

HOW CAN INFORMATION AND COMMUNICATION TECHNOLOGY REDUCE INEFFICIENCIES IN THE CONSTRUCTION INDUSTRY?

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ABSTRACT

Purpose of this paper - This paper is looking at why it is necessary to do research in the area of construction informatics. It discusses future research that will be conducted in the South African construction industry and how information technology can enhance the business processes that are part of a construction project and also a construction company.

Methodology/Scope – A literature study was done to determine what the current state of the research area is.

Findings – The use of technology can assist with collaboration among the different participants in a construction project.

Value – The paper is important as it not only outlines future necessary research but also discusses the trends as seen by other researchers in the field of construction informatics.

Keywords: ICT, Construction, Collaboration, Business Processes, Information Technology

1 BACKGROUND

Some of the reasons for using Information and Communication Technology (ICT) in construction projects are the improvement of how business processes interact with each other, bigger profits, service quality improvements and to gain a competitive advantage (Love et al, 2005:577-578). Mak (2001:258) also gave some suggestions on why and when contractors will invest in information technology. This includes savings in manpower, reduced expenditure and better management of tendering data. According Gyampoh-Vidogah et al (2003:168-170) problems with information management in companies are due to the slow and cumbersome information management processes, the lack of a policy on information management in companies, cultural issues and barriers to the adoption of Information Technology (IT). Zeng et al (2007:36-37) states that organizational structures, individual behaviors and the technical requirements of data in the industry are some of the barriers that hinders the flow of information among the participants in a construction project.

The owner, general contractor, subcontractor, engineer and the supplier are some of the participants in a construction project. The successful contractor that is responsible to construct the building is not only responsible for managing the process, but must also ensure that all interested parties are kept up-to-date. During the project operations phase the construction site needs information from designers, engineers, suppliers and sub-contractors in order to complete the construction on time and within budget. Sub-contractors are also often used to complete specialized tasks, such as tiling and electrical installations. The relationship between the two parties is governed not only by the legal contracts that was agreed upon, but also on how and when the work is completed. Tendering,

work and schedule changes, invoices and payments are some of the administrative tasks that must be controlled in order to make this relationship successful.

2 WHY USE ICT?

Collaboration between all role players during construction is not only important but also necessary for the successful completion of a construction project. Within any organization there exist a set of relationships that has an effect on how successful information sharing is among interested parties. With so many interested parties, communication and information sharing among them is vital. Not only must the formal structures and networks be examined to understand the level of information sharing that is happening on a formal basis, but the informal relationships among parties will depend on how and when information is shared and how and when information is flowing (Perreira & Soares, 2007:87). The various roles that participants can play vary with each project. The contractor, for instance, can also be the owner or the architect (Lockey et al, 2002:235).

Participants are finding it difficult to share information in the construction industry. Barriers hindering the flow of information include the organizational structures, behavior of individuals involved with information management and the technical characteristics of the information in this industry (Zeng et al, 2007:36-37). Modern companies will use information systems (or software) such as accounting systems (including payroll), project management systems and communication tools such as Internet and email. Many such applications exist already and can be bought as complete solutions. There need to be an alignment between information systems in use and the organization. If not, it can have a detrimental effect on the performance of the organization (Hicks, 2007:234). Information must be able to flow seamlessly between all parts of the organization (Laudon & Laudon, 2003: 209). Sub-contractors need easy access to instructions on what must be done such as architects or engineering specifications, give feedback to the project management office on how the work is progressing, and finally invoicing. Technologies that can assist with the sharing of information can be used very effectively between sub-contractors and the project management team.

Turk (2006:198) stated that “Construction informatics is a relatively young and immature field of applied science”. Buildings and the construction of it is a very old discipline, going back many centuries, yet the industry is lagging behind in the information and communications technology area. This research will help improve the situation by investigation the link between the processes on a construction site, stakeholders in the project and information management.

Both Turk (2007:215-218) and Working Commission 78 (W78) of the International Council for Innovation and Construction (CIB) as reported by Amor et al (2002: 245-257) attempted to define future research in the areas of construction informatics. Both studies found that issues associated with technology and re-engineering of processes were common themes in published research. Turk (2007:215-218) also listed collaboration infrastructures, knowledge management, software interoperability, database information retrieval, knowledge intensive applications and human computer interaction as important future research themes. Interesting to note is that collaboration is rated the important in current as well as in future research. Amor et al (2002: 245-257) noted that the majority of papers investigated were from Europe. Contributions from Africa were low, less than 3%.

3 PROPOSED RESEARCH

Given the ineffective way the construction industry utilizes their information, the proposed research will establish ways of how this can be changed. The research will attempt to address the problem of

ineffective information sharing among business processes as used in the construction industry. Information technology is seen as a major enabler to release the potential of effective information sharing in the construction of a building. Collaboration among participants is key to the success of any construction project.

The research will focus on the different business processes in a construction company, but more importantly, what are the different information pieces that each business process use (input) and/or generate (output) as well as how each information piece is connected. Where and how information is generated and used is often determined on the organizational structures. To introduce change in any environment, a leader is needed to propose and lead the introduction of the change. This will also be true of construction companies. Information is used in companies in a particular context and by particular people. This current organization structures will be established and a proposal of how a changed structure can better information management in this industry be made.

The subcontractor is a major role player on any construction site. Sub-contractors are responsible for completing many parts of the new structure that is being built. The investigation into the relationship between the construction company and sub-contractor, and the supply chain on a construction project but will also determine how and what information is flowing between them.

The most important question that will be answered by this research is how can an information based technology approach contribute to the objectives of a construction process?

4 CONCLUSION

With the advent of newer technologies (such as wireless communication tools) the industry must start looking at ways on how they can utilize their information better and unlock the potential knowledge benefits that this will give a construction company. This better management of information and the knowledge gained from this will enhance a company's potential to deliver on time with the expected profits.

Research into how the construction field can utilize their information and unlock the knowledge contained within their information is necessary.

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