

The role of strategic planning in the water crisis management: A survey on the water resources managers in the Karun River, Iran

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Abstract

Water crisis management is a critical issue in worldwide, particularly in regions heavily reliant on rivers for various socio-economic activities. This research examines the role of strategic planning in effectively managing water crises, with a specific focus on the Karun River in Iran. The aim of the study is to find the relationships between strategic planning and its sub-variables (top management support, strategic analysis of the internal and external environment, the presence of a strategic plan, evaluation of the implementation of the strategic plan), and the management of the water crisis. The research gains the importance of working on strategic planning within the water resources directorates in the Karun River and to extent of its compatibility with the requirements of water crisis management and to draw the attention of senior management to this subject. The opinions of the principals of the water resources directorates in the Karun River basin and their assistants were surveyed using a questionnaire that was distributed in 51 selected people. A form to collect information related to the research variables, and in order to reach the desired results. Appropriate statistical analysis using SPSS program (V22) were applied. The most important finding of the research is that there is a clear impact of strategic planning in managing the water crisis.

Keywords: Karun River; Strategic management; Strategic planning; Water crisis.

1. Introduction

Iran faces great challenges in its move towards achieving sustainable development. Many irrational practices and behaviors have led to the deterioration of many of Iran's vital natural resources, especially the water resources. It constitutes the most important obstacles facing Iran

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in achieving its ambitious goals in the field of food security and ensuring the sustainability of economic and social development. This requires reviewing the regulatory and legislative frameworks that regulate the use, exploitation, and protection of water resources and working to develop them. This requires undertaking institutional and organizational reforms aimed at putting the objectives of the national environmental policy into effect, by formulating and implementing national plans based on the application of the strategic management approach because of its expected impact in activating environmental policies and environmental planning. The water crisis in Iran is one of the most important problems facing the Iran's economy, as the scale of the water problem is large, and if it does not appear clear today, it will be dangerous in the future, so much of them call the third millennium the water era, instead of researchers from the oil era that characterized the years (Foltz, 2002). This is due to the fact that water resources and the resulting problems are among the most prominent issues facing Iran now and in the future.

The countries of the world have given great importance to their water policy by practicing the strategic planning process and developing advance plans in order to reach the optimal state in investing in water resources. As a result of the spatial and temporal variation of water resources, their scarcity, and their limitations within the Middle East region, the problem of water and its distribution among the countries of the region has emerged in a way that can be a factor of strategic strength and weakness, hence the justifications for choosing the research topic (El-Naser, 2009).

From the above, water resources directorates must possess a long-term strategic vision and a clear message through which they can confront crises. Senior management at all levels must lead the strategic process and possess the basic components that include awareness, perception, practical skill, and experience in following effective methods that achieve them. Strategic planning serves as a crucial tool to address these challenges by providing a comprehensive framework for sustainable water resource management. This paper highlights key elements of strategic planning that contribute to effective water crisis management in the Karun River basin. These elements include:

- 1) Integrated water resource management: It promotes coordination among various stakeholders involved in water management, including government agencies, local communities, industries, and agricultural sectors.
- 2) Risk assessment and early warning systems: It can identify potential threats to water availability and quality. By integrating early warning systems into the planning process, authorities can promptly respond to emerging crises such as droughts or pollution incidents.
- 3) Infrastructure development: Strategic planning recognizes the importance of infrastructure development for efficient water management. It focuses on constructing dams, reservoirs, irrigation systems, and wastewater treatment plants to optimize water allocation and reduce losses.
- 4) Climate change adaptation: This includes assessing future scenarios based on climate projections and implementing adaptive strategies such as rainwater harvesting or promoting efficient irrigation techniques.

5) Stakeholder engagement: Engaging local communities, NGOs, and private sectors fosters a sense of ownership and collective responsibility towards water crisis management.

The Karun River, as the longest and most significant river in Iran, plays a vital role in supporting agriculture, industry, and domestic water supply. However, it faces numerous challenges such as water scarcity, pollution, and climate change impacts. By implementing strategic planning in the management of water crises in the Karun River basin, authorities can enhance the resilience of the region's water resources. This study emphasizes that strategic planning should be an ongoing process, continuously adapting to changing circumstances, and incorporating new scientific knowledge. Ultimately, effective strategic planning can contribute to sustainable water management practices that ensure the long-term availability and quality of water resources in the Karun River basin.

The research problem revolves around the severe water crisis that is going through the country in general and in the Karun river region in particular and how to manage it through applying and practicing the strategic planning process in crisis management. For the purpose of identifying the origin of the research problem, a number of questions are set:

- What is the level of the strategic planning process in the water resources directorates in the Karun River?
- How do the water resources directorates in the Karun river deal with the water crisis?
- What is the impact of strategic planning in managing the water crisis?

1.1. Research objectives

- Determining the level of strategic planning practice in the water resources directorates regarding the Karun River.
- Diagnosing and determining the nature of the relationship between strategic planning and water crisis management.
- Identifying how to manage the water crisis in the water resources directorates in the Karun River.
- Knowing the impact of strategic planning in managing the water crisis in the Karun River.

1.2. The hypothetical outline of the research

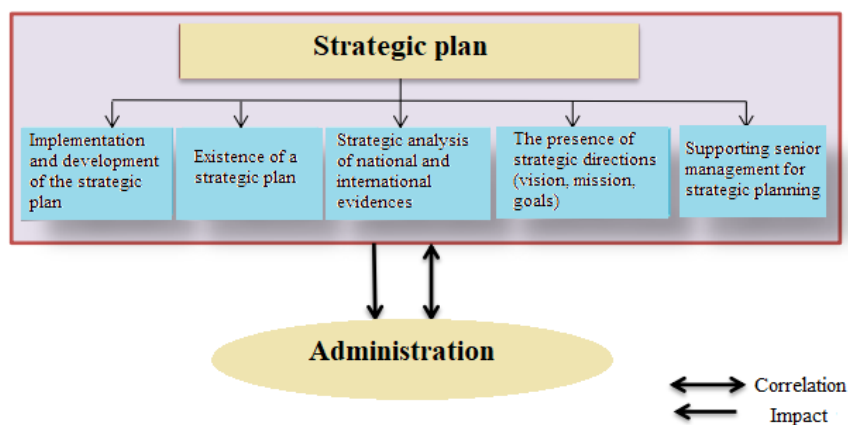


Figure 1. Hypothetical diagram of the research

1.3. Research main hypotheses

In order to achieve the research objectives and test its hypothetical plan (Figure 1), two main hypotheses were relied as follows:

- 1) There is no significant correlation between strategic planning in its dimensions and water crisis management.
- 2) There is no significant influence relationship between strategic planning in managing the water crisis.

2. Theoretical framework of the research

This section deals with the concepts and dimensions of strategic management. First, the definition of strategic management and its concept are explained. Then the extent of its importance as a modern management approaches that can have a major role in helping organizations develop and improve their performance. Then, the importance of strategy planning and the obstacles facing the application of the strategic management approach is also reviewed. Moreover, the dimensions of strategic management, in terms of formulating an integrated strategy, implementing, monitoring, and evaluating the strategy are described. It is also explained how the application of the strategic management attitude helps institutions, organizations and all different sectors to reach the goal of achieving sustainable development because it is closely linked to achieving efficiency and effectiveness.

2.1. Strategic planning

2.1.1 The concept of strategic planning

Strategic planning is defined as a basic process for achieving the organization's mission and providing it with a practical framework for making decisions related to distributing resources, facing challenges, and taking advantage of available opportunities. It is an organized process that seeks to determine the organization's status now and where it wants to reach in the future (Namken and Rapp, 1994).

As Shapiro (2003) believed that strategic planning is a general plan to facilitate the successful management process. It takes the planner out of the circle of activities and daily work within the organization and gives a complete picture of what we do? What is our future path? It provides the planner or management with a clear vision of where you want to go and how to get there.

Strategic planning is considered an important part of management and a vital element of its components because it expresses awareness of the future and prepares the requirements for dealing with it. It defines the intellectual and philosophical horizons of management and keeps pace with the stages of its development. Planning is an essential element of management. It is a way of thinking about the future and knowing its needs and circumstances so that current actions can be controlled to ensure achieving the desired goals (Steiner, 2010). Strategic planning is about fore-sighting the ideal shape of the organization in the future and achieving this shape (Ratcliffe, 2003). Strategic planning is:

- Insight into the features of the organization.
- Envision the organization's directions and path in the future.
- Vision of the organization's mission in the future.
- Imagination the field of business and activities in which the organization engages.

It is a major type of formal planning wherein the organization develops and forms long-term goals and chooses the activities to achieve these goals. Bryson (2010) pointed out that strategic planning is a form of planning designed to support non-profit organizations to respond effectively to the changes that occur in the organization. It is a system of combined efforts to take significant decisions and steps regarding what are the institution? And what do they do? Why do they do that?

Moreover, the strategic planning in institutions moves over a known time horizon ranging between 5-10 years or a little more, and ends with a strategic plan that includes a number of executive and procedural plans. All of these plans have other backup plans to be used in times of crises and abnormal circumstances or when the conditions of implementation change. The plans' flexibility and movement appear as it proceeds according to a rational process that will aim to achieve long-term tasks and objectives by using specific strategies that use all available and expected human, material, and technical resources.

Bryson (1988) stated that the strategic planning is the process of developing the organization's mission, goals, plans, and policies for the next stage. Furthermore, strategic planning is a long-term process in which the established objectives lead the path of mobilizing current and potential resources through a series of stages that begin with surveying the current situation and diagnosing the future vision. It also passes through a quantitative and descriptive analysis of the strengths and weaknesses in the internal environment and the opportunities and risks in the external environment, so a map of change is formulated. The strategy is subject to specific mechanisms for implementation and specific standards for following-up, whether at the level of organization or at the level of a sectorial, regional, or national economy.

It was represented that strategic planning is a systematic process to determine how the organization will move from the current situation to its desired future (Thomas, 2021; Akhter, 2003), as well as a process of making decisions based primarily on a set of questions: Where are we now? Where do we want to be? How will we get there? How do we measure our progress?

The strategic planning is a continuous process and a basic function of management related to preparing plans, executing them, monitoring, and evaluating implementation processes, while plans are one of the elements and components of planning, as final results are developed with mental effort to determine a behavior that is adhered to. Strategic planning also gives organizations the opportunity to analyze their strength and weakness factors, seize available opportunities, and are alerted about potential threats or restrictions in order to reduce their effects by taking appropriate decisions to mobilize their resources and invest them in a scientific manner (Cannon and Edmondson, 2005).

The researchers believe that the strategic planning process is the process of preparing or formulating a strategic plan, which includes reviewing the organization's mission and goals

and then choosing the appropriate strategy to achieve them, which is part or stage of the stages of strategic management (Bryson and Alston, 2011).

From the above, strategic planning is not a single concept, but rather a group of concepts that enable public institutions and business organizations to be more successful in achieving the vision, mission, values, and strategic goals. Through strategic planning, institutions can achieve the following:

- It studies and diagnoses the environment in which it exists, and works to uncover the factors and trends that affect its method of operation and prevent the implementation of its performance.
- It explains the most prominent difficulties or strategic challenges facing the institution.
- It directs its vision, clarifies its message, pays attention to its values, and defines its general goals.
- Developing strategies to achieve its directions, tasks and paths and crystallize public values.

It is clear from the previous definitions that strategic planning is an imaginative mental process for choosing the organization's future location according to the changes occurring in the environment and the organization's adaptation with them.

2.1.2 The importance of strategic planning

Bryson (2018) represented that the importance of strategic planning for institutions lies in the following points:

- 1) An opportunity for learning and team building: Strategic planning provides the organization with an excellent opportunity to encourage learning and commitment within the organization and relevant individuals.
- 2) Improving results: The presence of a clear mission, goals, and action plan for the organization positively affects the organization's performance, and the presence of a clear future plan for the organization and a follow-up system can contribute to maximizing the achievement of goals and reaching a high degree of transparency and accountability. Civil society organizations sometimes face a set of problems and opportunities which is difficult to confront and solve separately. Strategic planning is the method of solving complex issues or problems in a planned manner.
- 3) Communication and Marketing: Strategic planning can be an effective communication and marketing tool, especially since some funders of institutions ask about the institution's strategic plans as a requirement for contributions and continued support.
- 4) Overcoming crises and avoiding current and future crises: Strategic planning helps the organization overcome the current and future crises it faces, and it also helps it determine its resources, obtain more resources, and possess skills, which enables it to better provide its services to society (Bryson et al., 2015).

2.1.3 Dimensions of strategic planning

Based on the research literature, the following dimensions were adopted:

- 1) Senior management support for strategic planning, which means the presence of conviction and support from the Water Resources Department for the strategic planning process by providing all the financial and logistical resources it needs, in addition to encouraging all employees to participate in the strategic planning process.
- 2) The presence of strategic directions (vision, mission, goals), meaning that the Water Resources Department must have a clear vision that it aspires to reach, as well as have a successful message that distinguishes it from other institutions, and after the vision and message are defined, this is translated into specific goals that can be achieved (Loorbach, 2010).
- 3) Strategic analysis of the internal and external environment, by which are the set of internal factors and variables (strength and weakness factors) that exist within the institution and are subject to the control of senior management in the short term, and external (opportunities and threats) that lie outside the institution's borders from political, legal, economic, cultural, social, technological point of view (Ndou, 2004).
- 4) Griffin and Phillips (2023) defined strength, weakness, opportunities, and threats as follows:

Strengths: the characteristics that give the organization good capabilities that enhance the elements of strength and contribute to completing the work with high skill and experience.

Weakness: the points that indicate a deficiency or poverty in the institution's capabilities.

Opportunities: the circumstances surrounding the organization in a specific place and in a specific period of time that the organization is able to exploit those circumstances to achieve its strategic goals.

Threats: the potential events that, if they occur, will cause danger or negative effects to the organization.

2.1.4 Having a strategic plan

The strategic plan is the plan prepared by the institution to clarify its overall picture and its framework of effort, and explains the work environment in which the institution operates, and the strategic goals it seeks to achieve (Speech, 2001).

2.1.5. Follow up on the implementation and evaluation of the strategic plan

The process of developing policies and plans that were formulated in the previous stage of implementation through executive programs and the financial budgets associated with them and procedures of an executive nature, in addition to evaluating the strategic plan, which is considered equivalent to giving a final account statement on the extent of the plan's success or lack thereof (Palepu et al., 2020).

2.1.6 Conditions for the success of applying strategic planning in public institutions

Schaap (2006) stated that the conditions for the success of strategic planning are:

- The presence of senior management that believes in strategic planning.
- A clear and appropriate organizational structure for the institution.

- Availability of appropriate and diverse financial capabilities and skills to carry out the strategic planning process.
- Commitment of employees and middle management to planning.
- Provides complete conviction for plan participants of the extent of the benefits resulting from implementing the strategic plan.

2.2. *Managing the water crisis*

2.2.1 *Concept*

The concept of water crisis management is that a crisis is a situation limited to a state of alert, change, and departure from a state of stability. It provides opportunities to unleash latent creative abilities and find solutions. At the same time, it is an abnormal state that the individual or organization goes through, and it is a state of distress, or change for better or worse case (Liverman et al., 1999).

While Kernisky (1997) described the crisis as a mismatch between what the organization expects and what is happening in the environment.

On the other hand, a crisis was defined as a situation that includes two characteristics of threat resulting from the feeling of the parties affected by the crisis that they will not be able to obtain and maintain the values, resources and goals that they deem important, and time pressure is represented by those parties' awareness of the amount of time available to investigate facts and take action before losses occur (Billings et al., 1980; Ford, 1981).

The members of the crisis team are chosen from the few leaders who have certain characteristics and specifications. This team works as an integrated, interconnected unit with one goal: managing the crisis, preventing the deterioration of the crisis situation, exposing the crisis to its results, and preserving the vitality of the administrative entity and its ability to continue and withstand the events of the crisis (Madani, 2014).

Samawi (2021) pointed out that a crisis is a critical period or an unstable state awaiting a decisive change, a programmed attack of pain, distress, or dysfunction. As for crisis management, it is a special management process that produces a strategic response to emergency situations through a group of pre-selected and well-trained administrators who use their skills as well as special procedures in order to reduce losses to a minimum. While the crisis expresses a position, condition, process, and issue faced by the decision maker in one of the administrative entities (a state, institution, project, family) in which events follow accidents and overlap, and the causes are intertwined with the results, and matters become mixed and complicated, and the decision maker is lost with them. The decision maker is able to see when he encounters it for the first time and when he tries to control it or its future directions.

Managing the water crisis is a vital and essential function of management, through which it can determine the success of the institution in achieving and sustaining its goals, as the water crisis well managed by the institution's management carries with it the opportunity to learn, generate a good reputation, and improve the system, business, and operations of this institution, despite of defining the crisis as a negative phenomenon, the positive relationship between the crisis

and change must be renewed, which reflects the positive motivation to overcome the crisis for the successful development of the institution (Biswas, 2008).

Water crisis management means the management's ability to avoid potential water crises and must be measured by the extent to which the impact of these crises on organizational goals is mitigated (Fang et al., 2007). It is the result of the interaction of three integrated elements:

- The speed of the decision to respond to the crisis.
- Communication and information flow.
- Mobilization and mobilization of resources.

The researchers believe that a crisis is a situation that confronts the institution's senior management and determines its fate. It expresses a critical and dangerous moment characterized by decisiveness and constitutes a severe difficulty for decision makers and puts them in a dilemma of choosing between the decisions they can take in light of the prevailing feeling of uncertainty and the confusion of matters with one another.

2.2.2 Causes of the water crisis

A. External causes

1) Climate change and global warming

Climate change and global warming have led to the phenomenon of drought and lack of rainfall, as Iran is located in an arid to semi-arid region. The annual average rainfall does not exceed 200 mm. Consequently, this has led to a clear decline in the water revenues of the Karun River because rain is considered the main feeder for this river.

2) Geographical location:

The geographical location of the Karun river puts Iran in front of one fact, which is that the sources of the Karun river are not from Iran, but from countries neighboring Iran, which are Turkey and Iran, which makes these countries, by virtue of their geographical location, control and control the water resources of Iran.

3) Political tensions and the absence of international law

Water has become an economic commodity used to serve politics, and whoever owns the water resources owns the sources of influence in light of the absence of international organizations, legislation, and treaties, and because of the weakness of the compulsory international law regulating water shares between the riparian countries, Iran worked on making numerous agreements with the riparian countries, but the failure to activate these international agreements in accordance with international conventions and norms have led to non-implementation, failure and disruption. The most important of these treaties and agreements are those that took place between:

- Iran and Turkey
- Iran and Syria
- Iran and Iraq

B. Internal causes

Abas et al. (2019) believes that there are internal reasons that led to the water crisis, which are as follows:

- Lack of dams and lakes for storing water
- Absence of water using' guidance
- Not using modern irrigation systems
- Low cost of water
- Increase in population
- Growth of natural plants in rivers

2.2.3 The relationship between strategic planning and water crisis management

Rousaki and Alcott (2006) believe that strategic planning for a water crisis can expand the possibilities of preparing for it through practicing open thinking, allocating resources, and accessing information and experience gained from dealing with such a situation. Therefore, it increases the organization's degree of preparedness for crises.

As Gilpin and Murphy (2008) stated that strategic planning leads to focusing on the main problem, which contributes to saving the time necessary to identify the dimensions of the crisis and search for tools and skills that help reduce its severity. The essence of the strategic planning process lies in the extent of prediction of potential crises, and the position of the parties. Direct and indirect individuals, the circumstances surrounding the crisis effect on the level of success in managing the issue.

Somers (2009) pointed out that strategic planning and success in managing the water crisis are not only intertwined, but also closely interconnected, and there is a need to take into account certain elements of planning activities to lead to an effective response by building strategic flexibility and agility that enables adaptive behavior and taking advantage of improvisation and innovation.

While Schindler and Donahue (2006) believes that strategic planning works to discover early warning signs of a water crisis and provide the best response to it by determining the time, effort, and necessary material and human precautions, while at the same time preserving the economy of dealing with the crisis by preventing random and unnecessary activities.

Through the strategic planning process, the organization seeks to achieve greater effectiveness, remove the element of surprise, risk, and uncertainty, respond quickly, make more effective decisions, and evaluate business dynamics and related issues, allowing the organization to have greater control (Valackiene and Virbickaite, 2011; Lempert and Groves, 2010).

3. Research Methodology

The Karun River, originating in Iranian territory, as the longest and most significant river in Iran, plays a vital role in supporting agriculture, industry, and domestic water supply. The length of this river is approximately 900 km which flows through Chaharmahal and Bakhtiari province as well as Khuzestan province. It has a mean annual flow of 24.7km³ and flows into

the Shatt Al-Arab, to which it brings a large amount of fresh water just before reaching the sea (Mohamed, 2014). The river passes all or parts of 11 provinces; Kohgiluyeh and Boyer Ahmad, Fars, Khuzestan, Lorestan, Kermanshah, Ilam, Chaharmahal and Bakhtiari, Kurdistan, Markazi, Hamedan and Isfahan). However, it faces numerous challenges such as water scarcity, pollution, and climate change impacts

3.1. Data and methods

3.1.1 The research population and sample

The researcher adopted a comprehensive survey method for numbers of directors and related assistants, department heads, and divisional officials (51 person) in the water resources directorates in the Khuzestan province that has some studies or authorities about Karun river.

3.1.2 Research measurement tool

The questionnaire form was mainly relied upon to collect data and information by distributing 51 forms to the selected managers, department heads, and local officials in the water resources directorates in the Karun River in order to obtain the necessary information about the research topic.

3.1.3 Statistical methods

A set of statistical methods were used, which are as follows:

- 1) Descriptive methods, which are as follows (Jambu, 1991):
 - Frequency distribution
 - Standard deviation
 - Weighted arithmetic mean
 - Coefficient of variation
- 2) Analytical statistical methods (Johnson, 1949; Marascuilo and Serlin, 1988), which are as follows:
 - Simple and multiple correlation coefficient
 - Simple and multiple regression coefficient
 - Z test
 - F test
 - T test
 - Interpretation Coefficient R^2

In addition to the statistical programs, the SPSS (V22) was used to examine the nature of data distribution and tests of validity and reliability (Mishra et al., 2019; Setiawan et al., 2020), which are:

- Kolmogorov-Smirnov test.
- Wilk-Shapiro test.
- Coefficient test (Cronbach's alpha).
- Confirmatory factor analysis using AMOS software.

4. Analyzing the results and Discussion

For the survey list, this section focus on the analyzing results of the field study on the axes of the stages of formulating, implementing and evaluating the strategy and the effectiveness of environmental policies to achieve sustainable development, by reviewing the averages and frequencies to measure the trends of the research sample, and measures of dispersion to identify the elements of the variables with the highest dispersion, and interpreting and discussing the results. As for the second section He dealt with testing the study hypotheses by studying the correlational relationships between the variables included in the study, analyzing variance to determine the essence of the relationship between the variables and the phenomenon under study, as well as studying linear regression to show the different effects of the study variables and the degree of influence of each variable to clarify the validity of those hypotheses or not, as it became clear the validity of the main hypothesis and the three sub-hypotheses of the study. This section also presents the proposed framework for the role of strategic management in activating environmental policies to achieve sustainable development and analyzing its components, presenting the advantages of this proposed framework, the expected problems when applying this framework and the necessary precautions.

4.1. Validity and reliability tests for the research scale

4.1.1 Initial examination of the study data

In order to reach accurate results for the research, there is a necessary need to conduct a preliminary examination of its data before starting the procedures for describing and statistical inference of the data. The initial examination of the data includes examining the nature of the distribution of the data. To examine the nature of data distribution and for the purpose of verifying that the sample is drawn from a population whose data follows a normal distribution, there are two tests, one of which can be adopted, namely the Kolmogorov-Smirnov test and the Wilk-Shapiro test. In the current study, we will rely on the first test, the Kolmogorov-Smirnov test, as follows:

Table 1. Results of the normal distribution of the research variables

Variable	c_r	Kol-smi	p-value
X	2.541	0.069	>0.05
Y	2.420	0.071	>0.05

Source: Prepared by the researchers from computer output.

It is clear from the results of the statistical analysis of the Kolmogorov-Smirnov test (Table 1) that the value of the test is greater than the level of significance (5%), and this shows that the data of the study sample do not differ significantly from the normal distribution. This leads us to accept the assumption that the data of the special dimensions The study variables are drawn from a population whose data follow a normal distribution.

4.1.2 Testing the validity and reliability of the research tool

To ensure the accuracy and validity of the data, the following tests were conducted:

- 1) Testing the reliability of the scale

Reliability expresses the extent to which the measure is characterized by being free of bias or errors, and this ensures the consistency and stability of the results obtained from the measurement across different periods of time. Reliability is measured by verifying the internal consistency of the tool and the stability of the results of the same measure across different time periods, as follows:

2) Stability test

The primary purpose of conducting this test is to verify the existence of stability in the research results by distributing the measurement tool to the same sample over two different time periods and working to extract the stability coefficient between them. For the purpose of conducting the test, the researcher distributed the measurement tool to a random sample that included (40), and after a period of two weeks, it was redistributed the same measuring tool to the same sample again. Table 2 shows the reliability coefficients for this test, and they are all acceptable because they are greater than (0.80).

Table 2. Reliability coefficients between variables

Scale	Stability coefficient between the two time periods
Strategic planning	0.87
Water crisis management	0.84

Source: Prepared by the researchers based on the results

4.1.3 Internal consistency stability

Table 3. Cronbach's alpha coefficients for the research standards

Scale	Dimensions	Cronbach's alpha coefficient for the dimension	Cronbach's alpha coefficient for the scale
Strategic planning	Supporting senior management for strategic planning	0.82	0.83
	The presence of strategic directions	0.86	
	Strategic analysis of the internal and external environment	0.82	
	Having a strategic plan	0.81	
	Follow up on the implementation and evaluation of the strategic plan	0.80	
Water crisis management		0.86	0.84

Source: Prepared by the researchers using SPSS (V22) program

The existence of internal consistency of the research scales items was verified through the use of Cronbach's alpha coefficient. Table 3 shows the Cronbach's alpha coefficients for the three measures, as it appears that all values ranged between 0.80 and 0.86, which is statistically

acceptable in administrative research because its value is greater than (0.73), which indicates that the study tool’s measures are characterized by consistency and internal.

4.1.4 Validity of the research measurement tool

The concept of validity of the measurement tool is the expression of the tool’s ability to accurately measure the purposes that represent the basic conceptual structure, that is, the extent to which the measure is able to measure the true values and situations of the phenomenon to be studied (Hinkin, 1995), and as follows:

- Constructive validity of the research tool/confirmatory factor analysis: For the purpose of verifying the constructive validity of the research tool, confirmatory factor analysis was conducted using the AMOS program. It is one of the methods of structural equation modeling, which is a mathematical method that aims to know the strength of models developed for a specific research case and falls within it, in addition to confirmatory factor analysis, as shown in Tables 4 and 5.

Table 4. Criteria for suitability of the strategic planning dimensions' model

Standard used	χ^2/df	GFI	AGFI	RMSEA
Standard value	212/51=4.156	0.86	0.81	0.012
Acceptance limits	5 or less	0.50 or more	0.50 or more	0.08 or less
Decision	Model is applicable	Model is applicable	Model is applicable	Model is applicable

Source: Prepared by the researchers based on computer results.

Table 5. Criteria for suitability of the water crisis management dimensions' model

Standard used	χ^2/df	GFI	AGFI	RMSEA
Standard value	249/51=4.88	0.81	0.77	0.009
Acceptance limits	5 or less	0.50 or more	0.50 or more	0.08 or less
Decision	Model is applicable	Model is applicable	Model is applicable	Model is applicable

Source: Prepared by the researchers based on computer results.

4.2. Description and diagnosis of the research variables

4.2.1 Describing and diagnosing strategic planning variables

The following issues are evident from Table 6:

- 1) A large percentage of respondents to dimension (X1) reached 57.1%, heading towards completely agree and agree, and those who were neutral accounted for 25.4%, while it constituted 15.3% of those whose answers were neither completely agreed nor agreed, and the weighted arithmetic mean was 3.4 while the value of the standard deviation was 0.953, while

the coefficient of variation was 0.269, and the intensity of the answer was 70%. This confirms the support of senior management for strategic planning.

2) A large percentage of respondents to the dimension (X2) amounted to 61.7%, heading towards completely agree and agree, which are both they were neutral 25.9%, while 12.7% of those whose answers were neither completely agree nor completely agree, and the weighted arithmetic mean was 3.6, while the value of the standard deviation was 0.955, while the coefficient of variation was (0.258) and the severity The response rate was 73%. This is an indication of the presence of strategic directions; vision, mission, goals.

3) A large percentage of respondents to the dimension (X3) were legend 63.1% towards completely agree and agree, which are both they were neutral 22.4%, while 15% of those whose answers were neither agreed nor completely agree, and the weighted arithmetic mean was 3.6 whereas the value of the standard deviation was 0.982, the coefficient of variation was 0.269 and the response intensity was 73%, this indicates the presence of a strategic analysis of the internal and external environment.

4) A large percentage of respondents to the dimension (X4) were heading 60.4% towards completely agree and agree, which they were neutral 25.2% but 14.7% of those whose answers were neither completely agree nor completely agree, and the weighted arithmetic mean was 3.6 while the value of the standard deviation was 0.962, the coefficient of variation was 0.258, and the response intensity was 72%, this is an indication of the organization's existence of a strategic plan.

5) A large percentage of respondents to the dimension (X5) were heading 65.9% towards completely agree and agree, which are both they were neutral 32.3%, while 13% of those whose answers were neither agreed nor totally agreed, and the weighted arithmetic mean was 3.4 whereas the standard deviation was 0.918 and the coefficient of variation was 0.260 and the intensity of the response was 71%. This is an indication of the follow-up and evaluation of the implementation of the strategic plan. From the above explanations, it is clear that there is strategic planning in the water resources directorates at a reasonable level.

Table 6. Description and diagnosis of strategic planning variables

Dimensions	Para	Totally agree	Agree	Somewhat	Do not agree	Totally disagree	Weighted arithmetic mean	Standard deviation	Coefficient of variation	percentage
Supporting senior management for strategic planning	X1	46	129	81	40	9	3.4	0.953	0.269	71%
	Ratio (%)	14.6	42.5	25.4	15.3	2.7				
The presence of strategic directions	X2	67	126	77	38	6	3.6	0.955	0.258	73%
	Ratio (%)	21.2	40.5	25.9	11.4	1.3				
Strategic analysis of the internal and external environment	X3	63	130	67	41	7	3.6	0.982	0.269	73%
	Ratio (%)	20.6	42.5	22.4	13.1	1.9				
Having a strategic plan	X4	54	131	78	42	4	3.6	0.962	0.258	72%
	Ratio (%)	18.6	41.8	25.2	13.4	1.3				
Follow up on the implementation and evaluation of the strategic plan	X5	56	128	86	31	6	3.4	0.918	0.260	71%
	Ratio (%)	19.9	46.0	32.3	10.8	2.2				

Source: Prepared by the researchers based on the SPSS (version 22) outputs and N=51

Table 7. Description and diagnosis of the water crisis management variable

Dimensions	Para	Totally agree	Agree	Somewhat	Do not agree	Totally disagree	Weighted arithmetic mean	Standard deviation	Coefficient of variation	percentage
Water crisis management	Y	165	201	131	90	33	3.6	0.908	0.293	72%
	Ratio (%)	26.8	32.9	20.9	14.8	5.0				

Source: Prepared by the researchers based on the SPSS (version 22) outputs and N=51

4.2.2 Description and diagnosis of water crisis management variables

The results of Table 7 indicate that the respondents tend towards general agreement on the dimension of water crisis management, as is evident from the weighted arithmetic mean of (3.6) and the standard deviation of (0.908). The response intensity was (72%), and this is an indication of a high awareness among the respondents. How to manage the water crisis?

4.3. Testing the research hypotheses

4.3.1 Testing the correlation hypotheses

The simple and multiple correlation coefficients were used to test the first main hypothesis, which can represent the relationships between the dimensions and variables of the study, as follows:

1) Testing the first main hypothesis:

There is no significant correlation between strategic planning and water crisis management. Table 8 indicates that there is a positive correlation between strategic planning (X) and water crisis management (Y) as the value of the simple correlation coefficient between them reached (0.911). This value indicates the strong relationship between strategic planning and water crisis management, which supports the correlation. The positive value of the calculated z is (6.420), which is greater than the tabulated z value of 1.96 at the 1% level. In addition to the existence of a correlation between the dimensions of strategic planning and water crisis management, where the value of the correlation coefficients for each of them; X1, X2, X3, X4, X5 are 0.840, 0.944, 0.939, 0.913, 0.884, respectively, and the calculated Z value was greater than its tabulated value for all of these dimensions and at the (1%) level.

Table 8. Correlation between strategic planning and water crisis management

Variables		Water crisis management Y	Tabulated z value
X1	R	0.840	1.96
	Z	5.925	
X2	R	0.944	
	Z	6.660	
X3	R	0.939	
	Z	6.625	
X4	R	0.913	
	Z	6.441	
X5	R	0.884	
	Z	6.229	
X	R	0.911	
	Z	6.420	

Source: Prepared by two researchers according to the results of the electronic calculator

We conclude from the above that there is a strong and positive correlation between strategic planning in its dimensions and water crisis management. Accordingly, the first main hypothesis is rejected, which states “there is no morally significant correlation between strategic planning in its dimensions and water crisis management”, and the alternative hypothesis is accepted that means “there is a morally significant correlation between planning Strategic dimensions and water crisis management”.

2) *Testing the impact hypotheses*

In order to prove and testing the second main hypothesis that says “there is no significant influence relationship for strategic planning in managing the water crisis”, the (F) test was used to analyze the significance of the simple linear regression model, as shown in Table 9, which was built according to the following formula:

$$Y = a + b * X + e$$

Y represents the dependent variable, water crisis management, and X represents the independent variable, strategic planning.

Table 9. Estimating the parameters of a simple linear regression model to measure the impact of strategic planning and water crisis management

Dependent variable Y	Constant	Y	Value (F)		Interpretation coefficient R ²
Independent variable X	a	b	Calculated	Tabulation (% 1)	
X	0.07	0.262	14.0		0.815
X1	0.46	1.243	7.0		0.703
X2	0.29	1.41	23.36	1.150	0.887
X3	0.30	1.40	21.40		0.877
X4	0.36	1.349	14.67		0.830
X5	0.38	1.250	10.36		0.776

Source: obtained using the electronic calculator (N=51)

It is clear from the results presented in Table 9 that:

- The value of (F) calculated for the simple linear regression model for strategic planning (X) reached (14.0), which is greater than the tabular value of (F) 1.150 at a significance level of (1%). This indicates that the regression coefficient is stable (b = 0.262). At the aforementioned level of significance, meaning that a change in the amount of one unit of strategic planning affects the management of the water crisis by an amount of (0.262). This means that the significance of the simple linear regression model is proven, in addition to that the calculated (F) value is greater than its tabulated value for all dimensions of strategic planning, and this It indicates

the stability of its regression coefficients, which were (X1, X2, X3, X4, X5) with the dimensions, 1.243, 1.41, 1.40, 1.349, 1.250, respectively. Accordingly, strategic planning (X) has a significant impact on managing the water crisis (Y).

- The value of the explanation coefficient (R^2) was (0.815), which means that strategic planning (X) explains (81.2%) of the changes that occur in the management of the water crisis (Y). The remaining percentage (18.8%) is due to the contribution of other variables not included in the scheme of the current study.

From the above, the second main hypothesis is rejected, which states "there is no significant influence relationship for strategic planning in managing the water crisis" and the alternative hypothesis is accepted "there is a significant influence relationship for strategic planning in managing the water crisis".

Conclusions

Through the analyzing the results, major findings of the research are summarized as follow:

1. There is a clear impact of strategic planning in its dimensions on the effectiveness of water crisis management.
2. The interest in the strategic planning process in the water resources directorates in the Karun River is not at the required level.
3. In general, there is senior management's support for the strategic planning process, but it is not at the required level.
4. There are strategic directions in the water resources directorates in the Karun River.
5. There is a process of strategic analysis of the internal and external environment, but not at an accepted level to serve the strategic planning process.
6. Weak interest of the water resources directorates in the Karun River in preparing appropriate solutions to confront the expected water scarcity.
7. The water resources directorates in the Karun River have human competencies that have the ability to deal with the water crisis.
8. There is lack of interest by water resources directorates in the Karun River to be assisted from external experts and specialists when water crises occur.
9. Workers have weak incentives system in water resources directorates in the Karun River.

Conflict of interest

With the specific scope and research object of the paper, the research does not overlap with other published works.

References

- Abas, N., Khan, N., Saleem, M.S., and Raza, M.H. 2019. Industry Water Treaty in the doldrums due to water–power nexus. *European Journal for Security Research*, 4: 201-242.
- Akhter, S.H. 2003. Strategic planning, hypercompetition, and knowledge management. *Business Horizons*, 46(1): 19-24.
- Billings, R.S., Milburn, T.W., and Schaalman, M.L. 1980. A model of crisis perception: A theoretical and empirical analysis. *Administrative science quarterly*, 25(2): 300-316.

- Biswas, A.K. 2008. Integrated water resources management: is it working? *International Journal of Water Resources Development*, 24(1): 5-22.
- Bryson, J.M. 2018. *Strategic planning for public and nonprofit organizations: A guide to strengthening and sustaining organizational achievement*. John Wiley & Sons Inc., New Jersey: USA.
- Bryson, J.M. 2010. The future of public and nonprofit strategic planning in the United States. *Public administration review*, 70: s255-s267.
- Bryson, J.M. 1988. A strategic planning process for public and non-profit organizations. *Long range planning*, 21(1): 73-81.
- Bryson, J.M., Crosby, B.C., and Stone, M.M. 2015. Designing and implementing cross sector collaborations: Needed and challenging. *Public administration review*, 75(5): 647-663.
- Bryson, J.M., and Alston, F.K. 2011. *Creating your strategic plan: A workbook for public and nonprofit organizations (Vol. 3)*. John Wiley & Sons, New Jersey: USA.
- Cannon, M.D., and Edmondson, A.C. 2005. Failing to learn and learning to fail (intelligently): How great organizations put failure to work to innovate and improve. *Long range planning*, 38(3): 299-319.
- El-Naser, H. 2009. *Management of Scarce Water Resources: A Middle Eastern Experience (Vol. 14)*. WIT Press, Southampton: UK.
- Fang, C.L., Bao, C., and Huang, J.C. 2007. Management implications to water resources constraint force on socio-economic system in rapid urbanization: a case study of the Hexi Corridor, NW China. *Water Resources Management*, 21: 1613-1633.
- Foltz, R.C. 2002. Iran's water crisis: cultural, political, and ethical dimensions. *Journal of agricultural and environmental ethics*, 15: 357-380.
- Ford, J.D. 1981. The management of organizational crises. *Business Horizons*, 24(3): 10-16.
- Gilpin, D.R., and Murphy, P.J. 2008. *Crisis management in a complex world*. Oxford University Press, UK.
- Griffin, R.W., and Phillips, J. 2023. *Organizational behavior: Managing people and organizations*. Cengage learning, Massachusetts, USA.
- Jambu, M. 1991. *Exploratory and multivariate data analysis*. Elsevier, Amsterdam: Netherlands.
- Johnson, P.O. 1949. *Statistical methods in research*. Prentice-Hall. New Jersey: USA.
- Kernisky, D.A. 1997. Proactive crisis management and ethical discourse: Dow Chemical's issues management bulletins 1979-1990. *Journal of Business Ethics*, 16: 843-853.
- Lempert, R.J., and Groves, D.G. 2010. Identifying and evaluating robust adaptive policy responses to climate change for water management agencies in the American west. *Technological Forecasting and Social Change*, 77(6): 960-974.
- Liverman, D.M., Varady, R.G., Chávez, O., and Sánchez, R. 1999. Environmental issues along the United States-Mexico border: Drivers of change and responses of citizens and institutions. *Annual Review of Energy and the Environment*, 24(1): 607-643.
- Loorbach, D. 2010. Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance*, 23(1): 161-183.
- Madani, K. 2014. Water management in Iran: what is causing the looming crisis? *Journal of environmental studies and sciences*, 4: 315-328.
- Marascuilo, L.A., and Serlin, R.C. 1988. *Statistical methods for the social and behavioral sciences*. WH Freeman/Times Books/Henry Holt & Co, New York: USA.

- Mishra, P., Pandey, C.M., Singh, U., Gupta, A., Sahu, C., and Keshri, A. 2019. Descriptive statistics and normality tests for statistical data. *Annals of cardiac anaesthesia*, 22(1): 67-72.
- Mohamed, A.R.M. 2014. Trends in the artisanal fishery in Iraqi marine waters, Arabian Gulf (1965-2011). *Asian Journal of Applied Sciences*, 2(2): 209-217.
- Namken, J.C., and Rapp, G.W. 1994. *Strategic Planning Hand book for Cooperatives*, United States Department of Agriculture, Washington DC: USA.
- Ndou, V. 2004. E-government for developing countries: Opportunities and challenges. *The Electronic Journal of Information Systems in Developing Countries*, 18(1): 1-24.
- Palepu, K.G., Healy, P.M., Wright, S., Bradbury, M., and Coulton, J. 2020. *Business analysis and valuation: Using financial statements*. Cengage AU.
- Ratcliffe, J. 2003. Scenario planning: An evaluation of practice. *Futures Research Quarterly*, 19(4): 5-26.
- Rousaki, B., and Alcott, P. 2006. Exploring the crisis readiness perceptions of hotel managers in the UK. *Tourism and Hospitality Research*, 7(1): 27-38.
- Samawi, F. 2021. Educational Crisis Management Requirements and its Relation to using Distance Learning Approach: A Cross-Sectional Survey Secondary Stage Schools in Al-balqa'a Governorate during Covid-19 Outbreak from the Perspectives of Teachers. *Turkish Online Journal of Distance Education*, 22(3): 196-212.
- Schaap, J.I. 2006. Toward strategy implementation success: An empirical study of the role of senior-level leaders in the Nevada gaming industry. *UNLV Gaming Research & Review Journal*, 10(2): 2-11.
- Schindler, D.W., and Donahue, W.F. 2006. An impending water crisis in Canada's western prairie provinces. *Proceedings of the National Academy of Sciences*, 103(19): 7210-7216.
- Setiawan, N., Maisyarah, R., and Haraha, R. 2020. Analysis of Emotional Intelligence and Work Discipline On Employee Performance with Organizational Commitment as an Intervening Variable. *Airlangga Journal of Innovation Management*, 1(2):184-206.
- Shapiro, J. 2003. *Strategic Planning Toolkit*. CIVICUS: World Alliance for Citizen Participation, Retrieved from: <http://www.civicus.org>.
- Somers, S. 2009. Measuring resilience potential: An adaptive strategy for organizational crisis planning. *Journal of contingencies and crisis management*, 17(1): 12-23.
- Steiner, G.A. 2010. *Strategic planning*. Simon & Schuster Inc., New York: USA.
- Thomas, R.K. 2021. Strategic planning, Health services planning (215-245). Springer, Berlin: Germany.
- Valackiene, A., and Virbickaite, R. 2011. Conceptualization of crisis situation in a company. *Journal of Business Economics and Management*, 12(2): 317-331.