PUC Minas
E&G Economia & Gestão
ISSN 1984-6606

PERFORMANCE EVALUATION TO A COMMERCE AND IT SERVICES COMPANY FROM THE MCDA-CONSTRUCTIVIST PERSPECTIVE

AVALIAÇÃO DE DESEMPENHO EM UMA EMPRESA DE COMÉRCIO E PRESTAÇÃO DE SERVIÇOS EM TI SOB A PERSPECTIVA DA MCDA-CONSTRUTIVISTA

Angelita Mocelin Bett
UDESC
admangel1@hotmail.com

Fabiana Veni Tobias
UDESC
fabianatobias@gamail.com

Sueli Farias Kieling
UDESC
sfariaskieling@gmail.com

Sérgio Murilo Petri
UDESC
smpetri@gmail.com

Rafael Tezza
UDESC
rafael.tezza@udesc.br

Submissão: 19/10/2023
Aprovação: 04/04/2024

ABSTRACT

The aim of this article consisted of applying performance evaluation to a commerce and IT services company from the perspective of the Multicriteria Methodology for Constructivist Decision Aid (MCDA-C). From this, it is expected to achieve the evaluation and control of all areas that comprise the organization, through measurable indicators, in a formalized, structured and systematic way. The methodology is qualitative in nature due to considering the objectives, principles and reality of the decision maker (company manager), and quantitative due to the measurement of the performance of the studied company. Four major areas were identified: human capital, governance, services and finance, with governance with the best performance (40%) and services with the least prominence (12%) of the overall performance of the model. The outsourcing subarea had the lowest rate (2%), which is presented as a recommendation for improvement. This research contributes to towards validating the use of the methodology by this sector of the economy and for this niche business framework of Microenterprises.

Keywords: Information technology sector. Multicriteria Methodology for Constructivist Decision Aid. MCDA-C. Performance evaluation. Commerce and services.

RESUMO

O objetivo deste artigo consistiu em aplicar a avaliação do desempenho em uma empresa de comércio e prestação de serviços em TI sob a ótica da metodologia Multicritério de Apoio à Decisão Construtivista (MCDA-C). A partir deste, espera-se alcançar a avaliação e controle de todas as áreas que compreendem a organização, por meio de indicadores mensuráveis, de maneira formalizada, estruturada e sistemática. A metodologia é de natureza qualitativa devido a considerar os objetivos, princípios e realidade do decisor (gestor da empresa), e quantitativa em decorrência da mensuração do desempenho da empresa estudada. Identificou-se quatro grandes áreas: capital humano, governança, serviços e financeiro, sendo a governança com o melhor desempenho (40%) e a de serviços com menor destaque (12%) do desempenho global do modelo. A subárea de terceirização apresentou o menor índice (2%), o qual é apresentado como recomendação de melhoria. Esta pesquisa contribui no sentido de validar a utilização da metodologia por esse setor da economia e para esse nicho de enquadramento empresarial das Microempresas.

Palavras-chave: Setor de tecnologia da informação. Multicritério de Apoio à Decisão Construtivista. MCDA-C. Avaliação de desempenho. Comércio e prestação de serviços.

INTRODUCTION

The use of information and communication technology (ICT) equipment has grown exponentially in recent years in Brazil and around the world. The possibility of working and studying remotely, the realization of telemedicine, the comfort and practicality that technology allows for personal use are key points in this accelerated development. On a parallel and consequent path, the sale of ICT equipment also stands out in this market (Santos, 2022).

Companies that sell technology products or services related to this area are forced to work in a highly efficient manner to remain competitive in such a globalized, competitive and rapidly developing market. Sales of information technology products have been significant, whether to individuals or to increase companies' operational capacity (Vettorazzo, 2021; Hildebrand, 2021). This perspective is paradoxical for IT sales and service companies, while it is a challenge to keep up to date with market demand, it is a great opportunity to leverage turnover and develop the organizational structure.

Information and Communication Technology (ICT) companies play a key role in the digital transformation of organizations. According to a survey conducted by the Brazilian Association of Information Technology and Communication Companies (Brasscom) in 2022, ICTs have been essential in keeping organizations up-to-date in the market, ensuring their competitiveness, as well as increasing productivity, reducing costs, and minimizing risks in companies (Brasscom, 2023). The highly competitive market requires managers to take a strategic stance in the face of the need for efficient management, which is perhaps more latent in small and medium-sized companies - given the specificities of the external (market) or internal (hierarchy) focus; with challenges specific to ventures relating to technical, social and emotional skills; business environments such as the configuration of the organizational structure, the management model to be adopted and the resources available (Morais; Barrichello; Freitas, 2021).

Small and medium-sized businesses in Brazil account for a national generous market share. Between 2020 and 2022, there were record numbers of new business formalizations, especially due to the pandemic. However, even before this period, in 2018, the sector comprised 99% of the 6.4 million existing physical stores (SEBRAE, 2018). Given this representativeness, Araújo; Morais; and Pandolfi (2019) point out that several studies have been carried out to identify the causes of survival and mortality in this sector, due to its regional importance, participation in the Gross Domestic Product (GDP), and the economic relevance of small and medium-sized companies. The challenges faced by small and medium-sized companies include high tax burdens, economic instability, the need to adapt, resilience, motivation, and knowledge of the entrepreneur.

Inserted in a highly competitive environment, companies seek for new ways to organize themselves in order to accelerate the process of accumulation and transmission of knowledge fundamental to their business strategies (Gonçalves; Da Silva Junior, 2023; Dos Santos; Fukuda, 2023; Dos Anjos; Francisco, 2021). The scenario created by the pandemic period has raised concerns and accentuated others regarding the maintenance and installation of computers used for meetings, conducting classes, among other activities (Moraes, 2023; Dos Santos; Fukuda, 2023).

Gonçalves *et. al* (2020) argue that managers need to perform well in different managerial dimensions such as setting goals and objectives, monitoring individual development, work planning, multidisciplinary management, conflict management, effective communication, creative thinking, negotiating agreements and commitments, among others. Having the qualities of strategic orientation will be held to achieve the necessary conditions to overcome challenges and promote business success (Morais; Barrichello; Freitas, 2021).

Given this context, based on the assumption that the small and medium-sized companies sector is relevant to the economy, that to overcome the challenges the owner within this sector needs to be equipped with management tools and skills to assist in the development of his company; and also considering the relevance of the area of commerce and services in the area of Information Technology and its current expansion, this study aims to apply performance evaluation in a commerce and IT services company from an MCDA-Constructivist perspective. From this main objective, it is expected to achieve the evaluation and control of all the areas of structuring of the organization by means of measurable indicators in a formalized, structured, and systematic way.

The contribution of the research can be argued from (i) the theoretical and methodological contributions of the study and, (ii) once this methodology has been applied, the company studied will have concrete subsidies to support the management, development, and control of all areas.

The methodology was chosen due to the widespread use of this tool in a variety of economic sectors (Jordão *et al*., 2021; Nobrega Junior; Petri; Ensslin, 2021; Longaray *et al.*, 2019; Tezza; Zamcopé; Ensslin, 2010) especially because of the flexibility and adaptability made possible, since the idea is to build the performance evaluation model based on the assumptions, goals and principles relevant to the entrepreneur and the organization, in particular considering the latter's perspective in every detail, without seeking to classify the company into a systematic, but to develop the most appropriate one (Ensslin; Montibeller-Neto; Noronha, 2001; Lago; Kolling; Dos Santos, 2021).

In this sense, Neuenfeldt Júnior et al. (2015) mention that the MCDA-C methodology benefits from assisting in the decision-making process, dealing with complex issues, satisfying the needs of those involved - an important issue in the sense that a decision support methodology must be inspired with the quality of adaptability, so that it can be used by different types of institutions. According to Ensslin *et al*. (2008), evidencing the understanding of the problem to be solved is another characteristic of this methodology, because the knowledge is produced based on the decision-maker's values and goals.

THEORETICAL BACKGROUND

Small and medium-sized companies in the information technology commerce and service sector

Brazil's small and medium-sized companies are those that have annual gross sales revenues between R$ 180,000.00 and R$ 4,800,000.00. These companies have some different legal parameters, such as the unification of tax payment, covering the Federal, State and Municipal Government entities (Brasil, 2006).

Although there are tax advantages to facilitate the business process for the managers of these organizations, the reality is that the challenges of staying in operation in the national market are great, such as the high tax burden, the competitive global market, problems with costs and logistics. Several studies over time have sought to identify the reasons why such business is unsuccessful, since there are high rates of closure of companies in this group (Gonçalves *et al.*, 2020; Araújo; Morais; Pandolfi, 2019).

In view of the obstacles, companies need to take a few steps to have a long life: (i) the entrepreneur needs to have a systematic view of the organization, understanding that all sectors work and need to be thought of synergistically; (ii) it is necessary to seek external knowledge and training, to know the market and the competition; (iii) seek to achieve good relationships with its stakeholders (suppliers, customers, service providers, employees), (iv) seek systematic improvements such as reducing costs, increasing quality and others (Araújo; Morais; Pandolfi, 2019).

Considering a globalized market, it means that all fields of business suffer external impacts on the organization such as seasonality, political crises, water crises, exchange rates, among others. However, some sectors are in systematic and continuous demand, as is the case with information technology products and services. This market has been expanding steadily in recent years, especially considering the possibility of working, studying and attending all kinds of events remotely, as well as the unprecedented digital advance that is forcing companies and citizens to use technology equipment to carry out routine tasks such as paying by pix, scheduling an appointment, telemedicine - in short, the world can be accessed via a smartphone.

Therefore, managers of companies in this line of business cannot do without looking for effective means, tools, and solutions to manage their business in order to remain competitive and in operation in the market. In this context, this research aims to carry out a case study of a technology equipment sale and service company, which, to maintain confidentiality, the researchers have named "Alpha Company". The company sells technology products such as computers, smartphones, mouse, keyboards, speakers, games, and a range of related equipment. It also provides hardware and software maintenance services.

It is therefore a company based in Florianópolis/SC, a city known as an important technological hub. Since 2020, according to data from the Connected Smart Cities Ranking, the city of Santa Catarina has remained in second place in the country as the smartest and most connected city. It also ranks sixth in the technology and innovation category (Sabatini-Marques *et al*., 2020).

Considering the local scenario, it seems that the company under study is based in a location that is conducive to innovation and continuous development, which places it in a highly competitive market, considering the technology area. It currently has two stores and a workforce of around twenty people. According to the manager, one of the main goals is to make the company as "self-managing" as possible, in order that all processes are properly mapped, controlled, and organized.

In this sense, this study becomes strategic and extremely important, as it aims to produce indicators that will serve as a tool to better map and manage the strengths and, above all, the necessary improvements.

Performance Evaluation

Monitoring organizational performance is crucial for an organization to remain active and competitive in the market. In order to achieve this, organizational decision-making needs to be based on solid and concrete information. According to Nudurupati *et al*. (2011), customer demands change rapidly, requiring more sophisticated products and services. In this sense, companies find themselves in a challenging scenario where they need to offer more and better products, rely on a relevant supplier base, and have flexible processes adapted to the demanded needs.

Therefore, managers must use financial and non-financial performance indicators that align with the company's strategies. In this context, Performance Evaluation (PE) is a powerful tool that bridges the gap between the desired and achieved organizational objectives. Through this comparison, strengths and bottlenecks can be identified.

Gonçalves (2021) allocates the evolution of PE into two major phases: until 1980, evaluations were based on financial measures with a focus on profit and productivity. The second phase, starting from the late 1980s, recognizes that purely financial measures do not encompass the success of organizations in a complex and interconnected context, demanding new tools and evaluation methodologies.

Although there is no consensus on the PE topic (Gonçalves, 2021; Rodrigues, 2021), some authors provide definitions such as Forza and Salvador (2000, p. 359), who define

Performance Evaluation System as an information system aiming to "structure communication between all organizational units (individuals, teams, processes, functions, etc.)" and to "collect, process, and deliver information about the performance of people, activities, processes, products, business units, etc."

Furthermore, performance evaluation is a methodology that involves "establishing a contract with employees regarding the results desired by the organization, monitoring the proposed challenges, correcting the course when necessary, and evaluating the results obtained" (Pontes, 2021, p. 26). In summary, the process involves setting objectives, monitoring results, and providing feedback, with the entire process linked to the company's vision.

Among various definitions of Performance Evaluation, the concept of Ensslin, Ensslin, and Dutra (2009, p. 5) stands out in this research:

> Performance Evaluation is the process with an approach in harmony with its application to build knowledge in the decision-maker, regarding the specific context it aims to evaluate, based on the decision-maker's perception through activities that identify, organize, measure ordinally and cardinally, and their integration and the means to visualize the impact of actions and their management.

Considering the performance evaluation process, the choice of a methodology composed of criteria that best suits the organization's expectations becomes necessary. According to Gonçalves (2021), the measurement process is present in the activities that make up a company's daily routine, and to evaluate performance, it is crucial to compare it with the established criteria to pursue necessary improvements.

In this sense, there are some methodologies designed to perform this performance evaluation, each one with its specificities and advantages. Without aiming to exhaust the topic and methodologies, we will discuss the study conducted by Neuenfeldt Júnior *et al*. (2015), where the authors comparatively analyzed three multicriteria performance evaluation methodologies for decision support: Multicriteria Methodology for Constructivist Decision Aid (MCDA-C), Data Envelopment Analysis (DEA), and Analytic Hierarchy Process (AHP). The authors examined characteristics such as subjectivity, simplicity, adaptability, acceptance, and management - "criteria considered desirable for decision support methodologies and performance evaluation" (Neuenfeldt Júnior *et al*., 2015, p. 9). The methodologies are briefly presented as follows:

a) Multicriteria Methodology for Constructivist Decision Aid (MCDA-C)

This methodology is an extension of the traditional Multicriteria Methodology for Decision Aid (MCDA) and differs in that MCDA-C inherently aims to assist decision support without seeking the best solution (traditional method criterion). According to Ensslin *et al*. (2010), MCDA-C is constructed in three stages: Structuring, Evaluation, and Recommendations.

b) Data Envelopment Analysis (DEA)

This methodology, abbreviated as DEA (Data Envelopment Analysis), originated from the research of Charnes, Cooper, and Rhodes (1978), initially conceived with a focus on evaluating public educational programs. This approach involves efficiency analysis to compare the efficiency of Decision Making Units (DMUs) against the resulting efficiency, emphasizing the optimization of efficiency (Neuenfeldt Júnior *et al*., 2015).

c) Analytic Hierarchy Process (AHP)

This methodology, originating from the 1970s and stemming from the studies of Thomas L. Saaty, involves decomposing the original problem into subproblems. This allows

for obtaining a clear and measurable item to facilitate the selection of the best alternative, considering the criteria. By establishing a hierarchical structure, the assigned priorities become clear. Relative weights are assigned to existing attributes, and pairwise comparisons are conducted (Neuenfeldt Júnior *et al*., 2015).

Figure 1 presents a comparative classification based on the criteria analysis used by Neuenfeldt Júnior *et al*. (2015). In the figure, the intention is to score each methodology according to the perceived advantage in relation to the analyzed criterion.

Figure 1. Desirable Characteristics for Decision Support and Performance Evaluation Methodologies

Criteria	MCDA-C	DEA	AHP
Subjectivity	1	3	2
Simplicity	3	1	2
Adaptability	2	1	2
Acceptance	2	1	2
Management	2	1	0
Total	**10**	**7**	**8**

Source: Developed by the authors (2023), based on the study by Neuenfeldt Júnior *et al*. (2015).

Upon observing Figure 1, it is evident that all methods have advantages and disadvantages; however, a scale of advantage can be identified concerning the analyzed criteria. Regarding subjectivity, the DEA methodology has the highest advantage, presenting with the least subjectivity, followed by AHP, and finally, MCDA-C. Concerning simplicity, MCDA-C is the method with the highest level of simplicity, followed by AHP, and lastly, by DEA (considered the most complex by the authors). Regarding adaptability, the MCDA-C methodology and AHP are equivalent as the most adaptable, followed by DEA. Regarding acceptance, once again, there was a tie between the MCDA-C and AHP methodologies, with DEA being classified as potentially less accepted. Finally, regarding the management criterion, the MCDA-C methodology scored the highest, followed by DEA, and AHP did not score.

Thus, it is evident that the Multicriteria Methodology for Constructivist Decision Aid (MCDA-C) methodology presents itself as the most advantageous or useful, as it ranks at excellent levels concerning the criteria of simplicity, adaptability, acceptance, and management, even though it appears as the most subjective methodology. However, this characteristic, while not desirable, is especially due to the constructivist nature in which decision-makers apply criteria according to their own organizational objectives – a significant differentiator of this methodology used in this article, as presented in the next section.

Multicriteria Methodology for Constructivist Decision Aid (MCDA-C)

The decision-making process involves choosing between alternatives and possibilities; based on a problem or situation that could be improved, using pre-established criteria and goals, the best alternative is chosen (Bateman; Snell, 2011).

The Multicriteria Methodology for Constructivist Decision Aid was chosen for its exploratory nature and the intrinsic construction of the model based on the precepts of the process owner. Based on the objective of this study - to apply performance evaluation to IT commerce and services companies from a MCDA-Constructivist perspective - this methodology proved to be suitable in the sense that it enables the use of qualitative and quantitative criteria, to address all the aspects involved in the manager's decision-making.

The origin of MCDA-C dates back more than two centuries; however, it was only with the works of Roy (1996) and Landry (1995) that the methodology solidified as a scientific management tool (Ensslin *et al*., 2010). The European School of thought had a significant influence on the MCDA-C methodology, as the transition of many researchers from military institutions to industries, consultancies, universities, and government agencies facilitated the dissemination of their methods and procedures to develop processes that offered solutions to organizational problems (Gonçalves, 2012).

MCDA-C stems from traditional MCDA, and the difference between the two lies in the adopted paradigm. While MCDA is framed within the rationalist paradigm, MCDA-C embraces the constructivist paradigm. By adopting the rationalist paradigm, MCDA aims to create a more precise model to describe reality, seeking the optimal solution to the problem. This solution should be effectively applied in various contexts. On the other hand, the constructivist paradigm adopted by MCDA-C does not aim to obtain an optimal solution but rather to assist in decision-making by developing knowledge in complex contexts, considering the value systems of participants in decision-making (Neuenfeldt Júnior *et al*., 2015).

Due to its characteristics, which allow the manager to participate in the decision-making process, MCDA-C enables the process of constructing evaluation criteria in various contexts. We can mention Cunha *et al.* (2021) who used the methodology to propose a predictive risk assessment model for airport runway maintenance in Brazil; Nobrega Junior *et al.* (2021) built a model based on MCDA-C for the decision-making process regarding the investment of funds in Closed Private Pension Entities; and Ensslin *et al.* (2010) developed an assessment model for outsourced companies in the telecommunications area. Other studies, such as Tezza, Zamcopé and Ensslin (2010), used the methodology in the textile printing sector, aiming to develop a constructivist system to identify, evaluate and develop the skills and competencies of employees in this sector; and Wessler *et al*. (2013) carried out a performance evaluation of the assistance programs of the Unified Health System in the municipalities belonging to the Tubarão Regional Development Secretariat, Santa Catarina.

The operationalization of MCDA-C as an intervention tool, according to Kich *et al.* (2014) and Cunha *et al.* (2021) consists of three distinct but interrelated phases: (i) structuring the decision-making process; (ii) the evaluation phase with the construction of scales and the definition of substitution rates with the adoption of preferences by the decision-maker, and (iii) the recommendations phase based on the proposal of actions to improve performance (Ensslin *et al*., 2008; Neuenfeldt Júnior *et al.*, 2015).

In the structuring phase, the process of understanding the context and the problem takes place, and the actors involved in the decision-making process (decision-maker, facilitator, and stakeholders) are defined. Once the decision-maker(s) has(have) been included, a structure is created which must represent the organization's goals and how these will be achieved in a systematized way (Ensslin, Montibeller Neto; Noronha, 2001). This phase also involves determining the Primary Assessment Elements (PAEs), which can be phrases or concepts that the decision-maker considers important to address. From each PAE, points of view considered as fundamental (FPV) to the decision-maker were extracted, giving rise to the points of view tree (hierarchical structure of goals); and finally, the construction of descriptors (Kich *et al*., 2014; Ensslin *et al*., 2008). The descriptors are the most detailed part of the objective, consisting of the indicator that will be measured by the decision-maker for

decision-making, being linked to a FPV and this to an Elementary Point of View (EPV), and finally, to a major area of concern. Therefore, the descriptor must be measurable, unambiguous, and ordered in terms of preference as understood by the decision-makers (Tezza, Zamcopé; Ensslin, 2010).

The evaluation phase involves building a mathematical model in which the descriptors with their impact levels (Ensslin *et al*., 2008) will allow the performance of the organization studied to be measured using value functions associated with each descriptor. This phase includes the stages of constructing value functions (mathematical representation of the decision-maker's preferences for the levels of impact identified); determining the rates of compensation/substitution between the objectives; and based on the rates, carrying out the overall assessment of the model (Ensslin *et al*., 2008; Tezza, Zamcopé; Ensslin, 2010).

The recommendation phase consists of making suggestions for actions to improve the organization's performance, as well as improvements in criteria that do not meet the current perspectives. Based on the improvement actions envisioned, the sensitivity analysis of the modeling responses to these actions is carried out. It is then possible to ascertain the improvements to be achieved when intervening in the organization's performance (Ensslin *et al*., 2008; Tezza, Zamcopé; Ensslin, 2010).

When analyzing these methodologies in addition to MCDA-C, considering the criteria of subjectivity, simplicity, adaptability, acceptance and management, the authors mention that the Multicriteria Methodology for Constructivist Decision Aid was the only one that, due to its constructivist conception, presents the possibility of monitoring events and establishing a management process for activities; as well as "allowing the impacts of an action on the overall performance of the organization to be identified, permeating the various levels under evaluation" (Neuenfeldt Júnior *et al*., 2015, p. 17).

Another positive aspect of using MCDA-C is the tool's adaptability to different sectors and companies. According to Neuenfeldt Júnior *et al*. (2015, p. 15) "the adaptability of a decision support methodology is a desirable characteristic, because only then it may be applicable to different scenarios", which makes it possible to use it in different segments and even compare the results for companies/institutions in the same sector.

METHODOLOGICAL PROCEDURES

Types of Research

This research is classified as qualitative because it considers the objectives, principles and reality of the decision-maker (company manager), and also quantitative because it uses scales to measure the performance of the company studied.

The research is also classified as exploratory due to the aim of the study, which is to analyze the performance of "Alpha Company". From a paradigmatic perspective, the study is classified as constructivist (Saccol, 2009), considering that the construction of knowledge took place through the subject matter-object relationship, which included semi-structured interviews with the company's manager to gain an in-depth understanding of the case studied, in which the entrepreneur seeks decision support tools to better work, manage and improve current processes.

Due to the constructivist nature of the methodology, in which the process is developed around meeting the wishes of the manager(s), the perspective requires a case study, contextualized in organizational life, i.e., this methodology gives rise to a case study due to the intrinsic constructivist nature of MCDA-C.

For this purpose, the Constructivist Decision Aid methodology (MCDA-C) was used, a management tool chosen because it allows flexibility in relation to the decision-maker's needs, developed specifically for this organization, and therefore the results cannot be generalized.

Data collection and analysis

Data was collected through online interviews between the decision-maker (owner of the company studied) and the facilitators (authors). The conversations took place over fourteen meetings, totaling approximately 16 hours.

The first meetings were used to explain the methodology, the phases to be worked on and the goals to be achieved according to the purpose/problem to be worked on. The decision-maker told us about his company, in terms of operating procedures, management, finances and the main characteristics of the work teams (sales and maintenance of IT and technology devices). He also allowed us to learn a little about the fact pattern of the company and the manager himself - needs, challenges, strengths, and areas for improvement.

After presenting both sides, the decision-maker described the problem he wanted to work on: controlling and improving all the processes within the organization. The purpose of the work was then to carry out the MCDA-C methodology, consisting of 3 phases: structuring the decision-making model, evaluation, and recommendations.

The process begins with the structuring phase, which includes characterizing the context and the actors, resulting in the descriptors for the expected goals.

Using the brainstorming technique, the Primary Assessment Elements (PAEs) were written down in the form of phrases, words, in a random and unstructured way, to cover as many sectors, processes and procedures as possible that could be measured in the company. This phase ended with 29 PAEs, which were then grouped into small areas that allowed the decision-maker to see the company. By allocating each PAE to the four large areas established, it was decided to eliminate seven PAEs that were found to be ambiguous; and finally, the hierarchical value structure was finalized.

The next phase consisted of identifying the Fundamental Points of View (FPV), followed by the Elementary Points of View (EPV); and finally, to detail each level as much as possible, the descriptors were created.

Once all the descriptors had been created, the total model went through final validation by the decision-maker, to make any final adjustments that might be necessary so that it accurately reflected the performance measurement needs of the specific organization.

In all the meetings, the decision-maker was very receptive and collaborative in terms of contributing and discussing organizational situations, and the meetings took place very smoothly, with contributions from both sides.

RESULTS

Building the analysis model

In the structuring phase, the problem was contextualized, covering the performance evaluation process of the “Alfa” IT Commerce and Services company from a MCDA-C perspective. The purpose of study is a company that sells Information Technology services and products and has two units in the city of Florianópolis/SC.

The first stage was to identify the actors involved, as shown in Figure 2, and considering the decision-maker’s needs, the label defined was: “apply performance evaluation to IT commerce and services company from a Multicriteria Methodology for Constructivist Decision Aid (MCDA-C) perspective”. Based on the label, the decision-maker was encouraged to explain the concepts, goals, values, and phrases that referred to the objectives, which gave rise to the Primary Assessment Elements (PAEs). The manager's intention was to coordinate all areas involved in the company – precisely what a Performance Evaluation System advocated by Forza and Salvador (2000) envisages – to create a link between team communication, processes, as well as generate information about organizational performance (activities, individuals, processes, etc.).

Furthermore, the manager's intention is also supported by theory when Pontes (2021) advocates the use of performance evaluation to monitor new goals, address necessary points for correction, and conclude with an assessment of the achieved results.

Figure 2. Players

PLAYERS INVOLVED	
Acting	Company owner
	Company employees
Decision-makers	Company owner
Stakeholders	Suppliers
	Government
Facilitators	Research authors

Source: research data.

The Primary Assessment Elements explained by the decision-maker, after some adjustments, are shown in Figure 3.

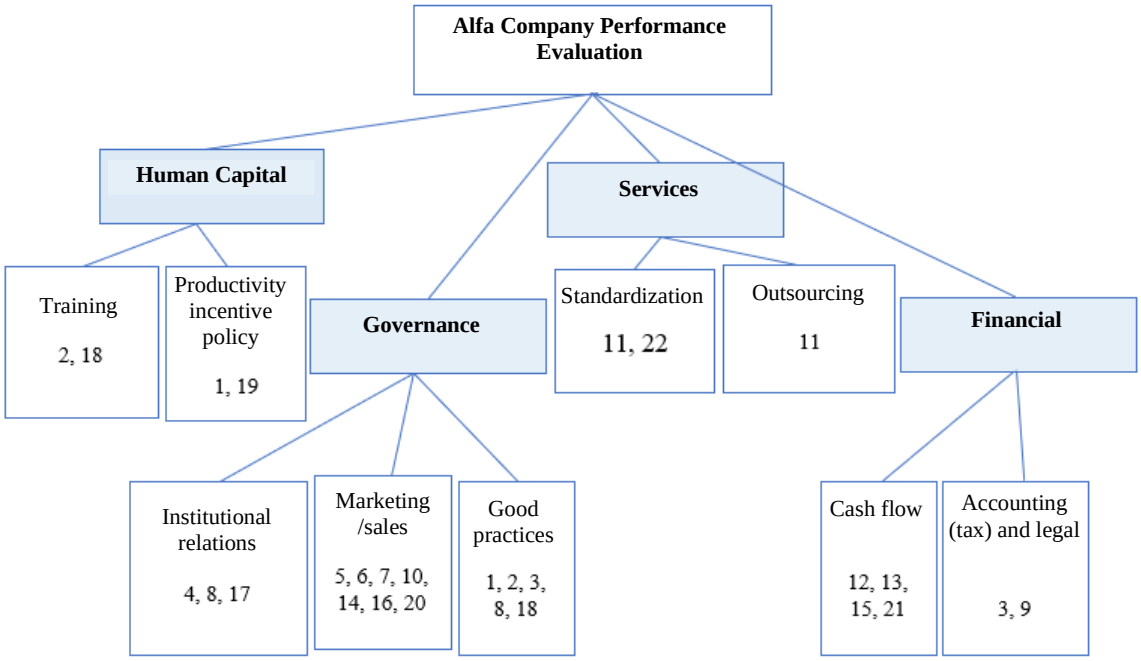
Figure 3. Primary Assessment Elements and their concepts

	PAEs	CONCEPTS
1	Professional motivation	Negotiate with employees to obtain team engagement/motivation
2	Regular employee training	Regular sales training
3	Compliance with supervisory bodies	Complying with the law regarding inspection bodies (City Hall, State, Internal Revenue Service)
4	Regular meetings	Hold regular meetings to update company and employee information and needs
5	Excellence in service	Excellence in customer service
6	Articulated social networks	Proper use of social networks
7	Leveraging	Leverage e-commerce
8	E-commerce	Good communication between the owners (family business)
9	Good communication	Have an adequate accounting/legal structure for the company
10	Adequate legal/accounting structure	Standardize customer service procedures
11	Standardized repair procedures	Standardize equipment repair procedures
12	Cash flow management	Manage cash flow
13	Negotiation with suppliers	Have an area for negotiating with suppliers
14	Increased revenue	Increase revenue
15	Cost reduction	Reduce costs
16	Hours of operation	Have opening hours and evaluate the positive and negative impacts of the decision
17	Delegation	Delegate activities and responsibilities to employees
18	Training courses for managers	Offer training courses for managers in the areas of business management, finance, accounting, law, marketing, etc.
19	Incentive policies	Offer a productivity incentive policy
20	Product portfolios	Increasing the product portfolio
21	Inventory	Manage and analyze stocks (just-in-time model)
22	Updating IT systems	Update new IT systems

Source: research data.

After the PAEs had been drawn up, the decision-maker and the facilitators grouped the Primary Assessment Elements into large areas called Fundamentals Points of View (FPVs) (Training, Productivity incentive policy, Institutional relations, Marketing/Sales, Good practices, Standardization, Outsourcing, Cash flow, Accounting (tax) and Legal) (Figure 4). The PAEs were then broken down into Elementary Points of View or sub-areas (Training, Productivity Incentive Policies, Institutional Relations, Marketing/Sales, and others) (Figure 4).

Figure 4. Aggregation of the Primary Assessment Elements into broad areas

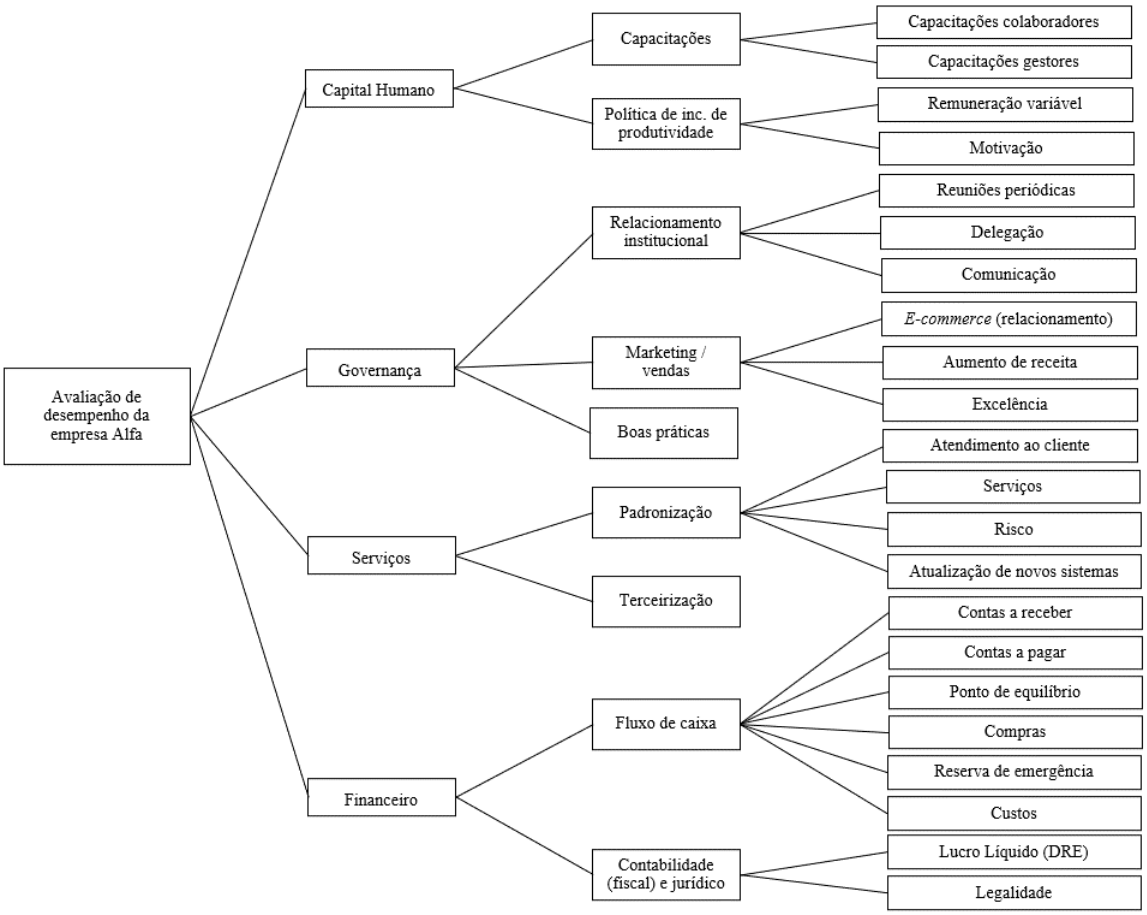


Source: research data.

According to the systematized scheme, Figure 5 shows the final version of the Fundamental Points of View Tree, composed of:

- 04 major areas;
- 09 Fundamentals Points of View (FPVs);
- 22 Elementary Points of View (EPVs).

Figure 5. Fundamental Points of View and Elementary Points of View Tree



Source: research data.

After breaking down the Fundamnental Points of View into Elementary Points of View, we went on to create the descriptors, which consist of a grouping of impact levels aimed at assessing the performance of potential actions for each Fundamental Point of View (Tezza, Zamcopé; Ensslin, 2010).

A descriptor is the most detailed/decomposed unit of measurement, which the decision-maker will use to measure the desired objective, and in this research 38 descriptors were constructed. Figure 6 shows the performance of the "types of training" descriptor on 5 levels, with the "good" reference set at N4 according to the decision-maker, while the "neutral" reference is set at N2.

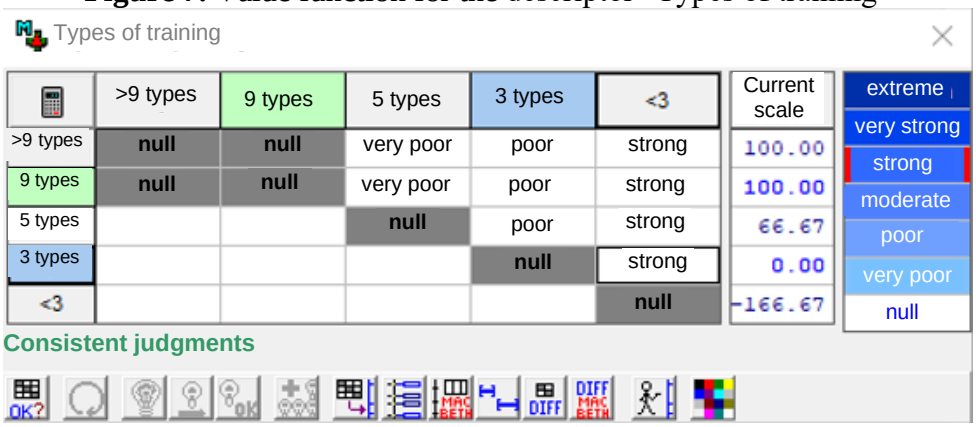
Figure 6. Descriptor, scale level and value function

FPV	EPV	Descriptor	Level	Reference	Ordinal measurement scale
Training	Training managers	Types of training	N5		> 9 types
			N4	Good	9 types
			N3		5 types
			N2	Neutral	3 types
			N1		< 3 types

Source: research data.

Next, it is necessary to construct the value function. These functions are built according to the decision-maker, who makes a pairwise comparison for each descriptor in relation to attractiveness, in order to present their preferences in a quantitative way, on an ordinal measurement scale and the Macbeth® software (Measuring Attractiveness by a Categorical Based Evaluation Technique) was used for this. Figure 7 shows a screen shot generated by the Macbeth® software of the value function for the "types of training" descriptor.

Figure 7. Value function for the descriptor "Types of training"

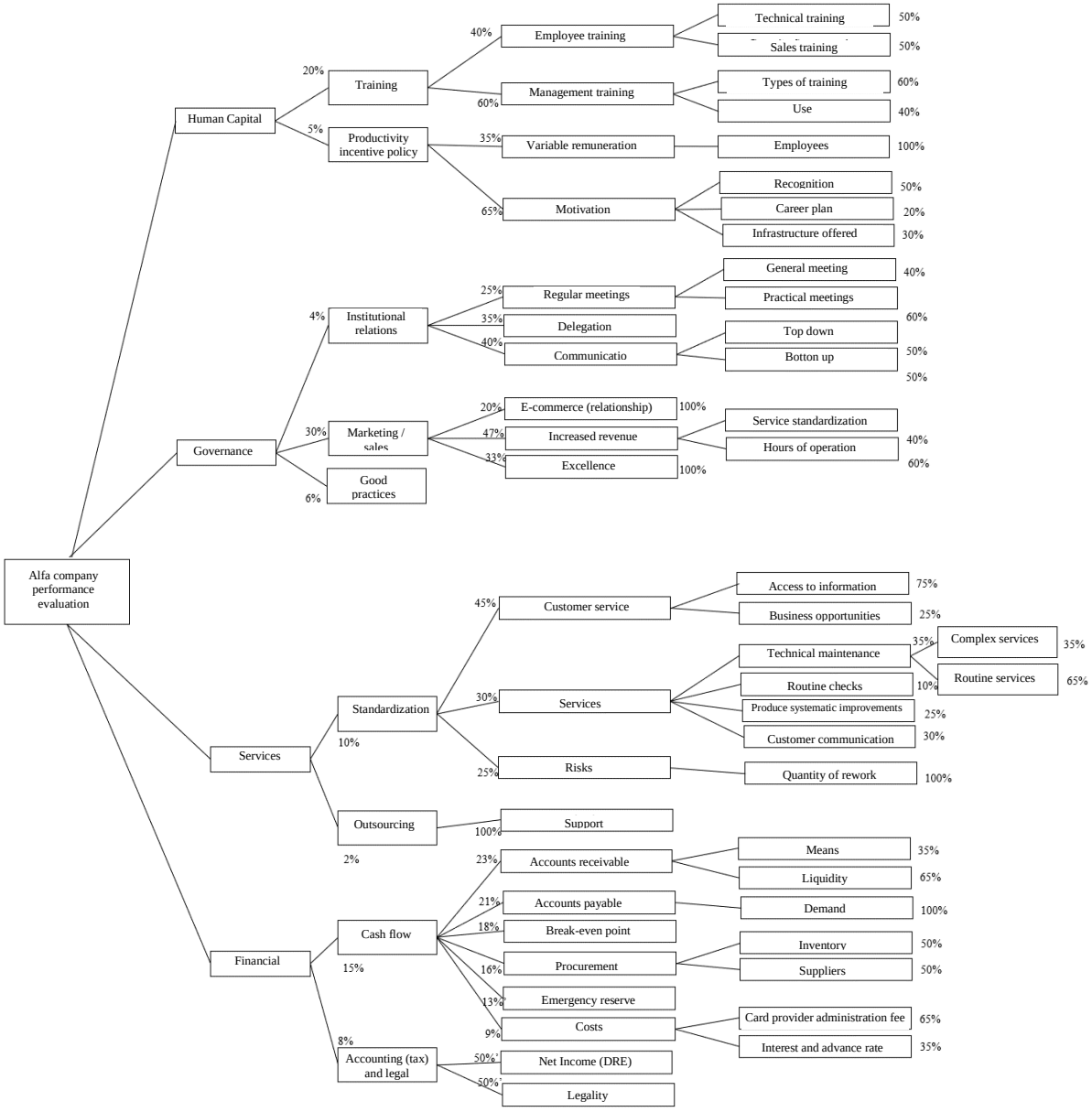


Source: research data.

So far, local performance has been assessed. To obtain an overall assessment, a set of parameters associated with the criteria is required, which are called substitution or compensation rates. According to Carneiro (2011, p. 1), "compensation rates are parameters that decision-makers deem appropriate to aggregate, in a compensatory manner, local performances (criteria) into an overall performance". To this end, the swing weights (SW) method was used, which consists of the decision-maker weighting the balance of the multicriteria decision analysis (Tervonen *et al*., 2017).

Figure 8 shows the hierarchical structure of value and substitution rates. The higher the percentage value given, the greater the importance of that item in overall performance. We can see that the large Governance area encompasses the Fundamental Points of View: Institutional Relations (4%), Marketing/Sales (30%) and Good Practices (6%), representing 40% of the overall performance value, and is considered the area of greatest relevance to the model. As a result, a performance considered low in this item will have an impact on the overall performance result.

Figure 8. Hierarchical value structure and substitution rates



Source: research data.

Figure 8 therefore shows the relative importance of each EPV and FPV for the model. Based on the model structured for Alpha and starting from the substitution rates calculated using swing weights, the modeling performance was calculated to assess the organization's performance according to the current situation. To do this, the additive aggregation formula (below) was used, according to the equation presented below, allowing the overall performance to be identified.

$$V(a) = W1*V1(a) + W2*V2(a) + W3*V3(a) + ... + Wn*Vn(a) \quad (1)$$

Where:

- V(a) = overall value of the potential action;
- V1(a), V2(a), V3(a), ..., Vn(a) = partial value of criteria 1, 2, 3, ..., n;
- W1, W2, W3, ..., Wn = substitution rates for criteria 1, 2, 3, ..., n;
- n = number of criteria used in the modeling according to the equation presented.

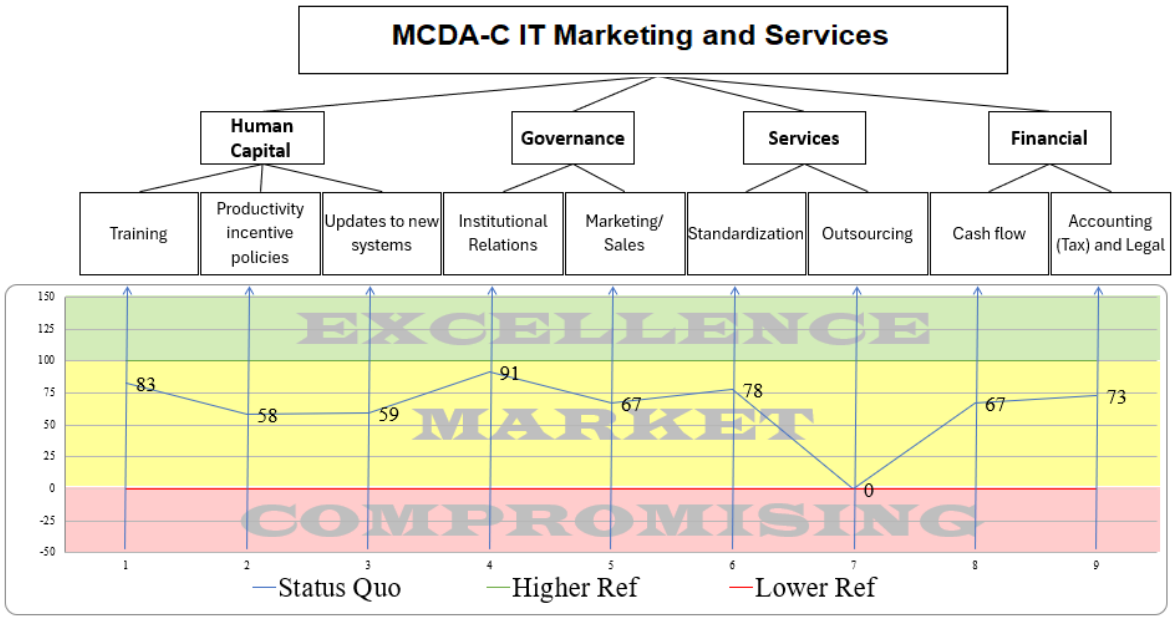
Using the additive aggregation formula, the result a was V (a) = 94 points.

DISCUSSION

Considering the value obtained of 94 points within a range of 0 to 100, it can be seen that Alpha achieved competitive performance, which evidences the status quo of most of the indicators, in which the organization was rated at a good level.

Figure 9 shows Alpha's competitive performance by presenting the impact of the FPVs and its status quo.

Figure 9. Impact Profile of the Fundamental Points of View



Source: research data.

Also based on Figure 9, it is possible to see that there was no negative FPV performance. And that the marketing/sales FPV and the standardization FPV reached the level of excellence. In summary, the model has four major areas, with the results presented below.

The large governance area was responsible for 40% of overall performance, made up of three sub-areas (FPVs): institutional relationships (4%), good practices (6%) and marketing/sales (30%). Among these, the most expressive FPV was impacted by the EPV increased revenue, which is more relevant to the decision-maker, since he considers it essential for the healthy development of the organization - which corroborates the importance given to the descriptor opening hours (expanded service at the units).

The second major area - human capital - corresponds to 25% of overall performance and shows that the decision-maker prioritizes the development of managers, qualifying them in various areas: finance, human resources, sales, planning, leadership, brand concept, digital marketing, and others. On the other hand, the FPV Productivity Incentive Policies receives less attention from the organization, which only includes descriptors related to employees. According to the decision-maker, well-qualified managers are able to properly qualify their employees.

The third area, called finance, is responsible for 23% of the model's performance and includes the sub-areas accounting (tax)/legal and cash flow. The cash flow sub-area receives the most attention from the decision-maker for this Fundamental Point of View, which comprises 15% of the large area, and is most strongly impacted by the accounts receivable

EPV (23%), with the liquidity descriptor also showing 65% representation; in other words, the decision-maker pays attention to financial availability.

The least important area is services, responsible for 12% of the model's overall performance. Among the FPVs, the outsourcing sub-area had the lowest index (2%). This result can be attributed to the decision-maker's management style, which gives preference to a high level of qualification for managers, enabling them to efficiently train their employees, thus outsourcing only extraordinary services.

With an excellent result, Alpha had most of the descriptors in the status quo at the top level according to the MCDA-C methodology. This performance demonstrates the manager's knowledge, as well as his ability to engage the team, focusing on organizational objectives and seeking continuous development.

However, upon examining Figure 9, a concern arises regarding the performance of the outsourcing PVF, which is hindered by the descriptor "support." This entails the execution deadlines for services sent to external partners, indicating a need for improvement.

Moving on to the recommendation phase, the third stage of the methodology, which aims to suggest improvement actions based on the organization's performance and considering the low performance demonstrated in the outsourcing PVF, it is recommended to implement an Action Plan to enhance the outsourcing PVF. The goal is to reduce the execution time for services sent to external partners. To achieve this, the following suggestions are made: (i) mapping partners and their respective service delivery times; (ii) investigating the reasons for delays, identifying critical points; (iii) based on critical points, employing supplier support strategies, such as logistics and training, to enhance supplier performance while also creating value for the organization. If, after adopting these strategies, the result is not satisfactory, it is recommended to seek new service providers who can meet tight deadlines.

Therefore, the need for the use of a performance evaluation methodology is highlighted so that the company can measure organizational processes and correct deviations, aiming to achieve the desired results (Gonçalves, 2021; Pontes, 2021).

With that said, considering the highly competitive environment and the need for a model capable of assessing the organization's actual performance based on criteria prioritized by the manager, it is evident that adopting the MCDA-C-based model for the organization has contributed to assisting the manager in decision-making due to its constructivist aspect.

CONCLUSION

The aim of this study was to build a model for evaluating the performance of an IT commerce and services company from a Multicriteria Methodology for Constructivist Decision Aid (MCDA-C) perspective. For this purpose, the structuring phase was carried out, which included contextualization, defining the actors, surveying the Primary Assessment Elements, giving rise to the Fundamental Points of View and the descriptors. In the evaluation phase, the value functions for each descriptor and their substitution rates were constructed, and this process led to the model's global equation, the result of which shows competitive performance for the company in most of the Fundamental Points of View.

In this context, the methodology proved to be efficient by enabling the systematic structuring of organizational objectives, principles, and goals in a flexible and tailored manner to meet the company's needs, fulfilling the exploratory proposal. It is worth highlighting the broad adaptability, a well-scored criterion for MCDA-C (Neuenfeldt Júnior *et al.*, 2015), granted to this methodology, which can be applied to various economic sectors. Its primary objective is to develop the most suitable solution for the organization (Ensslin; Montibeller-Neto; Noronha, 2001; Lago, Kolling, Dos Santos, 2021).

According to the results presented in the previous section, the company obtained an excellent performance, which classifies it as competitive in the MCDA-C. However, it is recommended that the decision-maker selects new service providers who can serve him with shorter lead times.

In using constructivist methodology, the research has limitations in terms of application: it is a case study and only conclusions can be drawn for this context. Another limitation is the fact that the methodology assumes that the modeling context is applied from the perspective of the decision-maker(s)—in this study, it was a single decision-maker, introducing subjectivity to the process with the potential for biases – something undesirable according to criteria considered essential in Performance Evaluation methodologies according to (Neuenfeldt Júnior *et al*., 2015). As MCDA-C is a tool to help management, it is applied to the decision of the manager(s) and does not involve employees.

At the same time, this subjectivity is a characteristic of the methodology itself when it is placed under the constructivist approach - not presenting the result as a final product, as the best choice; but, above all, it proposes the production of knowledge through the evolution of the process (Neuenfeldt Júnior *et al*., 2015).

Precisely because it takes this particularity into account, modeling is useful for the decision-maker to use this tool as a basis for better decision-making, to control and improve objectives that are currently unsatisfactory.

The study provides theoretical contribution by confirming/validating the use of the methodology in this economic sector and for this niche of Microenterprises business framing—usually a more vulnerable sector of the market, where the manager needs to be supported by effective strategies to keep the organization active and in constant development (Morais, Barrichello, and Freitas, 2021).

The research also brought practical contributions to the company in the sense that the manager reported the possibility of visualizing the entire scenario surrounding the business management of their enterprise - made possible through the construction of the Fundamental Viewpoints Tree (FVT), culminating in the visualization of the entire process to be addressed in the methodology; and, finally, another practical contribution by enabling it to serve as inspiration for other organizations to develop and explore the use of the tool to address their problems and needs. In summary, this research facilitated the development of performance indicators based on the constructivist methodology from the manager's perspective, allowing the identification of priorities and the development of recommendations to improve organizational performance. Furthermore, the systematic presentation adopted by the MCDA-C methodology enables readers and managers to visualize the elements evaluated, potentially inspiring them to adopt MCDA-C or use other performance evaluation methodologies. This is because, in a competitive and ever-changing scenario, it becomes a necessity to understand the real objectives, possibilities, and organizational limitations in order to measure, control, and enhance them.

For future research, it is suggested to apply other performance evaluation methodologies for information technology companies in order to enable comparison between the results obtained. Another possibility would be the use of the MCDA-C methodology in other IT service companies to ascertain similarities and differences in the application of performance evaluation criteria and the results achieved.

ACKNOWLEDGMENTS

The authors would like to thank The Fundação de Amparo à Pesquisa e Inovação do Estado de Santa Catarina (Fapesc) for the financial support.

REFERENCES

ARAÚJO, Felipe Emidio de; MORAIS, Fábio Rogério de; PANDOLFI, Edgar de Souza. The fable of the living dead: determinants of corporate mortality present in micro and small active enterprises/A fábula dos mortos-vivos: determinantes da mortalidade empresarial presentes em micro e pequenas empresas ativas/La fabula de los muertos vivos: determinantes de la mortalidad empresarial en micro y pequenas empresas activas. **Revista de Empreendedorismo e Gestao de Pequenas Empresas**, v. 8, n. 2, p. 250-272, 2019.

BATEMAN, Thomas S.; SNELL, Scott A. Administração: novo cenário competitivo. 2 ed. reimpr. **São Paulo: Atlas**, 2011.

BRASIL. **Lei Complementar nº 123,** de 14 de dezembro de 2006. Institui o Estatuto Nacional da Microempresa e da Empresa de Pequeno Porte. Disponível em http://www.planalto.gov.br/ccivil_03/leis/lcp/lcp123.htm. Acesso em 10 mai. 2022

BRASSCOM. Associação das Empresas de Tecnologia da Informação e Comunicação (TIC) e de Tecnologias Digitais. **Relatório Setorial 2022 Macrossetor de TIC**. 2022. Disponível em: https://brasscom.org.br/wp-content/uploads/2023/05/BRI2-2023-008-001-Relatorio-Setorial-v32-versao-resumida-SITE_compressed.pdf. Acesso em 18 de jan. 2024.

CUNHA, Daniel A.; ANDRADE, Michelle; PRADO, Lucius A.; SANTANA, Leonardo O; DA SILVA, Marcos Paulo Gonçalves. RISK assessment in airport maintenance runway condition using MCDA-C. **Journal of Air Transport Management**, v. 90, p. 101948, 2021.

ENSSLIN, Leonardo; Giffhorn, Edilson; Ensslin, Sandra Rolim; PETRI, Sérgio Murilo; VIANNA, William Barbosa. Avaliação do desempenho de empresas terceirizadas com o uso da metodologia multicritério de apoio à decisão-construtivista. **Pesquisa operacional**, v. 30, p. 125-152, 2010. Doi:https://doi.org/10.1590/S0101-74382010000100007

ENSSLIN, Leonardo; MONTIBELLER NETO, Gilberto; NORONHA, Sandro Mac Donald. Apoio à Decisão: Metodologias para Estruturação de Problemas e Avaliação Multicritério de Alternativas. 1. ed. Florianópolis - SC: Insular, 2001. v. 1000. 296 p.

ENSSLIN, Sandra Rolim; CARVALHO, Fernando Nitz; GALLON, Alessandra Vasconcelos; ENSSLIN, Leonardo. Uma metodologia multicritério (MCDA-C) para apoiar o gerenciamento do capital intelectual organizacional. **RAM. Revista de Administração Mackenzie**, v. 9, p. 136-162, 2008. doi: https://doi.org/10.1590/S1678-69712008000700007

GONÇALVES, Fernando Hungaro Lemes; BATISTA, Rosana Cláudia Semék; PIFFER, Vanessa; DE ALBUQUERQUE, Artur Aguiar; DE MORAIS, Fábio Rogério. Essential Managerial Skills for Brazilian Micro and Small Business Managers. **International Journal of Business Administration**, v. 11, n. 3, p. 60-71, 2020. Doi: https://doi.org/10.5430/ijba.v11n3p60

GONÇALVES, Marco Aurélio. **Avaliação do desempenho de oficiais militares, fundamentada na metodologia multicritério de apoio à decisão construtivista - MCDA-C**. Dissertação de mestrado, Universidade do Sul de Santa Catarina, Florianópolis, SC, Brasil. 2013. Disponível em:

https://repositorio.animaeducacao.com.br/bitstream/ANIMA/2958/1/107293_Marco.pdf. Acesso em 15 mai. 2022.

HILDEBRAND, Yuri. **Venda de PCs cresce no Brasil em 2021, mas preços sobem cerca de 20%.** Techtudo. Disponível em: https://www.techtudo.com.br/noticias/2021/06/venda-de-pcs-cresce-no-brasil-em-2021-mas-precos-sobem-cerca-de-20percent.ghtml. Acesso em 10 out. 2022.

JORDÃO, Kaylla Lage; GONÇALVES, Tiago José Menezes, DA GAMA, Daniela; DE MORAES, Daniela da Gama e Silva Volpe Moreira. Proposta de uma Abordagem Multicriterial Baseada na MCDA-C para a Avaliação de Desempenho: uma análise no departamento de obras, manutenção e serviços auxiliares de um instituto federal. **Exacta**, 2021. Doi: https://doi.org/10.5585/exactaep.2021.20165

KICH, Mara Cristine; SARQUIS, Aléssio Bessa; DUTRA, Ademar; ENSSLIN, Sandra Rolim. Aplicação da metodologia MCDA-C na avaliação do desempenho de marketing no setor de franquias. **Congresso XIX Seminários em Administração FEA/USP - SEMEAD**, São Paulo, SP, Brasil. 2014. Disponível em: https://sistema.semead.com.br/17semead/resultado/trabalhosPDF/51.pdf. Acesso em 12 out. 2022.

LAGO, Nicole Cecchele; KOLLING, Camila; DOS SANTOS, Jaiane Maldaner. Aplicação da Metodologia Multicritério de Apoio à Decisão Construtivista para analisar a sustentabilidade corporativa de uma indústria de pequeno porte. **Produto & Produção**, v. 22, n. 2, 2021. Doi: https://doi.org/10.22456/1983-8026.106869

LONGARAY, André Andrade; ENSSLIN, Leonardo; DUTRA, Ademar; ENSSLIN, Sandra; BRASIL, Ricardo; MUNHOZ, Paulo. Using MCDA-C to assess the organizational performance of industries operating at Brazilian maritime port terminals. **Operations research perspectives**, v. 6, p. 100109, 2019. Doi: https://doi.org/10.1016/j.orp.2019.100109

MORAIS, F. R.; BARRICHELLO, A.; FREITAS, G. M. D. Competências Gerenciais Determinantes da Orientação Estratégica Organizacional em Micro e Pequenas Empresas. In: XXIV SemeAd, 2021, São Paulo. XXIV SemeAd. São Paulo: FEA USP/SP, 2021. v. 1. p. 1-1. Recuperado de: https://login.semead.com.br/24semead/anais/arquivos/494.pdf? Acesso em 14 jun. 2022.

NEUENFELDT JÚNIOR, Alvaro Luiz; MACHADO, Caroline Martins; SILUK, Julio Cezar Mairesse; SOLIMAN, Marlon; HUPFER, Naiara Tatiane; DE PARIS, Sabine Ritter. Comparativo entre as metodologias MCDA-C, DEA e AHP. **Revista da FAE**, v. 18, n. 1, p. 6-19, 2015. Disponível em: https://revistafae.fae.edu/revistafae/article/view/27/27.

NOBREGA JUNIOR, Elcio; PETRI, Sergio Murilo; ENSSLIN, Sandra Rolim. Avaliação de desempenho de fundos de investimentos com o uso da metodologia multicritério de apoio à decisão construtivista (MCDA-C). **Revista Brasileira de Administração Científica**, v. 12, n. 3, p. 316-331, 2021. Doi: https://doi.org/10.6008/CBPC2179-684X.2021.003.0024

SABATINI-MARQUES, Jamile; YIGITCANLAR, Tan; SCHREINER, Tatiana; WITTMANN, Tatiana; SOTTO, Debora; INKINEN, Tommi. Strategizing Smart, Sustainable,

and Knowledge-Based Development of Cities: Insights from Florianópolis, Brazil. **Sustainability**, v. 12, n. 21, p. 8859, 2020.

SACCOL, Amarolinda Zanela. Um retorno ao básico: compreendendo os paradigmas de pesquisa e sua aplicação na pesquisa em administração. **Revista de Administração da UFSM**, v. 2, n. 2, p. 250-269, 2009. Doi: https://doi.org/10.5902/198346591555

SANTOS, Sergio. **As empresas de tecnologia no Brasil crescem - e a HPC é essencial para apoiá-las**. Canaltech. 2022. Disponível em: https://canaltech.com.br/infra/as-empresas-de-tecnologia-no-brasil-crescem-e-a-hpc-e-essencial-para-apoia-las/#:~:text=Dados%20da%20Datahub%20confirmam%20a,%C3%BAltimo%20levantamento%2C%20feito%20em%202011. Acesso em 25 mai. 2022.

SEBRAE. Serviço Brasileiro de Apoio às Micro e Pequenas Empresas. **Pequenos negócios em números**. 2018. Disponível em: https://www.sebrae.com.br/sites/PortalSebrae/ufs/sp/sebraeaz/pequenos-negocios-em-numeros,12e8794363447510VgnVCM1000004c00210aRCRD. Acesso em 26 mai. 2022.

TEZZA, Rafael; ZAMCOPÉ, Fábio Cristiano; ENSSLIN, Leonardo. A metodologia multicritério de apoio à decisão construtivista para a identificação e avaliação de habilidades para o setor de estamparia têxtil. **Revista Gestão da Produção Operações e Sistemas**, n. 1, p. 125-125, 2010.

TERVONEN, Tommi; GELHORN, Heather; BHASHYAM, Sumitra Sri; POON, Jiat-Ling; GRIES, Katharine S.; RENTZ, Anne; MARSH, Kevin. MCDA swing weighting and discrete choice experiments for elicitation of patient benefit-risk preferences: a critical assessment. **Pharmacoepidemiology and Drug Safety**, v. 26, n. 12, p. 1483-1491, 2017. doi: https://doi.org/10.1002/pds.4255

VETTORAZZO, Lucas. **Vendas online de produtos de tecnologia cresce 30% em junho, diz pesquisa**. 2021. Revista Veja. Disponível em: https://veja.abril.com.br/coluna/radar/vendas-online-de-produtos-de-tecnologia-cresce-30-em-junho-diz-pesquisa/. Acesso em 20 jun. 2022.

WESSLER, Greice Medeiros Martins; DUARTE, Clarice de Souza; DUTRA, Ademar; FILARDI, Fernando; REINA, Diane Rossi Maximiano. Aplicação da metodologia MCDA-C na avaliação dos programas assistenciais do SUS: um estudo de caso na Secretaria de Desenvolvimento Regional de Tubarão, Santa Catarina. **Revista Sociais e Humanas**, v. 26, n. 1, p. 79-102, 2013.