence and ensure that projects are done on time and to the expected quality.	Look for new ways of doing things, try to do it faster and cheaper, strive to exceed standards of excellence, and getting work done on time and with quality.
Commitment.	Makes sacrifices and efforts to complete tasks, collaborates with employees to do the job, and works hard to keep the customer.	Making full effort to accomplish tasks, always be collaborating with others, and make efforts to keep the customer.

Entrepreneurial criteria	Definition	Associated sub-criteria
Independence and self-confidence.	Seek independence beyond the rules and controls of others, even in the face of adverse outcomes maintain your point of view and be confident in your own capacity.	Seek autonomy over standards and controls, maintain position even with adverse outcomes, and demonstrate confidence in your ability.
Information seeking.	Obtain as much information as possible about the business environment and seek the advice of specialists for technical or commercial guidance.	Seek information about the environment and expert help.
Goal setting.	Establish clear long-term objectives and set measurable short-term goals.	Set objectives and targets in a challenging way, the goals should be clear, objective, and long-term, and short-term targets are measurable.
Opportunity-seeking and initiative.	Completes tasks before it is asked or forced by circumstances, expands the business into new areas of operation and takes advantage of opportunities as they arise.	Have initiative, enjoy expanding activities, and seize opportunities.
Systematic planning and monitoring.	Divides major tasks into subtasks with well-defined deadlines, always reviews what is planned by looking at the different variables that can influence and takes into account financial records in decision-making.	Divide up tasks by setting deadlines, always be reviewing your plans, observe influencing variables, and make use of financial records.
Persuasion and networking.	Debate possible strategies in advance trying to persuade others, uses key people to achieve objectives, and at all times is concerned to develop business relationships.	Discuss strategies in advance to influence, use in partnership with key people, and always be developing and maintaining business relationships.

Source: Own elaboration from McClelland (1985) and Oliveira, Silva and Araújo (2014).

Finally, the different entrepreneurial projects (as the different alternatives to the decision-making process) are the ones that will compete for public resources. Thus, the hierarchical design is presented in Figure 1 with criteria, sub-criteria and respective alternatives that develop the entrepreneurial profile. Subsequently, the form of data collection is presented and then the practical application with the respective analysis.

Figure 1 – Ranking design to improve selection of entrepreneurial projects.



Source: Elaborated by the authors.

For data collection, matrices were generated for Pairwise comparisons. Some matrixes were extracted and incorporated into this study with collected data to present them in a more synthetic manner. Thus, they are visualized according to Tables 3, 4 and 5.

Table 3 – Matrix of data collection between entrepreneurial criteria or characteristics.

Objective: Select Entrepreneurial Project	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
C1 - Search for opportunities and initiative		1,0	2,0	5,0	1,0	1,0	2,0	1,0	2,0	2,0
C2 - Persistence			1,0	5,0	5,0	6,0	1,5	6,0	1,0	2,0
C3 - Taking calculated risks				2,0	2,0	4,0	1,0	2,0	1,0	1,0
C4 - Demand for quality and efficiency					4,0	2,0	1,0	1,0	2,0	1,0
C5 - Commitment						1,0	3,0	1,0	2,0	2,0
C6 - Search for information							4,0	4,0	3,0	3,0
C7 - Goal setting								3,0	1,0	1,0
C8 - Systematic planning and monitoring									2,0	3,0
C9 - Persuasion and networking										2,0
C10 - Independence and self-confidence										
Inconsistency Rate = 0.08										

Source: Research data.

Table 3 of the data collection matrix between criteria or entrepreneurial characteristics evidence that using the AHP technique, they must be crossed "Pairwise". This avoids biasing the decision-making process in a simpler choice that usually occurs where one, two or three characteristics are considered. Here all characteristics are compared with each other.

Table 4 presents the *Calculated risk-taking* characteristic or criterion in which the sub-characteristics or sub-criteria are being compared to each other.

Table 4 – *Calculated risk-taking* characteristic or criterion

Criterion: Taking calculated risks	Cr1	Cr2	Cr3
Cr1 - Evaluate and discuss alternatives		4,0	3,0
Cr2 - Seeking to maintain control of the situation			2,0
Cr3 - Engage in moderate risks			
Inconsistency Rate = 0.1			

Source: Research data.

In Table 4, taking calculated risks is presented as the criterion where the different sub-criteria that make it up are also being compared. They are as follows:

- evaluate and discuss alternatives;
- try to keep control of the situation;
- get involved with moderate risks.

It can be visualized that these sub-criteria are being compared and thus maintaining evaluations at two different hierarchical levels to reach the alternatives afterwards. All data input matrices followed the consistency level recommended by the AHP method and thus generated results with significant consistency.

With this hierarchical design the research problem of this work would be reached, however, these researchers go beyond, they worked on the design so that it could be implemented. To this effect, in conjunction with theoretical grounding and implementation via AHP Expert Choice software, which is a reference on the theme, it was enabled the confirmation of the design with accounting professionals who were going to create their own companies.

Finally, in data collection, Table 5 is presented in which the different entrepreneurial projects evaluate themselves or are evaluated according to each entrepreneurial characteristic and sub-characteristic.

Table 5 – Evaluation of entrepreneurial projects for each characteristic

Sub-criterion: To have initiative (within Search for opportunities and initiative)	EPr1	EPr2	EPr3	EPr4
EPr1 – Entrepreneur Project 1		5,0	6,0	5,0
EPr2 – Entrepreneur Project 2			4,0	5,0
EPr3 – Entrepreneur Project 3				1,0
EPr4 – Entrepreneur Project 4				
Inconsistency Rate = 0.1				

Source: Research data.

Table 5 shows the matrix in which the entrepreneurial projects are compared against the sub-characteristic *Possess initiative* (within the characteristic *Search for opportunities and initiative*). The matrix compares all entrepreneurial projects to each other in relation to this sub-characteristic, as it can be seen.

This data collection could be very extensive with all the details, however, in the sequence previously presented, matrixes considering comparisons between characteristics (criteria), sub-characteristics (sub-criteria) and alternatives (entrepreneurial projects) could be evidenced.

In the following, the analysis and results achieved are presented with the implementation in which the prioritizations can be visualized in different ways, i.e., to exemplify:

- The best entrepreneurial projects of all can be visualized;
- It is also possible identify the best entrepreneurial projects from certain characteristics like the most persistent, planner, committed, systematic or self-confident.

In other words, the decision-making model makes possible to see the best entrepreneurial projects through various visions from the focus of each entrepreneurial characteristic.

Subsequently, this type of implementation will effectively occur for diverse research and practical implementations of the most diverse levels, assisting the direction and increasing the criteria for best governance practices, such as transparency, compliance, and accountability in public resources, since this work was not positioned only to this end of preparing a model for the selection of future entrepreneurs in the accounting area.

The judgements between the criteria establish the ranking of the characteristics to be

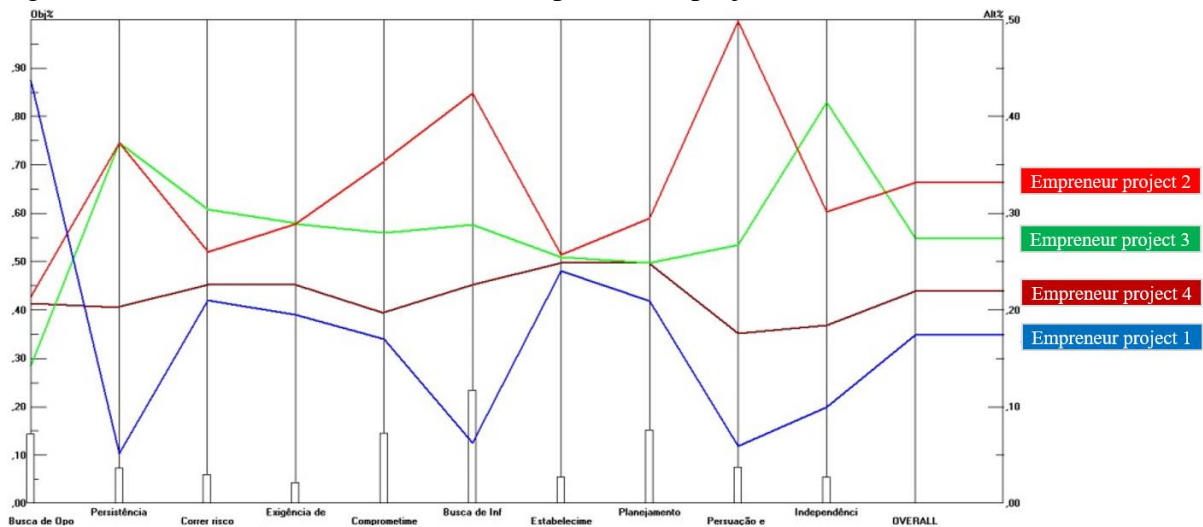
considered for the selection of entrepreneurial projects.

4. ANALYSIS

Many analyses can be generated in the application of this type of design and technique combined. Some have been separated here for a better understanding without going into too much detail. In this sense we can state that:

In Figure 2, which is a consolidating graph for the best entrepreneurial project is the one that competed as number 2. This entrepreneur was followed by entrepreneur 3, then entrepreneur 4 and finally entrepreneur 1. That is, in addition to selecting the best entrepreneurial project, one can with this design and application understand which other entrepreneurial projects come in the sequence.

Figure 2 – Consolidator chart for best entrepreneurial project



Source: Own elaboration, with Expert Choice.

One can also visualize in which characteristics the entrepreneurs stand out more, i.e., which are more evident in the set of Pairwise comparisons that provide the best entrepreneurial project. Softwares, such as Expert Choice, allow a sensitivity analysis, which gives greater prominence when compared to others developed with Excel spreadsheets, for example.

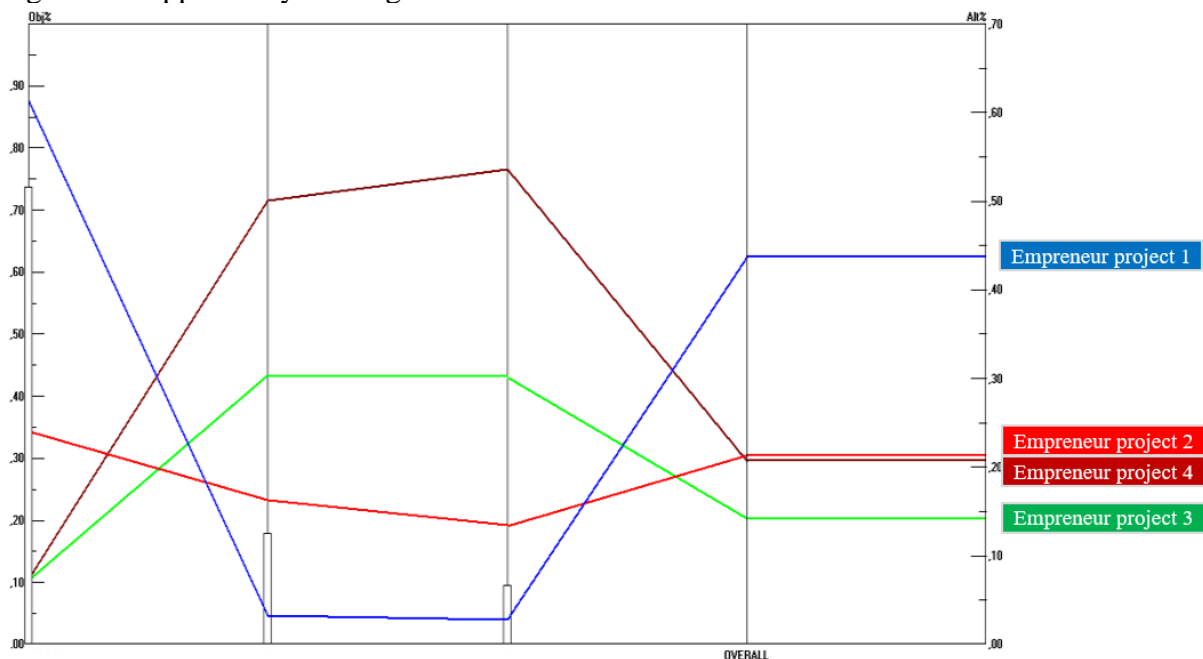
This sensitivity analysis allows us to vary the intensity of the different characteristics (also by sub-characteristics) to visualize which entrepreneurial project would stand out more as a whole. In other words, as an example, if the selection criteria would focus more on

commitment, which entrepreneur would be selected?

The design and application allow us to visualize this result very easily and, in this case, it could still be entrepreneur project 2 or any of the others. Human reasoning cannot mentally perform all these comparisons and crossings with a low level of inconsistency, but the software can, and therefore, it was implemented here.

In Figure 3, the performance of the entrepreneurial projects in a new sensitivity analysis is related to *Opportunity Seeking and Initiative*, in which the best in this simulation would be entrepreneur project 1, followed by entrepreneur project 2, then entrepreneur project 4, and finally entrepreneur project 3. Considering all the business characteristics analysed together.

Figure 3 – Opportunity seeking and initiative



Source: Own elaboration, with Expert Choice.

In Figure 3 (*Opportunity Search and Initiative*) it is also possible to visualize the performance within each entrepreneurial sub-characteristic or sub-criterion, that is, to understand which aspects influence more in the final performance among all the entrepreneurial projects, always considering all the "pairwise" crossings of the 10 main entrepreneurial characteristics and their sub-characteristics. In this simulation involving:

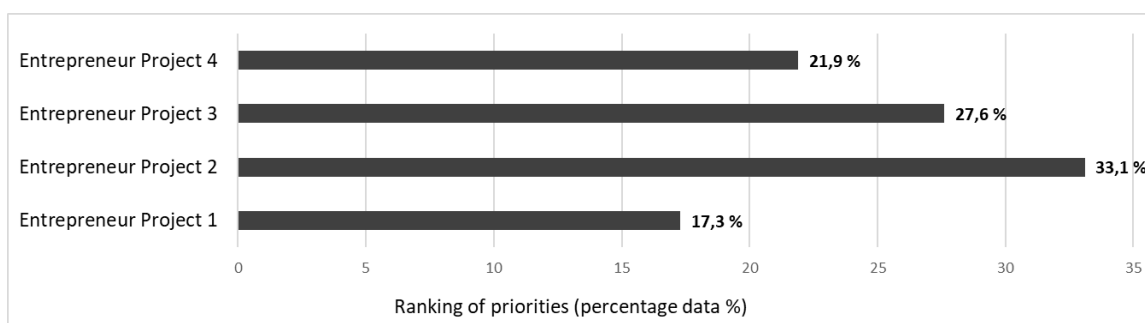
- have initiative;
- enjoy expanding activities;
- seize opportunities.

Many analyses can be carried out and with this the criteria and robustness to define the best entrepreneurial project in the dispute for public resources can be improved.

5. RESULTS AND DISCUSSION

The hierarchical design presented is a relevant result of this research as it presents a genetic model for decision-making in entrepreneurial projects. In addition, objective results were generated from the application of the model to four real entrepreneurial projects. These results characterize a ranking that prioritizes the entrepreneurs and their respective projects, which can be shown in Figure 4, between the entrepreneurs and their respective characteristics. Thus, entrepreneurial project 2 takes the first place in the ranking, followed by entrepreneurial project 3, which is significant for the decision-maker who must grant the funding.

Figure 4 – Ranking of entrepreneurial projects.

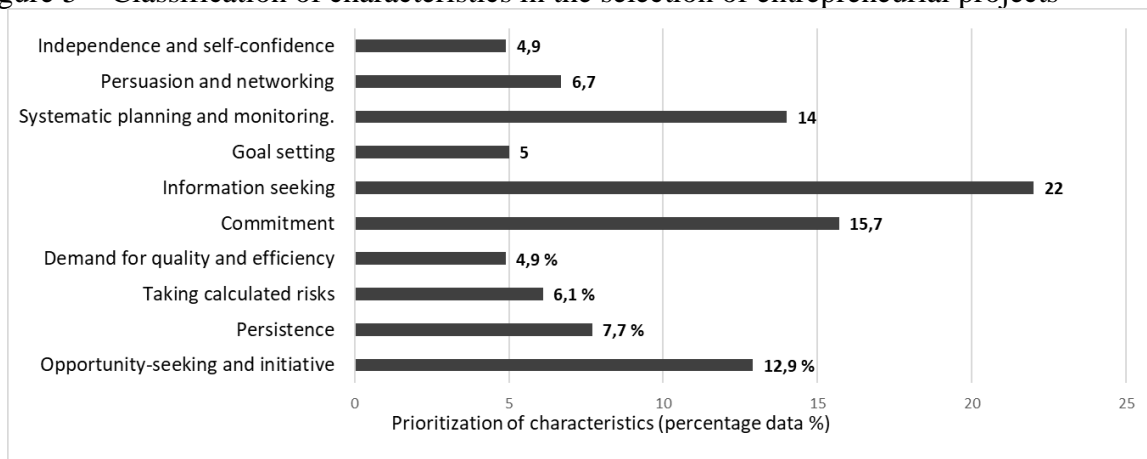


Source: Own elaboration.

Figure 4 corresponds to the ranking of priorities that show the relationship between entrepreneurial projects that achieved this performance considering the entrepreneurial characteristics together in this dispute, in this competition for the best entrepreneur and his respective project.

The survey results show in Figure 5 the prioritization of the entrepreneurial characteristics considered.

Figure 5 – Classification of characteristics in the selection of entrepreneurial projects



Source: Own elaboration.

As it can be observed, a decision cannot be made considering only 1, 2 or 3 criteria (one of them is better because it is more persistent or the other because it is more self-confident or, or because it knows how to take risks) but all criteria are analyzed together. Through the AHP technique the criteria are compared "pair by pair" among themselves and with the different entrepreneurial projects.

It can also be affirmed that the selected entrepreneurial projects have a greater capacity for the search for information, to which is added a commitment with the idea that the project to be developed with a systematic planning and monitoring execution, and with a high level of competence in the search for opportunities.

6. FINAL CONSIDERATIONS

The conclusions reached are related to the attendance and development of a multicriteria hierarchization design to improve the selection of entrepreneurial projects with the use of a rigorous AHP multicriteria decision process. With the use of the entrepreneurial characteristics referenced by McClelland it was possible to build the design involving criteria definition (characteristics), sub-criteria (sub-characteristics) and alternatives to improve the selection of entrepreneurial projects, being applicable to organisms that grant aid and financing to this type of request.

In this way, the conclusions of the study were articulated, in which the objectives of the research were achieved and extended owing to the practical application with projects of

professionals in accounting who will soon open their own offices. With this practical application it was possible to better understand the conversion of the complexity of multicriteria decision-making in the selection of projects that can be generalized and applied by public institutions when allocating investment resources.

The systematized analyses and results were very closely aligned and well oriented with the literature review and, based on this, a further step could be taken to build the design and practical application of the selection of the best entrepreneurial project through the DSR methodology with AHP. In addition to finding the best entrepreneurial project, a ranking of the following best projects was also generated and with this methodological approach and software used, sensitivity analyses could be conducted visualizing projects performance through the different entrepreneurial characteristics.

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