New decision systems in the VUCA world

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Abstract. *In a turbulent economic environment, marked by multiple challenges and changes at every step, organizations must adapt their management system, in order to maintain or even increase their productivity, as well as their competitive advantage. All the activities carried out within an organization are based on a series of managerial decisions, dependent on each other, by which the objectives and the modalities of action are determined, ensuring the economic-financial balance. Frequently, the activities carried out within an organization are changing, as the circumstances and characteristics of the business environment increasingly suffers transformations, thus it is necessary that the decision-making processes be updated. Therefore, the employees of the companies must be prepared to organize their activity in a volatile, uncertain, complex and ambiguous world - the VUCA world. Above the decision environment, are manifested a series of indirect and direct influences (interdependent variables, constraints and limit situations) that affect the result of the decisions adopted within the different levels of management in organizations. Thus, the present paper aims to determine and investigate the factors that influence the characteristics of the decision situations, regardless of the type of decisions adopted within an organization. The present study consists in analyzing the results obtained after applying an online questionnaire to researchers from Doctoral Schools and students of Project Management, from the Bucharest University of Economic Studies, who work in different areas of activity. After the statistical processing of the results obtained regarding the decision systems in the VUCA world, this paper aims to highlight the most important changes that occur in decision-making processes representing a key element for organizations in which managers have to make decisions on a daily basis, in order to ensure the economic performance, despite all the disruptions that occur.*

Keywords: VUCA world, decision systems, decision processes.

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Introduction

The management process carried out within an organization implies the adoption of lots of decisions, respectively the choice of a course of action from several possible alternatives, in

order to obtain certain results that ensure the economic-financial performance of the organization. The totality of digital transformations and perturbations in the business environment within organizations has led to a complete change in the way the activity is carried out, challenging the managers to become more and more proactive (Savic, D., 2020). In order to describe all these situations characteristic of an uncertain business environment, in which managers have to make daily decisions to maintain the level of competitiveness of the organization, was introduced the acronym VUCA, which describes a volatile, uncertain, complex and ambiguous world.

In the VUCA world, the real challenge consists in creating flexible organizations that can adapt quickly to the changes of the business environment and the desires of the consumers, and that each employee can broaden their knowledge and skills to complete each project in which they are involved (Sattar, 2016). The business environment in the VUCA world is constantly changing, becoming more dynamic and less predictable, than in the past (Papulova & Gazova, 2016). Volatility refers to all the unexpected problems and events that occur and are difficult to quantify and solve. The employees of an organization face various new situations every day, and in order to solve them they act more instinctively, based on past experience (Koudstaal, Sloof & van Praag, 2019). The volatility of the business environment can only be counteracted by managers who have vision, able to understand market developments even if they do not have all the necessary information (Saleh & Watson, 2017). Uncertainty refers to the lack of information that characterizes certain situations or events, both in terms of causes and the effects that would result from adopting a decision variant from several possible.

The complexity of the organizational environment reveals all the connections and interdependencies that exist within the systems of a company (human resources system, organizational, information, methodological), often a decision taken within a department can have effects on another or the whole organization. The ambiguity present more and more often at all hierarchical levels in an organization refers to all vague information that does not have clear links and cannot be understood. If in the past, the managers or employees of a company had to use the knowledge specific to its field of activity, in order to solve a certain problem or new situations that emerged, in the VUCA world this is no longer possible because the information which characterize an event are incomplete, and all the decision variants do not show big differences, so it is not possible to decide which alternative would bring the most benefits for the organization.

Literature review

Conceptual delimitations regarding management decision-making systems

All companies, whether they are medium or large, make different forecasts, in order to ensure evolution, which implies the adoption of a series of tactical and practical decisions. If these decisions did not exist, then the employees could not be organized and coordinated, so the activities could not be carried out.

The decision process generally involves the analysis of two key elements: the decider (the person or group of people who has the necessary skills to choose the most advantageous variant for the organization) and the environment (all internal and external factors that affect the decision system: the skills and knowledge of the managers, the methods and techniques used in the decision process, the technologies, the modern equipment used in the production of goods or the provision of services, the way of transmitting information from one

hierarchical level to another). The main stages of the decision process are described in the figure below.

Figure 1. The process of adopting decisions in the VUCA world

Source: Authors' own contribution

The complexity of the business environment, the amplification of the connections between cities and the spaces around them has led to the appearance of emerging structures, which requires special attention from the decision makers and specialists (Peptenatu, Draghici, & Merciu, 2012). In order to adopt a certain decision it is necessary that the managers of the organizations have the necessary information (Ucakturk & Villard, 2013). Therefore, the first stage, stage consists in collecting and gathering information on the situation which needs to be solved by the managers of the organizations

After analyzing all the information, the new objectives are established, taking into account all the characteristics of an uncertain environment. They may aim to achieve the same results planned in the previous period or to maximize profits, given that the situation has changed. The next step, identifying the decision variants, involves finding a finite number of decision variants, taking into account all the uncontrollable factors and constraints present in the VUCA environment.

Following the quantification of the information (social, economic, etc.) and their transposition into certain computer programs, the decision variants are not only identified, but are also investigated from the point of view of the consequences (positive or negative) that would be obtained within the organization, after selecting one alternative over another.

Therefore, a big challenge for all organizations that are influenced by external events is the ability of managers to analyze as soon as possible the new situations that have emerged regarding the decision alternatives (Vecchiato, 2019). After all the decision variants have been analyzed, the decider can select the optimal alternative, respectively the best solution for the problem that has appeared.

The process of analyzing the decision-making variants is strongly influenced by the emotions of the people involved, namely the fear of losing or not achieving the result established in the past or the exaggerated enthusiasm of obtaining a profit that hinders the research of all sources (Barrafrem & Hausfeld, 2019). The adoption of a decision refers to all the individual or collective decision systems, in order to achieve a certain objective using different scientific methods and means, in order to create and implement an action plan (Huang, Huang, & Chu, 2019).

The relationships established between decision-making systems involve elements of uncertainty and risk (Dinu, 2012). If in most cases the managers within the organizations are adept at rational approach, when they have to make a decision (either it is simple and it aims the activity of a single department, or it is more complex with consequences for the whole company), in the VUCA world this thing has become almost impossible a decision-making situation can no longer be completely defined, due to the multiple changes that occur in short periods of time. Therefore, the best approach is the intuitive one, with managers assuming that they cannot identify all the decision-making variants and in most cases the time is not in their favor, so sometimes the best solution is to adopt a wrong answer at the right time, despite the correct one after the time has elapsed.

The last stage, the implementation of the optimal decision variant and monitor the obtained results, consists in analyzing the effects resulted against the objectives planned in the first stage. If, between the results obtained after the application of the respective decision variant and the objectives previously established, are registered significant differences, then the causes that led to this must be identified.

As can be seen, decision-making is an motivated process that consists of researching information that characterizes a particular situation, evaluating possible alternatives and the decision itself (Huarnga, Mas-Tur, & Moreno, 2018). Strategic decisions adopted within organizations are of major importance for their proper functioning and increased competitive advantage, so choices must be made efficiently and effective.

The difficulty of strategic thinking comes from the fact that the future exists only in our minds, representing an unknown field in terms of the evolution of technologies and disruptions in the business environment (Bratianu, 2017). All the structural changes that result from the technological changes create losers and winners, both at organizational level and at individual level (managers and employees of companies) (King & Badham, 2019). Thus, in most cases, managers often consider that past mistakes are an important starting point for the present situation, but this is not always relevant because the problems now are completely new and often require special attention. In an ambiguous business environment, the managers within the organizations have become true innovative leaders, being extremely attentive to all the changes in the external environment of the organizations, making quick decisions to carry out the necessary actions for certain situations (Hall & Rowland, 2016).

In general, individual skills to adopt the best decision are developed through exercise and practice, in order to have a thorough knowledge of the area of activity, while the ability to solve new problems that apparently have no solution consists in identifying algorithms,

models, based on previous experiences (Sumedrea, 2012). Even if managers, as well as other employees, do not realize they have to adopt decisions, with a minor or major impact on organizations daily.

Classification of decisions by time horizon

Risky decisions

If until recently the decisions could be classified, according to the time horizon in decisions adopted under conditions of certainty, uncertainty or risk, in the VUCA world the first category is increasingly rare in organizations, whereas the business environment is no longer certain, due to the existence of a series of uncontrollable factors.

The decisions taken in risk conditions are defined by the probability of the occurrence of an event with consequences, often negative on the activity of the organization. For these types of decisions the factors and the decisional consequences cannot be completely described, but for each consequence a probability of occurrence can be associated. Developing a risk response strategy is a major step in any management process (Ciocoiu, Irimescu, & Stefan, 2019).

In other words, a company where managers adopt risky decisions responds proactively to the concept of the VUCA world, managing all disruptions and changes (Liang, Lee, & Sang, 2016). Among the risky decisions made in the VUCA world we list: forecasts regarding the need for stocks and the number of products to be made (the level of demand for a specific category of products varies frequently, often from day to day, but often most marketing researches use probabilities in the study of consumer preferences), decisions regarding the selection of suppliers according to certain criteria (speed in ordering, how they adapt to uncertain situations and the time required to solve problems), the rules regarding the verification and maintenance of equipment.

In the VUCA world, in most organizations, decisions are made under risk conditions, in which the deciders do not have and cannot identify all the data that characterize certain decision situations, because they are much more complex and different from those encountered in the past. The criteria, the plans for solving these decision-making situations are much more difficult to identify, often exceeding the competence of the managers or employees of an organization.

Analysis and processing of decision-making systems using computer systems

In the last years, have been created many computer systems, for the purpose of processing and analyzing the decisions automatically before being launched on the market, offering a number of benefits, including: reducing response time, easily researching data obtained in the past, in order to calculate the possibility of obtaining certain connections with the current data for choosing the correct decision-making variable, making forecasts (Subramanian, Abdul Hameed, Kenety, & Suresh, 2019). Therefore, in order to come to the help of the managers, have been developed algorithms for simulation, the possible consequences with the help of computer systems. Among the most popular techniques used by managers from various hierarchical levels are: mathematical expectation (expected value), decision tree, Markov chains.

Mathematical expectation: decisions are taken in a single stage, following the next steps: identifying the decision-making variants and the uncontrollable factors with the characteristic states of nature, distributing the probabilities of each state of the nature,

evaluating all the consequences that correspond to the probabilities for each state of the nature, selecting the alternative optimal considering the maximization of the expected effects. In the VUCA world, in most cases the employees of the organizations have to make different decisions extremely quickly and in the absence of complete information regarding the causes and effects of the new situation, so simulating several decision variants by assigning probabilities for each state of nature is often difficult to be done, because all the necessary data are not known. The analysis of the decision-making system can be made much easier, after the collection and graphic interpretation of the decisions. Therefore, after the data is recorded in a computer program, they are represented as a flow chart to select the correct decision alternative from all existing ones (Marshall, Bibby, & WoonBong, 2013). One method in this regard is the decision tree.

Decision tree: this method is recommended to apply in the case of problems which can be decomposed into several stages and in which the decisions influence each other. Thus, in order to apply this method, the following conditions must be accomplished: determining and characterizing the decision problem which needs to be analyzed, the events that can act probabilistically on the decision consequences, tree representation, determining the consequences (profit, cost, level of production, sales) characteristic of each one decision variants, taking into account the probabilities of occurrence of events, selecting the optimal variant, following the calculation of mathematical expectation. In general, in the VUCA business environment the decision tree method can be applied only in the case of strategic decisions, which have a major impact on the activity of the organization (conquering new markets, manufacturing a new product), with the condition that a series of accurate and complete information to be available, in order to minimize as much as possible the risks assumed and to determine whether the chosen decision alternative will be "failure" or "success".

Markov chains are a method that considers the probability of future events starting from the probabilities of the present events that are known. In the case of Markov analysis, the results of an analyzed experiment are totally influenced by the results of the previous experiments. The most important stages of the Markov processes are: identifying the probabilities for the situation in which the process is in a certain phase, calculating how the process goes from one state to another, identifying the probability for the situation in which the process stabilizes (reaches in a stationary state), the calculation of the time required for the process to return to a certain state (recurrence time). Considering that in the VUCA world the decisions taken at a certain time, are no longer related to the decisions adopted in the past, the decision-making situations being completely new and different (whether it concerns a problem or an opportunity), this method finds applicability less and less in a constantly changing environment.

Decisions in conditions of uncertainty

Uncertainty decisions, the most numerous category of decisions existing in the VUCA world, signify those events (states of nature) for which managers cannot establish probabilities of occurrence, these being characteristic of a turbulent business environment. In most cases, these types of decisions are based only on the intuition and creativity of the managers, so that approaching these decision variants involves using different methods of analysis (Delphi, Brainstorming, Philips 66), as the problems investigated cannot be clearly defined, often being new situations that have not been exploited until the moment of their appearance.

In the case of these types of decision, the deciders follow the same steps as in the case of decisions made under risk conditions only that he can no longer assign certain probabilities to the states of nature, thus creating a matrix made up only of the decision-making variants and of the states of nature. In order to choose a certain variant from more possibilities, several decision-making techniques are used, depending on the risk appetite: the pessimistic, optimistic technique, Laplace's technique, Hurwitz's technique, Savage's technique.

The pessimistic technique: it starts from an exaggerated care, considering that the deciders see "only black" in front of the eyes, being of the opinion that most likely there will be events that will have negative and not positive consequences, so he would like to protect themselves. Therefore the deciders intend to identify what are the smallest winnings in each decision variant, and then choose the optimal option, respectively the alternative that brings the highest results under unfavorable conditions.

The optimistic technique: it starts from the assumption that the decider doesn't have a great prudence, being optimistic, but not exaggerated. The decider knows that a decision taken can bring to the organization, both failures and successes, therefore he chooses as the optimal variant that brings the most advantageous results, when all conditions are favorable.

Laplace's technique: in this method it is assumed that the decider is aware that any of the states of nature can occur with the same probability, so that he assigns the same value to the probabilities of occurrence. Hurwicz's technique: according to this technique the decider is optimistic, introducing a coefficient of optimism. The optimum variant that he will choose will be that alternative that can bring him the greatest advantages out of all possible ones. Savage's technique: it starts from the premise that the decider does not want to regret a decision taken, so the regret that they might feel for each decision-making alternative will be calculated.

In this context regret is defined as the gain that the decision maker could lose instead of choosing a decision alternative, in exchange for the one that is optimal. In a business environment with frequent updates on the way of organizing and coordinating the activity, the managers and employees of the organizations are aware that any state of nature can manifest with the same intensity, so that in order to carry out a quick research of the information they apply the same value of the probability of occurrence for generating and analyzing the results that would be obtained after adopting a certain decision-making alternative.

Proactive management

All the challenges present at the global level, as well as the possible threats generated by certain organizational changes, the increasing number of tasks that can no longer be fulfilled only on the basis of knowledge and experience, demand the emergence of a new type of management – proactive management (Gitelman, Gavrilova, Gitelman, & Kozhevnikov, 2017). Proactive management involves the creation of a new system for identifying opportunities and threats early. In other words, proactive management is a set of economic measures applied at all levels of management, in order to prevent and efficiently manage internal and external factors that could have negative effects on the competitiveness of the organization.

In decision-making processes, the main role is played by managers because they process and analyze information about a problem or a business opportunity, in order to

choose the best strategic option (Strugar-Jelača, 2018). Thus, managers need to change their leadership style by becoming proactive, respectively, in order to be able to act in advance to effectively manage difficult situations that may arise. A fundamental element of a proactive managerial style is the confidence that the managers inspire the employees so that they are 100% involved and the decisions made have a positive impact on the organization (Proactive Management Strategies, 2011).

The accelerated rhythm of changes occurring in all fields in the VUCA business environment, in which organizations operate, requires managers with fast reaction speed. They must have in addition to their technical skills, specific to their field and a series of data on the problems that may arise within the different departments of the organization (financial, research-development, human resources, production), as well as the correlations that can be established between them, so that any situation that would make it difficult for the organization to be overcome very quickly.

Knowledge management is essentially, the process of collecting the information necessary for the functioning of an organization, namely the transformation of data from tacit knowledge into explicit knowledge (Alyoubi, 2015). The more consumers' desires, preferences and needs are better identified and analyzed by managers, the higher the competitive advantage will increase. Moreover, the predictive approach of all the characteristic components of an organization represents a factor with a major impact on the effectiveness of the management.

The realistic perception of innovation is very important, as it indirectly influences the way of resources are distributed, as well as the performance of an organization (Bradonjic, Franke & Lühthje, 2019).

In the VUCA world, a world in which the business environment undergoes fast changes (diminishing the product life cycle, reducing the time from the moment of discovering a new intelligent technology to launching it on the market, in order to make the activities carried out within the organizations more efficient, increasing competition at national and international level), the adoption of a decision implies major efforts from the managers, in order to study all the influencing factors.

Methodology

In order to study the way in which the decision-making process is carried out within organizations against the background of the changes determined by the VUCA world, a research was carried out, using the questionnaire method. The statistical population was represented by all the research from the Doctoral Schools (Management, Accounting and Economic Informatics, year I and II), as well as the students from the master's program Project Management (year II), the Bucharest University of Economic Studies, bringing together a number of approximately 180 people, working in organizations in various fields: accounting-finance, education - training, management - consulting, IT, marketing, secretarial - administrative, human resources, internet - eCommerce. The volume of the sample consisted of 122 respondents, respectively a 67% rate, which is a significant value, considering the 180 people to whom the questionnaire was distributed.

The questionnaire was distributed online, between January and March 2020, each student / researcher receiving the link below, to complete the necessary information https://docs.google.com/forms/d/e/1FAIpQLSdMat8Nzj0kUDcVjHBRuY03sUGBzKi9_uzDKIZzmp92/ = sf_link. The main objective of this research was to highlight the main factors that

influence the decision-making process within organizations and the way that employees are involved in decision-making processes.

The survey was conducted following the study of the specialized literature, regarding the decision-making process in a VUCA environment, considering all the constraints and changes often difficult to manage. In this regard, the articles were collected covering topics from the following fields: the methodology and systems after which current and strategic decisions were adopted by managers and employees of organizations, the characteristics of the new business environment and the effects of frequent changes on organizations, the analysis of the way in which the disturbances in the VUCA world have led to the modification of the algorithm for approving certain decisions within the companies, the existing systems and theories, in order to adopt the decision alternative that brings the maximum profit to the organization, even if this decision is taken under conditions of risk or uncertainty. Therefore, if in the first part different theoretical aspects are presented regarding the components of the VUCA world and how they influenced the stages of the decision-making process, in the next part all these notions are used in the actual research, identifying the most appropriate methods, behaviors to make decisions even in conditions of uncertainty and risk.

The distributed questionnaire was composed of open and closed questions, a total of 22 items, so as to best reflect the opinion of the respondents. Following the statistical processing of the information obtained and the interpretation of the percentage and graphical results, one can identify the main decision systems used in the enterprises. Thus, this study represents a starting point for organizations that are increasingly facing rapid changes, in which managers and employees must choose and implement a decision in a short time, without any scientific basis for the decision taken or a clear forecast of the future effects (positive or negative), often decisions being made only according to the vision and intuition of each one.

Results and discussions

The sample was made up of 122 respondents who work in organizations, both public and private, in different spheres of activity (the majority of interviewees (46%) work in the private sector, with a seniority ranging from 2 to 4 years). From the total number of interviewees, it was found that most of them were active in the area of Management - Consulting, in organizations totaling between 31 and 50 employees, followed by the respondents working in Accounting-Finance, Education - Training, IT, Marketing, Secretariat-Administration, Internet-Ecommerce, Human Resources. A smaller number of respondents was registered among persons who working in the banking or tourism system, in organizations with more than 50 employees. In order to study how seniority, and the analysis of each decision-making alternative influences the decision-making process, was realized a statistical research using Fisher's dispersion analysis test.

Analysis of the impact of seniority in the decision-making process

Taking into account all the changes characteristic of this turbulent business environment - VUCA environment, in order to verify the importance of seniority in using their own experience in the decision-making process, the respondents were divided into three

seniority groups: between 0-1 years, between 2-4 years and older than 4 years. Regarding the use of experience, the respondents had to choose on a scale from 1 to 5 (1 - not at all, 5 - very often), the frequency of using their own experience in the decision-making process.

Table 1. The influence of seniority on the use of experience in decision making process

Seniority (years)	Frequency of using one's own experience in decision-making process scale from 1 to 5 (1 - not at all, 5 - very often)			
	0-2 (j=1)	2-4 (j=2)	4-6 (j=3)	Total
small (i=1) (0-1year)	0	7	34	41
average (i=2) (2-4 years)	0	28	33	61
big (i=3) >4 years	0	6	14	20
Total	0	41	81	122

Source: Authors' own contribution

x – independent variable (Seniority)

y – dependent variable (Frequency of using one's own experience in decision-making process scale from 1 to 5 (1 - not at all, 5 - very often))

In order to study how seniority influences the decision-making process, the averages and dispersions for each group were calculated, as weighted arithmetic averages, obtaining

Frequency of using one's own experience in decision-making process	Number of answers (n _{1j})	Interval center (y _{1j})	y _{1j} *n _{1j}	(y _{1j} - y _{1medium}) ² *n _{1j}
0-2	0	(0+2)/2 = 1	1*0 = 0	(1-4,66) ² *0 = 0
2-4	7	(2+4)/2 = 3	3*7 = 21	(3-4,66) ² *7 = 19,29
4-6	34	(4+6)/2 = 5	5*34 = 170	(5-4,66) ² *34 = 3,93
Total	41	-	191	23,22

the following values.

Table 2. Employees with a seniority between 0-1 year

i=1

Source: Authors' own contribution

$$(1)y_{1medium} = \frac{\sum y_{1j} * n_{1j}}{n_{1j}} = 191/41 = 4,66$$

$y_{1medium}$ = average value of the frequency of use of experience in decision-making for employees with a seniority between 0-1 year

Frequency of using one's own experience in decision-making process	Number of answers (n_{2j})	Interval center (y_{2j})	$y_{2j} * n_{2j}$	$(y_{2j} - y_{2j \text{ medium}})^2 * n_{2j}$
0-2	0	$(0+2)/2 = 1$	$1 * 0 = 0$	$(1-4,08)^2 * 0 = 0$
2-4	28	$(2+4)/2 = 3$	$3 * 28 = 84$	$(3-4,08)^2 * 28 = 32,66$
4-6	33	$(4+6)/2 = 5$	$5 * 33 = 165$	$(5-4,08)^2 * 33 = 27,93$
Total	61	-	249	60,59

$$(2) \sigma_1^2 = \frac{\sum (y_{1j} - y_{1medium})^2 * n_{1j}}{n_{1j}} = 23,22/41 = 0,57$$

σ_1^2 = dispersion of the first group (employees with a small seniority)

Table 3. Employees with a seniority between 2-4 years

i=2

Source: Authors' own contribution

$$(3) y_{2medium} = \frac{\sum y_{2j} * n_{2j}}{n_{2j}} = 249/61 = 4,08$$

$y_{2medium}$ = average value of the frequency of use of experience in decision-making for employees with a seniority between 2-4 years

Frequency of using one's own experience in decision-making process	Number of answers (n_{3j})	Interval center (y_{3j})	$y_{3j} * n_{3j}$	$(y_{3j} - y_{3j \text{ medium}})^2 * n_{3j}$
0-2	0	$(0+2)/2 = 1$	$1 * 0 = 0$	$(1-4,40)^2 * 0 = 0$
2-4	6	$(2+4)/2 = 3$	$3 * 6 = 18$	$(3-4,40)^2 * 6 = 11,76$
4-6	14	$(4+6)/2 = 5$	$5 * 14 = 70$	$(5-4,40)^2 * 14 = 5,04$
Total	20	-	88	16,80

$$(4) \sigma_2^2 = \frac{\sum (y_{2j} - y_{2medium})^2 * n_{2j}}{n_{2j}} = 60,59/61 = 0,99$$

σ_2^2 = dispersion of the second group (employees with a average seniority)

Table 4. Employees with a seniority greater than 4 years

i=3

Source: Authors' own contribution

$$(5) y_{3medium} = \frac{\sum y_{3j} * n_{3j}}{n_{3j}} = 88/20 = 4,40$$

$y_{3medium}$ = average value of the frequency of use of experience in decision-making for employees with a seniority between 4-6 years

$$(6)\sigma_3^2 = \frac{\sum(y_{3j} - y_{3\text{medium}})^2 \cdot n_{3j}}{n_{3j}} = 16,80/20 = 0,84$$

σ_3^2 = dispersion of the third group (employees with a big seniority)

After calculating the average of the group averages, as well as the dispersions, the following hypotheses were established.

H₀: $\mu_1 = \mu_2 = \mu_3 = 0$ (null hypothesis);

H₁: $\exists (i \neq j)$ such that $\mu_i \neq \mu_j$ (alternative hypothesis).

After the data were statistically processed, the following values were obtained:

Table 5. The impact of seniority in the decision-making process

SUMMARY

Groups	Count	Average	Variance
small (i=1)	41	4,66	0,57
average (i=2)	61	4,08	0,99
greater than 4 years (i=3)	20	4,40	0,84

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8,275569772	2,00	4,137784886	4,894109944	0,004948135	3,072429272
Within Groups	100,61	119	0,845462185			
Total	108,8855698	121				

Small seniority (0-1 years)		Average seniority (2-4 years)		Big seniority (> 4 years)	
Standard Error	0,117528586	Standard Error	0,127606288	Standard Error	0,204939
Standard Deviation	0,752550136	Standard Deviation	0,996636968	Standard Deviation	0,916515
Sample Variance	0,57	Sample Variance	0,99	Sample Variance	0,84
Minimum	2	Minimum	3	Minimum	2
Maximum	5	Maximum	5	Maximum	5
Sum	174	Sum	229	Sum	79
Count	41	Count	61	Count	20
Confidence Level(95,0%)	0,230351795	Confidence Level(95,0%)	0,250103728	Confidence Level(95,0%)	0,401673

Source: Authors' own contribution

Following calculating the mean and dispersion, the confidence intervals for each group were determined. The confidence interval for the average of the first group is 4.66 ± 0.23 points, or the average of the first group is between the lower limit of 4.43 and the upper limit 4, 89 points, which indicates that even employees with a small seniority, frequently resort to the use of experience in the decision-making process. For the average of the second group, the confidence interval obtained was 4.08 ± 0.25 points. Thus, it can be stated that the average of the second group is in the range of the lower limit of 3.83 and the upper limit of

4.33 points, which demonstrates a high frequency of use of experience in the decision-making process. The confidence interval for the average of the last group was 4.40 ± 0.40 points, respectively 4.00 and 4.80 points, which shows that employees with a long experience in the company he often uses his own experience in choosing a certain decision-making option.

After the determination of the average of the group averages, the value of 4.33 points was obtained, which represents the degree of use of the experience in the decision-making process of the respondents, regardless of the seniority within the organization. Considering that the scoring scale had values from 1 to 5, it turns out that in the VUCA world more and more respondents use intuition and experience when they have to adopt a decision, rarely using a certain model/ decision program. In order, to study the level of influence of the independent variable (seniority) on the dependent variable (frequency of using one's own experience in the decision-making process), the systematic variance ($SS_1 = 8.27$), the residual variance ($SS_2 = 100.61$) and the total variance ($SS = 108.88$) were determined.

The Fisher test was calculated as the ratio between the collected dispersion ($MS_1 = 4.13$) and the residual dispersion ($MS_2 = 0.84$), obtaining the value 4.89. The resulting value for F_{calc} is higher than F_{crit} (F_{crit} was calculated for a significance level $\alpha = 5\%$), therefore hypothesis H_1 is accepted and hypothesis H_0 is rejected. This means that seniority significantly influences the use of experience in decision-making process.

Analysis of the impact of evaluating decision alternatives in the decision-making process

In order to study the impact of the evaluation frequency of each decisional variant on the decisional processes within the organizations, were established the following variables:

x – independent variable (Frequency of evaluation of each decision variant)

y – dependent variable (The way of carry out decision making processes)

The frequency with which the employees of an organization evaluate each decision-making option, before making a certain decision was classified into three groups "not at all", "sometimes" and "very often". Regarding the second variable, each of the 122 respondents

Answer variants	Number of answers	Answer variants	Number of answers	Answer variants	Number of answers
a) Not at all	8	b) Sometimes	70	c) Very often	44
1	0	1	1	1	2
2	2	2	1	2	2
3	2	3	30	3	3
4	2	4	27	4	14
5	2	5	11	5	23
Total	122				

had to choose on a scale from 1 to 5, if in adopting a decision variant they use at work a well-defined process (1 - not at all, 5 - very often).

Table 6. The influence of evaluating decision variants in the decision-making process

Source: Authors' own contribution

The following hypotheses were established for the two categories of variables:

$H_0: \mu_1 = \mu_2 = \mu_3 = 0$ (null hypothesis);

$H_1: \exists (i \neq j)$ such that $\mu_i \neq \mu_j$ (alternative hypothesis).

After the data were statistically processed, the following values were obtained:

Table 7. The impact of evaluating decision alternatives in the decision-making process

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	9,845560996	2	4,922780498	5,552778111	0,004948135	3,072429272
Within Groups	105,4987013	119	0,886543708			
Total	115,3442623	121				

SUMMARY

Groups	Count	Sum	Average	Variance
Not at all	8	28	3,5	1,428571429
Sometimes	70	256	3,657142857	0,663354037
Very often	44	186	4,227272727	1,156448203

ANOVA

Not at all		Sometimes		Very often	
Standard Error	0,422577	Standard Error	0,097347246	Standard Error	0,16212006
Standard Deviation	1,195229	Standard Deviation	0,814465492	Standard Deviation	1,075382817
Sample Variance	1,428571	Sample Variance	0,663354037	Sample Variance	1,156448203
Minimum	2	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	28	Sum	256	Sum	186
Count	8	Count	70	Count	44
Confidence Level(95,0%)	0,999236	Confidence Level(95,0%)	0,194202441	Confidence Level(95,0%)	0,326946259

Source: Authors' own contribution

Following the determination of the means, dispersions and standard deviations, for each of the two groups the confidence intervals were determined: for the average of the first group was obtained an interval with limits between 2.51 and 4.49 points, for the second group, was obtained an interval with limits between 3.46 and 3, 84 points, and for the last group was obtained an interval with the limits between 3.90 and 4.54 points, which reflects the fact that even in an uncertain business environment, in which employees have to make

certain decisions quickly, the decision-making process follows a path with clear, well-defined steps.

In order to determine the impact of the analysis of decision variants in the decision-making process, the averages and dispersions for each category were calculated as weighted arithmetic average. The average score regarding the decision-making process, regardless of how often each decision alternative is analyzed is 3.79 points, which shows that most employees follow well-founded rules when they have to take a certain decision with a greater or lesser impact on the organization. After determining the average score for the each group, the dispersions for each group were calculated as weighted arithmetic average, in order to study the degree of influence of the main grouping factor x on the variation of the dependent variable y , resulting the following values: for the first group the value of 1.42 was obtained, the value of 0.66, for the second group and the value of 1.15 for the last group.

To determine the total variance ($SS = 115.34$) were calculated the systematic variance ($SS_1 = 9.84$), the residual variance ($SS_2 = 105.49$). Before calculating the Fisher test it was necessary to calculate the systematically collected dispersion ($MS_1 = 4.92$) and the residual collected dispersion ($MS_2 = 0.88$). Thus, the Fisher test was determined ($F = 5.55$), as a ratio between the systematically collected dispersion and the residual collected dispersion. After its comparison with the critical value (F_{crit} for a significance level $\alpha = 5\%$) it can be concluded that the frequency of evaluation of each decision variant significantly influences the decision-making process ($5.55 > 3.07$).

Analysis of the managerial style within the organizations

Asked what is the predominant management style found in the organizations in which they work, the majority of the respondents (71%) considered that the employees participate, in the decision-making process, the predominant style being participatory. A percentage of 27% of the respondents considered that in the organizations in which they carry out their activity, the authoritarian style predominates, the employees being very little consulted in the decision-making process, while a percentage of 2% of the total interviewees answered that the management style in the organizations it is mixed (either participatory or authoritarian), depending on the situations that arise and the decisions to be taken (figure 2).

Figure2. Distribution of the respondents according to the management style

Source: Authors' own contribution

Based on the data collected, it can be concluded that in carrying out the tasks the people questioned frequently face changes, so it is necessary to reschedule the activities, as 83 respondents chose the "Yes" option and 39 for the "Sometimes" option. Among the factors

that determine the occurrence of changes within organizations are: complexity of the business environment, legislative changes, instability of the economic environment, changing consumer preferences, low predictability from the point of view of financing sources, staff fluctuation, etc. (Figure 3).

Figure 3. Distribution of respondents by frequency changes in the performance of tasks

Source: Authors' own contribution

From the total of the analyzed answers it can be stated that the decisions taken by the interviewed persons, even in a business environment in permanent change, have influenced in a positive way, both the turnover and other parameters, such as: profit, the image of the organization - as over 40% of the respondents confessed that the organizations in which they operate are affected by changes, and the decisions taken even under these conditions had a positive impact (figure 4).

Figure 4. Distribution of respondents according to the economic impact of decisions made on organizations

Source: Authors' own contribution

The decision-making mode, the choice of the most appropriate method for studying the decision-making alternatives is one of the most important parts of the deciders' work, as they establish and update the objectives of the organization, each being responsible for the decisions taken and obviously for their follow-up.

Conclusions

The decision-making process is increasingly difficult in the VUCA environment, since in most cases a decision taken, even though it is apparently a simple decision that can be taken by a single person, at individual level can cause chain changes at the level of the whole organization. Also, if before the decisions of the managers were taken under conditions of certainty, in this complex and ambiguous environment, in order to maintain the same level of production and to occupy a higher competitive position, some decisions must be taken quickly without any further rigorous processing of information, which can produce negative consequences on the implementation of the company's strategy.

If until recently the decisions were made on the basis of reasoning, the managers being able to define the problems or the opportunities that appeared, analyzing each decision variant, today this has changed the decisions being made based on the intuition. Over 60% of respondents stated that changes occur frequently in the organizations in which they work (figure 3), which shows that managers need to become professionals in the field in which they work, so that they can select the decision-making option that would bring the biggest profit of the organization.

A higher percentage of 70% from the total respondents stated that they participate in the decision-making process (figure 2), which indicates that in the VUCA business environment is much more efficient when adopting an important decision to consult the representatives of all departments. Even if the decisions taken by most managers are marked by risk, research has shown that they have positively influenced the organization (Figure 4 - increasing profit, improving the company's image, etc.). According to the analysis, most respondents believe that the evaluation of decision-making variants has a major impact on the decision-making process, so managers are advised to pay much more attention to the analysis of decision-making alternatives, even in an ambiguous environment with challenges everywhere (table 7). Also, based on the analysis of the data obtained, it can be stated that the seniority of an employee predominantly influences the way he uses his experience in the decision-making process (table 4). Thus, this research represents a starting point for organizations that are increasingly facing frequent changes, in which managers and employees must choose and implement a decision in a short time, without a scientific basis for the decision taken, without a clear prediction for the future effects (positive or negative), often decisions being made only based on the vision, experience and intuition.

Considering the rapidity of changes and the constant fluctuation of the business environment, following the research carried out it has resulted that fewer and fewer organizations use different models / decision-making tools, in most cases the decisions are taken at the moment depending on the situation. In the VUCA world, organizations frequently face decision-making problems, because for the functioning and achievement of the desired results, performances and objectives, a series of decisions must be made regarding the necessary resources and how they are distributed.

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