

# Chapter 31

## Mobile Information Communication Technologies and Construction Project Management: Indian Scenario Case Study

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### ABSTRACT

*Construction project management requires effective and real time information and data communication between all the project team agencies. In present scenario when the associating agencies may be geographically separated, and for projects with large site areas or being executed in hazardous or remote sites, the required information and data communication can be achieved through use of mobile communications. But, research shows that the adoption of mobile communications by the construction industry is limited. This chapter presents the issues affecting adoption of mobile communications by the construction industry, the research background, a case study of mobile communications adoption at a major construction project in India and further discusses the factors leading to sustainable mobile communication adoption by construction project teams. Construction industry primarily comprises small and medium enterprises (SMEs). Thus, the issues are studied with focus on adoption of mobile communications by SMEs.*

### INTRODUCTION

Construction projects involve participation of multiple organizations including clients, project managers, architects, consultants, contractors, material suppliers etc. and successful construction

project management requires effective intra and inter organization communication between all the project team organizations. Intra organization communication is in the form of communication within head office, between head office and site office, between site office and mobile site staff and sometimes between different sites when these sites are being managed by a common resource

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pool. Inter organization communication is in the form of communication between site and other organizations like consultants and material suppliers and also between head offices of different organizations. In present scenario, project team organizations may be geographically separated and required communication can be achieved by the use of Information communication technologies (ICT).

Construction project management comprises change management which requires effective communication and coordination between all the project agencies, resulting in efficient flow of information and documents to assist in decision-making, and the efficient flow of resources to maintain progress of development. Coordination tasks are often complicated by schedule pressure and productivity demands, worker fatigue, data loss during information exchange, misunderstandings because of poorly defined information, and iterative negotiation when unanticipated events (Magdic et al., 2004) or changes occur. This leads to poor access of the right information, at the right time which is required for efficient decision-making. In this environment, ICT and, especially wireless (Kondratova, 2004; Filos, 2002) and mobile communications would lead to overall efficient use of IT (Rebolj and Menzel, 2004) and required effective communication. Mobile computing consists of three major components: Hardware i.e computers which can be used indoors and outdoors while the user is in motion; Networks with sufficient bandwidth which can be accessed while in motion; and software i.e mobile applications supporting context-sensitivity and personalization (Rebolj and Menzel, 2004). Advantages of using mobile computing are in the ability to share data in real time, reduced rework and paperwork, ability to solve problems on site, construction of accurate databases by timely and continuous collection of data, increased quality of information and decrease in operational costs (Koseoglu and Bouchlaghem, 2006).

We are rapidly moving away from the Desktop and Laptop Web paradigms towards the Mobile Web paradigm, where mobile, smart devices such as the Smart phone, Pocket PC, PDA (Personal Digital Assistant), hybrid devices (such as phone-enabled PDAs or Pocket PCs), and wearable computers will become powerful enough to replace laptop computers in the field and will be widely used for real time communication of construction project information to project repositories or between project participants (Kondratova, 2004). Also, wireless LAN (WLAN) and virtual private networks (VPN) enable effective mobile data communication.

Table 1 indicates communication channels with respect to construction projects and as it is indicated, information as well as data communication between mobile site staff and other project nodes requires use of mobile communication technologies and if the sites are at remote locations, communication between site offices and other project nodes also requires mobile communication technologies. The nodes of Intra and Inter organization communication are indicated with different colors.

Thus, mobile information communication is an essential component of construction projects' information management in the construction and operation phases of built facilities as it facilitates communication between large physical distances. It would also help the construction industry in facing pressures to decrease costs, improve productivity and have a competitive edge in terms of quality of service and customer satisfaction (Venkatraman and Yoong, 2009). But, use of ICT and specifically mobile communication technologies in the construction industry is still at a nascent stage (Singh, 2006, Koseoglu and Bouchlaghem, 2006, Rebolj and Menzel, 2004). Some of the identified reasons for this scenario are that IT has not been adopted effectively at construction sites and also most construction IT solutions, like integrated building models (including complex

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