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Designing a Budgeting Model in Crisis Management: Case Study of Power Generation
Plants

Diseño de un modelo de presupuesto en gestión de crisis: estudio de caso de plantas
de generación de energía

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Abstract.

Important decision makings are always the imperatives of the crisis in the first moments, which, whatever the speed of decision-making by crisis management is greater, the speed of crisis control is greater. Since each organization is subject to various crises and power plants are no exception to this rule, to this end, the purpose of this study is to design a budgeting model for crisis management in a case study of power generation plants. In this research, we examine the relationship between crisis management steps and Planning, Programming and Budgeting System. A statistical population of this study is 60 managers of the power generation plants. The relationships between variables were tested using Smart-PLS software. The results of the model test showed that there is a significant relationship between budgeting dimensions and crisis management. The model fitness value is also numerically equal to 0.638, which is a strong index and indicates the overall high quality of the model.

Keywords: Crisis Management, Planning, Programming, Budgeting System, Power Generation Plants.

Resumen

La toma de decisiones importantes son siempre los imperativos de la crisis en los primeros momentos, que, cualquiera que sea la velocidad de toma de decisiones por parte de la gerencia de crisis, la velocidad de control de crisis es mayor. Dado que cada organización está sujeta a varias crisis y las centrales eléctricas no existen Con excepción de esta regla, para este fin, el propósito de este estudio es diseñar un modelo de presupuesto para la gestión de crisis en un estudio de caso de plantas de generación de energía. En esta investigación, examinamos la relación entre los pasos de gestión de crisis y el Sistema de Planificación, Programación y Presupuesto. Una población estadística de este estudio es 60 gerentes de las plantas de generación de energía. Las relaciones entre las variables se probaron utilizando el software Smart-PLS. Los resultados de la prueba del modelo mostraron que existe una relación significativa entre las dimensiones presupuestarias y la gestión de crisis. El valor de adecuación del modelo también es numéricamente igual a 0.638, que es un índice fuerte e indica La alta calidad general del modelo.

Palabras clave: Gestión de crisis, planificación, programación, sistema de presupuesto, plantas de generación de energía.

Introduction

Organizations, regardless of type and size, are faced with internal and external influential factors, which these factors, make uncertain achieving and time of achieving the goals of the organization. The effect of this uncertainty on the organization's goals is called crisis. The issue of crisis management discusses in different fields. Organizations as one of the main elements of society are not the exception. The crisis is a major chaos in the organization which finds broad press coverage, and the curiosity of people about this issue affects the organization's activities and can have a political, legal, financial, and governmental effect on the organization (Rezvani, 2007).

From an operational point of view, the crisis can also be analyzed as a system in which there are two sets of different factors, one of the environment and structure of the system, and the other factors that are causing the crisis. Determining which of the factors and elements of the system against the crisis is more vulnerable and more influential, is one of the primary tasks of crisis management research. Determining the most vulnerable part of the system in practice is the part of the system which needs the most attention (James, 2007).

The crisis management process is the process of planning, performance and enforcement actions that are being carried out by governmental, non-governmental and public entities around the identification and reduction of hazard levels and the management of prevention, preparedness, coping and rehabilitation of damaged areas. This process, by observing the pre-indicators and analyzing them and the available information resources, it is tried to prevent the crisis by using available means comprehensively and coordinate or, if they occur, prepare to deal with life and financial losses to restore the situation to normal. In this case, to manage the crisis, crisis budgeting and other financial resources to conduct crisis management projects, should check and identify.

One of the common methods of planning, decision making and control by managers is the use of the budget. To optimize the use of resources using the techniques and tools used in management, budget and budgeting are, in fact, a tool through which all management

plans are expressed, and it can be used to coordinate all of the company's activities (Sastry & King, 2005).

A Budget is a monitoring tool which gives a correct and real view to managers to plan and define programs and goals of organization based on reality. Budgeting and budget control is basis and rationale for planning and responsiveness in organizations (Johansson & Siverbo, 2014).

Budget is one of the important means of crisis management and crisis and crisis control and prevention which its important goals are maximizing resources, prioritizing different needs and assigning resources optimally. In fact, budgeting in crisis is correct planning through resources management, assigning and controlling or guiding monetary, financial, human and environmental resources in line with goals.

Despite the fact that budget is considered as a feeding system for crisis management and a vital vessel, in our country required attention is not paid to it due to some reasons like this fact that managers don't believe in budgeting requirement in crisis due to little chance of successful prediction of unexpected events and unorganized condition of services in normal condition and just pay attention to current issues, and, on the other hand, various organizations involved in crisis management like the Ministry of Health and Red Crescent Organization, in general, also face a severe shortage of equipment and facilities. Moreover, unfortunately, the budgeting process is done with unofficial and traditional methods at country level, and real processes and performances are not considered as planning and decision-making basis, and one of the important reasons of the budget deficit in our country, origins from the imaginary budgeting which has affected crisis management seriously and, on the other hand, other income resources in crisis management, like tax systems and insurance organizations, are not considered. While in many advanced countries, insurance organizations and tax systems are the most important providers of the budget in the crisis. Also, the severe weakness of information and monitoring systems in the crisis causes unfair assignment of equipment and resources, and distorts the link between costs and performance, and also lack of coordination among organizations acting in the crisis, caused that each one act based on personal ideas and comments, and this leads to a lot of waste of resources.

Above conditions clarify the necessity of designing a budgeting model in crisis management. Due to the wide scope of the crisis, determining crisis budgeting should be done by using systemic thought and theory. Purpose of providing a comprehensive budgeting method in crisis management is making a systematic budgeting system in different dimensions and choosing an executable method wherein a software system can present budget distribution between departments and sectors with the purpose of optimal resources assignment by receiving information.

Based on results of the studies, the best method of budgeting in crisis management based on the planning of budgeting systemic thought is a method Planning, Programming and Budgeting System (PPBS). In this way, the budget is a means to provide program goals and its different dimensions are consistent with crisis management. In PPBS method, the transformation of a multi-level and multi-dimension problem into a mathematical and solvable wherein goal function is to maximize utility resulted from the budget assignment. In this article, we describe problems in crisis management budgeting under the title of the budget crisis and then introduce PPBS systemic method for designing budgeting model in crisis management and how to use it in crisis management will be discussed in practice.

Theoretical Foundations

Crisis Management

A crisis, event, or set of special events is unexpected and unusual, which make high levels of uncertainty and threat goals with high priority for an organization (Valackiene, 2010).

Crisis management can be easily defined by using different approaches. Managing the crisis focuses on the main factors that can lead to business failure, challenging business. Avoiding the crisis depends on the organizational culture, the role of experts in decision-making processes and the appropriateness of organizational controls. Organizational crisis management has been investigated over the last thirty years in a wide range of organizational factors, which have identified many problems that include (Denis Fischbacher-smith, 2016; Selomo, & Govender, 2016):

- Technical-social failure
- Environmental problems and natural disasters

- Medicine problems and diseases
- National essential infrastructure failure
- To carry out intentional activities in the organization (professional liability and fraud, etc.)
- Leadership crises among the financial and political services of the organization

Report of U.S. Federal Emergency Management Association presented a four-level classification for crisis management planning including readiness, response, recovery and decrease. Also, it reveals some cases in each step by introducing the role of government and private organizations (FEMA, 2011).

There are many books on crisis management, but there is no acceptable definition of a crisis (Coombs, 2007; Mambile, & Machuve, 2018).

Therefore, in short, as a definition, crisis management, in addition to this fact that is a reactive management (crisis management, after incident), is a planning and forecasting management (beginning of crisis management before incident based on the results of observation Regular events and their analysis to prepare for potential risks).

Models of crisis management

Gonzalez and Prut Model

According to this analogy, the crisis is born at the time and eventually vanishes; the crisis has a starting point and an end. Gonzalez and Prut four-step model is among these models. These four steps are birth, growth, puberty, and cadence. It divides this model into completely separate and determinable steps and shows how to change a crisis over time. This is an illustrative model that is simple but influenced by the life cycle of a crisis. Gonzalez and Prut used this model in 1996 to explain the effect of organization management actions on organizational condition.

Pearson and Mitroff Model

In this model, recognizing the primary signs is the first step of crisis management. Except for very rare cases, all of the crises appear to be alarming before they occur. Unfortunately, in many cases, organizations are not aware of these symptoms and do not take any effective action to prevent the occurrence of a crisis. Of course, there is a

difficulty in identifying the early signs of the crisis. Given the fact that organizations are constantly exposed to various information bombarding, it is difficult to identify the signs of the crisis in the best of everyday situations.

Fink Model

This model has four steps: initial signs of crisis, acute crisis, chronic crisis, crisis resolution. At the restructuring stage, Mitroff emphasizes the opportunities for strengthening crisis managers, while Fink focuses on the time frame of the restructuring of the organization in the chronic phase. The Second difference between these two models is related to the crisis management cycle. The learning process of the Mitroff model shows that the organization has gone through the study of the crisis and learned from it a set of measures to enhance its ability to deal with other crises, while Fink's crisis resolution phase simply avoids talking about the future.

Barnet model

Barnet claims that these factors decrease the ability of an organization to focus and strategically manage a critical situation. According to this model, until these four factors fall under the control of the organization's management, the strategic management of the crisis will not begin. In this model, the author first presents the four factors that exist against crisis management: time pressure, issues related to control, threat level, and limitations related to the type of action against the crisis.

The Planning, Programming and Budgeting System (PPBS)

The goal of every economic activity is to achieve the goal and improve performance. Performance shows a certain level of results obtained to determined trade goals. In today competitive conditions, competitive advantage, efficiency, and effectiveness are among the most important organizational criteria. There are various ways to assess performance based on financial indices like financial turnover, market share, return, and profit. Based on above discussions, examining budget and budget supports to achieve determined goals of companies is essential and is considered as a criterion to assess performance

and is given to organizations and institutions as a tool to support decisions (Lidia Tanase, 2015).

In this regard, (Elhamma, 2011) stated that since the seventies of the twentieth century, extensive studies have been conducted to understand the impact of budget control on the firms' performance; however, there are few explanations in this regard. These works have been performed especially in Anglo-Saxon World (USA, UK, Australia, etc.). However, few studies have been done in developing countries (Elhamma & Taouab, 2015). In general, contradictory results have been created. For example, (Hopwood, 1972) showed that strict budget results in inefficient behaviors. But, (Otley, 1978) did not show such a relationship and found that the high emphasis on budget results in numerous meetings and more affinity. Following studies have been done under the effect of these two studies, which focused more on accounting based on performance, which includes reason of making the relationship between budget assessment style and behavioral factors affecting budget assessment. In this regard, (Chenhall, 2003) showed that six factors affect accounting base in designing management control systems: environment, technology, structure, size, strategy, and culture (Elhamma, 2015).

Budgeting system based on the program was presented in 1949 in the U.S. to modify public organizations management. In this budgeting style, the organization's operations are set in the form of a work plan and are considered for each credit program. Also, this model of budgeting is used more in the public sector and non-profit organizations, thereby avoiding additional costs, while ensuring that costs are accurately budgeted for programs that are more be profitable. Since traditional budgeting, both in the public sector and in the private sector, is fully input, their main emphasis is on detailed financial controls, while at the same time paying attention to existing organizational units, including the two parts. Program-based budgeting, on the contrary, is based on a program or activity set-up, which serves as a common goal and for this reason, is called goal-oriented since it focuses on the result. In this kind of budgeting, the final product of the organization's services and the attention to the system input is less attention. The main advantage of this is also a completely rational allocation of funds to the goals of the organization (Gordan & Sellers, 1984).

The budget is a program wherein credits are predicted based on tasks, programs, and activities of the public organization which should be done in the fiscal year of executing budget to achieve its goals. In other words, in the budget, a plan is defined that the government and government agencies in budget execution year, first, what are the goals, tasks, and intentions, Secondly, what kind of programs, operations and activities should do to achieve the goals and objectives of the program. In the programmed budgeting, like the traditional budget, the classification of credits is used based on the titles and the items of the costs, with the difference that in the traditional budget, the total credits of each government agency are predicted in different seasons and cost items, while in the programmed budgeting, credits of each one of the programs, activities, and plans, predict in the titles and the items of the costs. It needs to be noted that in the programmed budgeting of some countries, only programs are divided into titles and articles of costs, while in some other countries, activities, and plans also predict as titles and items of the costs. What is clear is that in the public accounting system of countries which use the programmed budgeting, classifications of the budget should be equally reflected in government accounts. Therefore, the costs of each ministry or government institution must first be distinguished from the programs, activities, and plans will be executed in that organization and, second, within these categories, the titles and items of costs are shown separately.

Elements of this budgeting method are as follow:

- Classifying organizational units in programs and activities
- Recognizing costs of programs and activities
- Deciding the output of these units should be due to these costs

The main advantage of this system is considering a time horizon bigger than one period to make informed decisions for the optimal use of resources and obtain results from determined goals.

PPBS system is a method which has been common in all countries to complete the programmed budgeting. This term was first used in early 1960 by U.S. Ministry of Defense and then went to other public organization under different conditions. By using this system, programming, planning, budgeting, management information, management control, and

the program's assessment can be related to each other, and at the same time emphasizes on the systematic analysis of each one of above elements. There is a significant amount of ambiguity about PPBS system. Some relate PPBS system simply to economic analysis. Some other, consider it only a good modification to the measurement system. But the key to the proper, complete, and comprehensive understanding of the concept is to emphasize the letter "S". This set must be considered as a system, not a specific method or technique, a system including accurate and rational decision-making basis in policy-making step and stating policy of designing executive programs, and assigning limited resources among infinite needs and providing constant relationship these factors. Naturally, each element of this system has a relationship with other elements to achieve the system goals.

In line with the new language of PPBS, new concepts entered managing development programs and assigning resources to development programs. PPBS system should be considered by development personnel in all ranks as a new and exciting tool which is used to improve, manage, and assess development programs. The special attractiveness of the PPBS system for development personnel should be in making and assessing new options or new activity pathways to achieve certain development targets. Many development programs have not been yet reviewed completely by analysis systems. Any development manager wants to do more than what resources allow him/her. PPBS help to these managers to choose among competitive programs.

Budgeting and Crisis Management

The most authoritative model for PPBS funding has been the Charles and Cooper model, which was presented in 1971 (Charles & Cooper, 1971). This model which was designed especially for U.S. army budget is still valid and is cited more or less in reliable scientific texts. The basis of the model is the organizational structure of the plan and program budget, as shown in (Figure 1).

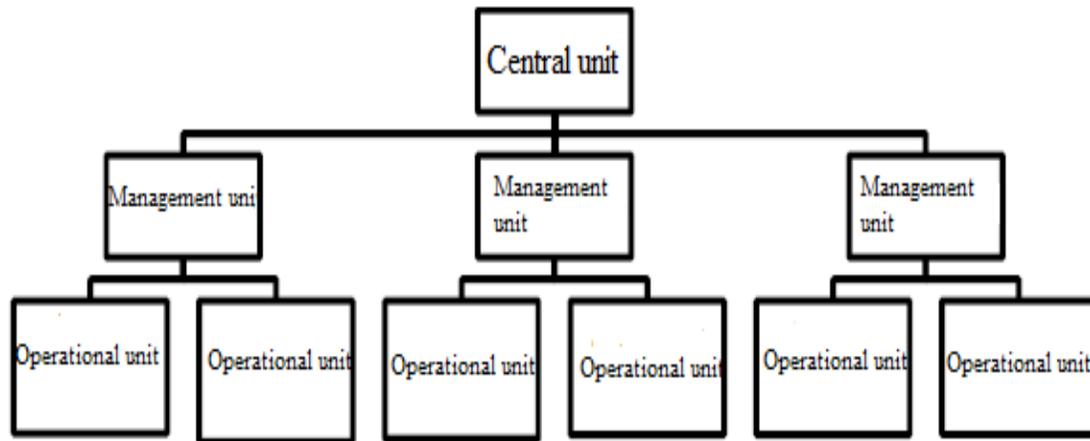


Figure 1. PPBS Budgeting

In this figure, the central unit is high-level characteristic of organization and is responsible for setting goals and assigning resources. Management units are medium levels of organization which can be local resources under their control in the determined power range. Operational units are the lowest level of organization which is responsible for creating project proposals for officials of managerial units. This simplification, in large and complex organizations, may be incorrect. But, we can't deny this fact that all of the organizations in the general format have this type of structure with environment regardless of internal and external relationships.

In line with this budgeting route in crisis management, it can be said that if an organization has more readiness against critical conditions, it can better manage the decisions in critical conditions. Coombs (Coombs, 2014; Zare, & Rajaeepur, 2013) pointed that in a crisis, effective internal and external relationships are necessary. The effective communication in a crisis can alleviate or annihilate the crisis and sometimes can provide more positive credit for the organization than before the crisis. The crisis management without communication will not succeed. Therefore, crisis communication should be done accurately in the course of the crisis.

In recent decades, many studies and researchers with different views and methods have been done on the crisis, how it forms and manner of managing it. Some researchers have

based their analyses on the case study. Some others have used comparative analysis, and also some others have taken the experimental approach.

Crisis prevention or management will not be realized without financial resources. In all activities related to resolving critical conditions, the certain and enough financial resources should be available in prevention, critical condition and recovery steps (Klučka, 2013). For answering this crisis management steps, there is this question that what amount of the budget is required for this steps? Crisis management has required budget details and resources. A Significant amount of budget is required for financing consequences of crisis which the most important resources to finance budget for the crisis management are:

- Public budget
- Local Budgets
- Store for crisis management in the public management budget titles
- Donations by real and legal institutions
- Using additional budget resources of government
- Paying debts by insurance companies
- Issuing of government bonds
- Loans
- Cooperation between public and private sectors

Financial security for critical actions provides guarantees for facing critical situations and proper management of its aftermath. Preparing crisis group activities before, then, and after crisis requires accurate financial resources. Crisis training should also be considered in the crisis planning (Kalupová, 2015).

Materials and methods

In this research, we examine the relationship between crisis management steps and Planning, Programming and Budgeting System. A statistical population of this study is 60 managers of the power generation plants. The relationships between variables were tested using Smart-PLS software.

According to the discussed issues in this research, using the following conceptual model, the relationship between variables is tested (Figure 2):

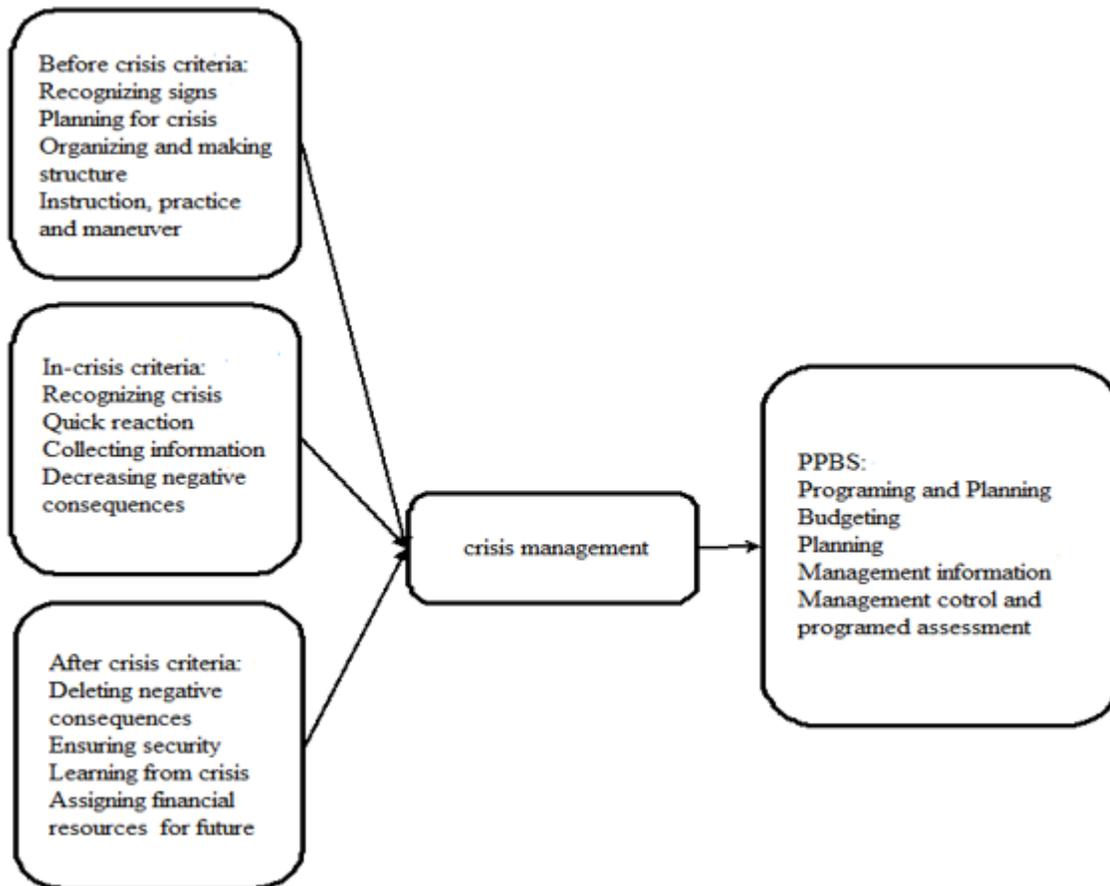


Figure 2. Conceptual Model of Research

The present study is a descriptive-applied type which is conducted in a survey method. Data collection tool in this research is questionnaire which includes 17 items.

A statistical population is 60 managers of power plants. Power production systems due to complex nature and multiplicity of technological and human elements are among systems prone to agitation and turbulence and system stability, and it is always a problem of stability of the system and maintaining the reliability of the system from the general concerns of the senior managers, especially the excellent management of the organization. With considering organizing and facilities on the one hand, and implementing crisis management system on the other hand, not only activities can be based on normal conditions, but also should be designed by considering the possibility of the crisis occurrence and emergency situation. Under such a belief, if the power plants are equipped knowingly and systematically to enough and broad capacities and possibilities to act

against crisis, they can take the initiative in an emergency, and return to the "practical capacities and systems stability" before the crisis occurs. In this research, 60 managers were selected by targeted and by judgment.

Validity and Reliability of Research Variables

Since the standard questionnaire used to test the variables, first, the selected indices were translated and then, with the reference to the elite, necessary corrections were made. The strength of the relationship between the factor (hidden variable) and the observable variable is shown by the factor load. The factor load is between 0 and 1. If the factor load is less than 0.3, the relationship is considered weak and is withdrawn. The factor load between 0.3 and 0.6 is acceptable, and if more than 0.6 is, is very desirable. Table 1 shows that all factor loads of variables are more than 0.5 and this reveals that the reliability of the measurement model is acceptable.

Table 1. Functional Loads and Research Variables.

Relationship	Functional load	t statistic
Programmed budgeting → q01	0.795	13.958
Programmed budgeting → q02	0.658	6.859
Programmed budgeting → q03	0.714	8.198
Programmed budgeting → q04	0.696	5.145
Programmed budgeting → q05	0.682	6.418
Pre-crisis criteria → s01	0.848	34.557
Pre-crisis criteria → s02	0.644	7.373
Pre-crisis criteria → s03	0.774	12.381
Pre-crisis criteria → s04	0.749	12.946
In-crisis criteria → s05	0.890	27.781
In-crisis criteria → s06	0.876	23.453
In-crisis criteria → s07	0.872	27.235

In-crisis criteria →	s08	0.824	17.890
Post-crisis criteria →	s09	0.817	18.684
Post-crisis criteria →	s10	0.896	47.284
Post-crisis criteria →	s11	0.712	8.473
Post-crisis criteria →	s12	0.757	13.746

Based on the results of the measurement model in (Table 1), the factor load observed in all cases is greater than 0.5, which indicates that there is a good correlation between the invisible variables with their hidden variables, and also, based on the results of the measurement model, the amount Bootstrapping (t statistic) in all cases is larger than the critical value of 1.96, which indicates that the correlation between the invisible variables with its hidden variables is significant. Thus, it can be concluded that each latent variable has been tested correctly by its obvious variables, and about the findings of this scale, we can test the research hypotheses.

Convergent Validity

Then, the reliability of the research variables was tested by Cronbach's alpha with a standard value more than 0.7 (Cronbach, 1951) and Combined Reliability (CR) with a standard value more than 0.7 and Average Variance Extracted (AVE) with a standard value more than 0.5 (Fornell & Larcker, 1981) indices by using Smart-PLS software. (Table 2) shows that research variables have reliability and convergent validity.

Table 2. Reliability and Validity

Variables	Cronbach's alpha	AVE	CR
Post-crisis criteria	0.815	0.638	0.875
Pre-crisis criteria	0.755	0.573	0.842
In-crisis criteria	0.888	0.750	0.923
Crisis management	1.000	1.000	1.000
Programmed budgeting	0.762	0.505	0.836

Cronbach's alpha for all variables is more than 0.7; therefore, the reliability of all variables is verified. Average Variance Extracted (AVE) is always more than 0.5; therefore, convergent validity is also confirmed.

Divergent Validity (Fornelland Larcker Method)

In the divergent validity, the difference between the indices of a structure is compared with the indices of other structures in the model. This work is calculated by comparing AVE radical of each structure with the values of the correlation coefficients among structures. To do this, a matrix should be formed that the values of the main diameter of the matrix are AVE radical of each structure, and the lower and upper values of the main diameter are the coefficients of correlation between each structure and other structures. This steering column has been shown in the (Table 3).

Table 3. Matrix for comparing AVE radical and correlation coefficients of structures

Row	Post-crisis criteria	Pre-crisis criteria	In-crisis criteria	Crisis management	Programmed budgeting
Post-crisis criteria	0.719				
Pre-crisis criteria	0.260	0.757			
In-crisis criteria	0.202	0.123	0.866		
Crisis management	0.708	0.605	0.710	1.000	
Programmed budgeting	0.458	0.190	0.213	0.425	0.711

As is clear from the matrix above, AVE radical of each structure is more than the correlation coefficients of that structure, which reveals that the divergent validity of structures is acceptable.

General Fit Test

Although in available PLS algorithms fitness statistics like Bentley and Bunt normalized fitness index is reported, they are based on this assumption that parameters of the estimated model are for decreasing the difference between observed and rebuilt covariance matrices. The assumption that is not in PLS. of course, (Tenenhaus et al., 2005) introduced general fitness index to examine model fitness. The general criterion of Goodness of Fit (GOF) can be obtained by calculating the mean geometric of the mean the communality values and R². For this index, the values of 0.01, 0.25 and 0.36 have been described as weak, medium and strong, respectively.

$$GOF = \sqrt{(\text{Communality}) \times (\text{R Square})}$$

Table 4. Communality values and R²

Variables	Communality values	R ²
Post-crisis criteria	0.638	-
Pre-crisis criteria	0.573	-
In-crisis criteria	0.750	-
Crisis management	1.000	0.993
Programmed budgeting	0.505	0.181

As we know and can be seen in the above table, only the endogenous variables have R² values. After doing the calculations, the GOF index value obtained 0.638, which is a strong index and shows the high overall quality of the model.

Analysis and Results

Relationship of studied variables in each research hypothesis has been tested based on a general structure with Partial Least Squares (PLS) technique. In the general model of the research, shown in (Figure 3), measurement model (relationship of each observable variable with hidden variable) and pathway model (relationships of hidden variables with

each other) has been calculated. To test the significance of the relationships, the t statistic has been calculated by Boot Strapping technique, which is shown in (Figure 4).

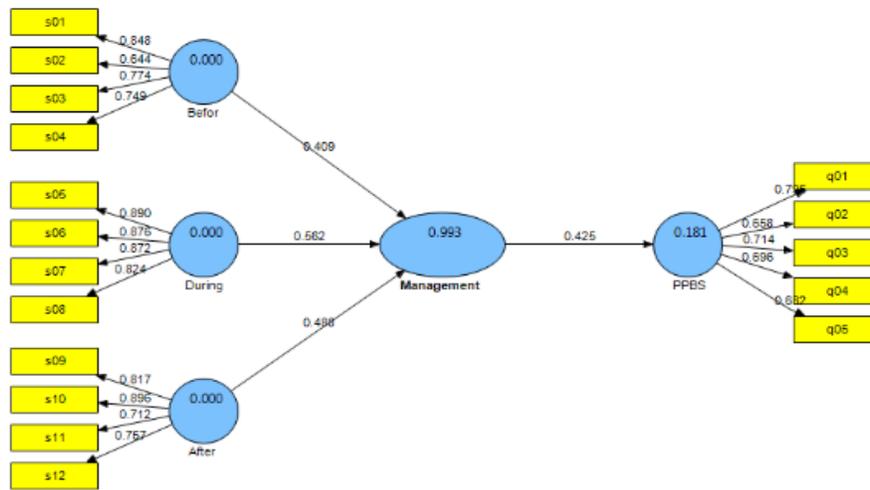


Figure 3. Partial Least Squares technique of the general model of research

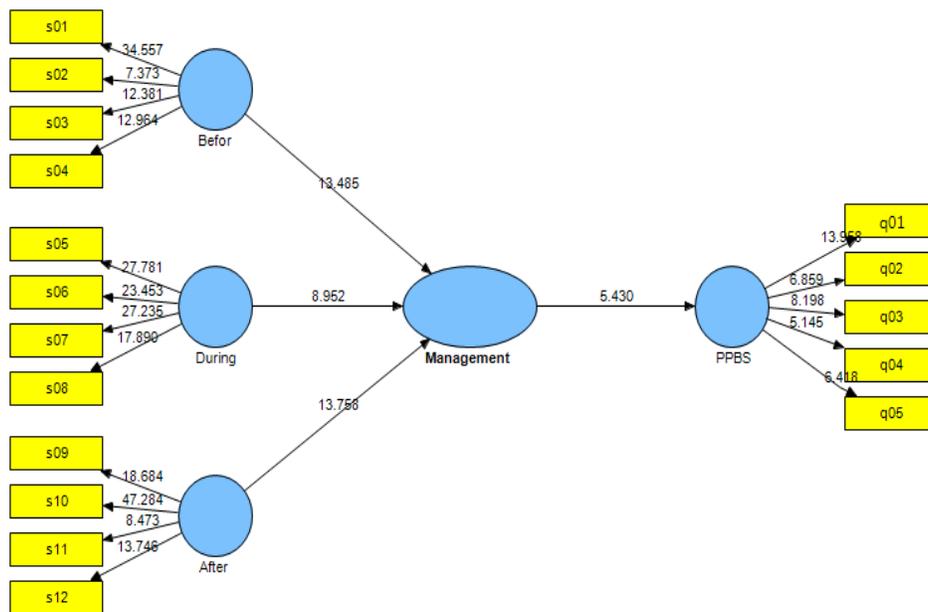


Figure 4. t statistic of the general model of research with Boot Strapping technique.

Major Hypothesis: crisis management affects programmed budgeting of power plant.

The intensity of the crisis management effect on programmed budgeting is calculated to be 0.425, and the test probability statistic was also 5.430, which is more than t critical value at 5% error level (1.96) and shows that observed effect is significant. Therefore, with 95% confidence, crisis management has a positive and significant effect on the programmed budgeting of the power plant, and the major hypothesis is confirmed.

First sub-hypothesis: pre-crisis criteria affect the programmed budgeting of the power plant.

To examine this effect, first, we examine the value and significance of each of the sub-pathway sections and then calculate the value of the general effects.

The first part of the sub-pathway:

The intensity of the effect of the pre-crisis criteria on the crisis management was calculated 0.409, and test probability statistic was obtained 13.485, which is more than the t critical value at 0.05 error level, that is, 1.96, and shows that the observed effect is significant.

The second part of the sub-pathway:

The intensity of the effect of the crisis management on the programmed budgeting was calculated 0.425, and the test probability statistic was obtained 5.430, which is more than the t critical value at 0.05 error level, that is, 1.96, and shows that the observed effect is significant.

All calculations related to analyzing direct and sub-path pathways were done by Smart-PLS software and presented them in a table called the total effects. As a result, we can observe the overall and meaningful impact of all variables. The results of these calculations are shown in the following table. It is observed that a meaningful value for the total effect of the pre-crisis criteria on the programmed budgeting was calculated 5.907, which is more than the t critical value at 0.05 error level, that is, 1.96, and shows that the observed effect is significant. Therefore, with 95% confidence, the pre-crisis criteria have a positive and significant effect on the programmed budgeting of the power plant, and the first sub-hypothesis is confirmed.

Table 5. General Effects.

Pathway	General effect	t statistic
Post-crisis criteria → crisis management	0.488	13.758
Post-crisis criteria → programmed budgeting	0.208	5.083
Pre-crisis criteria → crisis management	0.409	13.485
Pre-crisis criteria → programmed budgeting	0.174	5.907
In-crisis criteria → crisis management	0.562	8.952
In-crisis criteria → programmed budgeting	0.239	5.275
Crisis management → programmed budgeting	0.425	5.430

Second sub-hypothesis: in-crisis criteria affect the programmed budgeting of the power plant.

The intensity of the effect of in-crisis criteria on programmed budgeting was calculated 0.239, and the test probability statistic was obtained 5.275 which is more than the t critical value at 0.05 error level, that is, 1.96, and shows that the observed correlation is significant. Therefore, with 95% confidence, the in-crisis criteria have a positive and significant effect on the programmed budgeting of the power plant, and the second sub-hypothesis is confirmed.

Third sub-hypothesis: post-crisis criteria affect the programmed budgeting of the power plant.

The intensity of the effect of the post-crisis criteria on the programmed budgeting was calculated 0.208, and the test probability statistic was obtained 5.083, which is more than the t critical value at 0.05 error level, that is, 1.96, and shows that the observed correlation is significant. Therefore, with 95% confidence, the post-crisis criteria have a positive and significant effect on the programmed budgeting of the power plant, and the third sub-hypothesis is confirmed.

Conclusions

Today organizations and institutions face broad changes and threats in different issues. Crisis management is the process of predicting and preventing the crisis, intervention in crisis and recovery after the crisis. In other words, the term "crisis management" includes any action to avoid the crisis, a thoughtful search of the crisis, and ending the crisis. Budget is the most important strategic program. Therefore, a model for budgeting should be designed to be able to implement it, while maintaining the justification of the budget law, the optimality also does not endanger it. In recent decades, many studies and researchers with different views and styles have been done on the crisis, how it forms and how it can be managed. Some researchers have based their analyses on a case study. Some others have used comparative studies, and also, some others have adopted an empirical approach. Although choosing an appropriate pattern of decision-making in the conditions of organizational crisis and financing is of great importance, and has a high sensitivity, so far less has been analyzed with scientific methods. To cover this research vacuum, the present study addresses this issue from a scientific point of view. In short, this study has two main achievements: the first achievement, selecting an appropriate pattern of decision-making under critical conditions, which was determined by the results of the calculations. The second achievement of this study also recognizes more effective indices of crisis and their relationship with the PPBS budgeting process. Required financial resources of the organization in critical conditions can be provided through making the relationship between the budgeting process and the crisis management phases, and thus, the required time for financing crisis management decreases.

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