

The Importance of Factor Analysis in Revealing the Dimensions of Crises Management in Economic Enterprises: An Analytical-Statistical Study in the Algerian Regional Telecommunications Company in the State of Annaba - Algeria

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Abstract:

The purpose of this research paper is to reveal the factors that play an influential role in determining the dimensions of crises management among members of the study sample, which included 84 individuals in the Algerian Regional Telecommunications Company. This is done through the factor analysis method in analyzing the data of a questionnaire designed to measure the dimensions of crisis management among members of the study sample. The form included the dimensions: planning for crises management, availability of information, effectiveness in decision-making, communication system, financial allocations, support services, and qualified human resources.

The data was processed based on appropriate statistical tests using SPSS V23, and the results revealed three main influential factors.

Keywords: crises management, factor analysis, economic enterprise.

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1. Introduction

Organizations of all types are exposed to multiple crises that threaten their survival and continuity as a result of rapid and sudden changes in their business environment. Some of these crises may be dangerous for organizations, especially those that do not take precautions for crises and do not know how to manage them, and may lead to their complete demise. These crises differ in the severity of their impact and the degree of their recurrence.

Despite the multiplicity and variation of crises, each crisis has its own distinctive characteristics, so it is said that every crisis contains within it the seeds of success and the roots of failure as well.

Basing on that, crises require a specific method for managing and responding to them, but all crises of all kinds are subject to common standards in terms of preparing to confront them or mitigate the negative effects associated with them, and working to transform their effects to the benefit of the organization. Therefore, administrative thinkers have increased their interest in crises in order to avoid them or reduce their seriousness. When they actually happen, successful organizations adopt a crisis management system.

Problematic:

To achieve the requirements of this study, we present the following principal question

How are crises management factors measured based on factor analysis at the level of the enterprise under study?

partial questions:

-What is the number that can be extracted from the factors that fundamentally affect the determination of the dimensions of crisis management according to the study sample members,?

-What are the most important factors that affect determining the dimensions of crises management among sample members in the enterprise under study?

The main hypothesis states:

There are no factors influencing crises management from the point of view of the study sample members.

The Importance and objectives of the study:

The importance of the study lies in the fact that it attempts to answer questions related to the factors that affect determining the dimensions of crisis management, using the factor analysis method, which is considered one of the advanced topics in statistics.

Therefore, the study contributes to revealing the network of interrelationships between crises management variables on the one hand, and the comparison between the factors. Knowing the most important ones in determining the dimensions of crisis management on the other hand.

Accordingly, the study aims primarily to extract the most important factors in determining the dimensions of crisis management among sample members in the enterprise under study through a factor analysis of crisis management indicators, in addition to presenting a set of results and suggestions.

Study Approach:

The study belongs within the statistical-desk studies and uses the second analysis method for available data using the descriptive and analytical approach, which uses the factor analysis method for the results of the questionnaire for members of the study sample.

The study population represented all individuals working at all organizational levels in the Algerian Regional Telecommunications Company, where a random cross-sectional sample of 84 statistical units was selected, and the study relied on the worker as the basic unit of analysis.

The questionnaire was used as a main tool for collecting data, as it included the study variables represented in the dimensions of crises management.

2. The theoretical framework of the study

2.1 Crises management

The crises that occur in organizations are nothing but sudden changes that occur in the internal or external environment of the organization without any expectation of them or any imposition to avoid them. It is often said that every crisis contains within it the seeds of success and the roots of failure as well. Therefore, it is necessary to find means and methods in order to confront it, which is what is termed as Crisis management.

2.1.1 Definition of crises

Writers and researchers have addressed the concept of crisis with multiple definitions, including the following:

- "It is a specific situation that threatens the interests of the organization and its image before the masses, which requires taking quick decisions to correct the situation until it returns to its normal path" (Abawi 2006, 141).
- "An unstable administrative phenomenon that represents a direct and clear threat to the survival and continuity of the organization, and is characterized by a degree of risk" (Abawi 2006, 141).

A crisis represents an unusual, unexpected, extremely dangerous and rapid situation with successive events, in which the results collide and their causes are mixed, threatening the ability of the individual, organization, or society to survive" (Ibrahim, 2018, p. 416).

2.1.2 Characteristics of the crises:

Crises are characterized by many characteristics, the most important of which are presented as follows (Ibrahim, 2018, p. 416).

-Violent and complex surprise when a crisis occurs, due to the serious threat it poses to the existing situation.

-The rapid succession of events and their consequences, which creates great pressure regarding the time available to deal with the crisis;

-The intertwining of causes and results, which increases the complexity of the situation.

-A state of uncertainty as a result of a lack of information and knowledge, and then a weak ability to predict the direction of the crisis, which generates high confusion and ambiguity and extreme difficulty in making a decision and choosing the best alternative.

-A state of tension, anxiety, confusion, and fear of losing control prevails;

A fateful turning point that holds both threat and opportunity.

On the other hand, there are those who believe that the crisis has a set of characteristics, which are as follows (Al-Khaddam, 2017, p. 195):

-A turning point in which the need to confront emergency circumstances increases;

-There is a state of uncertainty and lack of information;

-Time pressure and the need to make correct and quick decisions with no possibility of error because there is no time to fix the error;

-There is a lack of control over events;

-The suddenness and speed with which it occurs.

2.1.3 Crises life cycle:

The life cycle of a crisis varies depending on its nature, and although researchers differ in dividing its stages, they agree on its content, as it is divided into the following (Al-Khafaji, 2010, pages 196-197)

- The birth stage of the crisis;
- Growth and expansion stage;
- The stage of maturity and conflict;
- The stage of recession and contraction;
- The stage of disappearance and fading

2.1.4 The concept of crises management

Writers and researchers have provided a number of definitions, the most important of which are:

"It is a methodology for dealing with crises in light of preparations, knowledge, awareness, awareness, available capabilities, skills, and prevailing management styles" (Abawi 2006, 142)

"The method of controlling the course and trends of the crisis is rational, scientific management based on searching for and obtaining knowledge

And using appropriate data and information as a basis for appropriate decision-making, planning, organizing, directing, and controlling, and staying away from emotionalism." (Al-Khafaji, 2010, p. 199)

" -The science and art of controlling the situation and directing it in a way that serves the interests of the organization in order to control its course and directions" (Al-Hadi, 2011, p. 56)

2.2 Dealing with crises

There are two methods for dealing with crises: the method of preventive preparedness through the actions carried out by the organization before the crisis occurs, and the discovery, tracking and analysis of early warning signals with the aim of preparing the organization's organs to deal with them in order to prevent them from occurring, or to mitigate their effects on the organization that may affect its survival and continuity. The method of remedial preparedness is through the actions carried out by the organization after the occurrence of the crisis.

It goes through the following stages: the stage of penetrating the crisis, the stage of positioning and establishing a base for dealing with the factors and elements of the crisis after its penetration, the stage of expanding the base of dealing and building bridges in the areas of choice, the stage of rapid spread to destroy the elements of the crisis, paralyzing their movement and removing them

from places of control, the stage of directing the forces of administrative action that create the crisis to Other fields (Al-Khuddam, 2017, p. 08)

2.3 stages of crises management

Most crises go through the following stages: (Al-Mahlawi, 2020, pages 99-100)

-Feeling the possibility of a crisis occurring: The crisis sends a series of warning signals that managers receive, but it may be difficult for them to pick up the important signals and not paying attention to the latter causes the crisis to occur.

-Preparedness or prevention: discovering weak points in the organization and developing a confrontation plan based on the worst case scenario and addressing it.

-Confronting the crisis: Means are being prepared to limit the damage and prevent it from spreading to include other parts of the company that have not yet been affected.

-Restoring balance and activity: This is done from several aspects, tangible and intangible assets, through short-term plans and programs that were previously prepared and chosen, which aim to gradually restore balance to compensate for what was lost during the crisis.

-Education and evaluation of experience: What was accomplished while confronting the crisis is evaluated so that it can be improved in the future.

Effective crisis management is based on basic components, the most prominent of which can be identified as follows (Al-Khafaji, 2010, pages 203-204)(Muhammad, 2016, pages 320-321):

-Scientific methodology: The crisis cannot be dealt with within a framework of randomness, but rather this dealing must be subject, in all stages of the development of the crisis, to the scientific method that characterizes the sound administrative approach.

-Assessing the crisis situation: It includes an accurate identification of the forces creating and supporting the crisis.

Sufficient reserve availability: A crisis requires sufficient and appropriate preparation and availability.

-Educating individuals: This requires a comprehensive and effective media campaign that uses various methods of mass communication.

-Simplifying procedures: The crisis is usually severe and violent, so the time element cannot be ignored, but rather requires immediate intervention during the simplification of procedures.

-Creating special mission teams: Special mission teams must be created for rapid intervention, provided that their members undergo high and sufficient training to qualify them to confront multiple and different crises.

Delegation of powers: requires granting a specific body the authority to make decisions.

-Using the media plan: The media is a real force and a weapon with great impact, whether positive or negative. Hence, the leadership must be aware and with a great deal of caution.

-Providing legal and official support: It is considered one of the most important components of effective crisis management.

-Using expert systems: includes facts based on applied scientific experience and the knowledge that the expert relies on in solving problems.

2.4 Dimensions of crises management

The study focused on the following dimensions (Aziz, 2010, pp. 48-86)

-Planning for crisis management: Planning is considered the basic foundation of any effective crisis management, as the foundations of the planning process can be applied to any type of potential crisis, and advance planning also aims to contribute effectively to preventing the occurrence of crises, and prepare well to deal with them if they occur. Crisis management planning is considered a process that includes a set of administrative procedures, policies, and implementation systems, and provides the ability and authority to manage the crisis.

-Availability of information and data: The essence of the success of crisis management of all types and at various levels depends on a set of main pillars, the most important of which is information, which occupies the cornerstone for the success of all measures and actions taken at all stages of the crisis, starting from predicting its severity and determining its dimensions, through planning, coordination and scenario-building processes. Then presenting alternatives, choosing the most appropriate ones, making decisions and how to deal with them, and arriving at the process of restoring the situation and maximizing it by drawing results and coming up with lessons learned for the purpose of using them in the future in managing similar crises.

Effectiveness in decision-making: The administrative decision must be appropriate to the crisis event, and can be implemented within the limits of the capabilities available to the decision maker during the crisis, and be clear to all individuals entrusted with the task of managing and

dealing with the crisis, in addition to its appropriate timing, so that it must be compatible with the event.

-Communication system: The presence of an effective communication system between the different administrative levels is one of the most important needs for crisis management, as sufficient and important information may be available to deal with the crisis, but difficulty, slowness, delay, or the inability to communicate it to the decision maker may lead to failure in Controlling and dealing with the crisis.

-Financial allocations: The availability of various types of resources, especially financial ones, is an important element for managing any crisis efficiently and effectively in its various stages. It is also necessary to conduct a periodic evaluation of the available and reserve resources with the aim of determining the amount and characteristics of each of their divisions, because the design of scenarios to confront the crisis depends on what is available in the financial allocations.

-Support services: It includes every additional vital operational insurance of resources that is used in times of need when crises occur, and is based on the formation of an effective reserve that is reserved and prepared in a way that can be mobilized quickly and intensively in times of crisis. The use of this reserve also depends on the type and size of the crisis, the area in which it occurred, and the extent of the damage resulting from it.

Qualified human resources: The success of dealing with crises depends on the good selection, training, and qualification of individuals. Indeed, the process of acquiring knowledge, increasing skills, and developing the ability to deal with crises almost depends in turn on the good selection of the individuals who will be entrusted with the task of dealing with the crisis. This must also be taken into account. Different and complementary specializations, the ability to analyze and deduce, speed in making decisions, in addition to being optimistic, ambitious and strong willpower

3. Applied study

3.1 The stability and validity of the study

The stability and validity of the study tool was confirmed using the Cronbach alpha coefficient method and the square root of its value, and the results are shown in the table as follows:

Table 1: Reliability and validity of crisis management dimensions

N	dimension	Alpha-Cronbach's coefficient	validity
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01	crises management planning	0.847	0.920
02	Availability of information and data	0.788	0.887
03	Effectiveness in decision making	0.799	0.893
04	Communication system	0.805	0.897
05	Financial allocations	0.774	0.879
06	Support Services	0.823	0.907
07	Qualified human resources	0.723	0.850
-	Total	0.826	0.908

Source: Prepared by the two researchers based on the outputs of the SPSS program, IBM 23

It is clear from the results of the table that the Cronbach's alpha coefficients are ranged between 0.723 and 0.847, and the total dimensions of the Cronbach's alpha coefficient reached 0.826. As for the validity coefficients, they were limited to between 0.850 and 0.920, and the total dimensions were 0.908. The value of all the coefficients is greater than 0.60, and thus reflects the stability and validity of the study tool. Therefore, the tool is valid for measuring what it was prepared for.

It should be noted that there are several methods for factor analysis, as the study relied on the principal factor method to analyze the data of the study sample, and the principal factor method, applying the principal components method, and using the reduced correlation matrix, where The principal components method is one of the most accurate and common methods of factor analysis. This method has several advantages, including that it leads to accurate saturations and leads to the smallest possible amount of residuals, and the correlation matrix is reduced to the smallest number of orthogonal factors.

Considering that factor analysis requires a condition of normal distribution of data, this was confirmed by relying on skewness and kurtosis coefficients, and the results are shown in the table as follows:

Table 2: Skewness and kurtosis coefficients for crisis management dimensions

N	dimension	skewness's coefficient	kurtosis's coefficient
01	crises management planning	0.643-	0.178-
02	Availability of information and data	0.299-	0.505-
03	Effectiveness in decision making	0.203-	0.576-
04	Communication system	1.024-	0.202
05	Financial allocations	0.750-	0.260-
06	Support Services	0.997-	0.232
07	Qualified human resources	0.631-	0.635

Source: Prepared by the two researchers based on the outputs of the SPSS program, IBM 23

It is clear from the table that the skewness coefficients are limited to between -0.203 and 1.024, while the flatness coefficients are limited to between -0.178 and 0.635. These results indicate that the normal distribution is achieved because the skewness coefficients are limited to their range [1,-1], and the flatness coefficients are limited to the range [3.-3].

For the purpose of discussing the hypothesis of the study, the axes were rotated in an orthogonal rotation method and one of its methods was used, which is the Varimax method. The purpose of this process is to redistribute the variance among the factors so that the maximum number of variables appears to be saturated by the smallest possible number of factors to study the factors influencing Determine the dimensions of crisis management management, and the results of the statistical analysis are explained that:

The adequacy of the sample size

The following table shows the adequacy of the sample size and the results are explained as follows:

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Adequacy.	Measure of Sampling	.731
Bartlett's Test of Sphericity	Approx. Chi-Square	73.097
	df	84
	Sig.	.000

source: Results obtained from program spss outputs

The table shows that the Kaiser-Mayer-Olkin (KMO) test is equal to 0.731, which is greater than 0.70. This result indicates that the correlations are at a good level and the sample size is sufficient. Also, Bartlett's Test of Sphericity has a statistically significant value because it is greater than 0.05, and this indicates that the indicator of the relationship between the variables is good

The degree to which each variable contributes to the formation of the extracted factors

The following table shows the degree of contribution of the variables included in the analysis in the formation of each of the extracted factors, where the initial values of the contributions of the variables are taken equal to one in the principle components method in the case of adopting the correlation matrix as shown in the first column of the table, and the second column shows the degree The contribution of each variable

Table 4: The degree of contribution of each variable in forming the extracted factors

dimensions	Initial	Extraction
1	1.000	.807
2	1.000	.735
3	1.000	.701
4	1.000	.803
5	1.000	.881
6	1.000	.923
7	1.000	.952

source: Results obtained from program spss outputs

The table shows that the extracted factors explain a high percentage of the variance of the variables, with the lowest percentage being 0.701. This indicates the importance of all variables in explaining crisis management. The most contributing variable in forming the extracted factors is the qualified human resources dimension, as its contribution value reached 0.952, meaning that 95.2% of the variance in the qualified human resources of the sample members is explained by the extracted factors.

The extracted factors are explained after the supporting services, as its contribution value reached 0.923, meaning that 29.3% of the variance in the services extracted among the sample members is explained by the extracted factors. After financial allocations, the value of its contribution was 0.881, meaning that 88.1% of the variance in financial allocations among sample members is explained by the extracted factors.

The latent roots of the correlation matrix and the sum of squares of the saturation values before and after rotation

The following table shows the latent roots of the correlation matrix (component variance), where the first principal component has the largest latent root. The second section of the table relates to the sum of squares extracted for the saturation values before rotating the factors, and the third section shows the sum of squares after rotating the axes.

Table 5: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.595	51.355	51.355	3.595	51.355	51.355	2.423	34.612	34.612
2	1.193	17.047	68.402	1.193	17.047	68.402	1.837	26.242	60.854
3	1.015	14.494	82.896	1.015	14.494	82.896	1.543	22.042	82.896
4	.492	7.034	89.930						
5	.415	5.931	95.860						
6	.225	3.210	99.071						

7	.065	.929	100.000						
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source: Results obtained from program spss outputs

The table above shows the values of the latent roots of the extracted factors, from which the amount of variance in the variable to which the change in a particular factor is attributed is inferred. Factors whose latent roots are greater than or equal to one are extracted. Where three latent factors were extracted, the table shows that the latent root of the first factor is equal to 3.595 and explains 51.35% of the variance structure of the crises management variables, the latent root of the second factor is equal to 1.193 and explains 17.04%, and the latent root of the third factor is equal to 1.015 and explains 14.494%.

The graphical representation of the aggregate of latent roots corresponding to the various factors was also extracted as follows:

Figure 1: Histogram of latent root aggregates corresponding to different factors



source: Results obtained from program spss outputs

The figure shows a diagram of the latent roots for each factor that was extracted. The figure shows that the region in which the curve connecting the points takes an almost horizontal position begins to appear between the second and third factors.

Factor saturation values for variables after rotation

The following analysis table allows extracting the most important factors influencing the definition of the dimensions of crisis management among members of the studied sample, and shows the saturation values of each of the seven variables on each of the extracted factors as follows:

Table 6: Rotated Component Matrix^a

	Component		
	1	2	3
HR	.926		
Connection	.882		
Planning		.898	
the decision		.716	.349
the information	.543	.657	
Support			.946
Finance	.653		.660

source: Results obtained from program spss outputs

From the previous table, it can be concluded that the first factor is the most important in determining the dimensions of crisis management, as its relative importance from the total effect of the factors extracted after rotating the axes is 34.61%. This factor includes two main variables: qualified human resources with a saturation of 0.926, and the dimension of the communication system with a saturation of 0.882. . As for the second factor, this factor contributed 26.28% of the total contribution of the factors. This factor includes three main variables: planning for crisis management, with a saturation of 0.898, the effectiveness in decision-making dimension, with a saturation of 0.716, and the availability of information dimension, with a saturation of 0.657.

While the third factor contributes to the total contribution of the factors, 22.04%, and includes two main variables: support services, with a saturation of 0.946, and after financial allocations, with a saturation of 0.660.

Study's results

The study aimed to reveal the most important factors involved in determining the dimensions of crisis management in practice, according to members of the study sample in the Algerian Telecommunications Regional Corporation in the state of Annaba, through a factor analysis test. The study resulted in the presence of three factors as follows:

- The first factor appears to be the most important in determining the dimensions of crises management at a rate of 34.61%, as it includes two variables: qualified human resources and the communication system.

- The second factor includes three variables with an explained rate of 26.28%, including planning for crises management, effectiveness in decision-making, and availability of information.

The third factor includes two main variables: support services and financial allocations, with an interpretation rate of 22.04%.

The study also suggests conducting further future studies and research on determining the dimensions of crises management in economic enterprises and verifying the results by re-testing them in other economic environments.

Bibliography References:

- [1] Zaid Munir Abawi. (2006). Modern trends in administrative organizations, first edition. Amman, Jordan: Dar Al Shorouk.
- [2] Nisreen Abdel Rahman, Ali Ibrahim. (2018). Evaluating the reality of planning for crisis management in the health sector - a field study on government hospitals in Latakia Governorate. Tishreen University Review of Public Studies Research - Economic and Legal Sciences Series, Volume 40, Issue 04, 411-421.
- [3] Samir Abdullah Samamaneh, Hamza Khalil Al-Khaddam. (01, 2017). Retrieved from crisis management methods and their relationship to strategic planning in the Jordanian Ministry of Interior. <https://www.researchgate.net/publication/309399276>.
- [4] Hamid Al-Hadrawi, Karar Al-Khafaji. (2010). The reasons for the emergence of crises and their management - an exploratory study of the opinions of a sample of members of the Iraqi Council of Representatives. Kufa Magazine, Volume 01, Issue 05, 192-214.
- [5] Muhammad Ethar Abdul Hadi. (2011). Crises management strategy: conceptual framing according to the Islamic perspective. Journal of Economic and Administrative Sciences, Volume 17, Issue 64, 47-63.
- [6] Saad Othman Ahmed Al-Mahlawi, (2020). Transformational leadership and its contribution to activating the stages of crises management in light of the spread of the Corona epidemic. A case study of a sample of hospitals in Khartoum. Journal of Business Research and Studies. Volume 4, Issue 02, 94-112
- [7] Al Madawi, Abeer Mahfouz Muhammad. (2016). The role of strategic planning in managing environmental crises - King Khalid University. Journal of the Faculty of Education, Al-Azhar University, Issue: 121, Part Two, 309-365.

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- [8] Salem Abdullah Salem Abu Aziz. (2010). Obstacles to crisis management in the Palestinian Ministry of Health under the siege: a case study of the Gaza Strip. Gaza: Islamic University.