

# **Design of Project Management Information Systems**

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## **Abstract**

We live in an amazing era of knowledge and information, the era of unbelievable acceleration in technology and innovation. In a ever-changing conditions and rapid technological variations and along with generalization of quick access to computers, information technology and modern media, organizations must run up more quickly to meet their chances of adaptation and advance against competitors. One of the most eminent factors in managers' decision making process is information. Having accurate, proper and well-timed information will speed up the process of decision making and also prevent from making lots of incorrect decisions. In recent years, the use and utilization of Project Management Information Systems (PMIS) which is derived from Project Management Information (PMI) is widely spread in many organizations. In fact, PMIS rather than just a project management information system is a management system that uses project information and of course is far beyond an informative system[10,11]. Therefore, reviewing, designing and implementation of PMIS in different organizations is very important issue that needs further analyses. Hence, the current study aims at investigating importance and necessity of these systems from different perspectives.

## **Keywords**

Information system, project management information system (PMIS), project management information (PMI)

## **1. Introduction**

Dr. Nordal

President of the International Union of Science and Productivity:

*In ever-changing conditions, we must also change; otherwise, we will pay dearly for the lack of change.*

The project management needs a modern management system within the project and the organization. This new and modern system that is achieved using integrated tools of project management in fact is the Project Management using these tools. This category, however, will not be created in the presence of an information system and requires changes in the skills of project management team, increase in IT literacy of organizations and project management team, and also reformation of procedures and structures within the organizations.

Here, it is natural that the projects because of their diverse and nonrecurring nature to have a structure different from daily routines of the organizations. Considering this issue, project management is always more difficult than ordinary administrative affairs in an organization and requires more attention from different perspectives.

So that managers in order to perform their main duty that is making decision in such a structure, require accurate, swift, and efficient information to be able to take their own decisions based on reliable support. In this condition, the need for Project Management Information Systems (PMIS) comes to sensation. The duty of PMIS includes collecting, processing and refining raw data of the project and creating a basic analyzed database required by management at all levels. Using this information over the time and by accomplishment of several projects, organizational knowledge will be created. Alongside these duties, facilitating the affairs of the project is considered as another duty of such systems [12].

## **2. Study of Literature**

### **1.2 History of PMIS**

Equipping the managers with an accurate and reliable information system that is capable of helping them in making decisions, planning and managing the project has a historical background. This process was begun in 1960s with the concepts of "double-entry bookkeeping system" which was presented by Luca Pacioli.

Following to use of American military from this technology and contemporary with the emergence of computers in businesses, the first official use of PMI was the punch-card in offices, which made managers capable of managing employees' working hours.

Afterwards, until the early twentieth century PMIS hesitantly continued their movement that this hesitation was probably due to human inability in preserving, protecting and restoring the data.

With the development of computers with high capacity, speed and accuracy, evolution and application of PMIS concepts developed with another process and more quickly that resulted in changes in the operations, activities and functions of business organizations as follows:

1. Centralized management, emphasis information centralization and utilization of advanced technology.
2. Designing Information and reporting required for management decision making, planning and project control.
3. Designing PMI with emphasis on control and PMIS.

And finally, the result of these concepts was called Management Information Systems or MIS.

Institutions which have attempted to utilize MIS learned that in this period, the major obstacles in the use of MIS are the managers themselves.

Managers as a group did not have enough technical information about computers. They were aware of their work and knew how to solve the problems; but they did not think enough about the role of information in solving problems. As the result, giving an exact explanation about what they want from MIS was difficult. This status was unbearable for information experts, as well because their knowledge of management was low.

Over the time, managers learned a lot about computers and the processes which carried out in problem solving and information specialists got familiar with management principles, as well. Therefore, MIS reformed and developed for compliance with the requirements of managers and MIS find its own position as a major field of computers utilization [2].

### **2.2 Related concepts of Project management information system**

#### **2.2.1 System**

System is a set or group of related or unrelated objects that follow a specific purpose or purposes, so that form a complex unit [13].

#### **2.2.2 Information**

Information is a set of data that leads to a new decision or in the shortest definition is "processed data"[14].

#### **2.2.3 Project**

A project in business and science is typically defined as a collaborative enterprise, frequently involving research or design that is carefully planned to achieve a particular aim and generally is a set of temporary attempts to fulfill a commitment or to create a specified product or service [15].

#### **2.2.4 Management**

Management is the process of effective and efficient deployment of human and material resources in planning, organizing, mobilizing resources and facilities, guidance and control to achieve organizational goals based on accepted value system [16].

#### **2.2.5 Information systems**

Information System is a complete system designed to generate, collect, organize, store, retrieve and disseminate information in an institution, organization or any other defined areas of the society [3].

#### **2.2.6 Project management**

Project management is the discipline of planning, organizing, securing, and managing resources to achieve specific goals that its main challenge is to accomplish all project objectives with regard to preconceived limitations.

These limitations include scope, time and budget that the project management is in quest for optimizing them through the use, allocation and integration of inputs [17].

### **2.2.7 Management Information System**

Management information system is an integrated, computer based and applied system to provide information in support of operations, management and decision making in the organization. The system takes the advantages of computer hardware and software, manuals and instructions, models for analysis, planning, control and decision-making and a database [4] This system collects environmental data and registers exchanges data and organizational operations and then filters, organizes and selects them to provide information to managers and also provides a tool for managers to produce the required information [5].

### **2.2.8 Project management information system**

According to PMBOK, PMIS is an information system that utilizes tools and methods to collect, integrate and present outputs of project management processes. PMIS can be utilized to support all aspects of the project from start to end and can include both manual and automatic systems [6].

The results of above-mentioned definitions give us the following outputs about PMIS:

- It is an information system.
- It is not a mere tool, but is a set of experienced tools and methods.
- It plays role of integration between all elements in the project.
- Collecting and presenting information is among its duties.
- It can be used in all sectors of the project.
- It can be considered as an environmental and global factor within the organization.
- It is not necessarily an automatic tool and even a part of affairs can be done manually.
- It should be used as a means to support the project team and we can not expect it to manage the project.
- It is one of the controlling tools in the project [7].

### **2.3 Importance of PMIS**

Not too long ago, managers recognized information as a costly phenomenon, but now appropriate information systems provide timely and reliable information in appropriate forms and regular reports to assist managers in decision making process. Therefore, these systems should not be viewed as a costly phenomenon but rather as a part of the company's capital. From management perspective, these systems offer solutions to environmental problems using the assistance of technical information.

Future is not where we go, but is the where we make it through the path toward the future. National advantage appears in countries that managers do not only seeking to increase efficiency, but their organizational movement is in line with overall strategy. (Dr. Michael Porter, Professor at Harvard University)

Undoubtedly, in the third millennium that the role of information and communication technologies and ever-increasing use of them in business and projects with the aim of responding to the needs of the changing environment and the need for correct and timely decisions seems more significant, it can be predicted that this may change many business circumstances.

PMIS and the project have their own interaction on each other and while system provides information about the project and affects the structure, culture and other parts of the project through the election of a new information system, the project needs also influence the design of system so that the project can benefit from new advantages of system. In fact, managers decide what and how a system should be established so that they could achieve what they want with regard to structure, politics, culture, project environment and management decisions.

Therefore, cost in management perspective is irrelevant and useless information that its side effects can even mislead managers in decision making; and related, accurate, timely, reliable information are as a part of project capital in management views that helps managers in making efficient and effective decisions. Since information itself is a factor of power to manage, so a powerful and capable manager is a person who has accurate and real-time information of environmental phenomena and take the advantages of such devices in order to achieve optimal organizational goals.

Considering this, PMIS is the official method of preparing accurate and timely information to facilitate manager's decision making process during planning, control and taking effective and efficient decision for the project.

Likewise, a good information system could lead to a better and more reasonable relationship to exchange information, reduces the redundant administrative tasks through eliminating unnecessary operations, accelerates the performance of different sections, eliminates the need for rewriting projects data in different sectors, and provides better control in the project. Indeed, facilitating the project is considered as the importance and necessity of PMIS [8].

### **3. Objectives of PMIS**

PMIS is a collection of system tools and techniques which are used in project management for presenting information for the following purposes:

- Creating an integrated information system for projects
- Providing useful information for managers' decision making process
- Easy access to project information by users
- Speeding up the information flow
- Increasing the level of project information security
- Using form a variety of useful reports
- Creating a helpful project documentation system
- Improving efficiency and effectiveness of the project
- Versatility with organizational processes and communicate with other enterprise systems
- Information backup for the rest of projects in the organization
- Decentralization of the management from multiple projects and facilitating the communication between different sites [18].

### **4. Implementation of PMIS**

PMIS rather than just a project management information system is actually a project management system that through using project information management and by taking a proper use of tools, the project will be managed more efficiently. Hence, deployment and implementation of that in project-oriented organizations will promote and advance the projects. The following items are of the necessity causes of implementing this system in organizations and projects:

- Projects get Larger and implementing multiple projects lead to some difficulties in management of information and communication.
- Information is not efficient for proper management decisions.
- Documentation and information flow procedures in the projects are innovative and personalized.
- Using this method especially in project-oriented organizations would lead to maintenance of solidarity and unity of the procedures over the time.
- PMIS are admitted for a comprehensive project management medium in project-oriented organizations for a long-term.
- Information Systems Management and Enterprise Resource Planning (ERP & MIS) could not meet all project management needs.
- Project information has to be in contact with other organizational systems, especially accounting, financial, business and ordering sectors.
- Finally, it should be noted that the main reasons for implementation PMIS in project-based organizations are diversity of project (diverse management views) and the differences in cultural levels of communities [18].

### **5. Knowledge of PMIS**

PMIS is a set of knowledge, skills, tools and techniques that is associated with information and communication technology, project management and other areas of knowledge. In order for an appropriate information management in the project, it requires at least one person to manage information that due to its nature, this person should be aware of ICT and project management and also PMIS.

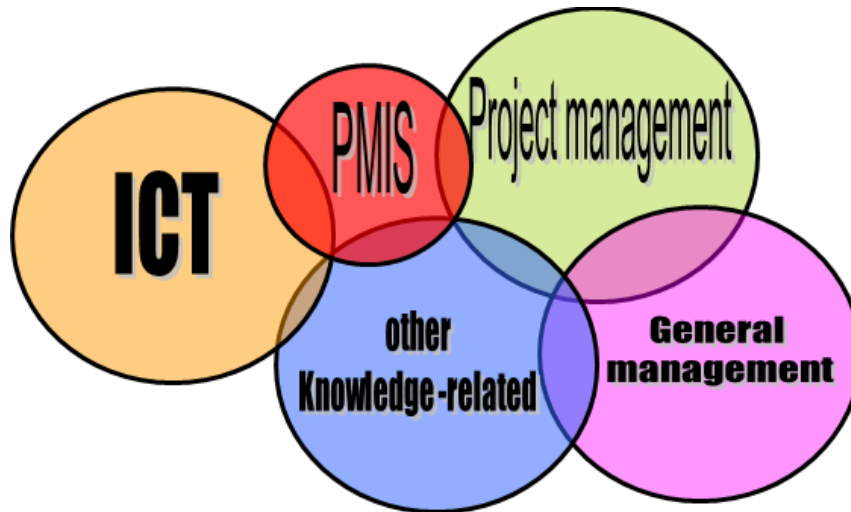


Figure 1: Domain of knowledge in PMIS

As shown in figure 1, the empty space between the area of ICT knowledge and domain of knowledge in PMIS, has faced the relationship between these two areas with some challenges. The gap that is considered as an intra-knowledge area is in fact a set of knowledge and experience to supply, production and appropriate use of ICT tools in project management as well as modern methods of project management with use of ICT tools. According to Figure 1, some objectives of domain of knowledge in PMIS can be stated as follows:

- Recognition and providing information needs of the project.
- Production or supply of suitable tools and software to provide information system for project or organization and establishing integration between them.
- Establishment and implementation of PMIS in project or organization.
- Control and improve existing PMIS.
- Optimization of the organizational process assets with an approach to PMIS in order to promote its culture in organization and projects and managing the projects using these tools.
- Increasing the skills of project management team in proper utilization of project management tools and adjusting it with project management processes[ 9]

## 6. Conceptual Model of PMIS

This model shows the Components of a PMIS that defines the program and the projects: cost, time, scope and quality. It defines the team: people, organizations and their roles. It helps manage agreements: contracts, permits, approvals and commitments. It manages documents. It produces standard and custom reports. It presents vital signs on dashboards. It guides collaboration and communicates best practices with policies, workflow diagrams and document management [1] .

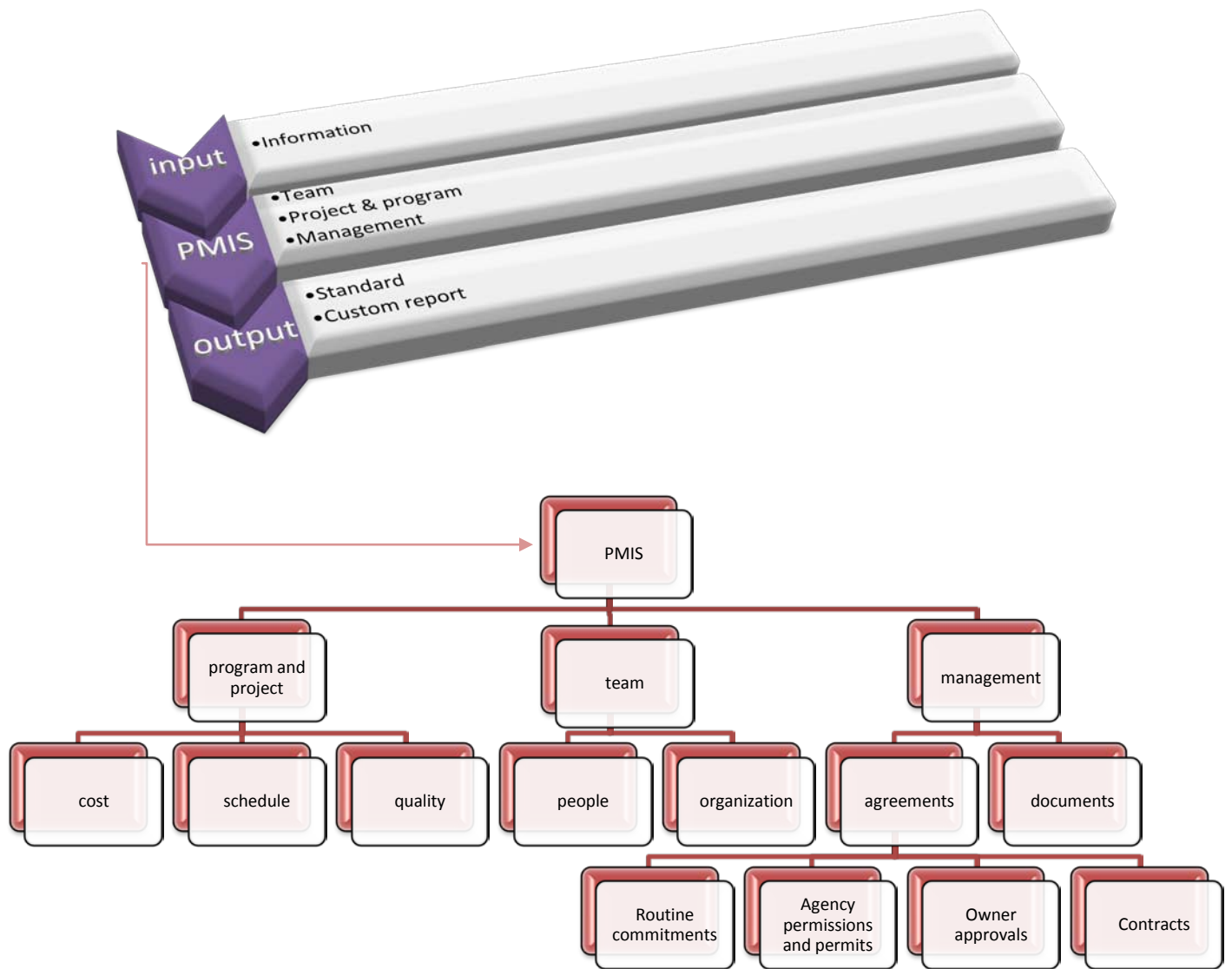


Figure 2: conceptual model and component of PMIS

## 7. Conclusion

PMIS represents two important focuses in today's world; one is the information systems that are significant standpoint in the field of information technology and another one is the theme of project which is an important subject in current world executive scenarios. As mentioned before, PMIS rather than just a project management information system, is a project management system that through managing project information and proper use of tools will have more efficient management in projects. Hence, deployment and implementation of PMIS in project-oriented organizations will lead to promote and advancement of the projects.

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