

# Project portfolio management system, concepts and approach foundations

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**Abstract.** Project portfolio management is an approach based on the knowledge of project management, in which the management system focuses on a combination of projects with specific goals and conditions and is considered to be a higher level of project management in organizations. In this management system, the main objective is to design and implement projects that can ultimately facilitate the achievement of the project organization for its strategic goals. Selection of suitable projects, proper allocation of limited resources of the organization, realization of the emphasis of the strategic statement, coordination and synergy in the portfolio of organizational projects and the provision of health The organizational relations of project managers are among the most important theoretical foundations of this system.

In this paper, the purpose of presenting concepts related to this approach is to discuss such definitions, models, the process of establishing the maturity model of the project portfolio management system, and how to form and collate the project portfolio. The description of the nature of the Project Management Offices (PMO) and the system Project Management Office (SPO) is another topic that will be addressed in this article.

## 1. Introduction

Today, the project management approach is recognized as one of the most effective management approaches to meet the expectations and expectations of project managers in the academic and executive circles. In the wake of this widespread acceptance, the desire to create project organizations to take advantage of valuable experiences and lessons learned in projects, gain more economic benefits, reduce the investment risks and better accountability of the organization is growing commitment to their customers.

In project organizations, the existence of several designs in the body of the organization has led to a variety of changes in terms of structure and methods and systems of work. This community of projects makes it possible to impose certain requirements on project organizations and project managers for project management and management. Therefore, in order to optimally use the opportunities and assets of the organization, on the one hand, and to control the progress of the organization's projects, it is necessary to establish a comprehensive and multidimensional management system of all projects of the organization with integrity and with appropriate economic, social and technical justifications.

## 2. Project portfolio management

The results of a study conducted by the Institute for Business Studies and Research (CBP)<sup>1</sup> show that in the organizations under study, more than half of the organizations use the portfolio management approach to manage their managed projects, and it was found that most These organizations are in the process of evolving this management system and have not yet succeeded in being successful in developing a portfolio management system and also continue to do.



The results from this research also confirmed that organizations that failed establishing a portfolio management system is cause of the lack of providing the necessary support and support from the top management of the organization and no formal responsible official was introduced in this organizational structure.<sup>2</sup>

### 3. Definition of project portfolio management

Theoreticians and experts in project management knowledge, each with their own perceptions of project management and related topics, have provided specific definitions of portfolio management, which are referred to in the following two sections:

- Project portfolio management means the ability to effectively manage and monitor the success of the organization's project success so that is the emphasizing of the strategic statement of the organization.<sup>3</sup>

- Project portfolio management provides a dynamic decision-making process that can be used to measure values, prioritize enterprise projects, and ultimately allocate limited organizational resources to achieve the organization's goals in the right way between projects.<sup>4</sup>

### 4. Posture and benefits of project portfolio management in the organization

In many project organizations where there is a lot of enterprise-wide organizational culture, project managers are trying to create a realm for themselves and manage and direct the project with their own desire. It is generally seen that in the absence of a large and centralized management system, the organization's projects conflict with each other and project managers are struggling to attract additional resources to be able to complete their project as best they can. They will ultimately be concerned about the loss of the entire organization and project customers.

Hence, senior executives should try to improve and improve the overall performance of the organization by balancing the needs of projects and expectations of project managers. Project portfolio management is an approach by which the organization's projects are aligned to the mission of the organization, with the result that the costs and projects are minimized and the organization achieves its own goals and objectives more quickly. In general, having a portfolio management approach brings the following benefits and results to the organization:<sup>5</sup>

- A higher collective value for a portfolio of organization projects
- lower collective risk for the organization
- Organization of organization investments (capital productivity)
- More organizational impacts with less investment
- Correcting and managing better performance throughout the organization
- A comprehensive understanding of the organization's performance status
- Good neighborliness guaranteeing the organization's projects

### 5. Project portfolio management models

Project portfolio management with regard to environmental and organizational conditions and assumptions can be applied in the form and basis of the following two models:<sup>6</sup>

- Engagement Profitability Model
- Budget Alignment Model

Each of these models is selected based on how much the organization is in terms of the amount of funds it has at its disposal in order to make a profit. Now, in order to know more about these models, a brief description of each one is presented.

A) Engagement Profitability Model According to the model, the projects and work plans have tools that can increase the income of an organization.

In this model, customer's decisions and behaviors are the particular importance, and any dissatisfaction from the customer can lead to a non-negligible risk. Obviously, in an organization that the model is selected to manage the project portfolio, it is easy to not respond to any Project proposal

unless it is assured that the project results will satisfy the customers' satisfaction of the project. In this model, the focus of evaluation and evaluation of projects is economic justification.

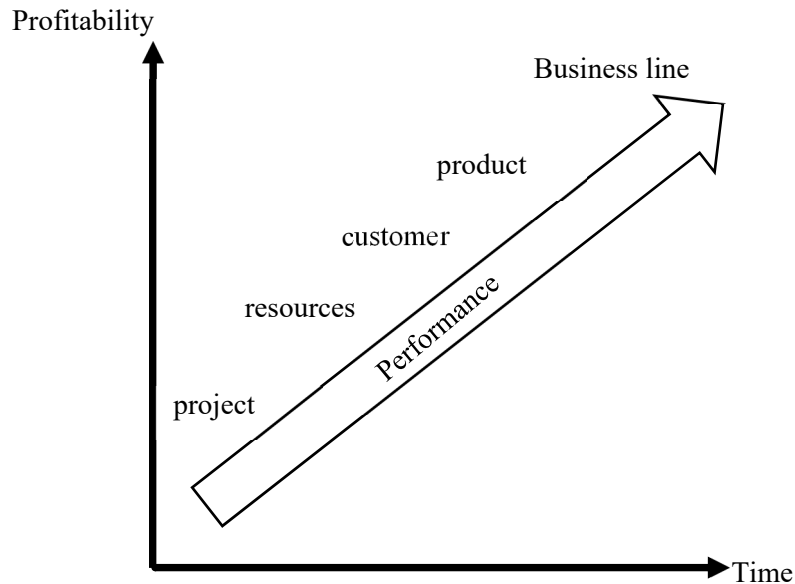


Figure 1: Subsidy Income Model

According to this model, initially the project portfolio management begins with the discovery of profitable projects and the study of organizational resources, and then, with the development of human and organizational skills, attention is paid to the market of consumption and product. In other words, based on this model, the economic benefits are derived from the results of the project, which determines the direction of the organization.

B) The budget commitment in this model emphasizes that the budget provided to the organization can be used to maximize productivity and efficiency. Based on this model, it is important to prioritize and manage the portfolio of projects that receive the most revenue in terms of limited budget. Of course, these projects may not benefit the project's core customers directly and in a short time. If the model is adopted, the management of the organization does not have much freedom to accept or disapprove of the project, and should be informed about its decisions.

The model focuses on organizational budgeting and social justification.

The following figure shows the nature and philosophy of the model.

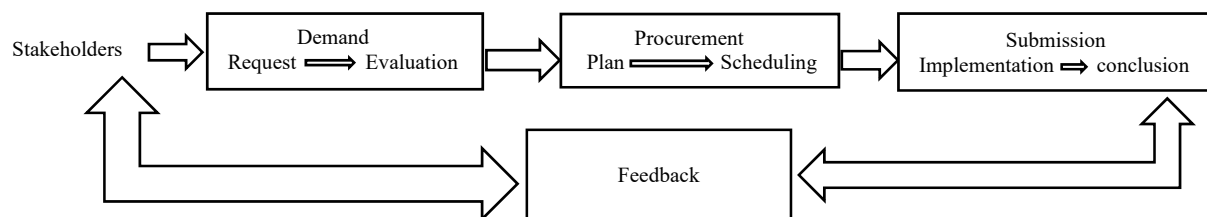


Figure 2: Budget commitment model

In the fact the model implies a linear process that projects the life cycle of the project from the beginning to the end of the phase. According to this model, first, new demands are received from project stakeholders, and then the demand for the two-dimensional budget-benefit analysis is examined. In the next step, detailed surveys, such as budget request, estimates, resource planning, and failure structure, are required for each of the projects. At this stage, scheduling is also provided for approved projects. At the stage of delivery, the approved projects are implemented according to the time and budget approved, and ultimately, the project proceeds are evaluated according to the goals that were originally intended

for the project, and the results of this assessment are reflected in the subsequent decisions for allocation. The organization's budget will be used for future projects.

## 6. The process of establishing a portfolio management system

The project portfolio management can be deployed in the form of a 5-step process in the following organizations:<sup>7</sup>

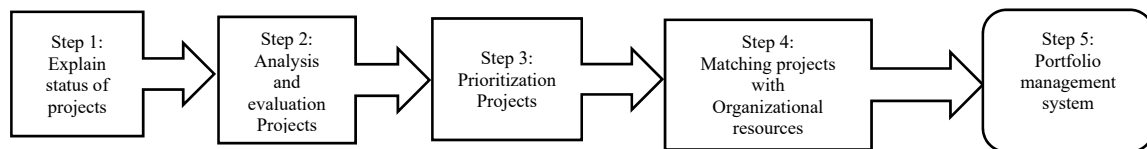


Figure 3 :Process for establishing project portfolio management

In order to clarify how the project portfolio management system is deployed, each step described in the figure is described below:

### 7. First step, explaining the status of the projects

The first step in establishing a portfolio management system in organizations is to collect and document comprehensive information on the latest status of projects and how to allocate assets between organizations. In this study, the status of all projects should be determined by the amount of investment, the human resources from the quantitative and qualitative dimension, the timetable, the economic justifications and the required budget.

This stage of the process of establishing a portfolio management system is important in that information obtained in the next stages of the process will be used as a criterion for allocating funds, prioritizing and analyzing projects. Therefore, it is necessary to use the same format to compile and display relevant information. Each project is used to make comparison between projects easier.

### 8. Second step, analysis and evaluation of projects

Once the status of all project projects is identified, it is time to determine the organization of the project evaluation criteria. It needs to be explained that at this stage, the organization's standards must be defined carefully and in accordance with the organization's strategies and missions, as well as understanding between project managers. Some of the most important criteria used to evaluate organizational projects are:

- 1- Value means the revenue and financial benefits associated with the project.
- 2 -Alignment means the degree of alignment of the objectives of the project with the mission and strategy of the organization.
- 3- Risk, meaning the degree of risk of the project.

### 9. Third step, Prioritization of Projects

Once the information on each project is cleared up, as well as the criteria for evaluating the projects, it turns out that for each of them, weights are calculated separately. In this step, it is essential that before judging the value of each project, first the project's history and evaluation criteria are addressed to the key actors of the organization such as senior management, project manager, project sponsors and stakeholders, and during the process of evaluation for each project will be done.

### 10. Fourth step, Project Implementation and Organization Resources

The study of resources available to the organization to allocate between priority projects is very complicated and difficult. Restrictions such as the organization's budget, available human resources, the level of existing staffing skills, and predetermined social and commitment commitments make it difficult for project managers to compete with each other for the completion of their under-executed

projects, and their projects are more important and complete. They will be more important and require more organizational resources.

### 11. Fifth step, Project Basket Management

The studies that have been carried out before this stage confirm the true and desirable status of how much real value of the projects is and how much the costs and risks of each project are.

To better manage project portfolios, project status should be interpreted in three areas. These three areas are:

- On Target, meaning that the project is in line with the mission of the organization.
- At Risk, meaning that running a project can be risky, despite the probability of an organization's mission.

-In Trouble, which means that the project in the current circumstances is in conflict with the organization's goals and mission.

At this step, senior management of the organization can, by clarifying the aspects, actively decide on the continuity, correction and even suspension of the organization's projects and to use the resources of the organization in the correct and correct way.

At this point, the organization is more equipped with the tools and processes needed to manage the portfolio, more capable of doing so in this way. Here are some of the steps that can make the management of the organization more effective in managing portfolios:

1. Exactly outline the expectations of the projects and use the same criteria and tools for the same evaluation for all projects.

2. Audit and follow up on the obligations of project consultants and contractors and guide their performance

3 Review and study the exact cost and time of projects

4. Creating a sense of commitment and follow up of project managers in relation to the organization's plans and expectations. There are several characteristics and key factors in managing portfolio management issues, which can be considered in identifying requirements for deployment and operation.

It has a great impact. Some of these factors include:

- Methodology and process of project evaluation
- Measure and evaluate project costs and revenues
- How to report on project progress
- Identify, update and display key information about projects
- Tracking how to spend on projects

### 12. Model of maturity of the project portfolio management system

Following a study by Mark Jeffrey of the University of Management in Northwestern, the maturity of the project portfolio management system is achieved in four steps. The table below shows the conditions and characteristics that indicate the maturity level of the project portfolio management.<sup>8</sup>

Table 1: Maturity levels of the project portfolio management system

First level: Inception period	Second level: Fixation period	Third level: Delivery period	Fourth level: Consolidation period
- existence of random projects. - Inconsistent decisions between Project Managers.	-Standardized methods for evaluating and prioritizing proposed schemes. -Central Office of Project Management. - Central monitoring of how the organization allocates funds. - Database of Project. -Basic information to do Financial analysis and Investment.	- Establishing a link between the level of the required budget for projects with the life cycle of the organization's budget. - Using financial techniques to assess the status of projects and review annual plans with Attention to results and studies. - The commitment and commitment of project	- The existence of professional processes in project management. - The ability to evaluate projects at every stage of its life cycle. - Continuously reviewing and monitoring the projects and correcting their movement. - Continuous assessment of project risks and project portfolio.

	<ul style="list-style-type: none"> <li>- The lack of collective consensus on the level Project Managers on the organizational commitment of each project.</li> <li>- The lack of a link between evaluating the results of project performance and organizational decisions.</li> </ul>	<ul style="list-style-type: none"> <li>managers to follow the processes and procedures Standardized.</li> <li>- Correct the movement and progress Projects to adapt to the strategic direction of the organization.</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluation of future opportunities for projects.</li> <li>- Continuous feedback from the status of projects.</li> <li>- Making decisions based on results and analyzes.</li> </ul>
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The following figure shows the maturity curve of the portfolio management project:

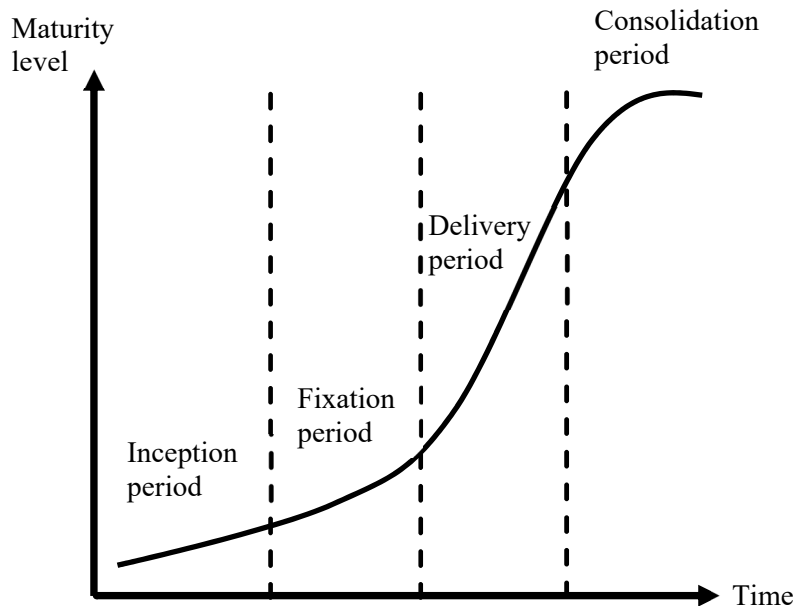


Figure 4: Maturity of the portfolio management project

In describing the levels of maturity of the portfolio management system according to the table, it can be deduced that at the lowest level, the projects of the organization begin with individual and diligent judgments and without the scientific and analytical backings related to the economic justification and precise feasibility, and also to promote the project Inconsistent and sometimes contradictory decisions are taken by project managers, which can long run, impose irreparable damage on the body of the organization.

But at the second level, or the growth level of the maturity model, gradually, methods, processes and instructions are written and available to the staff. Other measures to be taken at this level include the Project Management Office (PMO).

The existence of a central organization in the organization to keep and record information and documentation related to the organization's projects for conducting analytical studies and technical and economic assessments are also other activities that should be carried out at this level. But there are other shortcomings that may still exist on this level, there is still no collective agreement between project managers regarding the project's position throughout the organization, and they still tend to complete their project without considering the goals and mission of the organization. They believe that project performance is prioritized by the organization's operations.

However, at the third level, the maturity of the project management system is gradually reduced to project managers who need to coordinate the benefits and lanes of the project with the interests and strategy of the organization in order to support the organization's performance, and may well follow the good neighborliness With other projects and benefit from this partnership, such as the transfer and sharing of experiences and learning, the provision of resources and material and spiritual support. At



this level, financial analysis tools and techniques are used to assess and determine the strengths and weaknesses of the projects, and the results are used to improve the status.

At the latest level of maturity levels of project portfolio management, project managers are equipped with advanced management processes, especially in project management, and can at any moment and at any time in the life cycle of the project review and correct the affairs and discriminate in the fastest time to fix at this level, it is also possible for senior management of the organization to examine the status of all projects using the management dashboard at a glance. In the event of project deviations, the organization's main mission is to take corrective actions to maintain project alignment.

### 13. Project Management Offices

As noted in the maturity model of the project portfolio management system, the establishment of a project management office is one of the steps that must be taken to achieve unification of procedures and the establishment of integrated systems. Considering the existential nature of such offices in project organizations, this article is due to the fact that through these offices, many of the issues related to the management of project organizations are defined and lead.

-The Office Project Management Office is a support to ensure, develop and use "best practices" in project management and provide support services to custodians and project management experts to achieve optimal performance levels in projects.

-The project management center is central to Develop project management standards, improving interactions, and building leverage for better use of organization resources, reducing waste and the negative effects of project failures on the overall productivity and effectiveness of the organization, promoting and encouraging the excellence of project management in all project organizations.

-An Enterprise Project Management Office is designed to create a project oriented mindset that, through the introduction and use of various tools and methods, strives to maximize the success and improve the outcomes of the projects, while committing and empowering the projects.

The following figure shows how the office interacts with and interacts with other components of the project organization.<sup>9</sup>

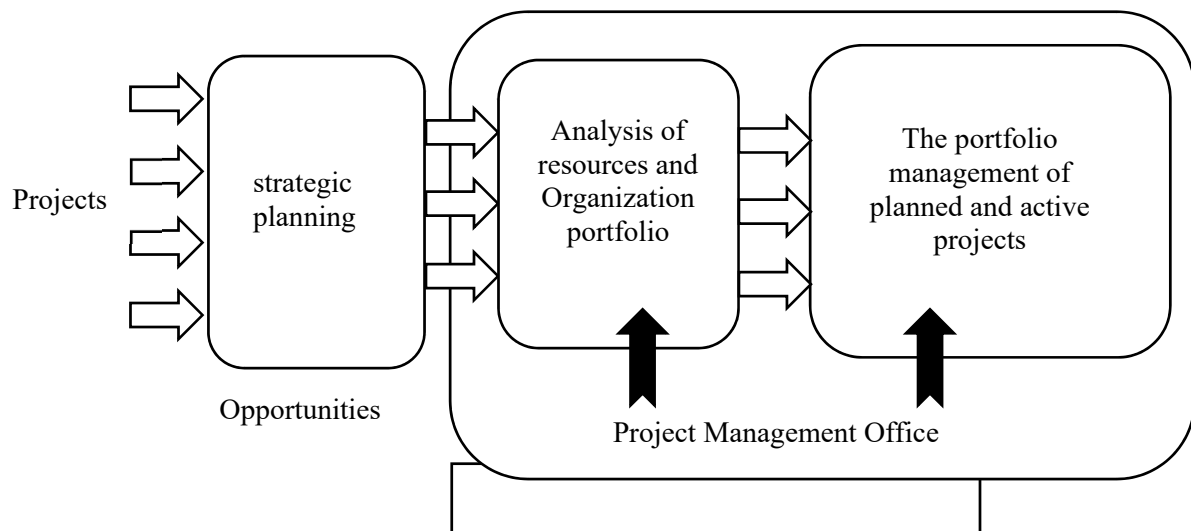


Figure 5: Status of Project Management Office in Project Organizations

As can be seen in the figure, the role of the project management office begins after strategic planning and strategic priorities set by senior officials who draw on the policy of the organization, and it is clear that the office should initially analyze projects sponsored by policy makers and Policymakers, and of course, this should be done according to different criteria such as internal capacities, available resources, etc., and ultimately defines a portfolio of applicable projects and planning.

More precisely, one might say that the responsibility of the project management office is to create a realistic, ideally ideal project. The project management office defines a reasonable set of criteria, as well as determines the priorities of priorities, as well as the assessment of the executive and managerial capabilities of the project and the human and organizational capabilities, and provides a clear vision for project managers and managers in order to stay away from uncertainty and ambiguity.

However, after designing the portfolio of project organizations and implementing the various project phases by the respective managers, the project management office, while retaining its role in the design and analysis of new projects, is required to provide special services to their operators in relation to the projects that enter into the implementation process. Some of these services include:<sup>10</sup>

drafting project management standards, resource evaluation, project planning, project review and analysis, and the implementation of approved projects.

#### **14. Roles in project portfolio management**

In order to make the project portfolio management system effective in implementing the organization of the project, it should address three fundamental roles<sup>11,12</sup>

##### **A) Governance role**

This executive role is one of the decision-making roles normally played by the senior management team. Among the decisions that have to be made in this role are the following:

- Accept or reject the project plan
- Determine the start time of the project
- Determine the number of active projects
- Development of project evaluation criteria
- Prioritization
- Allocation of resources and manpower
- Review projects to continue, correct or stop them

##### **B) Management role**

Management in this system means ensuring that the project management system is under control and that it can be assured that the objectives of the projects are realized within the expected time frame. Each project generally pursues three main objectives, one in which one can say that completion of the project at a specified time, approved budget and a specific range and management in this position is to provide the necessary processes for the planning and implementation of the project to achieve the objectives. This task is usually left to the project management office.

##### **(C) Project portfolio management role in project**

organizations This role is usually played to help senior management of the organization, and the main task for this role is to provide information and advice that can be used to improve the overall performance of the organization Totally improved. Those responsible for this role, in addition to collecting information and corrective and preventive suggestions, also monitor the progress of the projects. For this reason, and given the nature of this role, there is usually a close link between the strategic planner and the portfolio manager. It has been argued that as long as strategic planners try to design ways to achieve the goals of the organization, the project portfolio manager also wants to define the appropriate programs and projects to move the organization's strategic direction. In this regard, the project portfolio manager should follow the progress of the projects with follow-up and receiving reports, with the strategic plan, so that they can be informed whenever they are in conflict with the program.

#### **15. Strategic Project Office**

One of the requirements for the establishment of the project portfolio management system is the formation of the Strategic Project Office (SPO). The activity of this office, which is very similar to the nature of the project management office, is an organization that is responsible for evaluating the projects, in accordance with the organization's strategy. And monitor and ensure that the portfolio of the organization's projects is in accordance with strategic planning. Support for projects, selection and support of project management software, implementation and maintenance of current project



management processes, design and development of standards and methodologies for carrying out work, providing project management training, providing project management consulting services and managing and developing project managers from the major tasks of the project management office.

The project management office is relatively small in relation to other parts of the organization, but it is also a factor in the relationship between the senior management's view of the organization and the current and future activities of the projects. In addition to carrying out the formal project management activities mentioned above, this office is responsible for a number of activities that are addressed in the strategic management of the project, such as evaluating the maturity of the portfolio management system management organization, promoting project management culture, integrating And generalization of project management processes at the organization level, quality assurance of project organizations, organizational resource management for the project portfolio and project portfolio management. But perhaps the most important task of the project management office may be summarized in two respects:

- Tracking and ensuring the consistency of the work plans and projects of the organization with the strategic objectives approved by the senior management of the organization
- Prioritization and selection of the portfolio of executive agencies of the organization based on the prioritization and importance of projects towards each other.

In some of the project organizations that have recently begun to establish a portfolio management system, this is similar to an internal revolution, meaning that some major adjustments and reforms must be made to some of the projects, and the so-called new project frontier will be implemented. Perhaps those priority projects may be of less importance. Once established, the project management director must act as the voice of the projects within the organization's governing council and decide on how limited the resources of the organization should be allocated between the organization's projects, and in this new front, the role and the role of each project for the organization's victory.<sup>13</sup>

## 16. Combine project portfolio

In the project portfolio management, the most fundamental issue is whether the portfolio should include what projects. Correct selection of portfolio projects implies a good performance of the project portfolio management, and as soon as this fit and proper combination is selected, the mission of the organization will be more likely to be realized. In choosing this combination of opportunity detection, evaluating the degree of alignment with the organization's goals and structure, and analyzing the costs, benefits, and risks of the project is very important.

In this mix, adaptation, utilization and balance between projects are considered. Now, in order to better understand the criteria for composing the project portfolio, a brief description of each one is presented.<sup>14</sup>

### A) Fit

is the first step in establishing a portfolio of Environmental Opportunity Recognition Project, and after identifying opportunities, it must be determined how far the identified opportunities can facilitate the achievement of the organization's goals. To this end, the following questions can be helpful in identifying opportunities and future projects of the organization:

- What is the project?
- Which projects can help to achieve the goals of the organization?
- Does the organization have enough resources to implement the project?
- Does the organization have project management processes and tools for managing portfolio portfolios?

For this purpose, the following activities are in force:

- Process design for identifying opportunities and projects
- Provide an overall framework for determining the acceptability of the project
- Provide general and initial criteria for project evaluation
- Understanding and informing about the emphasis of the strategic statement of the organization with project evaluators

### B) Utility

The second step in the development of the project portfolio is what is required for the implementation of the selected projects, and what costs should be paid by the organization to benefit from the project revenues. At this point, the answer to the following questions may be useful:

- What is the guarantee for achieving the potential benefits of the project?
- What do the organization earn in return for the cost of the project?
- When and how long is the date and duration of operation of the projects?

For this purpose, the following activities are in force:

- develop criteria and models for decision making and selection of project projects
- Collect data and detailed information about projects
- Designing a process for analyzing project information
- generalization and application of a single methodology for use in all projects

### **(C) Balance**

The third and final step in the development of the project portfolio is the selection and selection of selected projects. The success of this step depends on the extent to which the evaluated projects are properly selected and investigated and whether cost and benefit analyzes have been carefully performed. Answering the following questions will make the composition of the projects in the basket more accurate:

- Which projects should be selected?
- What combination of projects can best serve the mission of the organization?
- What is the contribution of each project to achieving the goals of the organization? For this purpose,

the following activities are in force:

- Developing a process to optimize the portfolio mix of projects
- Conduct meetings to review the status of the portfolio and decide on corrective actions

## **17. General conclusion**

The existence of several projects, coupled with specific operating conditions in each one, makes it possible for valuable experience to be provided to organizations and custodians with great expense, and this phenomenon can, along with other assets of the organization, have multiple benefits for growth and development the Organization in the long run. Obviously, management of a set of projects, if you use the experience and achievements in both the field of administration and project management, will be able to manage and manage large projects for the board of directors of the organization and project managers to fulfill the emphasis of the strategic statement of the organization.

In this regard, the strategic managers of the organization should improve the performance of the organization along with realizing the goals of the project, by focusing on the future mix of organizational projects as an opportunity. Certainly, such approaches may be referred to as the establishment of a project portfolio management system (PPM). In this transition, selecting a conceptual model for explaining the requirements for an organization is essential, since selecting this model, while outlining the organization's beliefs in implementing projects, brings to light many decisions and actions at the level of the organization's projects, and offers a clear vision to the managers in case of The project.

But after choosing the overall model, what matters most is the detailed design and implementation of the deployment of an operational model, whereby each of the organization's units in the queue areas and the headquarters of support in the development of the curve of the maturity level of the portfolio management system The project understands its tasks. In this way, the description and definition of the Office of Project Management (PMO) in the organizational chart is also one of the tools that facilitates the realization of the objectives of the portfolio management system project portfolio management system (PPM).

## **References**

- [1] Center for Business Practices.<sup>1</sup>
- [2] Center for Business Practices," Project Portfolio Management, a Benchmark of Current<sup>2</sup> Business Practices".
- [3] SpearMC, Withepaper Series, " Project Portfolio Management " September, 2012.<sup>3</sup>

- [4] Robbins, G. “ Ten Critical Steps for Successful Project Portfolio Management “ June2017.<sup>4</sup>
- [5] Light, M. “ Project Portfolio Management “ Gartner Symposium Itxpo, San Diego, California, 23-27 March, 2015.<sup>5</sup>
- [6] Project Arena, “ The Two Model for Implementing Project Portfolio Management “29<sup>th</sup>., Oct., 2012.<sup>6</sup>
- [7] Center for Business Pracices,” Project Portfolio Management, a benchmark of Current Business Practices<sup>7</sup> .
- [8] Jeffery, M. “ Project Management Maturity Model “ Kellogg School of Management. Northwestern University<sup>8</sup>.
- [9] Vistacion, Margo, Designing an Enterprise Project management Office to Improve Organizational Project Management Efficiency<sup>9</sup>, Giga Information Group, Inc., 2017.
- [10] Light, Matt and Fabular, Irma j<sup>10</sup>., Project Management Office (PMO) , ATC Summer Sessions, Gartner, Inc., 2018.
- [11] Kendall, G. I. “ Executive Guide to Project Portfolio Management<sup>11</sup> “ TOC International, 2015.
- [12] Fitzgerald, D., “ Another Look at Project Portfolio Management<sup>12</sup> “.
- [13] Pennypacker, J., Sepate, P., “ Project Portfolio Management and The Strategic Project Office<sup>13</sup> ” reprinted from Portfolio Knowledge, Issue 2, 2014.
- [14] Pennypacker, J., Sepate, P<sup>14</sup>., “ Project Portfolio Management and The Strategic Project Office ” www.pmsolutions.com, reprinted from Portfolio Knowledge, Issue 2, 2013.

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