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To Study the Benefits of Information Communication Technology Adoption in Construction Project Management

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Abstract: Information Communication Technology (ICT) can provide powerful strategic and tactical tools for organisations, which, if properly applied and used, could bring significant advantages in promoting and strengthening their competitiveness. construction industry is main contributor to the national economy with an annual growth of approximately 10% in GDP (Gross Domestic Product).Construction project requires effective coordination and collaboration between the project participant due to large number of geographically separated stakeholders involved at all the stages of the projects. good and responsive communication is important to monitor and control projects activities according to the specific plans and thereby to achieve required project goals. This paper focuses on current levels of ICT practice and benefits of ICT also identifies the reasons hindering its usage by Civil Engineering firms.
Keywords: Construction, Information communication technology, project management.

I. INTRODUCTION

Information Communication Technology (ICT) can provide powerful strategic and tactical tools for organisations, which, if properly applied and used, could bring significant advantages in promoting and strengthening their competitiveness. construction industry is main contributor to the national economy with an annual growth of approximately 10% in GDP (Gross Domestic Product). However, the industry is widely being criticised for its lack of innovation with results in low productivity. The application of various ICT systems are seen as a way to enhance the productivity of the construction industry. The application of such technologies has great implications on current construction management models. In the management of processes where the coordination among many persons, locations, and vehicles is needed, the communication plays an important role. Modern wireless networks can provide efficient way to exchange information and to improve production methods. ICT applications in construction include Electronic Document Management Systems (EDMS), Web-based Project Management Systems (WPMS), Application Service Providers (ASP), E-work and E-business applications, Virtual Reality (VR) applications, mobile computing, and wireless communication. It is believed that ICT, when appropriately used, can significantly contribute to the timely, economical, and successful deployment of construction projects. Main constraints in its use are the difficulty of the construction industry to adopt new technologies in conjunction with a difficulty in identifying clear benefits of ICT use, the limited budget for ICT investment, the need for computer-skilled staff, issues of ICT standardisation, and technological and financial constraints. The development of construction projects includes several stages during which a large number of human resources of different specialties interact and cooperate. An important element in this interaction is the information management and communication process which constitutes a determinant factor for the efficiency of human resource cooperation. Enhancing communication among project participants, however, proves to be a challenging task due to the extended fragmentation of the construction industry and the huge amount and wide dissimilarity of the information involved in the construction process. The wide variation of specialties, expertise, educational background, professional skills, computer acquaintance, and working environment among the project participants impedes the information management and communication of the project team. The distance between the construction company headquarters and the construction sites renders the communication even harder.

II. LITERATURE REVIEW

Important role of ICT in construction has been emphasized by a number of researchers. In the construction industry there is a necessity for innovative methods to improve the construction efficiency that proves to be true happening now and for soon expected changes. The given paper studies information and communication technologies concerning their usage within the construction

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industry with purposes to increase construction efficiency and solve the special challenges such as sustainable design and construction.

A. Need for New Approaches to Construction

In the construction industry there is a necessity for innovative methods to improve the construction efficiency that proves to be true happening now and for soon expected changes. In this paper information and communication technologies concerning their usage within the construction industry as a new approach for achieving the following purposes:

1) Quantify the scope for improvement of construction efficiency;
2) Examine current construction practice and assess the potential for its improvement by way of innovation;
3) Identify specific actions and good practice that would help achieve more efficient construction.

modern construction projects takes place over all-round, unified and capable to an exchange data model. It allows carrying out complex analyses at early stages of virtual design and construction. Further the model will include business intelligence, lean construction principles, green policies and whole lifecycle costing. Information and Communication Technologies in this case becomes the base for all innovative methods of design and construction and needed as much attention possible. It gains currency for construction companies which generally are being short of investments to ICT. (*Sergey Kalinichuk)* ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically. Construction projects involve; clients, consultants, contractors, local authority; residents; workers and suppliers, all with differing interests in the project which demands heavy exchange of data and information. Thus the construction industry is one of the most information-intensive industries, and requires close coordination of a large number of specialize interdependent organizations / individuals to achieve cost, time and quality goals of a project. The industry is characterized by inaccurate and untimely communications that often result in costly delays. ICT is a potential solution to this problem. This paper highlights the level of ICT penetration, its impact and constraints to its adoption in Uganda's construction industry. Questionnaires were distributed to suppliers, engineers, quantity surveyors and architects. The study revealed that the most commonly used software are; Microsoft Word (88%), MS excel (87%) and PowerPoint (59%). AutoCAD is most popular at (53%) for Architectural/ Engineering design and drawing, Master Bill (30.8%) for quantity surveying, Microsoft Project (76%) for project planning. Among other operations, 76% of the firms use computers for bookkeeping. Mobile phones (87%), intranet (68%) and internet (64%) are used for employer employee communication. The benefits derived from use of ICT are reduced mistakes in documents (82%), easing of complex tasks (80%), time saving and increased productivity (79%). However, the use of ICT is constrained by; high cost of investment (86%), system malfunction / virus attacks (82%), and high cost of professionals to employ (78%).(Ednah Tinah, Mutesi, Michael Kyakula)B Building project management requires effective communication management between all project team members. This can be achieved through the strategic use of information and communication Technology at the industry ,organisation and project levels. Construction industry is fragmented with the majority of organisation being SMEs, Research is required to study the factors influencing the use of information and communication technology at all three levels and also the inherent relationship between these factors across the levels. This research is being conducted in context to the Indian construction industry. Interpretive structural modeling technique has been applied for developing a structural equation model that considers and evaluates causal relationship between factors effecting use of ICT. A framework is being developed for ICT enhanced communication protocols with the potential for industry, organisation and project level adoption during the management of building projects by SMEs. (Jay yang, Vanita Ahuja, Ravi Shankar)2007

III. RESEARCH METHODOLOGY

After review of literature, a questionnaire survey was conducted to identify current level of usage of ICT by civil engineering firms and the factors hindering the level of usage in their organizations. A survey used a structured questionnaire approach. questionnaires are the simplest method to collect data from respondents, a well-designed questionnaire that isused effectively can gather information on specific components of the system.

A. Benefits Of Information Communication Technology In Construction Project

Benefits of ICT adoption for managing building projects and improving overall organizational efficiency . Some of the identified benefits are: richer information to aid decision making, project information obtained quicker, improved communication, closer relationships, improved information flow, and greater management control (Hendrickson and Au, 1989; Root and Thorpe, 2001; Love et al., 2004).

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1) Project completion as per the estimated budget
2) Projects completion as per the estimated time
3) Effective collaboration and co-ordination between project team members
4) project completion as per the specifications
5) Real time information made available to project managers
6) Effective material procurement and management
7) Effective contract management

Details of Questionnaire administered and returned

NO.SENT	NO. RETURNED	RESPONSE RATE(%)
20	10	50%

Respondent view on extent of ICT used in the firms

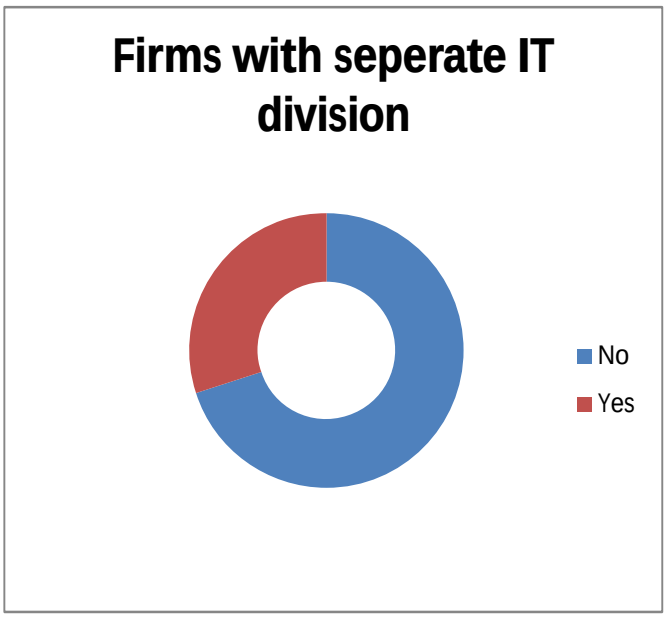
No.of respondent	High	Medium	Low	Total
10	28.50%	56.75%	14.75%	100%

Types of ICT hardware in use

No. of respondent	Desktop	Laptop	Mobile phones	Tablets	Projectors
10	100%	79%	100%	45%	89%

Types of software in use

MS Word	100%
MS Excel	100%
MS Power point	100%
MS Project	85%
Primavera	45%
Autocad	100%
Revit	24%
Archicad	12%



Activities Computerized

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1.Accounting
2.Project Progress Report
3.Resource Planning and Scheduling
4.Costing and Budgeting
5. project cost control
6.Purchasing and Invoicing
7.Project Drawing
8.site Management and security
9. Communication with Project sites and external parties
10. Subcontractor and supplier information

IV. CONCLUSION

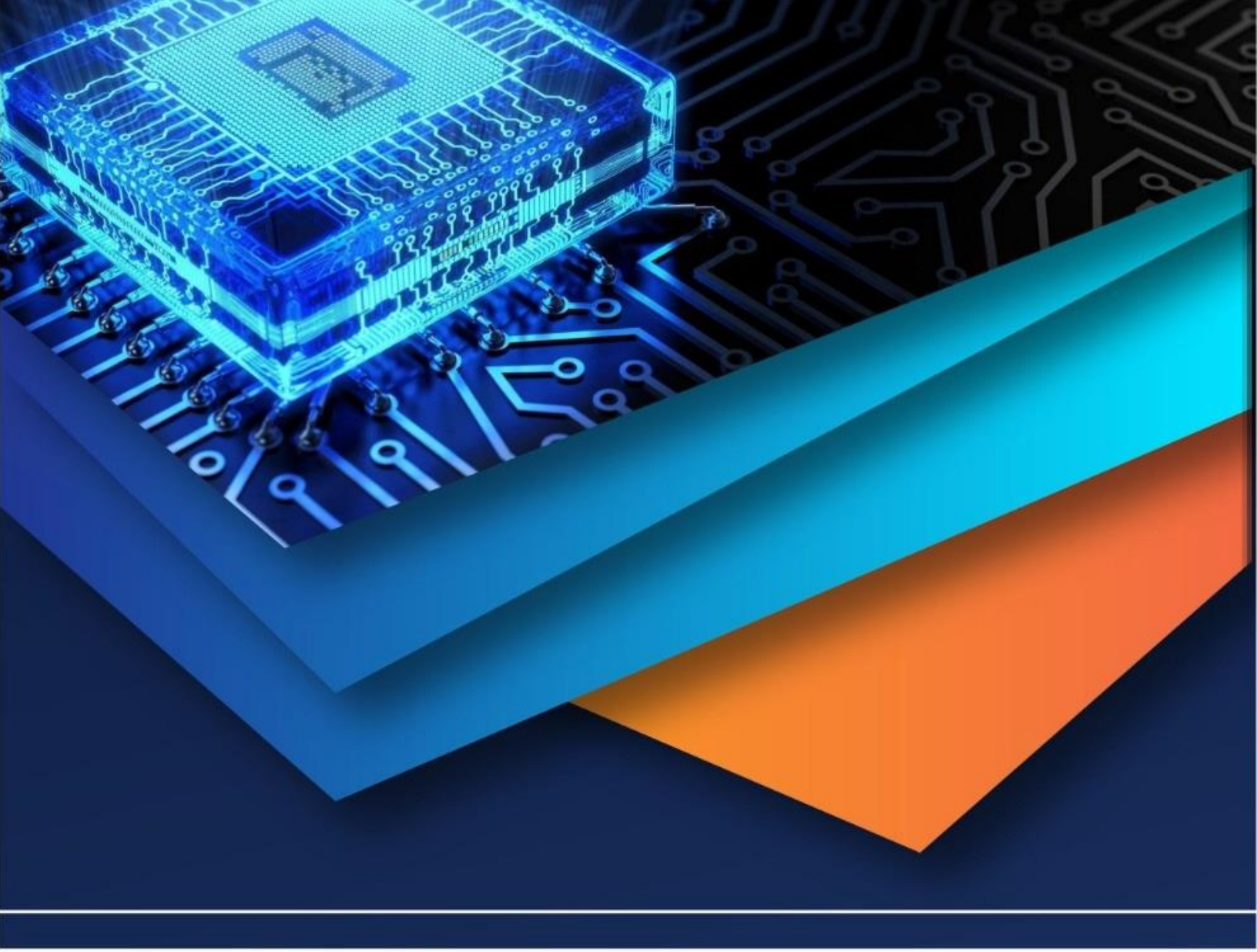
This paper present the results obtained from the structured questionnaire survey. Form this survey we know that the current level of information communication technology using by the civil engineering firms on project sites and the corporate offices. There are two reasons hindering the use of information and communication technology.

A. budget limitation for ICT investments
B. Lack of commitment by firm's management towards ICT.

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