جـامـعـة الـشـرق الأوسـط
MIDDLE EAST UNIVERSITY

# FRAMEWORK MODEL FOR STRATEGIC PLANNING USING DYNAMIC WORKFLOW

نموذج اطار العمل للتخطيط الاستراتيجي باستخدام سير العمل الديناميكي


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# DEDICATION

To those who had taken care of me…
To those who gave me their love and tenderness…
To the memory of my parents…
To my brother Ahmad and my sister Muna
I dedicate this thesis to the memory of my parents who always encouraged me to pursue my ambitions. I would also like to express my special gratitude to all those who have helped me. I would like to thank them for their support and knowledge that helped to bring this research into perfection.
Finally, I dedicate this project to all those I love…

# ACKNOWLEDGMENT

I would like to thank for his great assistance and comprehensive supervision. I would also like to thank my brothers and all those who helped me during all my thesis work.

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# LIST OF ABBREVIATIONS

| WfM | Workflow Management |
|---|---|
| **VB.net** | Visual Basic |
| **SQL** | Structured Query Language |
| **ADO.net** | ActiveX Data Objects for .NET |
| **ASP.net** | Active Server Pages ,ASP.NET is a Web application framework |
| **UML** | Unified Modelling Language |
| **HTML** | Hyper Text Markup Language |
| **C** | Programing Language |
| **XML** | Extensible Markup Language |
| **AGWL** | Abstract Grid Workflow Language |
| **KPI** | Key Performance Indicators |
| **Workflow Chart** | Is a diagram that demonstrates all the major steps of a process |
| **IIS** | Internet Information Services |
| **IE** | Internet Explorer |
| **IF** | Instruction for Programming language |
| **SWETCH** | Instruction for Programming language |
| **AI** | Artificial Intelligence |
| **Grid** | Type of relation among employee as web |

**ملخص الرسالة:**

يقدم هذا البحث طريقة جديدة لتصميم وتطبيق الخطط الاستراتيجية والتي تعتمد على انسيابية العمل. ويعتبر هذا النموذج المحاولة الأولى لمكننة الخطط الاستراتيجية والهدف منه هو بناء بيئة قياسية للخطط الاستراتيجية بكفاءة وباقل كلفة وبنسبة اقل من الاخطاء . اضافة الى ذلك ، يستطيع هذا النموذج تقييم الخطط الاستراتيجية من اجل متطابقتها مع الوضع القياسي، حيث تتم عملية التقييم بمقارنة الخطط الاستراتيجية مع نموذج قياسي للخطط الاستراتيجية بناءا على معاييرمعيّنة تم وضعها واقتراحها في هذا البحث .

هناك عدة مميزات لهذا النموذج على البحوث والدراسات السابقة المتعلقة بهذا الموضوع. و من هذه الميزات : تركيز الدراسات السابقة على بناء عمليات لانجاز العمل اليومي، في حين يعمل هذا النموذج على تطبيق خطط استراتيجيّة طويلة الامد. اضافة الى أنّه يقوم بتزويد المخططين بتوصيات وارشادات من اجل ضبط وتعديل خططهم الاستراتيجية وتحسينها وتتم هذه العملية من خلال اجراء التقييم.

يتكون هذا النموذج من اربعة نماذج فرعية. يتكون النموذج الفرعي الاول من جزئين هما قاعدة بيانات الخطط الاستراتيجية وواجهة التطبيق التي سوف تتعامل مع قاعدة البيانات. ثم النموذج الفرعي الثاني الذي يحتوي على واجهة تطبيق مسؤوله عن اجراء تقييم ومقارنة مع الخطة القياسية. أمّا النموذج الفرعي الثالث فهو نموذج واجهة التطبيق المسؤول عن اجراء عملية انسيابية للعمل و تنفيذ الخطّة. و يتعلق عمل النموذج الفرعي الاخير بتصميم العمليات وهو مكوّن من جزئين : قاعدة البيانات وواجهة التطبيق الخاصة بتصميم العمليات .

لقد تم تطبيق هذا النموذج بنجاح في شركة المناطق الحرة. وقد اظهرت النتائج المستخلصة امكانية تحسينه لكفاءة الخطط الاستراتيجية بسبب ضمانه لتطبيق الخطط الاستراتيجية حسب ما هو مخطط له .

**ABSTRACT:**

This thesis introduces a new model for the design and implementation of strategic plans depending on workflow. This model is considered to be a trial for automating strategic planning that aims at effectively building a standard environment for strategic plans with lower costs and fewer errors. In addition, this model can evaluate manual strategic plans to generate effective manual plans. The evaluation process is performed by comparing the manual plan with the standard plan. And in order to construct the standard plan it is necessary to find out all recommended criterion for any effective strategic plan.

There are many characteristics of this model over the previous studies and researches. One of these is that these studies focus on day –to- day work, while this model is implemented for long term strategic plans. Another difference is that this model provides some guidelines for planners to adjust and then improve their strategic plans and this process is performed during the evaluation procedures. The model also reveals many shortcomings in the manual strategic planning.

This model consists of four sub models. The first sub-model is made up of two parts: Database for strategic plan data and an interface with this database. The second sub model contains another interface that can be used to compare any strategic plan with the standard plan. As for the third sub-model, it is the strategic plan programs which are concerned with the workflow. The final sub-model is related to the process design, and it consists also of two parts: The first part is the data base of the process interface and the second part is the data of these processes.

This model has been implemented successfully in Free Zones Company. The results of this model reveal that it has improved the efficiency of the strategic plan implementation because it ensures the implementation of the strategic plan, and that it is automatically performed according to the expected planning.

# 1. INTRODUCTION

# CHAPTER ONE

## 1.1 Research Motivation

Despite the positive outcomes of the application of workflow management (WFM) systems, MomotkoM.(2005), there are still some important and notable restrictions. One of the main restrictions is the assumption that the business operations do not repeatedly change during the implementation. While this assumption is suitable for the production field, it is not consistent with the business operations because they are, for instance, more flexible. Alsothe managerial operations in the administrative centers are continuously changing.

Because of the nature of the operations, it has to adapt to the vital changes in the working environment of the workflow at the level of resources, data and application Sadiq, S.( 2000 )), (Aalst, (1999) and Weske, M., Vossen, G, (1998). For example, if the head of a division wants to choose a person to handle a given task, his choice should be dynamically based on the employees list of that division. Another example, is improving the cost of fixing a car in which the decision should be based on the time and cost of fixing the car, and whether any additional test should be carried out.

The previous studies also reveal that the flexibility of the workflow is considered to be one of the keys to WFM systems. For example, and as mentioned in one of these studies, a research conducted on 200 medium-scale factories showed that they still face challenges in using the technology that enables them to run their business operations in a more flexible way, Vector ( 2000).

A recent study by Amset Wings shows that more than 40% of the executive officers view the flexibility of the workflow as a key to concentrate on the organization

strategy Buttler Group (2002). Furthermore, the flexible workflow processes are considered to be a source of knowledge and confidence.

After going over the motivations of the previous studies, it is clear that these studies are only concerned with the implementation of the daily routine tasks. The workflow systems have evolved and improved by moving from static into dynamic states. However, there isn't one study on how to construct a dynamic model of the workflow in the area of running and executing strategic planning as well as managing projects. And since the strategic planning is a collection of projects that aim at achieving the vision and message of organizations and corporations, the proposed model will accomplish this task by focusing on the implementation and management of the workflow of the projects enclosed in the strategic plan. In addition, there is an absence of a model that can handle data documentation, evaluate the performance and measure the level of accomplishment of the strategic plans and the embedded projects. Also, for instance no model allows the administration to test the proposed plan in order to check whether there is any deviation from international standards. Therefore, this study will try to overcome the shortcomings in the other studies and models, and apply the right management to implement the processes that guarantee the best performance and implementation possible.

## 1.2 Contribution

The contribution of this research can be identified as follows:

1) Studying and analysing the standard parameters used to generate a framework to design standard strategic plans with workflow processing. In order to

perform this task we should accumulate these parameters that provide and assure the construction of a standard strategic plan.

2) Studying and implementing all the factors to design the model for managing strategic plans, like assigning tasks to their resources, measuring and assessing the plan. This objective should depend on workflow processing.

   By these two objectives we have designed a procedure to construct a frame work of a general strategic plan that can be used by all information systems and planners.

3) Each planner in any organization can design his/her strategic plan by selecting various factors related to that organization from this model (framework). This objective is considered a new trend to design different types of any strategic plan from a standard one depending on workflow processing.

4) Comparing and evaluating any strategic plan with the standard plan, in order to allow any planner to build his own, and measure its deviation from the standard plan parameters.

   The proposed system should provide the planner with alternative solutions to improve that plan either by adding new parameters or replacing the existing parameters with other ones to get a more effective plan, with high performance planning progress. This system is considered to be the first trial for strategic plans evaluation.

5) The project presents a guideline to any new plan with alternative plans, characterized by more effective parameters, and enabling the user to either accept his/her original plan (selected at the first time ) or to choose one of the

other effective alternatives depending on the application and the organization capabilities .

6) The final and most important objective is to design a new model for constructing a framework planning with workflow processing.

## 1.3 Problem Statement

The main objective of this thesis is designing a new workflow model for strategic plans implementation. As per OmaryZ 2008, all previous studies stated that it is possible to extract data from WFS and determine its life cycle that can be used to outline the paths of these workflows. However, the workflows lack clarity in their procedural steps and tasks, so that the intended employees can follow-up and design algorithms for models suitable for different application areas for a given project.

One of the important advantages of using workflow is that it enables users of workflow to gather statistical information about their work. This implies the possibility of using the workflow in areas of the strategic planning and in all the related data management. In addition, this research examines all strategic plans and checks their consistency against the standard parameters. Also, it examines whether the workflow of the strategic plan would follow the right path. Thus, this study is expected to answer the following questions:

1) Will this thesis be able to design new software as automation of strategic plans with workflow processing?
2) What are the common parameters that can be used to construct a framework strategic plan?
3) Can we construct this framework of strategic plan from these parameters?

4) What are the most common parameters that can be used by all planners?
5) How can this thesis prioritize these parameters according to some criteria, such as their importance and the application type?
6) Can the planners generate their own plans with limited parameters assigned by that planner?
7) Can the model evaluate and compare each strategic plan with the standard strategic plan?
8) Does the software have the ability to provide alternative strategic plans with an estimated percentage for each alternative?

   The workflow system has been fully built, without any ready tools or systems, as the cost and efforts of modifying and making amendments goes higher than building one from scratch. The work flow needed for the system addressed by the thesis is just a simple prototype, able to execute and implement the tasks required in the strategic plan.

## 1.4 Methodology

This Thesis has tried to determine the components and the definition of the strategic plans, so that the model would be able to do its required task. It was also designed in a way that makes it able to deal with many forms of strategic plans. Besides, standards were placed in order to evaluate any plan entered to this model for implementation. This comparison was not qualitative, rather a quantitative one, since it is hard to determine the quality and the effectiveness of plans before completion, getting results, and translating these results into financial numbers. However, it is still possible

to examine if these plans have the suitable specifications and form to be successful or not.

The waterfall model has been used in achieving all of module's phases, as the module was divided in to a number of phases; each phase consists of three layers. When it is time to develop any phase of the module, the waterfall steps would be applied right from the beginning until the end. After making sure that this phase was successfully achieved, moving to the next phase comes.

The first phase of the module is the phase of managing and designing the strategic plans; which is divided also into three layers: The Database layer, the business layer; and it is consisted of a number of classes, and the application interface or the presentation layer. Then after finishing this phase the process of development enters the second phase; which is the phase of process design, which is further divided in to three layers as well, similar to the layers in the previous phase. After all that, work goes into developing the implementation of the strategic plan, and this part is responsible for implementing the tasks in the strategic plan by using the work flow and this one also consists of the three layers as the previous phases.

When time comes to develop the evaluation sub model, the waterfall model is the one used. This was, all parts of the modules are developed and assembled together.

## 1.5 Thesis Outline

Thesis is divided and organized as follows:

### 1.5.1 Chapter Two:

This chapter presents a review of a collection of previous related work. These cover different aspects and evolutions about the workflow. For example, some studies are concerned with transforming the workflow from a static into a dynamic model, while others propose smart workflow models. Furthermore, some studies presented the field of applications for the workflow such as workflow models for industrial and manufacturing production and workflow models for management. However, this chapter reveals that these studies ignore the possibility to build a model specialized in executing the strategic planning management; hence the proposed model of this study covers this shortcoming by suggesting a model for the strategic planning.

### 1.5.2 Chapter Three:

This chapter talks about the workflow in terms of definition and general information. It also describes the evolution and gives a comprehensive image about the workflow. It discusses the research journey that the workflow goes through from its humble beginning of small and static systems into the more advanced status of smart and dynamic workflow systems. In the latter systems, processes can be built either by the end user or automatically by the system itself. Then, the discussion proceeds to the strategic planning in terms of its definition and broad outlines. The discussion also includes the explanation of the Wheelen and Hunger School of dynamic workflow which will be the core of the model of this research.

### 1.5.3 Chapter Four:

This chapter addresses the different aspects of the methodology of constructing and implementing the model which relies on the methods and norms applied in software engineering. In the proposed model, there has been a use of a mixture of three approaches, specifically: The water fall, the spiral and the prototype models. The model implementation and design process will be divided into tiers; each of which will be divided into smaller components.

### 1.5.4 Chapter Five:

This chapter is divided into three main sections. The first section talks about the approach followed in implementing and building the model of this study. Next, the second section gives an overview about the model, the mechanism of data flow and the form and specifications of the required hardware in order to provide the best environment for the model implementation and to guarantee the optimal results. Finally, the third section falls into two parts which are the database design and the user interface which represents a median between the database and the end user. The user interface is also divided into two main parts which are: (a) The first part that deals with building processes, constructing a strategic plan and feeding the system with data, and (b) the second part that handles the end user who is authorized to take on the designated tasks. Finally, the chapter discusses the evaluation of the strategic plan which tests, based on certain standards, how much the plan under study is consistent with the optimal form and the criteria of the strategic plan.

### 1.5.5 Chapter Six:

This chapter contains three main sections that cover the application of the model and a discussion of the overall conclusions. Therefore, the first section includes a description of the instructions and steps of using the model by all types of users; whether process designers, strategic plan designers or end users who execute the required tasks and operate the system. Next, the second section discusses the results of applying the system to the Free Zone Company. Finally, the third section includes the conclusions and recommendations of this thesis.

# 2. LITERATURE SURVEY AND RELATED WORK

# CHAPTER TWO

## 2.1 Introduction

This chapter presents a brief description and the main conclusions of some previous studies related to the field of this thesis. These studies track the history of the workflow evolution over the last few decades. Some studies explained the importance of the workflow model, being a common practice in the major business fields; including the industrial, commercial and service sectors.

Over the few decades, there has been a noticeable and pivotal development in the workflow. For example, these workflows changed from static models in the early days, when the paths and procedures to be followed couldn't be changed, into the current dynamic model. In the latter models, there is no need for an experienced programmer or for any extensive knowledge in computers to build a workflow system for a certain process, with a path that can be modified along with that path. There are some smart workflow models that can design paths with less or no intervention of people, while there are others that are specialized in specific fields of production, commercial or managerial sectors. The workflow could take the form of a system with users or tools that require writing a code; which means that there are workflow models that still need programmers and computer specialists to build the relevant processes. . Accordingly, the workflow is developed rapidly in terms of variations in the existing workflows on the commercial level in the market, or on the undergoing research level.

The previous studies and models in this chapter are classified into three categories. The first category includes the dynamic workflows that deal with particular sectors such as industrial, production and commercial operations. This thesis considers and focuses on the dynamic workflow. The second category deals with smart workflow

systems which are heavily used in artificial intelligence, to automatically construct the expected processes. The last category includes the distributed workflow systems which are utilized in the web or the internal or external networks, in order to pass certain processes and procedures from one employee to another. This chapter outlines the main issues that would be studied and tackled in this research, including building a workflow system specialized in implementing and managing the strategic plans. The model also has the ability to perform an evaluation procedure for any plan and produce results about how close these plans are, to the criteria of the international schools of strategic planning. Finally, the model outlines the level of progress of the strategic plans implementation and their workflow.

## 2.2 Dynamic workflow

A study by Peng Li and Yuyue De (2009) has introduced a model to improve the dynamic response to the process changes. In this research, the authors built a workflow model depending on flexible activities, and the historical information and data that can be retrieved from their storage. Each flexible activity is used to encapsulate unidentified factors, including constraints and optional activities that would be used to extract and complete the flexible activities. The implementation of the historical information would be utilized to form another stage of the workflow. The model in this study can be applied widely in modern factories and industries especially business applications that constantly change and lack fixed procedures. This model ignores the iterations in the sub-workflow and can be considered adequate in revising process of the activities and procedures.

W.M.P. van der Aalst (2009) conducted a study that dealt with correcting any flow in the dynamic change of the workflow chart. The author proposed a model for the workflow that depends on the changes in the procedure information for the charts which include three cases of change. The first one is the area that contains parts of the workflow model affected directly by a static change. The second area encompasses parts of the workflow that are indirectly affected by the dynamic change in the work procedures. The third area is the minimal change area which is considered part of the dynamic change area; because the former diminishes the latter by getting rid of the decision and process implementation points. The main conclusion of this study was that the three cases of the workflow leave the minimal change area unidentified and can be transferred from an old workflow to a new one without causing any problem, such as the failure of the process or reaching a deadlock. So this study developed a high performance model. For a future research, the study suggested implementing the presented plan using commercial workflow.

Villazon, and M. Wieczorek (2005) presented a research, in which the application developers used an invisible network based on the workflow language which transfers data using the XML called AGWL the workflow in a high level of abstraction. The tasks were linked to each other's by the data and control flow. The study indicated that the AGWL supports two types of conditional statements: (IF and SWITCH). The study also provided two examples of (IF) control statement. The data flow was carried out by connecting data-in and -out ports with the activities, in order to control the flow and transfer the data. Therefore, the data related to the internal and external activities should be connected to an activity outside the conditional activity, which cannot be

determined. To solve this problem, the in-and out-data of the internal activities are connected to the out-data of the conditional activity. Also, the out-data of the external activity is linked to the next activity after the conditional statement structure.

One of the most popular applications of the workflow engines was implemented by Jia Yu and Rajkumar Buyya, (2005). In a study that includes a classification of the workflow management systems. The study depended on five major fields: Workflow design, scheduling, error tolerance, information retrieval and data movement. There are four key factors in the workflow design which are: Whether the workflow structure is DAG or Non-DAG, whether the workflow model is abstract or tangible, the workflow chart architecture and the service quality. As for the workflow chart, there is a collection of properties that should be taken into consideration when there is a need for examining the workflow scheduling. These properties involve: 1) Scheduling Structure, 2) Decision Making, 3) Planning Design,4) Strategy Scheduling, and Performance Evaluation.

The error control for the workflow management systems was done on two levels: The first level is the task and error retrieval level and the second is the workflow level. Finally, transferring data was accomplished directly by a user or by automating the process. In addition, most of the workflow management systems, in use today, are monitored according to taxonomy criteria and classified into categories.In a workshop, Fox G and GannonD*, (2006*), proposed and discussed several applications related to the structure and design techniques of the workflow. Furthermore, a number of workflow models were tested according to their design, success in dealing with workflow complexity and the ease of application. Such models involve Triana, Kepler, Taverna, Grid-Flow, SkyFlow and some others. A great attention was given to matters

related to the implementation of the workflow, such as efficiency, robustness, sensitivity and supervision. Some of the issues that were considered include: Safety and documentation of the workflow as part of a scientific computing experiment, which is a method for packing the data sources and connecting their components with the workflow components.

In Shi Meilin, Yang Guangxin, Xiang Yong (1998), The authors discussed the workflow management in (WFMs) research and its related concepts and typologies, such as the workflow, workflow activities and the workflow processes. This study used 45 different models to be sorted out. The discussion of the research has been extended to the application of the WFMs in many fields including commerce.

This study decomposed WFMs into the following categories: a) structured or ad-hoc, b) documentation-based or process-based, c) email or database and target button or task button. The main components of WFMS models are: 1) Process design, 2) Workflow enactment service, 3) Client applications, 4) Iinitiated application and 5) Control and management tool. Furthermore, a workflow management system should take into consideration the following: a) Flexibility, b) Object-oriented structure, c) Intelligence d) Parallel process support and e) Mobile-device support.

## 2.3 Distributed dynamic workflow

Y. Hudeib (2011) and H. Owaied, A. Farhan H. and Y. Hudeib (2011): This study presents and proposes designing a dynamic model for managing the data exchange and flux. The main goal of this research is improve and increase the efficiency of data exchange between the different departments in organizations and large-scale

companies in which data are exchanged electronically. By implementing the suggestions in this proposed model, it is expected to achieve the concept of the electronic company.

The model consists of three parts which are: The model of the dynamic unit process, the database model, and the data exchange and movement model.

The proposed model is very much consistent with the human behaviour during handling and processing duties and work. For example, automating the commercial processes provide a mechanism that allows processing paper work electronically, gathering information, preparing orders that need approval to be completed in an easier manner. This model is also applicable in different types of networks; internal and external. The second part is the database which is considered as a median between all the other parts of the model. The interaction with the database is accomplished using (.Net) which enables the authorized user to log-in the system, design a path for the process and then the transactions and data proceed to any attended person as initially intended. They also ensure facilitating the data exchange among the individuals in an organization efficiently and faster within the specified time frame.

Furthermore, this model takes the role of managing the workflow processes using the electronic transaction model. By using the electronic model, the model improves tremendously and efficiently the communication among individuals and groups in the organization. Here, information is gathered directly according to the sequence of the procedures.

When applied, this model is expected to reduce the required time to execute a process and thus reducing the cost. In a response to the issue of limited research and models that can deal with exchanging electronic papers, this model proposes a model that stems from the idea of dynamic paper exchange. In this concept, an authorized user identifies the type of the intended process, designs a process path and assigns specific employees to complete this process, with the need for a computer expert or programmer. Based on the approach and the design of this model, the end user can handle any process easier and without further complications. Finally, the model provides more flexibility in dealing with final user.

Toannguyen and Jean- Antoine (2009) introduced a workflow system in the field of businesses management that efficiently supports the managerial documentation processes. Many engines of workflow that have been developed and published as source code programs are based on distributed environment systems for user accounts. For example, the intermediate network has the ability to support a wide range of optimization and distributed applications which are considered as properties that handle the workflow systems, such as long-period runs. The research concentrated on the challenges of deploying and running distributed workflow to the extent that workflow systems reach a fictional state.

Larina Aversano, et al. (2001) outlined crucial points for developing successful information systems for the distributed organizations and corporations. The main problem that faced the researchers in this study was that most organizations lack integrated and diverse tools and technologies for managing the workflow process. In addition, they suggested integrating the workflow into the documentation

management systems which include several implemented types, using the hypertext systems and programming languages for the purpose of merging the retrieval technologies of the database and information. The workflow of this research was implemented on two different levels: The documentation level and the interface level. The first level merges the documentation and the analysis as well as modelling the workflow. Therefore, gathering data should be performance during the analysis of the requirements of the business operations, in order to focus on the general structure of the documentation and on the life cycle of the workflow. In the practical stage, the researchers used the UML approach to construct static and dynamic models for each type of documentation, specifically the UML chart, that was used to put out a model to generate the documentation and the relations among documentation types. On the other hand, the documentation life cycle was in the implementation phase of the static models.

The next study is the one conducted by Bastin T. R. Savarimuthu, et al. (2005). This study presented the use of an actual example to combine the workflow in the form of a service network, and the workflow in the form of steps, such as procedures and points of decision taking by agents. The agent provides a description of the flexible workflow structure which facilitates the integration between the service network and the workflow system. The study suggested widening the work range to form a society and organization of agents who use the internet service. These agents should cooperate with each other's and do their tasks in a team work manner to achieve the common goal.

Emrah Ceyhan, Gabrielle Allen, Christopher White, and TevfikKosar ,(2008), have

designed a grid that enables workflow to analyze the data storage. Data storage analysis is a part of a project whose objective is to automate the analysis steps such as: Entering the data in stages, distributing the cases to the network sources, retrieving the data in stages and post-retrieving the data processes. The project has been used as a workflow manager to theoretically control all the applications, while the round robin algorithm has been used to transfer the data which is being used as a scheduling policy.

## 2.4 Intelligent Dynamic Workflow

A study by Francois and AdneneGuabtni (2005) presented a dynamic workflow model, consistent with dynamic planning and (AI) artificial intelligence, in an attempt to solve a problem using past experience and that cannot be solved using a simple approach. The researchers hoped to effectively reach a high and crucial level of progress in the workflow system in a short time and reasonable ways using dynamic artificial intelligence.

Tevfik Kosar et al (2004) designed a system to transfer the data confidently and automatically. They also examined the use of data manipulation in scientific and other various applications. This system made anabled them to carry out the data transfer process to the network source by data manipulation first and then completing the process by transferring the data. This system had a mechanism to recover from a failure in any stage of the application. Besides that, all the stages were executed without any human intervention; i.e: It was all automated. Accordingly, this system has been designed to transfer data and accounts, and formulate them in different ways. As a result, data movement and failure recovery were both optimal.

# 3. STRETEGIC PLAN AND WORKFLOWS

## CHAPTER THREE

## 3.1 Introduction

This chapter presents an introduction to explain the workflow, clarifying the proposed model for the reader. Hereby, the chapter provides an overview about the workflow and its definition as discussed in some of the studies. Then, this chapter dicusses the development of the workflow systems over time, by giving a comprehensive image and showing how the workflow has evolved from small and static models into smarter and more dynamic models. Due to the developments and complications in the work environment and the increasing costs of running the business, the need for improving the workflow to a more flexible and dynamic stage has become very essential. Today, the workflow makes it much easier to build a certain process for a work environment whether by the end user or automatically by the system itself. The system collects the data and puts it into log files which would form paths. Then the system searches for the most used paths by the user of the system in the organization, in order to build the process that is consistent with the best path. The chapter then shows the importance of the strategic planning in the proposed model. Therefore, it is important to understand the strategic planning. The discussion includes a preview about the importance and concept of strategic planning and its components, as suggested by one school of thought. These components will serve as a criterion for the form and components of the plan of the system-entered. Furthermore, the discussion then explains the system inputs which are the components of the strategic planning which includes the vision, message, objectives, programs, activities, tasks, measurement tools and evaluation. It is found that the most suitable school of thought for this model

is Wheelen and Hunger School. Therefore, the proposed model will be constructed according to the principles of this school in the strategic planning.

## 3.2 Workflow overview

The information technology has become one of the most important components in the business world, which made moving going forward harder to maintain, without adopting a certain information system. It has emerged as the keystone in any decision making process and in performing the business tasks efficiently in order to cope with to the accelerating growth. It is apparently that competing in business world is not possible without considering information technology tools and applications. The efficiency and performance of organizations depend on the effectiveness of the flow of information between departments of the organization. The automation of the business process and communication through adopting an automated workflow for passing documents and tasks leads to the improvement of the efficiency of the organization Owied, Karim Farhan and Hudeib (2011).The purpose of the workflow systems is to computerize the manual procedures with keeping in mind that workflows automatically transfer tasks and work from one person to another and from one stage to another according to a predefined way Y. Hudeib (2010), Schnurbusch *(2009)* ,M. Repetto, M. Paolucci, and A. Boccalatte (2002).

Owaied, H.H., Al-Kareem, H.A. & Hudeib, Y.W.( 2011) also explained that the application of the infrastructure of the information technology has become increasingly very important. The researchers stated that most organizations have a desire to improve and develop their business and increase the efficiency and

effectiveness of their finished work through adopting a new philosophy for re-engineering business. They added that information processing by any organization requires applying certain tools and approaches to deal with re-engineering business, such as using automation systems for performing current operations and tools that speed up the response to changes in the business environment. Usually the communication among groups in any organization depends on the effectiveness of the information flow to execute and perform their business efficiently and adequately. The automation of business processes is implemented fully or partially to pass documents, information or tasks between individuals for processing according to procedural rules called workflow.

The purpose of the workflow systems is to computerize the manual procedures with keeping in mind that workflows automatically transfer tasks and work from one person to another and from one stage to another according to a predefined way. Hollingsworth (1995) defines workflow as: The process of performing work according to a set of automated procedures, and in which passing documents, information and tasks among participants is consistent with precise procedural rules that aim at achieving the goal of the whole business sector.

On the other hand, Owied, Karim Farhan and Hudeib (2011) gave many definitions for workflow systems. In their work, they define the workflow simply as the movement of documents and tasks through the business processes. Notably all previous definitions fail to mention one element that the workflow should be implemented within precise plan put in advance. Daniel1 F, Pozzi2 G, and Zhang Y (2008), overcome this shortcoming by defining the workflow as the automation of

work process by assigning atomic work units (task) to participants (agents) according to a workflow outline.

To know how the workflow works, Muehlen, M.Z. (2001) explained that the changes of the workflow during the implementation the workflow should be recorded in a database. This process is considered to be the most important characteristic of the work flow which, at the right time, facilitates reviewing precise and crucial information regarding the operational behavior of the business project. This process enables the decision makers to generate reports and statistics about individuals of the organization and its operations, which in turns helps in re-engineering the processes. In order to connect between the workflow and the strategic planning and understand the role of this study and the proposed model, it is necessary to explain the strategic planning.

The previous models and studies have constructed workflow systems to facilitate business and ordinary tasks. However, none of them addressed the possibility of applying the workflow in the process of executing the strategic plan.

## 3.3 Strategic plan management and Inputs

As per Wheelen, T. L. and Hunger, J. D. (2007): Since this model is a software (computer program), it is necessary to specify its inputs of the strategic plan, present their definitions and explain the interrelationships between them. These inputs are listed as follows:

- The vision: It is the state that the organization is eager to achieve within a certain number of years. Based on that vision, the organization puts forward its mission. Although the vision exists in the strategic plan, the mission of the

organization is considered as the cornerstone of the strategic planning.

- The mission: It is a detailed explanation of the vision. It contains answers to questions such as: “Who are we? How can we meet our goals? What services can we provide and to whom?” and so on. The objective of the mission is to answer these questions briefly and clearly.
- The goals: Goals are the anticipated to be achieved upon the completion of the plan programs. These goals are derived from the mission components.
- The policies: They stand for the methods and approaches adopted by the organization to implement its programs and materialize its promising goals.
- The programs: The programs represent the business that the organization intends to carry out within the plan framework. It is very important to specify the start and the end time of each program, and the related evaluation indicators, in case these programs were not connected to the activities or the tasks. Also it is necessary to specify the employees who will be working in these programs. Besides that, the cost of each program should not be ignored and should be stated in the plan; because the total cost of programs makes up the budget plan.
- The activities: Each program is divided into a set of activities and each activity is divided into a group of tasks which, if executed, would insure the completion of the program. There is also a need to evaluate the indicators of each activity, which can replace the program evaluation indicators.
- The tasks: The tasks are the processes of breaking up each activity into smaller

parts to facilitate their completion. When the activities are split into tasks, they can be connected to the corresponding evaluation

- Evaluation indicators: These indicators provide information about the achievement percentage which results in full evaluation, conducting supervision and giving a feedback, which helps the planner to make modifications to the plan and therefore give a thorough evaluation of the plan. Evaluation indicators are also important in the decision making and putting a comprehensive vision about the state of the organization which is very helpful in moving forward.
- The resources: They comprise of the individuals represented by the employees and instruments represented by the machinery, systems and so on. The function of these resources is to carry out and complete any business assigned to them.

Returning to the strategic planning concept, Carter, M. N. (2011) defined it as whether an organization knows its prospects over the next year, whether it has the means to surpass its expectations and whether it knows that the goals are achieved or not. Carter explained that the main objective of the strategic plan should be the organization, while the focal point of a business plan should be a certain product, program or service.

Carter also mentioned that there are various types of methods and models used in the strategic planning. The method adopted by the organization in the strategic plan depends on many factors including the nature of the leadership of the organization, the culture and the size of the organization, and additional factors

related to the planners in terms of their experience and educational level. Some strategic planning models are based on the goal while others are based on the membership.

Wheelen, T. L. and Hunger, J. D. (2007) listed the steps of constructing strategic plans and their components. They divided the factors affecting the strategic planning into two types: Internal factors and external factors. The external factors fall into three types:

1. The natural environment.
2. The task environment.
3. The stakeholders.

The internal factors, which are particular to the organization itself, including the following:

1. The merits.
2. The supply chain.
3. The organizational structure.
4. The internal supervision.

As per Wheelen, T. L. and Hunger, J. D. (2007): To construct a strategic plan, it is necessary to follow a number of stages taking into consideration all the internal and external factors. These stages can be summarized as follows:

1. The analysis process: This stage is to analyze and investigate the factors that affect the construction of the mission and from which the strategic plan goals

are derived.

2. The formation stage: This stage involves putting down the main components of the strategic plan which are the mission, the goals, the policies and the strategies.

3. The implementation stage: This stage involves creating programs that aim at achieving the goals of the strategic plan, and determining the procedures for every program. It also involves defining aspects such as the beginning and end time of the program, and the individuals and divisions assigned for the program implementation. The same applies to the procedures.

4. The evaluation and supervision stage: This stage includes setting up the evaluation indicators for the plan and the evaluation procedure for the progress level, and an evaluation for the general situation.

# 4. METHODOLOGY OF MODELING

# CHAPTER FOUR

## 4.1 Introduction:

This chapter discusses the methodology that will be used in building and implementing the model of this study. The methodology of the model stems from the fundamentals of software engineering. To achieve the best results, three approaches have been incorporated into the design and implementation of the model. It is also necessary to divide the problem in hand into smaller components to simplify the execution process. To implement and complete the system, the model will be composed of tiers, and each of which will be divided into several smaller parts.

The object-oriented analysis and design are considered the most prominent subjects for each programmer or developer. Like any programming language, programming with an object-oriented language consists of 4 stages: Analysis, design, coding and testing. Based on these stages, a programmer should first analyze the program and identify the problem that needs to be analyzed. Then he proposes solutions and checks how these objects can interact with each other. Next, the programmer starts the coding process and applies the design proposed in the previous stage. Finally, he tests the program to make sure it is consistent with the previous processes. These stages are often referred to as the Software Development Life Cycle. Every software project should go through the same stages in a specified order and the development process should be according to a certain methodology.

These methodologies ensure that the process of solving the problem would stay on the right track. In addition, they provide us with all what is needed during solving the problem. The problem is divided into sub-problems that are solved individually using

different activities. These activities are implemented one at a time and the resulting solution from this process is added incrementally to a set of solutions that would eventually make up the module. Finally, the design of the module consists of tiers, provided that moving to one tier is not possible without the completion of the previous one. Figure 1 illustrates the problem solving stages.

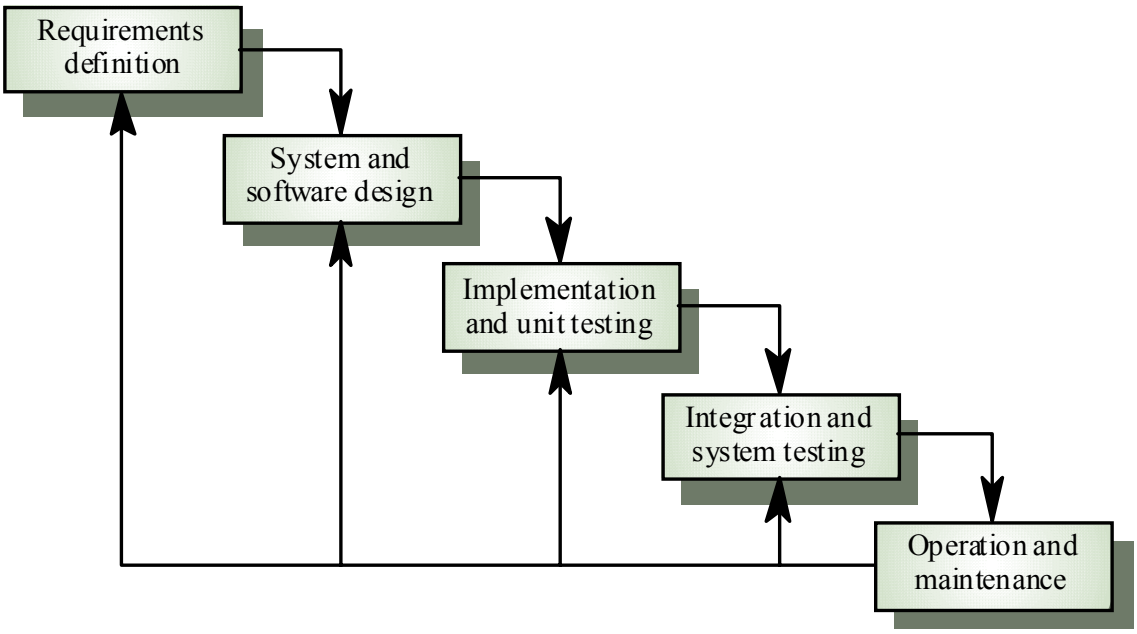


**Figure 1: Stages and tiers of problem solving using the iterative water-fall approach**

The implementation of these tiers starts with an analysis of the system followed by the design stage and so on, without returning back to previous stages. Each stage is divided into smaller stages with each sub-stage working individually in a complete and comprehensive manner.

This methodology provides the development process with a logical sequence, and as per Sommerville I ,(2011), for these stages (analysis, design, coding and testing), which are very useful in producing more flexible approaches, such as the spiral approach—an early attempt to improve and develop the water-fall approach. In the spiral approach,

it is possible to develop a project using more than one cycle (or more than one water-fall) at the same time, and with the same stages of the iterative water-fall approach. Therefore, it is feasible to take incomplete requirements, analyse, design and code them. So, this incomplete version indicates that the first cycle is completed and it is possible to begin with next one and so forth until the whole project is completely developed.

Besides using this model in the implementation process of the proposed model, employing the iteration approach was very useful in diminishing the risks associated with the execution of the model to a minimum. In this model, it is possible to go back one step to fix any anomaly and then move forward to the next step. Hence, the development process of a project has evolved to include several cycles, and each one allows moving one step forward or backward as required Figure 2 illustrates the implementation waterfall.

SommervilleI (2011): In order to implement the proposed model, it is necessary to use administrative tools. There are numerous approaches that can explain how projects are developed and many methods that are useful in describing and outlining the relations between the objects, but the best and the most popular one is the Unified Modelling Language (UML) which is considered the standard approach. All approaches currently incorporate UML as a standard language in all projects, and it is used in the proposed model due to its ease of use.

## 4.2 Introduction to UML

SommervilleI,(2011): The UML language provides a description of how to build a software project. It also gives a detailed description of the architecture of the project

charts. Thus, it can be effectives for software development. However, the UML does not specify details about what should be used in the analysis or design stage because this task is performed by the methodology. Therefore, the topic of the methodology is crucially important to the extent that, without one, it would be difficult to identify the needed chart in the requirements collection or the analysis stage—thus using the UML language is essential for this model.

## 4.3 Modelling Class Relationship

One of the UML charts is the class chart: These represent the basis for the programming process. A large number of programs can generate codes from these charts. On the contrary, there is another approach to reverse this process, which is a set of other programs that can reverse it by extracting a chart from a code. There would be no need to use any tool to generate a code because the .net is satisfactory.

## 4.4 The Proposed Model Tiers

1. The lower tier- the data base: This tier is built by using the SQL and contains tables that store the data.

2. The middle tier: This includes all the elements or the classes which contain all the variables and a number of methods. Each variable represents the field value in the data base, with each method having a special task. Also a note can be used to point to or explain a chart clearly. As in all ordinary classes, the visibility for any variable or function should be specified by using certain symbols (+, #, and-) as shown in figure 2.

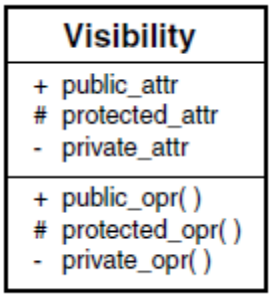


**Figure 2: The shape and the contents of a class using the UML.**

The type of the relationships between classes in the model is determined as association, which shows that a class-to-class relation falls into two types: Aggregation or Composition. It also explains the role of each object in the relation and the number of objects that play the required role. In the case of the proposed model, each activity is implemented using two classes--the first one initializes the parameters while the second implements the processes that deal with the database i.e., update, insert, delete and select.

3. The third tier is the user interface: This tier consists of the screens and implementation of the activities of the system, depending on the design and all the related tools. The implementation process of the model doesn't only focus on the coding but also to a great extent on the design. To implement this tier, the model uses the same languages used to construct the internet pages such as the Hyper Text Mark-up Language (HTML).

   The HTML language is not a programming language in the sense and notion known to programmers, unlike the other programming languages such as the C

Language which needs a compiler. For instance, this language doesn't have conditional and loop statements. But if needed, they can be applied through some other script languages such as Java, JavaScript and CGI. For the purpose of this research, the JavaScript would be enough. Also, this language is operating-system independent and its scripts get interpreted and executed by a web browser. It is a simple language that is easy to understand, learn and doesn't need previous or extensive knowledge in programming languages and their architecture.

There are certain steps to be followed whenever a computer is being used to tackle a problem. The degree of efficiency in implementing these steps would determine the level of efficiency in solving the problem by the computer. It is worth mentioning that the most important step, which represents the logic of solving a problem, gets implemented and carried out outside computer and without using it. These steps are problem definition and analysis, algorithm, and writing the program. Below is a brief description to these stages according to their logical order:

## 4.5 Problem Definition and Analysis:

In this stage, the dimensions of the problem and goals are identified by analysing and describing all the related data. Then the following tasks should be completed:

- Defining the outputs precisely: The outputs include all the results expected to be achieve from solving the problem. The outputs should be defined first so we can specify what inputs and processes are required to achieve the desired outcome. Therefore, the results are defined and specified first and obtained

later.

- Based on the required outputs and results, the required inputs which include data, parameters are determined. In addition, the form and specifications of these inputs should be identified precisely.

- Determining the solution methods from the point of view of a computer and evaluating them in order to choose the best one. Since any problem can be solved using many methods, there should be thorough consideration of each method to select the most suitable one to be implemented on a computer in terms of simplicity, speed and memory.

## 4.6 Selecting the Algorithm

The next stage, after choosing the best method to solve the problem, is expressing this method in a group of steps that are logically subsequent and linked to each another in a way that leads to solving the problem. This group of steps is referred to as an algorithm. It can be expressed in writing or in drawing using a collection of notations called flowcharts.

## 4.7 Preparing the Process Flowchart

The process flowchart is a drawing process that shows the logical sequence of the flow of the required processes. These processes are used to solve a specific problem, using standardized geometrical symbols and shapes, each describing a certain process.

These flowcharts will be used in the implementation of the model, giving the

following benefits:

- Simplifying the study and implementation processes to the clients.
- Simplifying the review process of the model program in order to modify it or discover any existing errors.
- Simplifying the documentation process, since the chart reflects all the program processes including the input, retrieval or processing of data.

There are important building guidelines when preparing a flowchart:

- Specifying the inputs and outputs and assigning the corresponding variable name for each one.
- Identifying the chart of converting inputs into outputs and solving the problem.
- Drawing the process flowchart.
- Testing the feasibility of the process flowchart by experimental data.

The steps of solution in this type of flowcharts have been organized in a linear series from the beginning to the end of the model.

Also, the processes' flowcharts have been used, so that we don't need to repeat some of the processes many times to get the best outcome.

# 5. PROPOSED MODEL

# CHAPTER FIVE

## 5.1 Introduction

The discussion in chapter five is divided into three main sections. The first section talks about the methodology of building and implementing the model which depends on the various programming methods of the software engineering. The proposed model relies on a mixture of three methods for implementing the software systems which are: the water fall, the spiral and the prototype. The implementation and design process is composed of tiers and each one of them is further divided into smaller parts. The second section provides an overview about running the model, the flow of data, and the form and specifications of the hardware needed to lay out a suitable environment that ensures optimal results. In this chapter, there will be a discussion about the architecture of the internal network which will serve as the environment for the model application. Next is the third, section which is composed of two parts. The first one deals with the design of the database which consists of tables storing all the data related to the strategic planning and processes designed by the users. The second part of this section is dedicated to building the user interface which serves as a vessel between the database and the users including strategic planning designers, process designers, end users and executives. The user interface is also branched into two parts: One is concerned with establishing processes, building strategic plans and entering their data into the system while the other part deal with the end users—an authorized person assigned to complete certain tasks as outlined by the plan. Finally the focus in this chapter shifts toward the last component of the system which is using proposed standards to test for the consistency of the entered strategic plan with these standards in terms of its structure and form. The evaluation process is conducted using six

proposed criteria and every one of them has an algorithm that checks for any deviation in the entered strategic plan from the standards.

The system consists of a phases, represented as below

## 5.2 Phase One: The Strategic Plan Management

The strategic plan management is divided into two parts: First part has the data base and the second represents the application interface.

### 5.2.1 The Database

The model proposes building a data base that contains information about the elements of the strategic plan and any other related data. In addition, there should be some specialized components that can interact with the data base. The database has been built using vb.net in order to store, modify and retrieve the data of the strategic plans. However, it is necessary to get familiar with the tables, data base contents and interrelationships as shown in Figure (3) below.

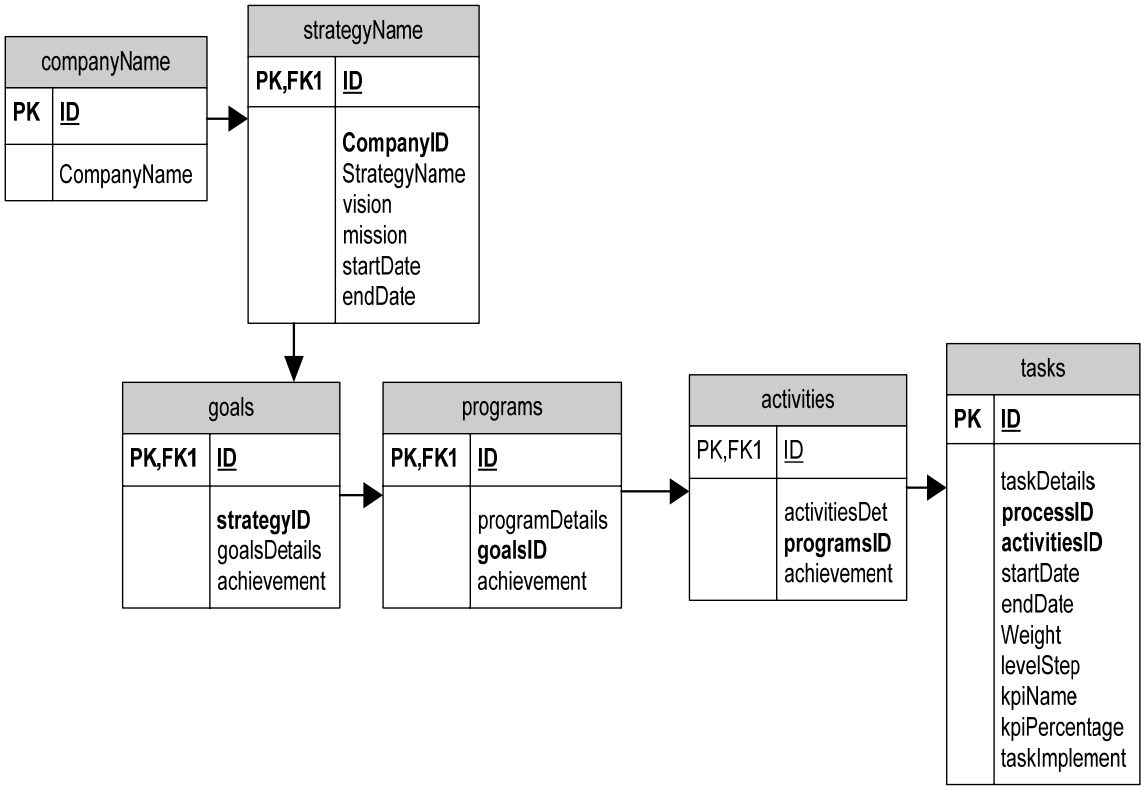


**Figure 3: Data base related to strategic plan.**

The storage process is preceded by another stage in which a user name for the organization and an ID are given. This process requires a connection with other systems such as the human resources in that organization. Next, the process of storing the components of the strategic plan starts by giving the plan an ID and a name, and then entering two elements: The vision and the mission. It is also necessary to specify the start and end dates and relate them with the organization ID, because the system allows for more than one organization within one data base. The following is a brief description of these elements:

1. The vision: Since the vision has one value for each strategic plan, it can be stored in the table of strategy Name, see the algorithm in Figure (6).

2. The mission: The mission also has one value; therefore it would be stored in

the table of strategy Name—see the algorithm in Figure (6).

```
Function Insert(ByValobjNames As array list , byvaltableName As string)
Dim strSqlStmt As String
n=objName.count()
strSqlStmt = "insert into TableName(field 1, field 1,…, field n "
" values (@par_field 1 ,@par_field 2 ,. . .  ,@par_field n)"
myCommand = New SqlCommand(strSqlStmt, conn)
for (i=0 to n)
myCommand.Parameters.Add("@par_field " & i ).Value = objNames.fieldNumber(i)
next
conn.Open()
myCommand.ExecuteNonQuery()
conn.Close()
end function
```

**Figure *4:*The pseudo of storing the strategic plan components.**

3. The goals: Each plan has several goals with their own values such as the achievement level. Thus it should be placed in a separate table. Each goal can be accessed through an ID connected to a plan with a foreign key called strategyID- see the algorithm in Figure (6).

4. The programs: Each program has an ID and a tool called goalID to connect it to its anticipated goal. Furthermore, the output of the program evaluation would be stored in field named achievement- see the algorithm shown in Figure (6).

5. The activities: The activities data are stored where each activity is given an ID and linked to the relevant program called programsID. Also, activity details called activitiesDet and the evaluation output (achievement) are stored- see the algorithm in Figure (6).

6. The tasks: The tasks data is stored where each task is given an ID, details (taskDetails), a start date and an end date. Each task is linked to an activity with an ID (activitiesID) which is connected to a process by a (processID). Next the

task is given a weight (measured in hours), according to the metrics of the organization. Then the task is ranked so the model can determine the execution time and when it is possible to send the data of that task to the assigned employee. This field is called levelStep. Finally, it is necessary to introduce an evaluation tool with an initial percentage value of zero—see the algorithm in Figure (6).

7. The evaluation tool: The user can access the tasks table and modify the data of the evaluation tool in the field named key performance indicator (kpiPercentage)--see the algorithm displayed in Figure (5).

```
Function Update(ByValobjtasks As tasks)
      Dim strSqlStmt As String
   n=objName.count()
strSqlStmt = " Update tasks set
(kpiPercentage=@par_kpiPercentage,kpiPercentage=@par_kpiPercentage "
              " where ID=@par_ID "
myCommand = New SqlCommand(strSqlStmt, conn)
myCommand.Parameters.Add("@par_kpiName") = objtasks.kpiName
myCommand.Parameters.Add("@par_kpiPercentage") = objtasks.kpiPercentage
conn.Open()
myCommand.ExecuteNonQuery()
conn.Close()
                 end function
```

**Figure 5: The pseudo of the storage process related to the task achievement level. measured by the performance indicator.**

### 5.2.2 The Application Interface of the Plan Management

This model module enables the designers to build a strategic plan and define the relations between its components. Additionally, it allows them to identify the processes that will be used by the planned tasks.

The design process should be built from top to bottom, where the components are

also constructed from top to bottom of the tree. Each component is linked to the one preceding. For example, the tasks are children activities, activities are children of programs derived from goals and the goals are children of both mission and vision. Please refer to figure (6). Figure (7) explains the mechanism of building a plan.

<table>
<tr><td colspan="16">vision</td></tr>
<tr><td colspan="16">mission</td></tr>
<tr><td colspan="8">Goal2</td><td colspan="8">Goal 1</td></tr>
<tr><td colspan="4">Programe1 (project)</td><td colspan="4">Programe2 (project)</td><td colspan="4">Programe3 (project)</td><td colspan="4">Programe4 (project)</td></tr>
<tr><td colspan="2">Activity1</td><td colspan="2">Activity2</td><td colspan="2">Activity1</td><td colspan="2">Activity2</td><td colspan="2">Activity1</td><td colspan="2">Activity2</td><td colspan="2">Activity1</td><td colspan="2">Activity2</td></tr>
<tr><td>task1</td><td>task2</td><td>task1</td><td>task2</td><td>task1</td><td>task2</td><td>task1</td><td>task2</td><td>task1</td><td>task2</td><td>task1</td><td>task2</td><td>task1</td><td>task2</td><td>task1</td><td>task2</td></tr>
</table>

**Figure 6: The structure of the strategic plan and the interrelations among its main components.**

```
Creat new strategy plan
Initialization Strategy(ID,vioin,misin,companyID)
Insert(objStrategy)
strategyID=ID
While (goals not inserted)
{
Initialization Objgoals=new goals(ID,strategyID,goalsDetails,achievement)
Insert(Objgoals)
}
Iteration  (programs not inserted)
{
```

```
        Fetch  goalsID
        Initialization objPrograms=new programS(ID,programDet,goalsID,achievement)
        Insert(objPrograms)
        }
        Iteration  (activities not inserted)
        {
        Fetch programsID
        Initialization objActivities=new activities(ID,activitiesDet,programsID,achievement)
        Insert(objActivities)
        }
        Iteration  (tasks not inserted)
        {
        Fetch prossesID
        Fetch activitiesID
        Initialization                                                    Objtasks=new
tasks(ID,taskDet,prossesID,activitiesID,startDate,endDate,Weight,levelImplementation,kpiName,kpi
Percentage,taskImplement)
        insesrt (Objtasks)
        }
```

**Figure 7: The pseudo of designing and building the strategic plan.**

## 5.3 Phase Two: Creating Processes

To create a process, the system designs all paths of the data flow, and their relevant transmission to every other process and identifies human resources assigned to carry out any stage of the path. This is done by pinpointing its location on the process flow chart either using its personal or functional title. Moreover, the points of decision making and the steps for each process are narrowed down. Finally, the serial or

parallel procedural for the process are specified. This phase of the model includes two main components:

- The data base includes the process, define, tag with a number and the steps of execution.
- The application interface related to the process in which the communication with the data base is performed. Figure 8 illustrates the whole model.

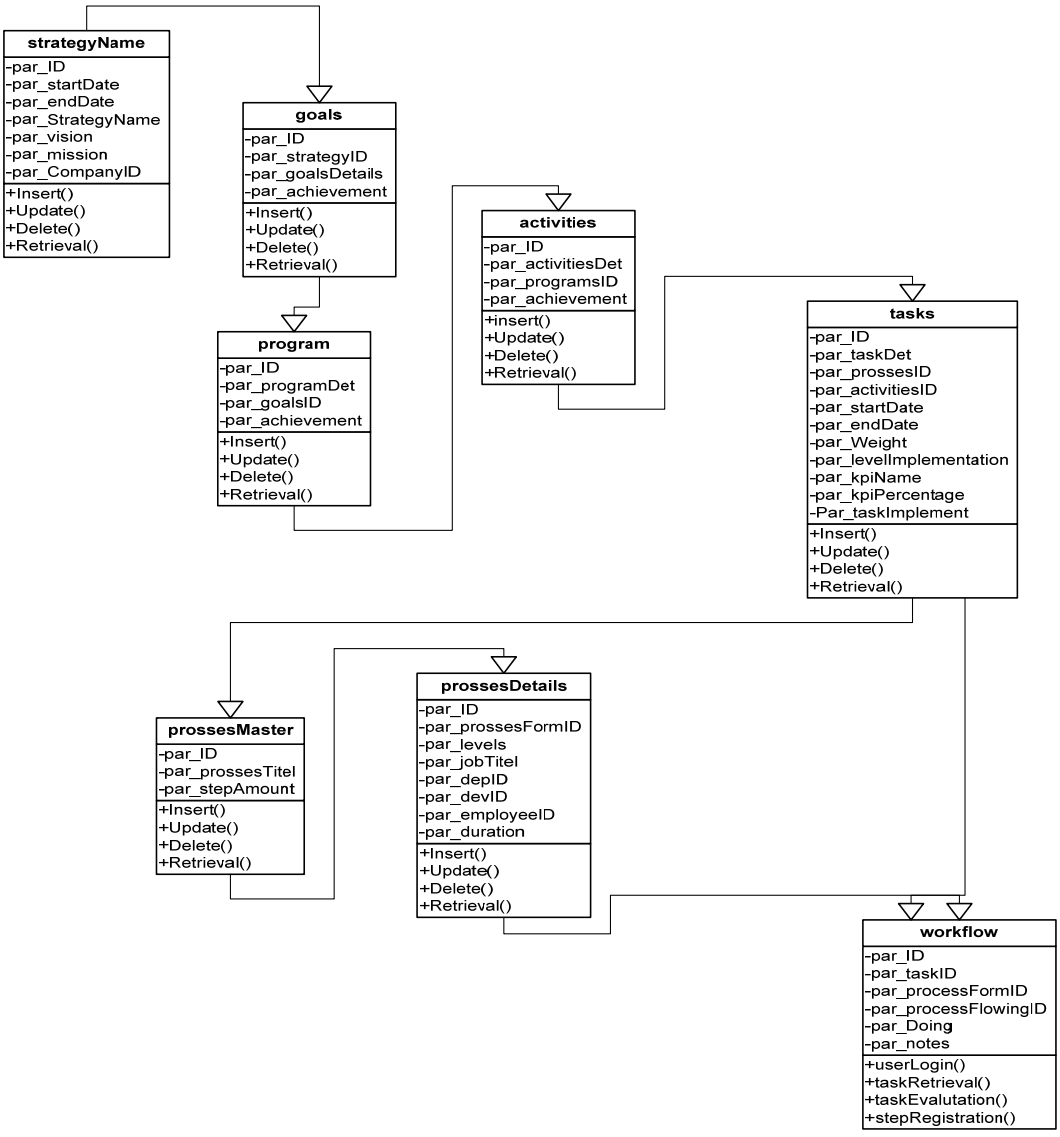


**Figure 8: UML of the Application of a Model**

### 5.3.1 The Database

In this part, the data related to the process is stored and then moved to a path to interchange data between the users. The stored data includes the process properties, such as determining the start and end points, the decision points and the points that enable the users to define the path for the data to follow in the next step.

This part of the data base consists of two tables and the interrelation between them falls into two types: “Master” or “Details”- see Figure (9). There is also a table of partial data derived from the human resources system. which is connected to the data base. Figure (10) displays the stored partial data related to the personnel information.

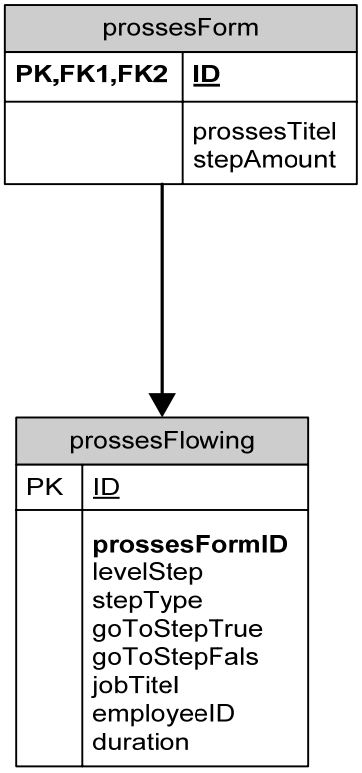


**Figure** *9:* **Partial Data Base for the Process Data.**

| employee | |
|---|---|
| **PK** | **ID** |
| | **companyID**<br>empName<br>empJobTitle<br>qualification<br>DepName<br>devName<br>sex<br>salary<br>creditVacations |

**Figure** *10:* **Partial Data Base Containing Data for the Personnel Information.**

Below is a brief description of the tables in figures 9 and 10:

1. ProcessForm table stores the name of the process, the number of its steps and provides it with an ID.

2. processFlowing table: Is of a type “Details” where the process steps are stored and ranked according to a counter. Also, the table provides details about the type of each step, whether it was an executive or a decision step and whether the step has a fixed path or a moving one that can determine the next step path. The algorithm in Figure (6) enables us to store data about the name, the number of steps and the properties of each process.

### 5.3.2 The Application Interface of Processes Design

This module of the model allows us to build an application interface which enables the users to design processes, and define their steps and properties, including the human resource assigned to the process, and the decision points. The subsequent points are those that are not related to a human resource, facilitating the process of directing the process path. To understand the process, see the algorithm in Figure (11).

```
        Creat new presses

Initialization objProsses =new possesCreat(ID,prossesTitel,stepAmount)
        Insert(objProcses)
        prossesID=ID
        Fetch jobTitel
        Levels=0
        While (goals not inserted)
        {
        Fetch depID
        Fetch devID
        Fetch employeeID

Initialization ObjstepOfProsses =new
stepOfProsses(ID,prossesID,levels,jobTitel,depID,devID,employeeID,duratio)

        Insert(ObjstepOfProsses)
        Levels ++
        }
```

**Figure 11: Pseudo of the Process Design.**

### 5.3.3 Connecting the Tasks of the Plan with the Process

In this part of the model, the tasks get connected with the processes, by adding the Process Id from the (processForm) table in the (processed) field. Thus, the process that will be responsible for the execution of this task will be defined. This connection is illustrated in figure 12 below. The class named "Tasks" will add the value of the variable (processed) in the "Tasks" table, through the "Insert ()" method.

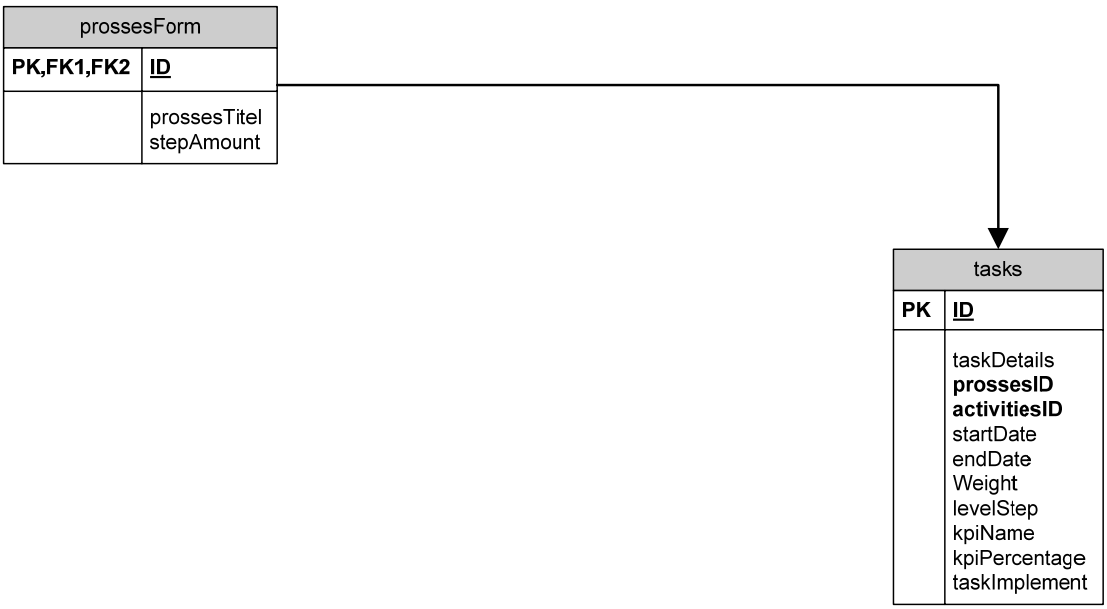


**Figure 12 : The relation between "Tasks" and "Processes" table.**

### 5.3.4 The Strategic Plan Implementation

In this part of the model, the strategic plan is built and connected with the suitable processes. The implementation of the tasks listed in the plan takes place according to the paths that are drawn in each process.

According to the evaluation tool (KPI), the results are entered in the model, in order to get the execution results, and the achievements progress.

To understand the system, the relevant section should be explained. It is divided into two parts: The first one includes the database while the other includes the interface. The database stores the completed tasks; all the employees' information is stored in the "**workrecord**" table, the task number is stored in the (**taskID**) field, the procedure number in the (**processFlowingID)**, the process number in the (**processFormID),** and the process status if executed or not. The later is called the digital signature **(Doing),** and finally the **"Notes"** are saved, see figure (13).

As for the second part, the interface, it includes a class called (workflow), which has variables holding the same fields' names, in the (workRecord) table. This class stores, presents and modifies the data in this table, see figure (10). It is called when the employees enter their own account screens (through the interface), display the tasks, do the required work, evaluate the achievement, and digitally sign.

| workRecord | |
|---|---|
| **PK** | **ID** |
| | taskID<br>prossesFormID<br>prossesFlowingID<br>Doing<br>notes |

**Figure 13 :** workRecord Table

Steps of task execution using the workflow:

1. The steps of the task that has been selected from the strategic plan are analyzed. This analysis includes assigning the start and end times of the task, its procedures, the time needed to complete each procedure, and the employee who will be executing this procedure.

   It is also important to define the measurement tool for this task (KPI), and that this analysis is based on what the strategic plan implies.

   The table 1 illustrates the steps and procedures of a task in the strategic plan of the Free Zones Company.

| amount | Procedures | Incentive growing economy and go on in huge infrastructure projects | Purpose |
|---|---|---|---|
| | | **Contributing in reinforcing the investment structure** | **Program** |
| | | **Enhancing and Improving the infrastructure** | **Activities** |
| 128 | The surveyor conducts a study to define the roads needs, and gives recommendations | Opening roads, and extending infrastructure services in the Zarqa Free Zone | **tasks** |
| 8 | The Study is sent to the investment director for preliminary approval | | |
| 48 | The study is sent to the financial manager to allocate the budget | | |
| 1 | The study is sent to the general manager for final approval | | |
| 48 | Recommendations are sent along with the general manager approval to the tenders department | | |
| 1 | One of the administration staff is assigned for follow up and receipt. | | |

**Table 1 : steps and procedures of a task in the strategic plan of the Free Zones Company**

2. A path is drawn for these procedures, with the time to execute each, and with the employee who will be performing the certain procedure. The figure 15 is a flowchart for the steps of completing a task.

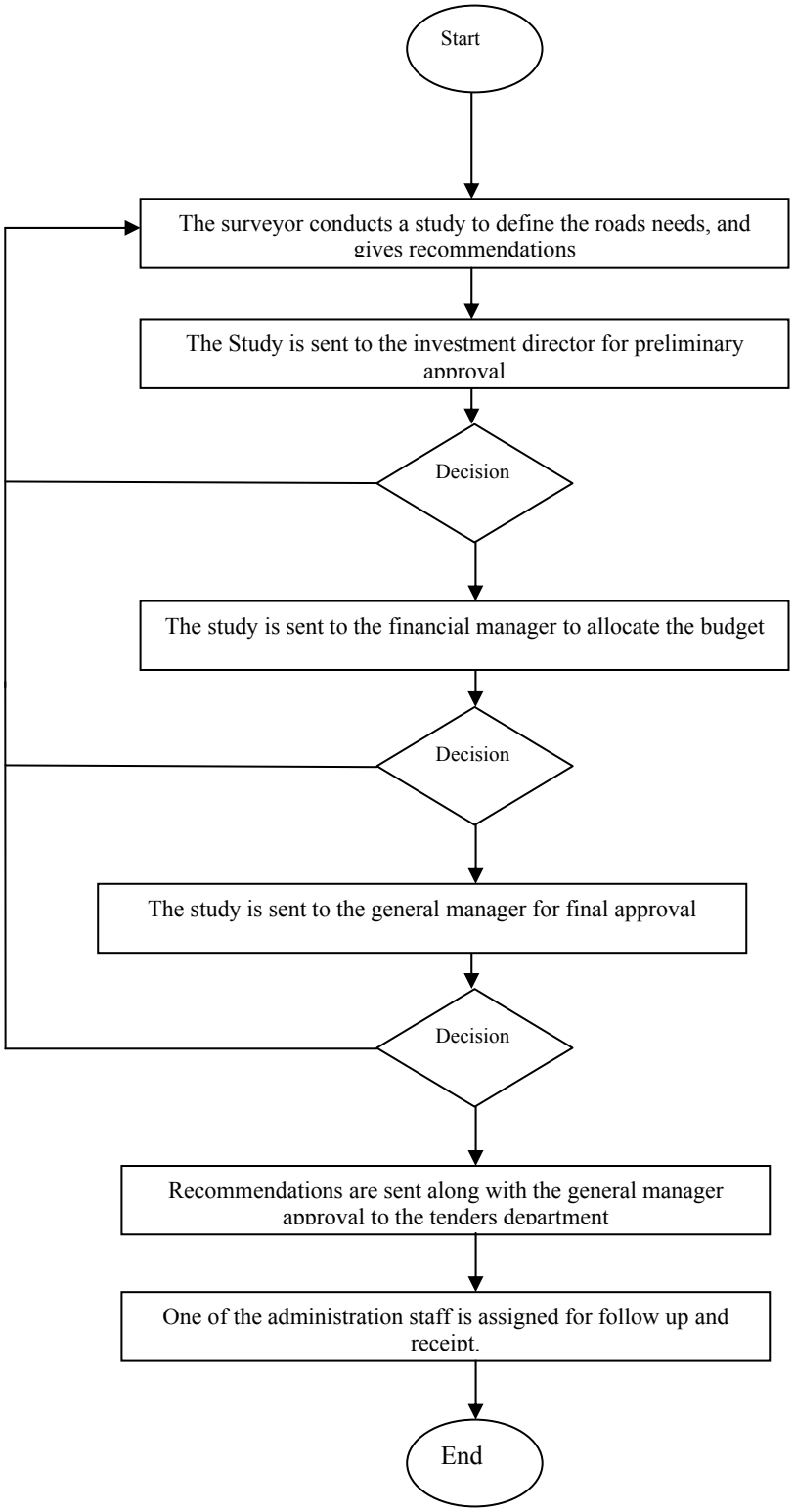


**Figure 14 : flowchart for the steps of completing a task**

3. These steps are then transformed to the form of a process, and are entered to the system according to the previous analysis (point 1 and 2). The process gets registered

and is given an ID and a name. Then the steps and procedures are built, and the procedure ID is defined and stored in the (processFlowing) table in the (levelStep) field. This way the steps order is specified and the procedure location among the others is defined. After that, the employee assigned to perform it is set in the field (employeeID), or the job title is set instead in the field (jobTitle), in addition to the field (levelsEmp). Thus the employee is assigned along with the time duration to complete the task (duration).

As for the procedures type, it is either a decision or an execution. The step is specified by storing an indicative value in the field "stepType". If the type was a decision, it is necessary to specify the next step by adding the ID in the field (goToStepTrue), in case of approval, while if the decision was "rejection" the ID is added in the field (goToStepFalse). The purpose of storing the step Id is to identify the the path and the next steps in both cases.

So, if the procedure type was a decision, one of the two fields (goToStepTrue, or goToStepFalse) should not be blank, while if the type was "execution", tehn both fields should stay blank.

The database fields get updated through the interface, where this data is entered as variables holding the same names as the fields', through a method called (insert())from the class (processDetails) in the database.

4. According to the start and end time variables, and the employee assigned for the task, the workflow system sends a (Job) as soon as the conditions are met. These conditions imply that all the tasks preceeding the current one are completed, and this gets verified by checking that the value of the field "taskImplement" is equal to 100 % for all the tasks in the same program, and whose "levelStep" is less than the levelStep of the current task. Then we verify that the start date variable is equal to the real date. Please see the code in figure 16 .

When the employee accesses his own account screen, he finds his tasks in the "Inbox" screen, and when he performs the required work, he should digitally sign. The task is considered as completed, and its weight is added to the total weights of the completed fields, and then stored in the "taskImplement" field in the (tasks) table.

A record is added in the (workRecord) table, the task ID, the (processFormID), the (processFlowingID), the (Doing) digital signature, and the employee's notes.

When all the steps are passed by, and when we reach to the end of the process, here we consider that the task is completed, and the relevant fields (Program and Activity) get updated, according to the completed task weight. This program property will be clear in chapter 6 that discusses the most important findings about the Achievement ratios.

```
If Validate (username , password)=true then
Fitch (jobTitel,depID,devID,employeeID) from employee table
If jobTitel !=head Division and jobTitel=manager then
If (jobTitel !=head Division) then
Fithch (ID,prossesID,levels,jobTitel,depID,devID,employeeID,duratio) from prossesFlowing table
Where (employeeID=username or employee=null) and jobtitel= head division
Fithch
ID,taskDet,prossesID,activitiesID,startDate,endDate,Weight,levelImplementation,kpiName,kpiPercentage,t
askImplement) form tasks table where ID=rossesID
if (real date >=startDate and real date <= end date)
Show this task in inbox
Eles
Fithch (ID,prossesID,levels,jobTitel,depID,devID,employeeID,duratio) from prossesFlowing table
Where (employeeID=username or employee=null) and jobtitel= head division
Fithch
(ID,taskDet,prossesID,activitiesID,startDate,endDate,Weight,levelImplementation,kpiName,kpiPercentage,
taskImplement) form tasks table where ID=rossesID
if (real date >=startDate and real date <= end date)
Show this task in inbox

End if
else
Fithch (ID,prossesID,levels,jobTitel,depID,devID,employeeID,duratio) from prossesFlowing table
Where employeeID=username

Fithch
ID,taskDet,prossesID,activitiesID,startDate,endDate,Weight,levelImplementation,kpiName,kpiPercentage,t
askImplement) form tasks table where ID=rossesID
if (real date >=startDate and real date <= end date)
Show this task in inbox

End if
```

**Figure 15: Pseudo of Assigning Tasks to the Intended Employee After Logging into His/ Her Screen.**

## 5.4 Evaluation and Comparison:

The model analyzes the entered strategic plan and compares all its components with the standard criteria of the model which have been mentioned earlier in the first part. Then it reports the results related to all the deviations from these criteria. These results represent the recommendations generated by the model to the decision makers, to guide them to the necessary adjustments to the strategic plan. The criterion of evaluation and constructing a standard plan are:

- Criterion 1: All relevant goals of the programs.
- Criterion 2: Testing the level of utilization of the human resources.
- Criterion 3: Testing of uniform distribution of the program over the implement period of the plan.
- Criterion 4: Programs division into activities.
- Criterion 5: Activities division into tasks.
- Criterion 6: Each task has its own performance indicator (KPI).

The comparison process is illustrated below where each criterion is compared separately, either before or during the workflow process:

1. The first criterion examines whether all the goals are related to the program. Here, the data stored in the “Goals” table is accessed to study each goal separately, and then receive its own ID. Next, it is necessary to ensure that this ID doesn't already exist in the “programs” table in the field named GoalsID. If this ID is in use, the next goal has to be considered. But if the ID is not in use, the program would notify the planners that “the plan cannot achieve this goal”. Accordingly, the planner has to adjust the plan and put down programs that can fulfill this goal. Figure 16 illustrates this criterion.

```
GoasCounter =select Count ID of goals

N= GoasCounter

GoalsVal=null

While N <> 0

GoalsVal= Select ID form Goals where ID=N

If GoalsVal = = null

GoalsChec = Select goalsID from programs goalsID =N

End if

If GoalsChec<> null


" Tell a planners there is a mistake in the plan "


End if

GoalsVal = null

N =n-1

End while
```

**Figure *16:* pseudo for criterion1of All relevant goals of the programs.**

2. The second criterion is to examine the utilization level of the human resources: This criterion assumes that, for example in Free Zones Company every employee works eight hours a day and 22 days a month. Then it calculates the time needed to complete all the tasks of the strategic plan, in order to find the average percentage utilization of the human resources during the years of the plan that would take the workflow to complete.

   The calculations are done by getting the number of the employees in the

human resources system in the company and then use the following formula:

CapacityEmp= dayVar*hoursVar*Total Employees

Where:

dayVar = day of work every month.

hoursVar = hours of work every day.

Next, the total of the "Weight" fields in the "tasks" table, which represents the total weight of the strategic plan, gets extracted and therefore gets the variable name "planWeight." Finally, the following formula is applied:

Utilization=(planWeight/capacityEmp)*100%.

Example:

Capacity in Free Zones:

dayVar=22 hoursVar=8 and total emplyees=400

CapacityEmp=dayVar *hoursVar of work every day*Total Employees

CapacityEmp=22*8*400=7044 hours every month and every year =7044*12=844800.

Plan weight in yare 2009 = 59000

Utilization = (59000/844800)*100=7%

If the utilization percentage is small, the system will notify the planner that "this plan underutilizes the available employees and thus it should be restructured or reformed by adding more programs.

3. The next criterion checks whether the programs are fairly distributed throughout the years of the plan. This criterion, which depends on the outcome

of the previous one, considers the weight of the tasks every year and compares it with the past years, to determine the level of human resources utilization for the current year and suggest the proper recommendations. If the difference from one year to another is big, then the model would inform the planners that "there is a wide discrepancy in human resources utilization over the years and thus they have to come up with more programs for certain years to reduce that discrepancy."

4. This criterion ensures that all the programs are divided into activities. it takes the ID of each program in the plan and checks whether this ID exists in the "programsID" field of the activity table at least once. If the ID doesn't exist in the "activity" table, the model informs the planners that "this program is not divided into activities and will be therefore hard to implement, Figure 17 illustrates this criterion.

```
For each ID from programs
If ( SelelctprogramsID from activity where programsID= ID)= null
" Tell a planners there is a mistake in the plan "
End if
```

**Figure 17: Pseudo of Criterion's Programs Division into Asctivities.**

5. The criterion here makes sure that all the activities are divided into tasks. This criterion checks whether each activity ID exists in the field "activityID" of the tasks table at least once. If it doesn't exist, the model notifies the planners that

"this activity is not divided into tasks, and therefore its execution would be difficult and should to be divided into at least two tasks". Figure 18 illustrates this criterion.

```
For each ID from activities
If ( SelelctactivitiesID from tasks where activitiesID= ID)= null
" Tell a planners there is a mistake in the plan "
End if
```

**Figure 18: pseudocode for Illustrates the evaluation this criterion .**

6. The final criterion verifies that each task has an indicator that measures its level of achievement. This criterion accesses every task and confirms that the fields of "kpiName" and "kpiPercentage" have values and are not empty. If they are empty, the model informs the planners that "Some of the tasks don't have evaluation indicators and it would be hard to measure their level of achievement". Figure 19 illustrates this criterion.

```
For each ID, kpiName , kpiPercentage from tasks
If kpiName = null OR kpiPercentage= null
" Tell a planners there is a mistake in the plan "
End if
```

**Figure 19: Pseudo of Criterion 6( Each task has its own performance indicator).**

## 5.5 The Data Flow and Interaction between the System Components

To achieve an effective flow of data, all the components of the system (application interface) deal within the interconnected data base and with the other modules in the organization. When the model is applied, the system should be connected.

Thus, in order to implement the system we need to have one server for the application and one for the data base. The users can connect to the data base from the application server, while the model connects to other modules such as the human resources system module. The latter stores the data on the data server which can be accessed whenever needed from the application server. Figure 21 illustrates the system works.

Furthermore, the model deals and accesses the server assigned to the data base using a technology available on the ASP.net called ADO.net, where a connection is established and commands and data are sent or received to or from the SQL. Figure 20 illustrates the method of communication between the application interface and the data base.

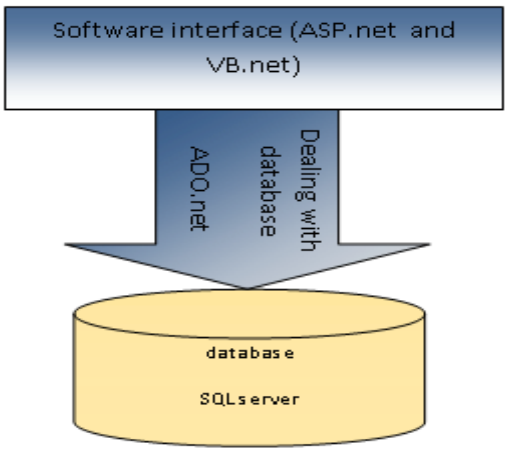


**Figure 20 : The Method of Communication between the Application Interface and the Data Base.**

Transferring data from one user to another or from one stage to another has been done according to the organizational process as proposed by the model. The application interfaces, which are the plan management and building the processes, determine where the data should be sent in the initial stage. Then, the data must be transferred from one stage to another based on the commands received by the model and according to what is planned in the application interface of the process.

Whenever a process is being built, a suitable path that should be followed to transfer the data has to be put in place. Next, the strategic plan should be constructed using the relevant application interface. Therefore, the assigned employee should connect each task to a process that has been laid down in advance to transfer data for a certain task from one stage to anther and from one user to another. When the process of carrying out the designated duties starts, the data moves from an ending stage to the next where they are received by the designated person. Figure 21 illustrates the method of data flow.

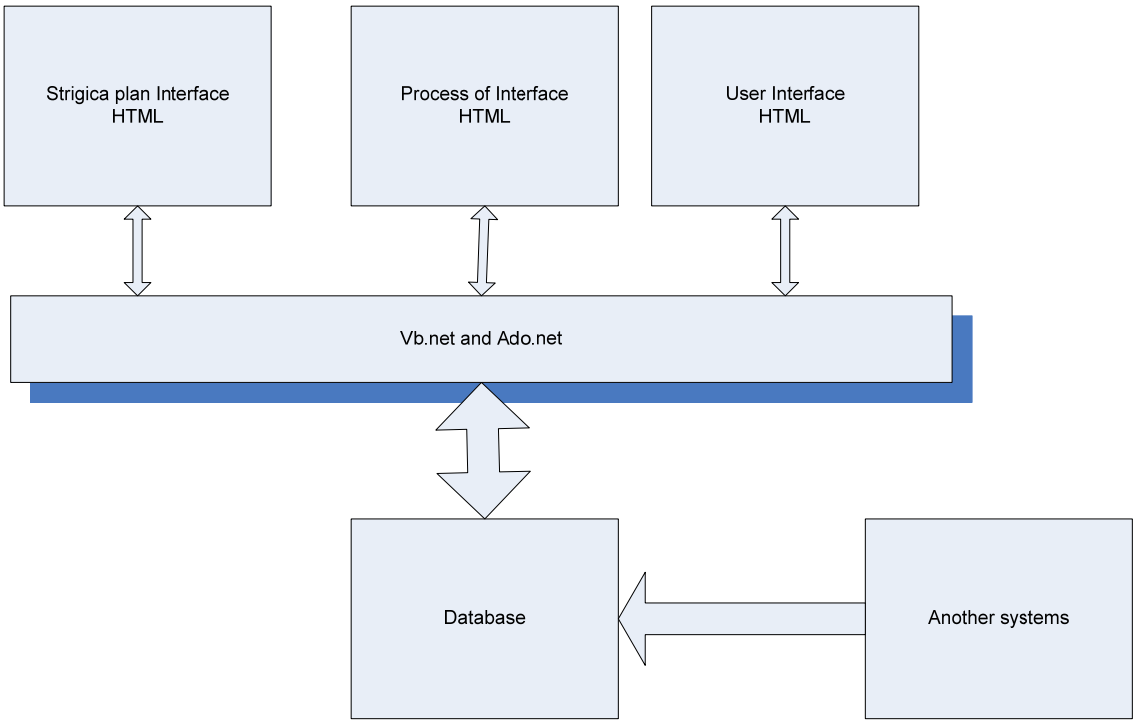


**Figure 21 : The Method of Data Flow in the Data Base**

# 6. EXPERIMENTS RESULTS AND CONCLUSION

# CHAPTER SIX

## 6.1 Introduction

This chapter includes three main sections. The first section describes the instructions and steps for operating the system, and discusses the technique of using the model. Many users can use this model, like process designers, strategic plan designers and end users who perform the assigned tasks. The model has more than one level of authorization and user interface. Every user type has a certain level of user interface that best satisfies his needs. Next, the results of applying the model to Free Zone Company are discussed. The results came from the comparison and evaluation of the entered plan based on the previously mentioned standards. The goal of the evaluation is to check for any deviation in the plan from the proposed standards; which lead the system to issue the proper recommendations. The final results, which are based on the actual application of the model to the strategic plan of the Free Zone Company, show that the plan is consistent with some standards, while it is not with the others.

Finally, the third section presents the overall conclusions of the research.

## 6.2 Model of Implementation

The model suggests establishing four main components for the strategic plan as follows: 1) Strategic plan manger, 2) Process initiation system, 3) Plan evaluation system 4) Employees' interface. To execute the tasks, understand the model and have a precise picture about it, the best way is to discuss the steps used by the system:

- Creating a user name for the organization that wish to use the system so that it becomes familiar with the system. Figure 22 explains this activity.


**Figure 22: Create a New Company**

- Establishing a strategic plan and specifying the relevant and important data regarding the vision, the mission and the length of the time period. As shown in figure 23.

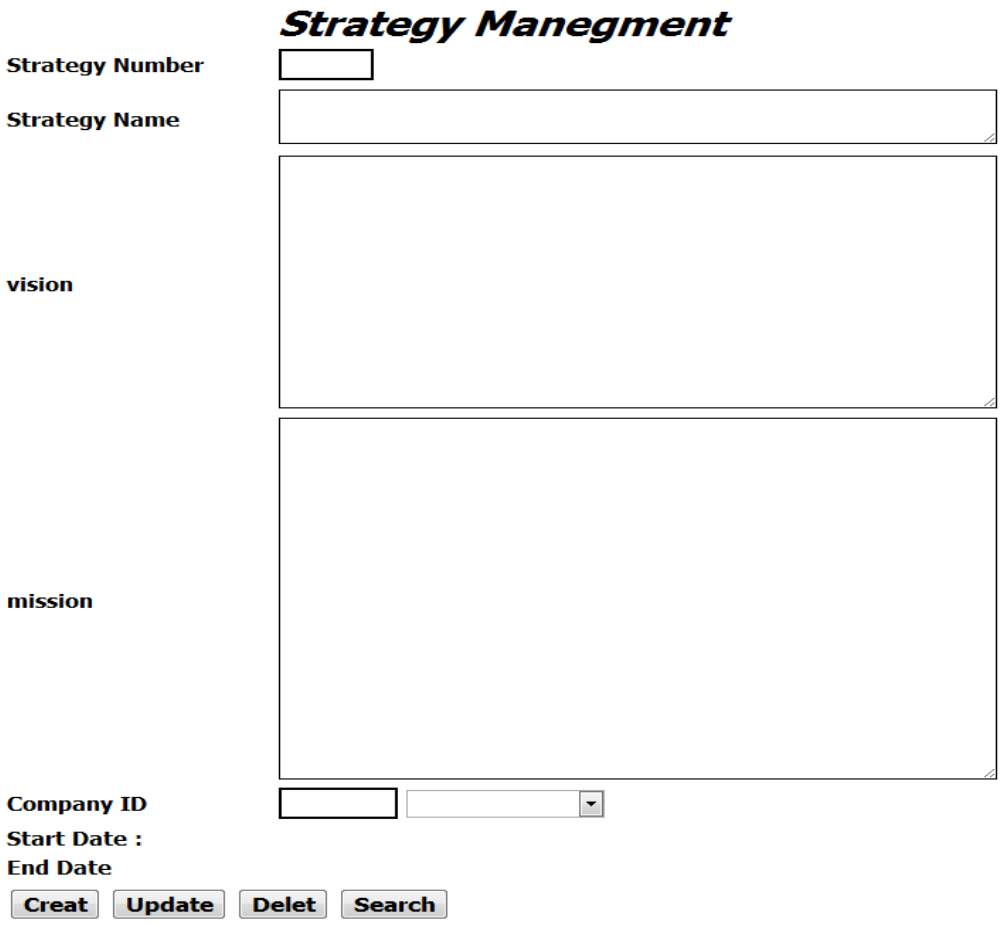


**Figure 23: Createing a New Strategic Plan**

- Define the goals of the strategic plan. Figure 24 explains this activity.

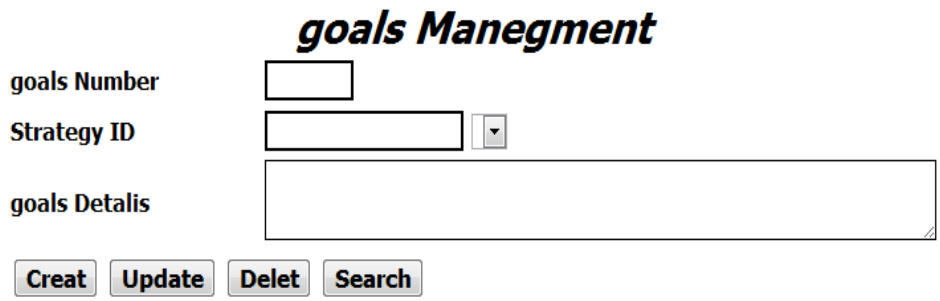


**Figure 24: Insert a Strategic Plan of Goals**

- Creating programs and linking each one of them to a set of goals that are to be achieved by that program. As explained in figure 25.

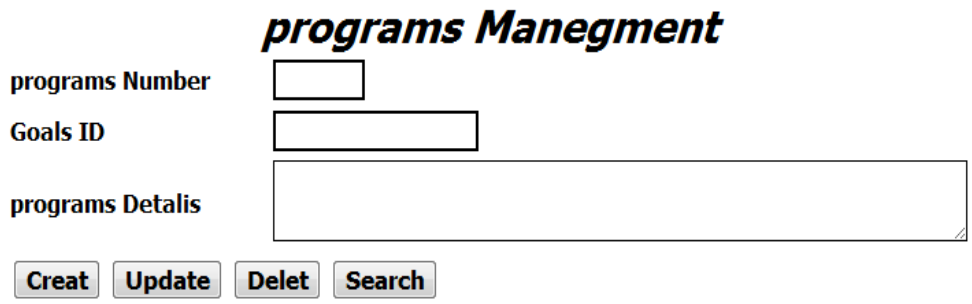


**Figure 25: Establishing a Strategic Plan of Programs (of a Project)**

- Entering the activities of each program and the relevant data. See figure 26.


**Figure 26: Establishing Activities for Every program.**

- Entering the tasks for each activity and linking them to the corresponding process that needs to be executed. It is also necessary to define a performance

indicator for each task, the time of execution and the ranking among the other tasks within the each activity. See figure 27.

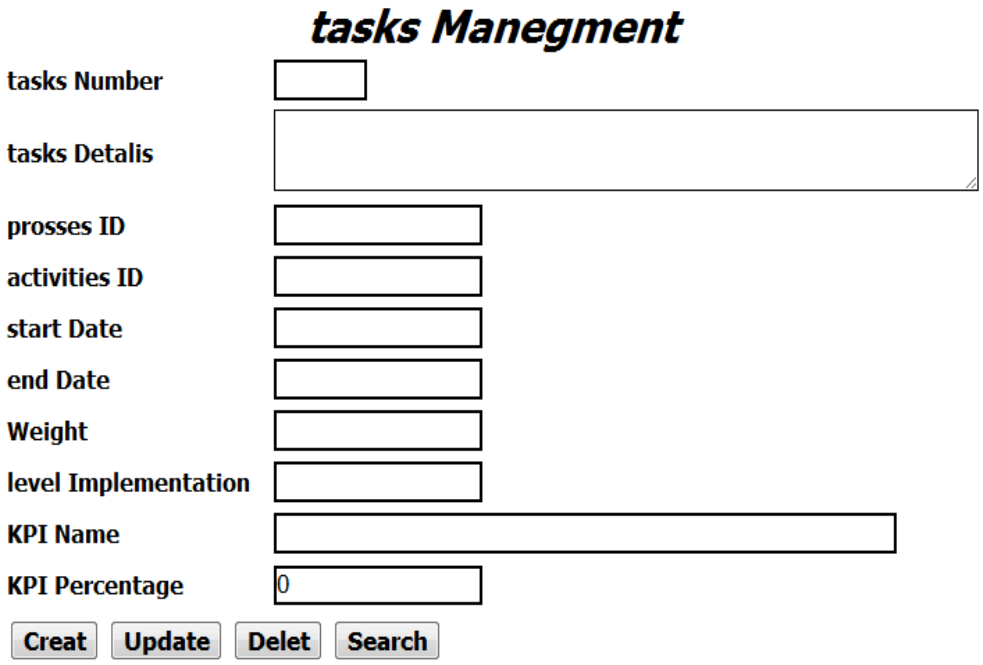


**Figure 27: Establishing a Task for Each Activity**

- Performing automated testing for the plan, to ensure that it has met the proposed standards, of testing against any deviation from the standards. These standards, previously stated by Wheelen, T.L and hunger, are:
  - All relevant goals of the programs.
  - Testing the level of utilization of the human resources.
  - Testing for unified distribution of the program over the period of the plan.
  - Ensuring that all programs are divided into activities.
  - Ensuring that all activities are divided into tasks.
  - Verifying that each task has its own performance indicator.

- Establishing processes that consist of stages and procedures. First, there should be a meaningful name for each established process that points to its goal. Next, stages and procedures should be put in place and an employee should be assigned to execute them. A procedure could be tied to a directorate, a division or even an employee. In the case of not assigning an employee, the process is transferred to the most senior level in the management, such as the director, if the procedure has been transferred to a directorate or a head of a division if it was transferred to a division. See figure 28.

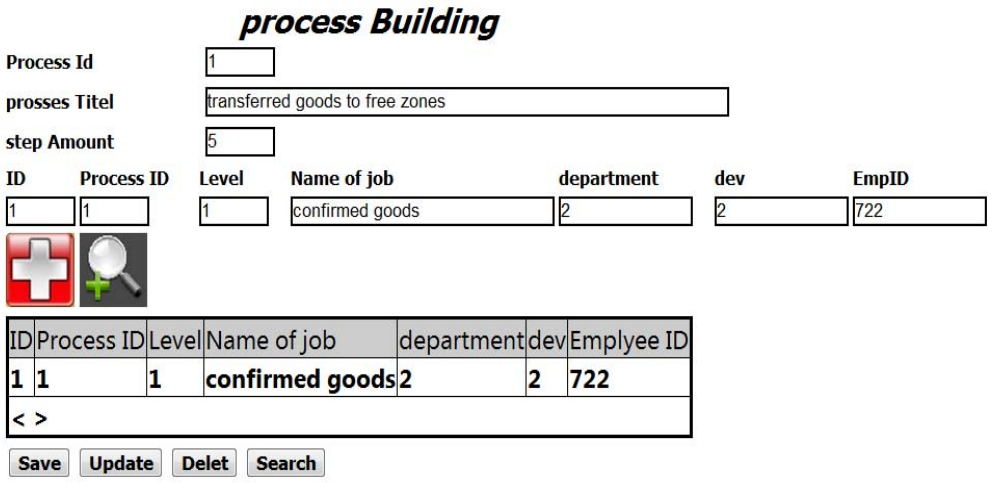


**Figure 28: Creating a New Process and Establishing the Steps of these Processes**

- The proposed model is dedicated for the user screen of each member of the organization staff. After accessing the screen using a user name and a password, the set of tasks that are assigned to that user are displayed. The user then should perform the tasks, add some remarks, evaluate them using a performance indicator and sign them electronically. Finally, the process is transferred from the inbox to another and thus it moves from one step to another according to the predefined path.

- This stage is particularly for the result type that produces some statistical data and reports to evaluate the performance, in terms of how many goals have been met.

## 6.3 The Results:

To check the feasibility of this model, we can apply it in many governmental organizations in the Middle East, because their existing strategic plans are consistent with this model. Among these organizations is the Jordan Free Zone Company which has been chosen as a case study. After feeding the data of the strategic plan into the model, the following results have been obtained:

- The model reveals that the level of human resources utilization in executing the plan was meager, with only 7% of the total human resources of the Free Zone Company. The rest of these resources were working on daily routine tasks. The model suggests to the planner to add more programs to the strategic plan, in order to increase the percentage of the human resources. Since the type and number of recommend programs are governed by the company policies, and as its status enforces planners to improve their plan, the decision was up to the organization. However, if the planners decide to modify the plan, they can add more programs and then examine the results. See table 2.

| Daily work | Strategic Plan | Years |
|---|---|---|
| 93% | 7% | 2009 |
| 94% | 6% | 2010 |
| 92% | 8% | 2011 |
| 93% | 7% | 2012 |
| 93% | 7% | 2013 |
| 93% | 7% | AVERAGE |

**Table 2 : Utilization Percentages of Human Resources in the Strategic Pan.**

- It is apparent that the distribution of the programs over the lifetime of the strategic plan is not uniformed. It is found that more programs are more concentrated in some years than others. In 2010, the utilization percentage of the human resources was very low compared to the other years. So the model should give the following recommendation: "The planners need more programs to be added in that year to increase the utilization percentage of the human resources". See figures 29.

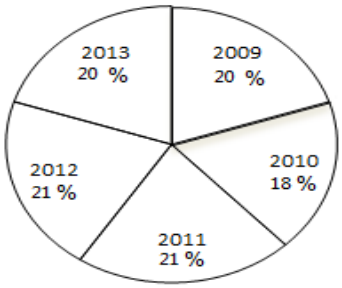


**Figure 29: Distribution of Programs Over Different Years of the Strategic Plan**

- The model also shows that the strategic plan of the Free Zone Company is consistent with the criterion of dividing the programs into activities. Therefore there is no need to make any adjustment to change the related results. The deviation, measured by the number of programs that are not divided into activities, reached the optimal level of zero.

- The model indicates that the strategic plan of the Free Zone Company is consistent with the criterion of having programs to achieve the goals, and that the deviation, measured by the absence of programs to achieve the goals, reached the optimal situation of zero.
- On the other hand, the model was not completely consistent when it comes to the criterion of dividing the activities into tasks. It shows that the deviation, measured by the number of activities that are not divided into tasks, was not optimal. Consequently, the model provides a report containing the activities that need to be divided into tasks, to facilitate their execution.
- The model shows that all the tasks related to the human resources in the strategic plan have performance indicators. Thus, there isn't any need to modify the plan, in terms of that criterion that all the tasks have got performance indicators due to the deviation. Measured by the number of tasks that don't have performance indicators, it is at its optimal level of zero.

- Some operations were built to perform the 37 tasks and programs and to get the relevant evaluation for the strategic, for the year of 2012. The implementation of this plan has started during the period (01\01\2012 - 12\31\2012). The usernames were distributed to the involved staff, the implementation process was launched, and the results have been received in the form of reports.

  Evaluating the Progress in Achieving the Strategic Goals of the Corporation.

  The number of strategic goals that have been evaluated was (6) goals.

  Second: Evaluating the Achievement in the Strategic Plan's Activities and Programs:

  The number of activities and programs in the strategic plan that have been implemented and evaluated was (37) tasks, and were categorized as follows:

  A. The activities whose completion exceeded the plan, and they were (4) tasks.
  B. The activities that were completed as planned, and they were (22) tasks.
  C. The activities whose completion was behind the plan, and they were (11) tasks.

Some operations were built to perform the 37 tasks and programs and to get the relevant evaluation for the strategic, for the year of 2012. The implementation of this plan has started during the period (01\01\2012 -12\31\2012). The usernames were distributed to the involved staff, the implementation process was launched, and the results have been received in the form of reports. After unloading and studying the data, it was summarized as follows:

**First:** Evaluating the Progress in Achieving the Strategic Goals of the Corporation:

The number of strategic goals that have been evaluated was (6) goals.

**Second:** Evaluating the Achievement in the Strategic Plan's Activities and Programs: The number of activities and programs in the strategic plan that have been implemented and evaluated was (37) tasks, and were categorized as follows:

A. The activities whose completion exceeded the plan, and they were (4) tasks.
B. The activities that were completed as planned, and they were (22) tasks.
C. The activities whose completion was behind the plan, and they were (11) tasks.

**Third:** Evaluating the programs' achievement according to the department, also the reason of drifting the reached schema was obtained from the planned department in the free zones' company. Although the reason of drifting was not related to defects in the model. See table 3.

| Department | The Corporation's Goal | Measurement Benchmark | the plan in 2012 | Achieved in 2012 | Bias | The Justification |
|---|---|---|---|---|---|---|
| **The Investment Services** | Increasing the amount of investment in the diverse investment's activities by (10%) yearly | The capital that is registered in the public and private duty free areas ( one million JD) | 1516.8 | 1417 | (109.8-Million JD) | Because of the world economic circumstances |
| **Information Technology** | Improving and developing the corporation's performance | The number of electronic services | 12 | 12 | 0 | |
| | | The number of electronic system | 30 | 26 | -4 | A number of financial allocation was deleted from the system in 2011 through the General Budget Department |
| **Planning and Development** | Increasing the satisfaction of the clients | The internal satisfaction of the clients | 67.90% | 74.70% | 6.80% | The increased level of the internal satisfaction from the following dominations: Work environment, financial and moral incentives, and career advancement |
| | | The external satisfaction of the clients | 80.60% | 0 | (-80.6%) | 1. The absence of the quality department's manager. 2. Transferring the quality department |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | officer to the information technology department, and enrolling the substitute in the end of the year where he did not have time and information to perform the survey. |
| **Human resources** | The optimal use for the human resources and increasing the use efficiency indicator | the efficient use of the human resources | 70% | 70% | 0% | |
| **Finance** | the optimal use for the financial resources and increasing the use efficiency indicator | The efficient use = the rate of change in the percentage of the surplus | 125% | 102% | 23%- | Until now the due and imposed income were not calculated, and it will remain this way until the Stocking Committees are finished with the report that has to do with the due incomes. |
| | Contributing in serving the local community, protecting the environment, and increasing the level of contribution. | The amount of spending in the Jordan Dinar | 13690 | 100 | (-13590) | According to the prime minister's note number (3) 2010to reduce the current expenses for this year by no less than (20%) from the operating expenses. |

**Table 3 : achievement according to the department**

**Forth:** Evaluating the Achievement in the tasks and strategic plan programs

1. The tasks that are past due the achieved plan by (12\31\2011), since the model only included the implementers at the time to pass the data from one person to another, which increased the achievement speed. see table 4.

| Directorate | The Activity | From | To | Performance Indicator | Planned For By the End of 2011 | Achieved until the date of 12\31\2011 |
|---|---|---|---|---|---|---|
| **Internal Audit** | Implementing the initiatives for preventive audit | 01\01\2011 | 12\31\2011 | The number of studied initiatives | 3 | 13 |
| **Zarka Free Zone** | Getting rid of the damaged chemical and food substances | 01\01\2011 | 12\31\2011 | The amount of damaged products ( in Tons) | 100 | 150 |
| **The Media, Communication, and promotion** | Implementing programs to take care of the employees | 01\01\2011 | 12\31\2011 | The number of annually completed events | 4 | 5 |
| **The Media, Communication, and promotion** | Promoting for the free zone in Karameh | 01\01\2011 | 12\31\2011 | The number of completed Promotional campaigns | 2 | 3 |

**Table 4 : Evaluating the Achievement in the tasks and strategic plan programs.**

2- The tasks that were achieved within the planned time by the end of (21\31\2011). See table 5.

| Directorate | Activity | From | To | Performance Indicator | Achieved until the date of 12\31\2011 |
|---|---|---|---|---|---|
| **Free Zone in Zarka** | Training the investors and employees on the fire and first aid work | 01\01\2011 | 12\31\2011 | The number of completed Training courses | 5 |
| **Free Zone in Zarka** | enhancing the look and feel | 01\01\2011 | 12\31\2011 | The number of the new plantings | 500 |
| **Financial Affairs** | improving the ways of collecting incomes | 01\01\2011 | 12\31\2011 | The percentage of the sums collected from the public funds yearly to the total of the collected amount | 0.15 |
| **Financial Affairs** | Adjusting the current way of spending | 01\01\2011 | 12\31\2011 | The availability percentage in spending to the planned spending | 0.05 |
| **Information Technology** | Reengineering the competitiveness and storage system | 01\01\2011 | 12\31\2011 | Implementing the project | 60% |
| **Information Technology** | applying new stages in the electronic archiving system | 01\01\2011 | 12\31\2011 | The number of new stages | 3 |
| **Information Technology** | Documenting the software systems | 01\01\2011 | 12\31\2011 | The number of the documented systems | 2 |
| **Information Technology** | The integration of the computer system | 01\01\2011 | 12\31\2011 | The number of the interrelated systems | 2 |
| **Information Technology** | Electronic connectivity with the corporations and departments that are related to the corporation's work through the secured government network. | 01\01\2011 | 12\31\2011 | The number of electronic connection points with the relevant corporations. | 3 |
| **The Media, Communication, and promotion** | Promoting for the free zones and their investment advantages | 01\01\2011 | 12\31\2011 | The number of conferences and exhibitions contributed in/ | 3 |
| **The Media, Communication, and promotion** | communicating with the local community | 01\01\2011 | 12\31\2011 | The number of completed yearly events | 3 |
| **The Media, Communication, and promotion** | Designing programs for advertising and media. | 01\01\2011 | 12\31\2011 | The number of advertising programs | 2 |
| **The Media, Communication, and promotion** | Internal training for the Jordanian universities' students | 01\01\2011 | 12\31\2011 | The number of trained students | 4 |
| **The Media, Communication, and promotion** | The external communication | 01\01\2011 | 12\31\2011 | The number of parties that have been contacted | 50 |

**Table 5 : tasks that were achieved within the planned time .**

**3.** Tasks that require less time to achieve than what was planned for, by the end of (12\31\2012) and the justifications why they could not be achieved in the proper form were obtained from the planning directorate in the free zone company. These justifications were far from the suggested model except for the task of reengineering the process and simplifying its parts. The problem was in the persuader that was responsible for the implementation of this task was

endless. And after the readjustment it was possible to achieve this task and that will happen by the end of the year. See table 6.

| Directorate | The Activity | from | To | Performance Indicator | Achieved by the end of 2011 | Justifications for deviation from the plans |
|---|---|---|---|---|---|---|
| **planning and Development** | comparative study with competitive free zones | 01\07\2011 | 12\31\2011 | completing the study | 10% | 1. we were not able to collect the needed information about the study, except for some simple information was obtained from the interest.<br>2. Lack of providing substituted staff instead of the transfer ones. |
| **Administrative affair** | The project of developing and updating the Infrastructure in the free zone in Alzarka and Alkaramah | 01\01\2011 | 12\31\2011 | Completing the activity | 25% | delay in approving budget project until September 2011 |
| **Information Technology** | Structuring a control system in the free zone Alzarak/ Sahab/ Airport road/ Al karak/ Alkaramah | 01\01\2011 | 12\31\2011 | Completing the control system in the free zone Sahab | 0% | Financial allowances were provided biased on the strategic plan for the corporation, and it was deleted in the general budget department |
| **Human Recourses** | Planning for substituting ( sequentially) | 01\01\2011 | 12\31\2011 | The number of employees that were qualified for the career substituted | 8 | A. The training budget for May 2011 was approved<br>B The training activity was stopped and was presented to the planning committee and they decided to postponed it, and that was during the meeting number (13) in 08\16\2011, as all the committee members agreed on it. |
| **Human Recourses** | Training and developing the employees | 01\01\2011 | 12\31\2011 | the number of benefited employees from the training course. | 155 | |
| **Human Recourses** | predicting the needs of the human resources | 01\01\2011 | 12\31\2011 | The number of employees that were hired biased on the prediction plan through the activity's period | 0 | A. The Prime Minister has issued a declaration to stop any recruitment.<br>B. Transforming the corporation into a company |

**Table 6 : Tasks that require less time to achieve.**

## 6.4 Conclusion

This model builds a framework for constructing a strategic plan and managing the related issues. The model evaluates any strategic plan according to some suggested standards to ensure the consistency of that plan with these standards. In this case, this model provides different guidelines and recommendations for planners to adjust their plans and increase their effectiveness. Next, the model executes the plan by distributing the tasks among some intended employees according to the planned timer priority and order, using the workflow technology. Upon reviewing the previous studies and researches, it becomes apparent that there is a crucial difference between this study's model and the previous ones. Previous models focused on building workflow models that deal with the daily routine work, while this model has used the workflow in implementing programs and projects of the strategic plan.

To confirm the validity and reliability of the model, it has been applied to one of the governmental organizations and institutions in the Middle East, due to the conformance of its strategic plans with this model. Jordan Free Zone Company has been selected as a case study. The implementation results revealed the effectiveness and feasibility of the model, and the following was obtained:

- The results show low level of utilization of human resources in the strategic plan. It has been found that a very small percentage of the human resources of the Free Zone Company are working on the strategic plan, while the rest of these resources work on daily routine tasks. The standard strategic plan reveals also some drawbacks in the traditional strategic plan; such as the poor assignment of human resources to the different tasks.

- Upon the implementation of the strategic plan evaluation component of the model and conducting the comparison with the suggested standards, it becomes obvious that there is an uneven or variant distribution of the programs and projects over the years of the strategic plan.

It is worth mentioning that using the proposed standards in evaluating the strategic plan has helped in detecting errors in the structure of that plan. The system reported these errors and presented them to the higher administration members to review and consider. Finally, the proposed system provided a means for storing the data of a certain plan and preserving it from loss, and has also facilitated the retrieval and exchange as well as the execution of the related tasks, which guaranteed an optimal implementation of the plan projects.

## 6.5 Future work:

1- Design a workflow and a frame work for strategic planning, that can automatically design a process by using Artificial Intelligence (AI).
2- Evaluating the strategic plan and suggesting the content of a new one using genetic algorithms.
3- Design of a workflow and a frame work for project management purposes.

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