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The Prospective Benefits of Using Advanced Computer Based Management Systems for Running Remote Construction Projects: Two Saudi Case Studies Examined

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Abstract

This paper examines the potential use of the Advanced Computer based Management Systems (ACMS) to manage remote construction projects in the Kingdom of Saudi Arabia. It discusses two case studies; the first is concerning a public services company whereas the other is about mega construction companies. Using observation, questionnaires and interviews, the study found significant barriers to the utilization of ACMS and these are ranged according to their significance and the paper recommends proper solutions that facilitate the use of ACMS by companies in the Kingdom of Saudi Arabia.

Introduction

Remote projects have their unique and unexpected management problems and these are caused mainly by the remoteness of the project. Little research though was undertaken concerning this issue, particularly in the Persian Gulf region, and it has revealed few unique communications and management problems such as the loose control, lack of human resources, infrastructure and experience. On the other hand, many case studies indicated the positive impact of the Advanced Computer based Management Systems (ACMS) on various aspects of project management, while indicating obstacles that hinder adoption, diffusion, and utilization of the ACMS by the construction industries around the world. This paper reviews two case studies in the Kingdom of Saudi Arabia. The first inspects the use of ACMS by Saudi Electric Company (SEC) whereas the other investigates the use of ACMS by mega Saudi companies. Consequently, two field surveys had been undertaken and the results showed that while there are a number of technical barriers, the present management system is non-standard, fragmented, and loose. The absence of robust management system had affected how projects are run and may hinder the optimized utilization of the ACMS.

The Case Studies

Case study I: Saudi Electric Company (SEC)

This case study examined how far the ACMS tools such as mobile, Web-based Project Management Systems (WPMS), web cams, and construction robots that use wireless, satellite, Internet-based, or mobile tools and networks would help the project team managing remote construction projects in the Kingdom of Saudi Arabia (KSA) [1-4]. It is suggested that the construction department at SEC experiences a number of unique problems concerning the management of remote projects [5-9]. A main survey was undertaken on Saudi Electric Company (SEC) and it aims to find how ACMS are used and barriers to the use. The study found that the ACMS tools have the potential but this potential is hindered by a number of technical, managerial, and staff factors. The study showed that the top barriers to ACMS include ACMS cost, maintenance and support, the traditional management system and practices, organizational readiness to change, and the IT skill levels of staff [10-17]. To get the full potential of ACMS, the researchers recommended the followings:

a. The pre-planning of site activities such as supply, human resources, environment and project variables;

b. Flexible decision-making mechanisms should be created and tested;

c. Present traditional project management practices should be redesigned and revolutionized;

d. Linking systems and sharing information and management tools with project team. This would enhance knowledge integration and help to foster innovative ideas that dramatically improve projects Barlow [18]; and

e. Proper plans should be adopted for SEC's staff and contractor training and managers should be trained on how to virtually manage remote sites.

Case Study II: Mega Saudi companies

This case study examined the use of ACMS by large companies in the Eastern province, Kingdom of Saudi Arabia (KSA). These companies are: Aramco (Saudi Arabian Oil Company), Royal commission of Jubail (RCJ) (petrochemical company), SABIC (Saudi Basic Industries Corporation and a petrochemicals manufacturer), compendium of construction and consultancy companies which are working on remote sites of University of Dammam and how ACMS would help these companies sorting out a number of present projects' management problems. Consequently, a field survey was carried out and aims at finding present and prospective obstacles to the utilization of ACMS [19,20].

The survey revealed significant association between little use of ACMS and frequent management problems and the domination of use of traditional communications and management systems. The researchers

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argued that the use of traditional management systems for running remote projects and sorting out construction problems would severely limit the applicability of ACMS in large Saudi companies. To maximize the potential of use, ACMS should be designed to provide innovative and intelligent solutions to the unique remote construction problems. The design of future ACMS should consider the following issues:

a. To incorporate the company's strategy into the ACMS system and this includes the strategic management of all its' remote projects.

b. The study indicated that the application of lean and sustainable management principals associated with the use of customized ACMS would help overcoming use barriers.

c. To automate the design and pre-planning of site activities and consider the risky factor of the environment, the remote site and project as mentioned above.

d. The ACMS should enable short and long-term partnering, and sharing information and management and communications tools with project parties.

e. ACMS should provide precise daily control concerning remote inspection of work quality, monitoring productivity of site workers, and calculation of material consumption rates.

f. ACMS should have intelligent knowledge- based enabling the creation of new hypothesized cases, and the input of existing cases of emergency scenarios and the generation of possible intelligent solutions.

g. Some problems are generated during the project. So ACMS should be designed to incorporate these problems and suggest solutions thus help all parties to respond efficiently to unexpected issues, to quickly sort queries, to lead multinational teams, to sort out potential social conflicts and find out possible solutions, to coordinate with other remote sites' managers and overcome communications problems. The system should give managers the required level of authority and this helps in mobilization and demobilization of HR and equipment between distant projects.

h. ACMS should have all the necessary information i.e. benchmarks/ standards/ measures on the system so it would be used by staff without the need to get the approval from the higher authority. It should provide transparency and considering how to reduce the negative impacts of remote projects on the environment.

i. ACMS should help facilitating the procurement of materials and recruitment of specialist HR from overseas.

Conclusion

The case studies above demonstrated the great prospective potentials of ACMS. However, ACMS should facilitate the implementation of sustainable and lean practices and ACMS should be customized to respond effectively and flexibly to the daily remote site requirements and problems. It also should enable Flexible decision-making using intelligent mechanisms and knowledge-based system. The future system should allow remote examination of the quality of construction work, monitoring the productivity level of site workers, and calculation of the rate of material consumption. It should be designed to incorporate emergency scenarios and assess their impacts on project process, personnel, cost, time and quality.

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