Review Article

Construction of Project Management Using Information System

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Abstract. Information is playing a vital role of every concerns project management processes. The activities of organization's project management, desires to attain an excellent flow of information. This task can be done through to build a high quality information system to that concern. This paper concentrates the present status of information systems in the function of construction project management for the huge corporation and government agencies in Saudi Arabia. The innovative conceptual model names as Information System Success (ISS) is built to obtain the barriers of information system in project constructions as well as independent variables are introduced. With the assistance of ISS model, the researcher can create a survey to verify the achievement of the information system and the autonomous variables that influence the information system within the population data. The results will explain the improvements of Saudi Arabia's large corporation government agencies construction project. Moreover, the result indicates that the independent variables have focusing the effect of the information system such as IT infrastructure, organizational competence along with management support.

Keywords. Project management, Cost maintenance, Research strategy, Organizational competency

Mathematics Subject Classification (2020). 68Q30, 68Q06

1. Introduction

Currently the world is depending more on digitalization, defined it as to utilize the recent technology of digital to enhance the business activates and tasks. It also means that to transfer the business tasks from regular processes that depend on non-digital techniques such as papers. For all kinds of successive business, the digital transformation plays an important factor.

Covid-19 has highlighted the importance of digitalization since the business trip as well as the meetings also restricted. Moreover, the digitization proves the reduction of effort along with time requires in all kinds of business and also the total productivity is increased.

A Project is defined as a series of activities that needed to complete to reach a specific outcome. As complexity increases the concept need something to control or manage the whole complex sequence of tasks for that the project management is introduced. Project management is the application of processes, methods, skills, knowledge and experience to achieve the specific objectives of the project according to the project acceptance criteria within the agreed parameters. Project management is not an easy work, to make human work easier the machines are invented similarly here exist a need for the system that is the project management function [6].

Construction of project requirements stores huge amount of information, the information has been stored according to their security level. Optimal information system provides the tremendous satisfaction in handling with the most important projects.

Project construction in Saudi Arabia is facing numerous hurdles in handling with some of the factors similar to cost of maintenance. Moreover, it faces many delay troubles which cost more. Based on the previous survey 76 percent of the projects were delayed. According to the Ministry of Rural Affairs and Municipal about 75 percent of public construction projects were delayed. The survey report says that 662 projects, calculated to cost 40 billion Riyals, prolonged their due date with substantial delay time.
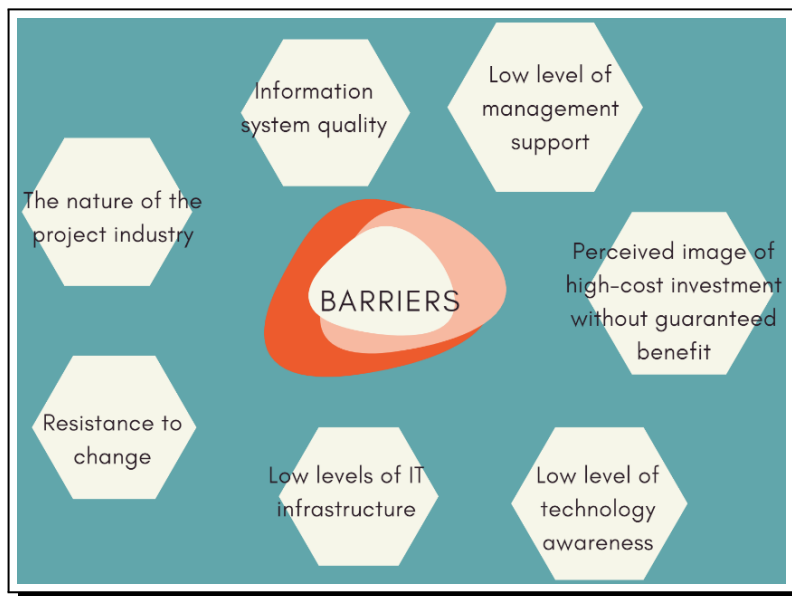

Figure 1. Barriers facing any project

Figure 1 portrays about the barriers of project construction management like information system, management supporting level, investment with benefit, technology awareness level, IT infrastructure level, changing resistance as well as nature of project industry. Main aim of the paper is to assess and evaluate the recent construction project management for the Saudi Arabia government agencies, to discover the major successive factor, to explore the significance of the information system and to enhance the model for the main success factors of huge corporation and the Saudi Arabia's government agencies.

2. Related Works

The effect of the social environment on the use of IT in project management is to identify how knowledge sharing in the social environment influences the use of IT in project management. This study is mainly based on data collected from survey questionnaires that were distributed to 170 employees who were a member in at least three project teams. The findings of this study show that there is a significant difference.

Path analysis of 160 participants who used PMIS for ERP projects at the FPT information system - member of the FPT group showing all the empirically supported hypotheses. The results indicate that the success of the ERP project is determined by the satisfaction of the PMIS users which in turn is influenced by the usability of the users, the quality of the system, the quality of the functional information and the quality of the support service [2].

The researcher deliberately sampled the 62 WVT projects nationwide, for which questionnaires were administered to 92 staff members with a breakdown of 30 DME officers and 62 project managers; other forms of data collection were also used, such as direct observation and face-to-face interviews. Respondents' responses were analyzed using the Social Science Statistics Package (SPSS) [3].

The article studies the process and method of reengineering the construction project management process based on the CPR (Construction process reengineering) theory, offers a conceptual reflection for the engineering construction project management information system based on the CPR theory, and uses J2EE technology to set up an information platform to implement support for the construction management process [5].

Another related document introduces an SMS alert function for the approval of project documents developed using Short Message Gateway and the interface program provided by the mobile phone company, which has positive significance for a project process. 'Shorter approval and improve work efficiency. The uses of this feature in the construction of MIS power plant infrastructure have garnered constant recognition and praise from customers, adding strengths for the management of power plant infrastructure construction projects [6].

In the country, due to the lack of unified standards of planning and construction of information technology on project costs, has led to the formation of many "information islands". Therefore, the article proposes the integration of the project cost information management system for the project cost management service to meet the urgent needs of project cost sharing and utilization [7].

3. The Proposed Conceptual Model

Information system can be classified into voluntary use as well as mandatory use. Factors and reasons of information system are discussed below. Table 1 describes about the relationship among the Barriers and Factors.

Figure 2 explains about the data flow of conceptual model, in that the relationships of management support, technology support, organizational support along with IT infrastructure. This conceptual model consists of ten constructs respectively. These ten constructs can be divided into concern groups which are termed as ISS model associated with the influencing variables group. It contains some of the characteristics like system quality termed as SQ which is used to calculate the needed characteristics of the system, Information quality (IQ) which determine the quality outcome of the concern system, service quality referred as SEQ which estimate the support that the consumer receives from the system provider and the final one is net benefit which measure the positive as well as negative impacts of the stakeholder.

Table 1. Communication between barriers and factors

| Barriers	Factors
Attained images with high cost investment exclusive of guaranteed benefit	This is measured as an outcome of bad attitudes in the direction of technology
Minimum level of management support	These barriers can be based on management support factors as well as attitude towards technology factors
Minimum level of technology awareness	It can be use technology experience factor, organizational competence factor as well as expectance
Minimum level of IT Infrastructure	It can be use the IT infrastructure factor or facilitating condition factor
Changing Resistance	This can be act as a common barrier of the industries
Project Industry Nature	Common barrier among all countries
Quality of Information system	ISS model will be used to estimate the accomplishment of the information system
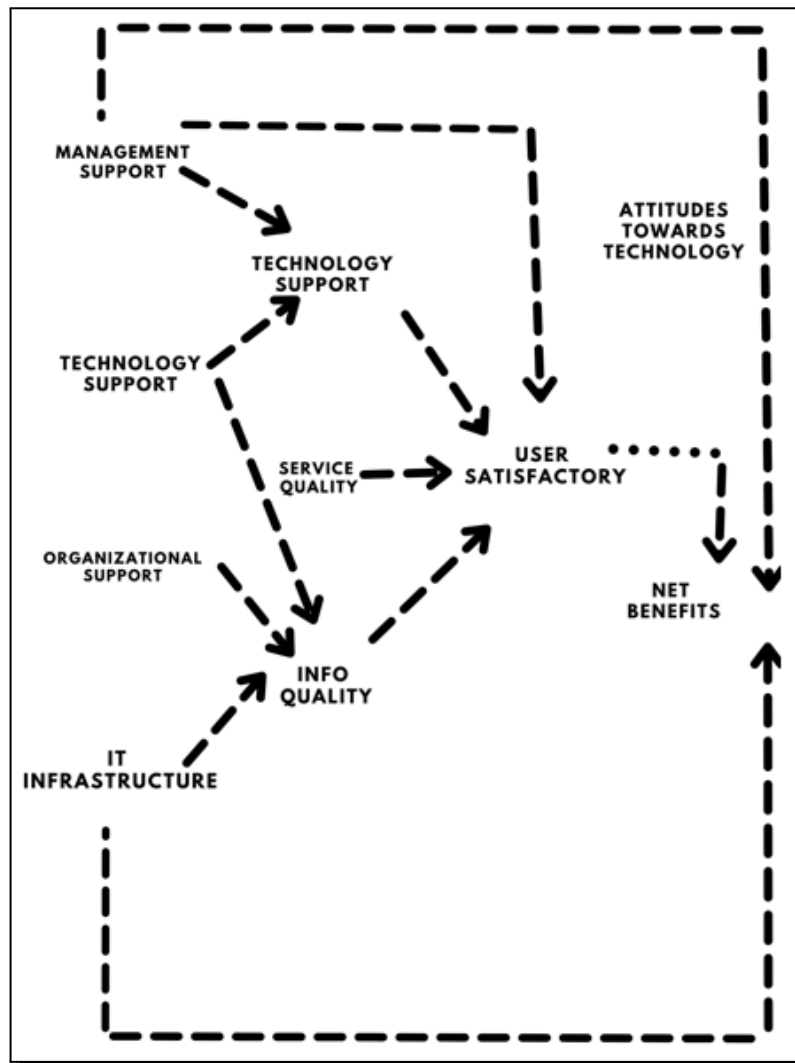
Figure 2. Conceptual model

At the same time the influencing variables group encloses the characterizes similar to ATT termed as attitudes towards technology which is the degree to which the consumer acquires a constructive view of technology, TE termed as technology experience which is the sum of knowledge a user has had with the recent technology, management support which is the degree of information support (MS) an information system as a sponsor, champion of the system, OC termed as Organizational competence which is the knowledge possessed by the concern application, purpose as well as operationalization of IT and the final characteristic of ITI termed as IT infrastructure within the firm.

4. The Research Methodology

The Research methodology focuses on how to build the research method. So the research goes on building how to store quality information and data throughout the global processing.The philosophy gives us an idea about the project management system and thus by creating a well build information system. The collection of data are also being stored and protected throughout in this methodology.

The sampling method will be mixed between intentional sampling and avalanche sampling which will suit the resources of this methodology. For data collection, this research will use the Google form to create and distribute the survey. This survey will be distributed via WhatsApp and LinkedIn is the primary distribution channel[5].

The major limitation in this methodology is the data collection, since the distribution is handled not as efficiently as planned. The probability sampling technique is being used in this work. Therefore,the result is not as perfect which is the main limitation of this research process [6].

The analysis of the data is also being collected for this work and done according to the plan. The distribution of survey is done through LinkedIn and WhatsApp which is considered not as efficient. Out of 205 respondents, 152 actually responded which is approximately 74%. Out of these 152 responses, 42 were excluded since they did not answer tricky answers which are mentioned in the survey.

Finally, those 110 responses are only considered efficient enough according to the analysis done in collected data. Thus got a clear numerical based analysis based on the survey done by the study in Data Analysis. The main characteristics of data analysis are age, work experience, project value, occupation and work field of the respondent.

5. Achieved Results

The summarized data is tabulated for the analysis purpose; it contains Age and Experience of the sample. Mean, Median, Mode, etc. are shown in Figure 3 with respect to its Age and Experience.

From Table 2 the highest age is 34 and its experience is 9.90. Maximum is 51.

The summarized data is tabulated for the analysis purpose, it contains project value information. It involves frequency, percent, valid percent and cumulative percent which is shown in Figure 4.
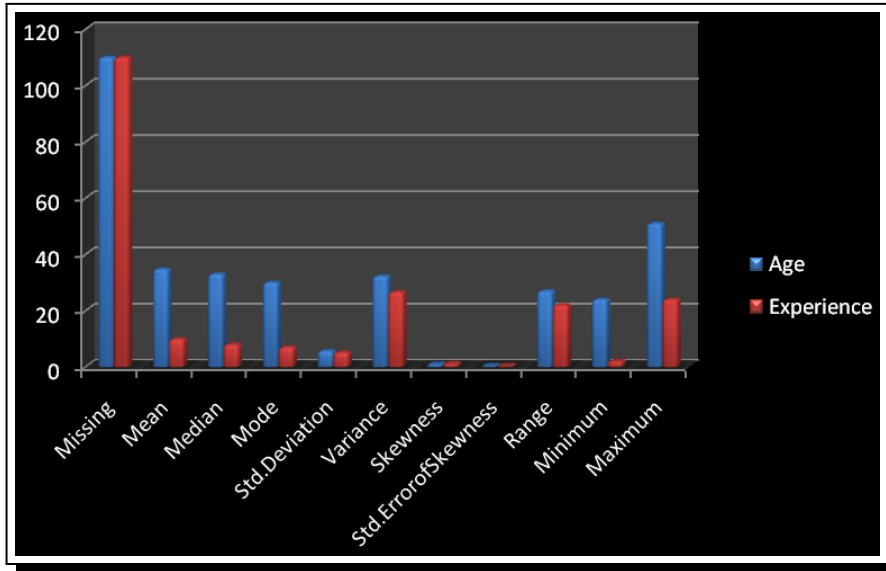
Figure 3. Age and experience of the sample data

Table 2. Age and experience of the sample data

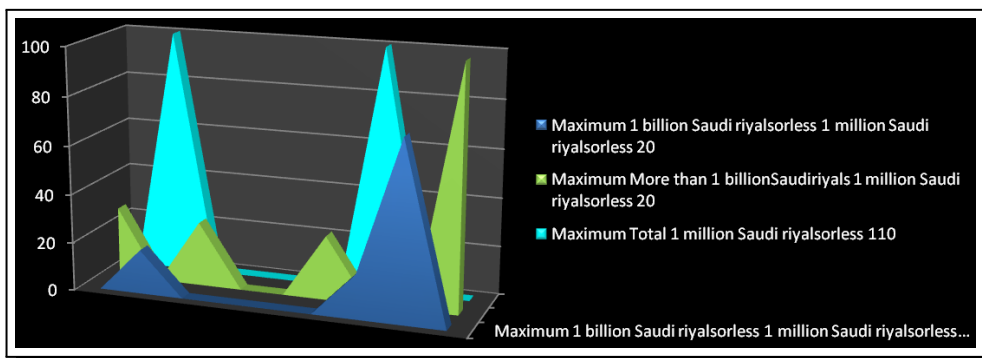| Particulars	Age	Experience
Missing	110	110
Mean	34.74	9.90
Median	33.00	8.00
Mode	30	7
Std Deviation	5.679	5.158
Variance	32.251	26.605
Skewness	0.968	1.138
Std Error of Skewness	0.230	0.230
Range	27	22
Minimum	24	2
Maximum	51	24

Figure 4. Project value

Table 3. Sample data of project value

Particulars	Frequency	Percent	Valid Percent	Cumulative Percent
1 million Saudi riyals or less	16	14.5		14.5
10 million Saudi riyals Or less	24	21.8	21.8	36.4
100 million Saudi riyals or less	21	19.1	19.1	55.5
1 billion Saudi riyals or less	20	18.2	18.2	73.6
More than 1 billion Saudi riyals	29	100.0	26.4	100.0
Total	110	100.0	100.0	100.0

From Table 3, we see that the project value is shown. Higher factor of frequency - higher the percent along with the valid percentage.

The summarized data is tabulated for the analysis purpose; it contains Occupation of admin, project engineer, manager and top management.
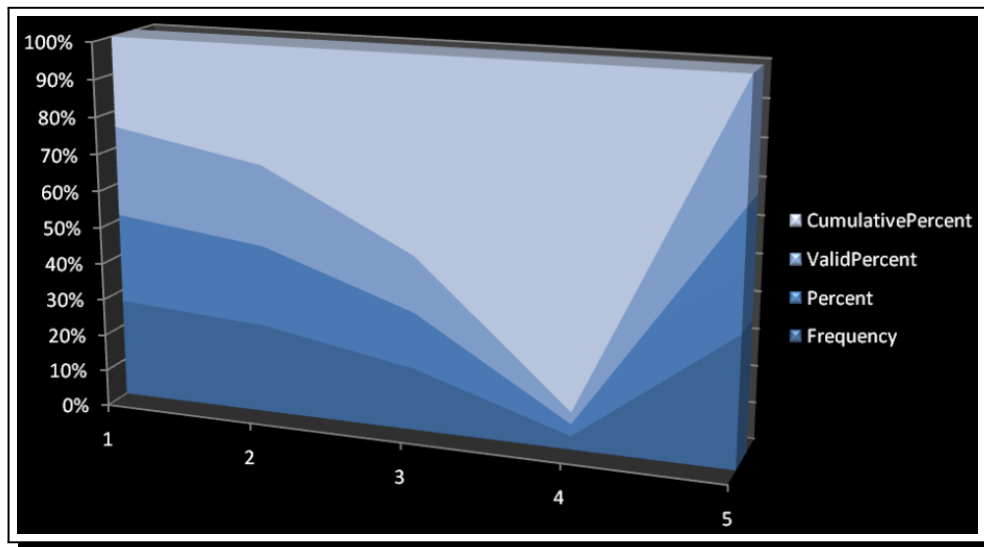

Figure 5. Occupation

Table 4. Occupation details

Particulars	Frequency	Percent	Valid Percent	Cumulative Percent
Administrator or technician	23	20.9	20.9	20.9
Project Engineer	52	47.3	47.3	68.2
Project Manager	31	28.2	28.2	96.4
Top management	4	3.6	3.6	100
Total	110	100	100	100

From Table 4, Occupation details are shown. Project engineer is having the highest frequency while Top management is having the low.
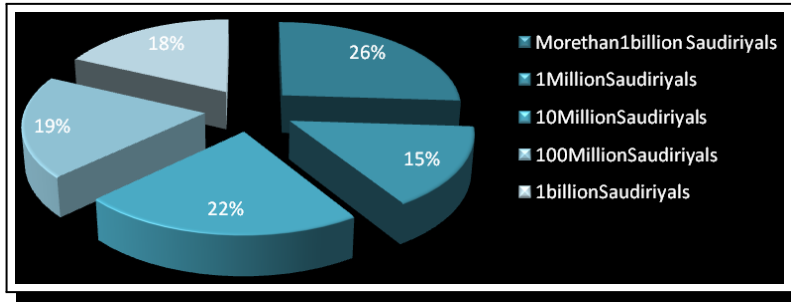
Figure 6. Project value distribution

The summarized data is tabulated for the analysis purpose; it contains Project value distribution. Figure 6 is shown in a pie chart form in which Saudi riyals is distributed.

Table 5. Project value distribution

Saudi riyals	Percent
More than 1 billion Saudi riyals	26%
1 Million Saudi riyals	15%
10 Million Saudi riyals	22%
100 Million Saudi riyals	19%
1 billion Saudi riyals	18%

From the above Pie chart, More than 1 billion Saudi riyals is dominating by 26% whereas 1 Million Saudi riyals is least which is 15%.

The summarized data is tabulated for the analysis purpose, it contains Occupation distribution. Different levels of occupation are shown in Figure 7 using pie chart.
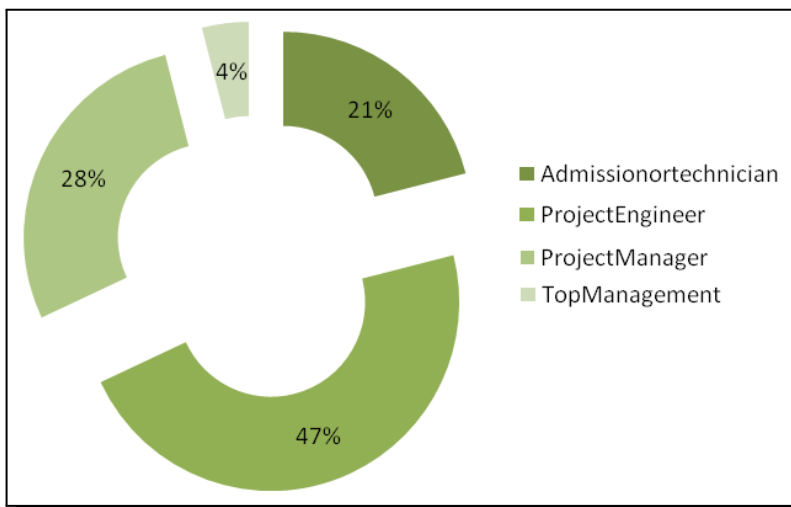

Figure 7. Details of occupation

Table 6. Details of occupation

Occupation	Percent
Admission or Technician	21%
Project Engineer	47%
Project Manager	28%
Top Management	4%

From the above table, Project Engineer is leading among other three Occupations. Almost half of the occupation is carried out by the Project Engineer.

The order of the survey will be analyzed as:

- System Quality
- Information Quality
- Service Quality
- User Satisfaction
- Net Benefit
- Attitude towards Technology
- Technological Experience
- Management Support
- Organizational Competency
- IT Infrastructure

6. Discussions

For the relationship of variables within the ISS model, the study can add another conformation for the model to the body of knowledge. It appears from the data analysis section that all the assumptions of the ISS model are accepted with a confidence level of 99% and beta coefficients between 0.53 and 0.74. For the second part, which is the relationship between the five independent variables and its dependent variables within the ISS model, the data analyzed do not support all the hypotheses. The reports are divided into three categories: the first category is accepted with a confidence level of 99% and beta coefficients between 0.3 and 0.66. This category contains the following relationships:

- Management assistance > System quality (0.66)
- Management assistance > Information quality (0.357).
- Management assistance > User satisfaction (0.449)
- Management assistance > Net profit (0.534)
- Organizational competence > Quality information (0.301).
- Organizational competence > Net profit (0.589)

- IT infrastructure > Net profit (0.581).

From the result, it is clear that the influence of individual characteristics on the current IS of construction projects is little or no. What we mean by individual characteristics is attitude towards technology and technological experience which are the two variables that measure an individual trait in the conceptual model of this study. If we looked at the descriptive analysis of these two variables, we could see that they have the highest values compared to the other variables. The attitude towards technology is on average 4.16, which reflects a positive attitude towards technology. In addition, the standard deviation is 0.578, which means that the dispersion is small and most of the sample has a positive attitude towards the technology.

7. Concluded Comments

At the end of this study it is concluded to stress the importance of improving the information system of any company and via this analysis it is found that a particular importance for the project construction industry which is important for the economy of any country. Saudi Arabia is at the start of its journey to 2030 during which it will complete many construction projects requiring an effective information system. The analysis suggested that in order to improve the information system, one must initially improve the characteristic variables of the organization (for example, these are management support, organizational competence and IT infrastructure).

This improvement can be achieved through the co-operation of different parties such as universities, large companies and government agencies and technology implementation companies. This means that the need of several studies with different tools and techniques like case studies and interviews or a survey like this study. The information from this analysis must be carefully analyzed and a decision based on it must be made. Technology is not a strange subject for Saudis as they are already familiar with it in different areas such as e-government. Therefore, this construction project information system development path will not be difficult, it will only require effort and time.

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Competing Interests
The authors declare that they have no competing interests.

Authors' Contributions
All the authors contributed significantly in writing this article. The authors read and approved the final manuscript.

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