POWER OF DIGITAL TECHNOLOGIES AND SKILLS IN CONSTRUCTION INDUSTRY THROUGH HIGHER EDUCATION

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Abstract

Construction is a fragmented process with the general contractor, individual trades and multiple suppliers each operating as separate functions on a project, which regularly affects time, quality and cost. By adopting a more innovative approach and improving links in the whole industry supply chain to undertake research and development, the construction industry would be better placed to innovate and as a consequence capitalize on the challenges and opportunities presented by the national and global market. Construction industry is an ever growing demand for housing, infrastructure, and energy projects, yet there are challenges with the current workforce. Technological advances in construction will allow projects to be better designed and constructed faster, leading to customer satisfaction and financial gains. Digital transformation Digital is undoubtedly a hot topic capturing the attention of all stakeholders of engineering and construction (E&C) companies around the world — from the front lines at physical locations, to the C-suite, the board, the suppliers and the customers interacting with the space. The heart of transformation is the biggest challenge for most people — change. As a leader, change and transformation must first take place within. The present study aims to analyze the various new technologies used in construction industry. Both primary and secondary data were used for this study, 50 sample respondents were taken randomly for analysis. Based on the finding, the researcher has given suitable suggestion related to digital technology.

Keywords: Construction industry, Digital Technologies, Higher Education

Introduction

The construction industry is one of great strategic importance on the regional, national and global levels. It is a large industry in terms of its size, economic scope and the number of people employed in the sector. Yet it is a troubled industry, with serious challenges including productivity, safety, waste, energy efficiency, environmental friendliness and labour shortages in some countries. The impact of emerging technologies on the construction industry will certainly also affect the labour market, the future nature of work in the industry and skills requirements for the future. This in turn will require universities and other educational institutions to consider how they will ensure that the next generation is equipped to take full advantage of new technologies in a future construction world that will in many respects be very different from the one we know today. The next generation of construction workforce will work in a industry which differs in many respects from the industry we know today. Many of the young people entering the industry will be 'digital natives', who will naturally accept, if not demand, digitalisation. They need to be prepared for the new types of jobs which will be required in the new digitalised and automated construction world – many of which do not even exist today.

Digital transformation is one of the most significant global trends. It impacts every sector of society, driving progress, economic growth and quality of life. No industry is left untouched. Digital-related technologies such as mobile and cloud-based applications will underpin a number of other emerging digital and data technologies. These will in turn enhance the quality of data driven decision-making and productivity. Technological innovation is important, but it should be blended with other types of innovation such as business model and organisational innovation to achieve ultimate business success. As new technologies emerge, the nature of work and jobs change. It is typical for disrupted industries to experience technology-related labour upheavals, particularly during transitional periods. New types of jobs requiring new types of skills emerge. As mature technologies become obsolete, the jobs and skills they require, phase out. A number of emerging technologies are contributing to the automation of construction, lending weight to the notion of 'construction as a manufacturing process'. They will contribute significantly to productivity enhancement.

Statement of the problem

The construction industry conducts operations in several locations simultaneously — with employees, subcontractors and job managers often on job sites in different locations. With Intelligent Information Management platforms, employees and project contributors can access documents related to a job anywhere they might be. If an on-site project manager needs to access a blueprint drawing, for instance, they can pull it up within seconds on their tablet or smart phone. This transforms the way worksites operate and drives efficiency into the job site. Nowadays, Technology is more effective and always changing. For most people, implementing/using technology requires learning a new set of skills, and the learning curve can be steep. Embracing and implementing technology does not guarantee future success. So that, the researcher has find out the usages of technology how it will be effective in India.

Objectives of the study

The following are the objectives focused in this study:

1. To study the oldest technologies used by engineers for their work place.
2. To find out the various Digital Technology used by the Construction Industry and how they benefited them.

Methodology

Both Primary and secondary data were used for the study. Primary data were collected through interview schedule. A total of 50 engineers from the residential area in Thoothukudi were chosen for this study by using random sampling method. Secondary data were collected from websites, journals and books, etc. For analysis purpose statistical tools were applied such as percentage analysis, weighted average score and Garrett ranking method.

Analysis and Interpretation

The brief analysis and interpretation were discussed below

Table 1: Demographic profile of the respondents

Particulars		No.of.Respondents	% of Respondents
Gender	Male	47	94
	Female	03	06
	Total	**50**	**100**
Age	Upto 30	25	50
	30-40	18	36
	40-50	6	12
	50-60	1	2
	Total	**50**	**100**
Qualification	Engineering	37	74
	Diploma	13	26
	Total	**50**	**100**
Profession	Contractor	27	54
	Engineer	19	38
	Architect	4	8
	Total	**50**	**100**
Annual income	Below 2 lakhs	23	46
	2-4 lakhs	12	24
	4-6 lakhs	9	18
	Above 6 lakhs	6	12
	Total	**50**	**100**
Years of experience	Upto 10 years	29	58
	Above 10 years	21	42
	Total	**50**	**100**

Source: Primary data

The above table clearly explains the respondents' demographic details such as gender, age, qualification, income and their years of experience. It is evident from the above table majority of the respondents are male. 50 per cent of the respondents are comes under age group of up to 30 years. Regarding their qualification 74 per cent are engineering graduates. 58 per cent of them have upto 10 years of experience in their field.

Table 2 : Reason for adopting Digital Technologies

Digital Technologies	Garrett Mean score	Rank
Self healing concrete	54.98	I
Use of Augmented and virtual reality	46.1	VI
3D Printed	54.42	II
Robotics	45.22	VII
PV Building glazing	52.26	IV
BIM	50.9	V
Artificial Intelligence	52.38	III
Drones	43.7	VIII

Source : Primary Data

Garrett ranking technique is used by the researcher, to analyse the reasons for adopting digital technologies. "Self healing concrete" got first rank with the garrett mean score of 54.98, Drones got eighth rank with the garrett mean score of 43.7. It shows that engineers prefer to use self healing concrete technology to design their construction and they are less aware of drones used in the construction work.

Table 3: Problems of Digital Technology

Problems	V	IV	III	II	I	Total	Weighted Average	Rank
Technical Challenge	11 (55)	14 (56)	11 (33)	6 (12)	8 (8)	50 (164)	6.56	II
Skill and Training Challenge	10 (50)	8 (32)	12 (36)	11 (22)	9 (9)	50 (149)	5.96	V
Legal Procedural Challenge	9 (45)	12 (48)	9 (27)	13 (26)	7 (7)	50 (153)	6.12	IV
Economy	13 (65)	9 (36)	12 (36)	7 (14)	9 (9)	50 (160)	6.4	III
Increase unemployment	14 (70)	10 (40)	9 (27)	11 (22)	6 (6)	50 (165)	6.6	I

Source: Primary Data

The above table exhibits the Problems of digital technologies in construction industry. Weighted average method is used by the researcher to identify the major problems. 5 variables played a dominant role. Weights are assigned to each variable. From the above analysis it is clear that the main problem in digital technologies is "Increase unemployment" with the mean score of 6.6. "Legal Procedural challenge" is the least problem of digital technologies with the mean score of 6.12.

Recommendations

Based on the above findings the researcher suggests the following:

Regard to gender majority are male, Proper technical skills are given to female may increase their working knowledge.

Latest digital technologies are used by the respondents who are all in upto 30 years. Above 50-60 years respondents have no ideas on digital technologies. This may be their education system.

Regarding qualification level majority of them are Engineering graduates. Diploma holders have only little knowledge on digital technologies. So, Proper guidelines must be provided to diploma graduates.

Skill and Training challenge is the biggest challenge faced by the respondents. This is due to Proper skills are not given to them in higher education. Drones have the least important preferable digital technology among the respondents. This may be the cost effective.

Conclusion

Construction Industry is an extremely competitive sector where the stakes are high and operational efficiencies mean bigger profits. Construction industry is a multi-billion-dollar sector. The process of modernizing their business operation with digital transformation makes construction companies more efficient and more profitable. In India Number of digital technologies are used in construction industry but not yet familiar in compared to the foreign Industry because their education system is not effective in the manner and also the cost of these technologies advances should highest one.

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