Editorial: Special Issue on the Advancement of Information System and Technologies in Building and Construction Management

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Abstract  Construction informatics is an applied science that studies the construction specific issues related to processing, representation and communication of construction specific information in humans and software. The aim of this special issue is to foster state-of-the-art research in the area of construction and information and communication technologies. Research in construction informatics is addressing the new challenges and opportunities. The special issue is aimed to provide insights into the advancement of information and communication technologies in the AEC (architecture, engineering and construction) sector. The issue includes four papers that have explored the current context for construction informatics research by highlighting a number of local and global trends in the construction industry and beyond.

Keywords  Project Management, Information Technology, Reference Models, Book of Knowledge, Building Information Modeling (BIM), application, construction project, effectiveness, Malaysia, construction projects, materials management, RFID, tracking

1. Introduction

Construction informatics is an applied science that studies the construction specific issues related to processing, representation and communication of construction specific information in humans and software. The aim of this special issue is to foster state-of-the-art research in the area of construction and information and communication technologies. Research in construction informatics is addressing the new challenges and opportunities.

2. Papers in the Special Issue

The papers in the special issue provided insights into the advancement of information and communication technologies in the AEC (architecture, engineering and construction) sector. The first paper by Latiffi, et. al., explore BIM implementation in Malaysian construction industry. A literature review was done to explore previous BIM studies on definitions and history of BIM, construction issues, application of BIM and BIM tools in construction projects as well as benefits of BIM. Malaysian government encourages construction players to apply BIM to construction projects because it can overcome construction project problems such as delay, clash of design by different professionals and construction cost overrun. Autodesk tools have been suggested by the Malaysian government as a BIM tool platform. Other tools include Revit Architecture, Revit Structural, Revit MEP, Navisworks and Cost-X. It is crucial for construction players to be aware of the importance of BIM application in construction projects. This is because BIM can be one of the conditions required of a company to qualify for future government and private projects, similar to what is practiced in some other countries. Moreover, BIM helps to increase construction project efficiency and effectiveness. It can also be implemented to improve communication and collaboration between construction players. The implementation of BIM technology is expected to become more widespread in Malaysian construction industry because of the government’s efforts in promoting BIM.

The second paper by Kasim et. al. then discuss about the materials management in construction projects as a key function that significantly contributes to the success of a project. The management of materials in construction projects is made problematic by materials shortages, delays in supply, price fluctuations, damage and wastage, and lack of storage space.
Paper-based reports are mostly used to record and exchange information related to the materials component within a supply chain, which is problematic, error-prone, and inefficient. Generally, emerging technologies such as wireless system, bar-coding and Radio Frequency Identification (RFID) are not being adequately used to overcome human error and are not well integrated with project management systems to make the tracking and management of materials easier and faster. Thus, this study seeks to identify the potential employment of that technology focusing on RFID for materials management in construction projects. As a precursor to this work, a literature review on materials management and exploring RFID technology potentially being employed in materials tracking was conducted. In conclusion, the findings reveal the needs for more sophisticated materials management solutions to improve on-site materials tracking and inventory management processes in the future.

The third paper by Abedi et. al. discusses about the major obstacles within the precast construction projects. In order to improve collaboration among precast supply chain stakeholders on the various phases of precast construction (planning, design, manufacturing, transportation, installation and construction), a system are needed for an effective communication and accessing to up to date information. This paper is aimed to explore the potential of the cloud computing technology as the construction collaboration tools for precast supply chain management. The research findings are established according to the study of comprehensive literature on information technology, supply chain management and precast construction industry. Findings show that the poor planning and scheduling, high cost of precast concrete components, the poor design, lack of architectural creativities, the poor production timing, large size and heavy precast components, wrong deliveries, poor on site coordination and collaboration, poor specialised contactors and lack of good communication among parties are the main barriers within the precast supply chain. These barriers within the precast supply chain phases may result to adverse consequences on the performance of precast project delivery. Hence, the cloud computing technology was found to have huge potential to provide efficient collaboration systems within the precast construction.

Finally, Rawai et. al. proposed a project management information systems (PMIS) reference model. PMIS are socio-technical systems comprising people, organizational systems (processes and organizational structures) and an information technology infrastructure to ensure the effective flow of information. PMIS seek to provide all project stakeholders with the information necessary to undertake their tasks. These systems have changed considerably over the last decade. They no longer focus on scheduling and resource management alone. Instead, they have become comprehensive systems that support the entire project lifecycle. These improved systems have raised several difficulties in the development process which arise from the character of the information itself. Therefore, information models play an important role in the development of information systems, especially in the analysis, design and deployment phases. Reference models are one approach to accelerate the development of enterprise-specific models and provide companies and researchers with an initial solution for the design of organisation systems and mobile applications in the architecture, engineering and construction (AEC) industries. An understanding of project management information system reference models is critical to improving the quality of computerised system development in the AEC sector. This paper will review and compare the available information system models which are applicable to construction project and programme management. These reference models will provide guidelines for developing a computerised system for construction projects and programmes. The model can also be used for the design of project management software and the setting-up of the surrounding organizational system, as well as to decide on the software requirements that are essential to select a commercial project and programme management software system. Thus, these reference models are important to assist a stakeholder in selecting the right project management system.

3. Summary

The special issue has provided insights into the advancement of information and communication technologies in the AEC (architecture, engineering and construction) sector. The issue has explored the current context for construction informatics research by highlighting a number of local and global trends in the construction industry and beyond.

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