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Impact of Technology in Construction Management

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Abstract: *Technology is re-shaping the face of the industry from its conventional perspectives to the modern era. The technological transition had begun by shifting away from the traditional method to reduce carbon emission, which is one of the unresolved mysteries of climate change. Technology can help the industry carry out large-scale projects while considering the impact on the environment as well. Earlier, there was a higher volume of waste produced at the site. One of the advantages of technological development is that it helps the industry to reduce, reuse and recycle materials which in turn largely reduces carbon emission by avoiding burning of waste materials.*

While minor construction projects can be managed manually from planning to execution, a company becomes handicapped when it executes large-scale projects. Without technology the process would be strenuous. Therefore, companies are investing a lot of money to develop internal software and application in order to manage projects under one roof. Application is developed in the way the project has been managed from pre-construction, scheduling, soil testing, designing, material procurement, supply chain, payment, field reporting to the back office and so on. The entire process documents have been uploaded to the cloud and can be accessed whenever any changes arise. Such a process would be seamless for companies and the customer to follow up on what is happening with the construction work. Technology helps bring transparency to one another..

Keywords: *Odisha Electricity Regulatory Commission (OERC), captive power sources, Indian Energy Exchange (IEX), etc*

I. INTRODUCTION

Everything evolves around technological advancements and transitions and that includes human beings too. If we detach from technology, the world will be in chaos and may even become a non-entity. Ever since technology spread its wings, most of the industry has transformed itself from manual work processes to complete automation. The construction industry cannot fly in the face of, instead, the industry had to embrace the new era.

The Indian construction industry stands as the second-largest employer, employing over 49 million people in the sector, and expected to become the world's third-largest construction market by 2025. The construction industry is expected to record a CAGR of 15.7 per cent to reach \$738.5 billion by 2022. Despite this robust growth in the industry, companies are grudging to invest on the technological front. According to the international data corporation, India's construction companies have spent around 1-3 per cent of their annual turnover on technology, and only 3 per cent of the companies are on their way to technological transformation.

II. LITERATURE REVIEW

A. Construction Technological Transition

Technology is re-shaping the face of the industry from its conventional perspectives to the modern era. The technological transition had begun by shifting away from the traditional method to reduce carbon emission, which is one of the unresolved mysteries of climate change. Technology can help the industry carry out large-scale projects while considering the impact on the environment as well.

Without technology the process would be strenuous. Therefore, companies are investing a lot of money to develop internal software and application in order to manage projects under one roof. Application is developed in the way the project has been managed from pre-construction, scheduling, soil testing, designing, material procurement, supply chain, payment, field reporting to the back office and so on.

B. Mobile Technologies

Construction companies are contemporarily adopting mobile technologies and mobile apps in order to superintend the project to maintain the process flawlessly. Mobile technology can collect real-time data and transmit it between the job site and project management team, which assists both to make alterations, if necessary. It allows submitting time cards, expense reports, work records and other documents, which save plenty of hours in data entry and increasing the productivity hours at the site.

C. Emergence Of Pre-Fabrication

Technology has brought an additional dimension to the construction industry, which is eco-friendly. In prefabrication construction, the building components are built offsite and then installed at the site.

D. Virtual Reality

Virtual reality, though in its nascent stage in India, has been a game-changer in the industry and has given customers an adequate understanding of what would be their future home designs and how will it look like. This helps them to pre-plan their home interiors and alter whatever they want before the construction itself.

E. Blockchain

Blockchain is another disruptive technology that can make a difference in the Indian construction sector. It can bring transparency between the two parties without any intermediary interferences. It is essentially about sharing databases and processes. It uses concepts such as artificial intelligence and the Internet of things to process run, by integrating databases in real time. For example, two users can edit Web documents simultaneously and upload the same document.

F. Artificial Intelligence

Artificial intelligence has the ability to solve a lot of problems by learning and helping the industry to protect itself from last-minute glitches. During the pre-construction stage, AI can be used to ensure a flawless construction process and avoid frequent changes in the plan. AI can be integrated with finance, marketing and procurement to keep the flow of work undisturbed.

III. TECHNOLOGY AND MATERIALS

Sustainability has been the main driver behind construction technology with the main goal centred on how the industry can continue to develop projects on a mass scale whilst considering the effects on the environment too.

Every year, more and more research is conducted to improve the longevity and safety of materials used in the construction of everything from large scale operations to our homes. From Cardiff University’s study on self-healing concrete to reflective self-cooling paint – sustainability and safety are at the forefront of developing construction materials.

IV. TECHNOLOGY AND METHODS

3D rendering software programs such as BIM allows projects to be designed digitally from start to finish. This means that the whole project team can analyse and plan the whole construction process before moving a single shovel of dirt. It also allows for step by step re-evaluation of the project and reduces the risk of any costly and timely errors.

Benefits of modular and pre-fabrication construction are:

- 1) Buildings produced in less time – up to 90% faster than conventional methods
- 2) Better construction quality management
- 3) Improves overall safety and security
- 4) Up to 80% less waste and more products recycled for future use
- 5) Reduces transport, labour and site preliminaries by around 80%

Whilst the many benefits of technology in the construction industry are clear, it’s important to note that not everyone in the industry will benefit from these changes.

Sample Dashboard of the planning and starting of the job (Manpower).

Table 1. Man Work Flow

Man Work Flow			
<p>Approve Work Permit Exceptional Workpermit</p>	<p>Create Work Permit 0 By Vendor</p>	<p>Start Work Permit 0 /... By LM</p>	<p>Work Permit Cancellation By LM</p>
<p>Work Permit Extension Approval By LM</p>	<p>Close Work Permit 249 By LM 0</p>	<p>Access Request Recommendation ... By LM to ACM</p>	<p>Approve Excavation Clearance Approve Excavation Clearance</p>















Machine Work Flow			
 Create Machine Request By LM	 Approve Vendor... 252 By RM	 Cancel Machine... 2126 By LM	 Extend Machine Request Approval By RM
 Machine Job Start 973 By LM	 Machine Job End 2 By LM	 View Machine Rate Chart View Machine Rate Chart	 Debit Note Detailed Report Debit Note Detailed Report

Table 2

Report & Status		
 View Work Plan View Work Plan	 View Work Permit View Work Permit	 Zone Access Report Zone Access Report
 View Machine Request By Vendor... View Machine Request By Status	 View Concrete Request Status View Concrete Request Status	 Weather Report Weather Report

V. REPORT AND STATUS FOR THE WORK.

Comparison of the technology

This technology for monitoring the real time progress is in the beta phase but potential is more to extract the real time data with date and still linking with cloud facility for data storage is for project end to end schedule is more. We can achieve more. Like BIM model gives the whole information about the structure.

Integration of the above process is used for the daily monitoring through schedule and real time use in Construction field. This is an online web-based application can be accessed from any-where and anytime. It can access the manpower and machinery list from excel based uploading facility. Further research for linking it to MS- Project Primavera for attending the critical path job and resource levelling in real time with web-based application.

Work Permit

Work Permit ID: 153776

Work Order ID: 3800015562-TATA PROJECTS LIMITED

Work Plan ID: 3062089

Date: 09/05/2021

Time Range: 09/05/2021,07:00 AM-09/05/2021,03:00 PM

Break Time Range: 01:00 PM-02:00 PM

Impact of technology in construction management

VI. SUMMARY

The Top Construction Industry Trends significantly improve efficiency, worker safety, construction speed, and implement sustainability practices. Collaborative robots, autonomous equipment, drone-based inspection, and laser-based terrain mapping reduce labor costs and increase accuracy. Further, companies use advanced materials such as self-healing concrete, engineered wood, and nanomaterials in modular construction and 3D printing. These materials ensure lower construction time and higher adherence to budgets. In addition to these, IoT-based solutions such as wearables, smart helmets, and vests enable remote worker monitoring while increasing worker protection.

REFERENCE

- [1] Ahmad, A., Jehanzeb, K., and Alkelabi, S. A. H. (2012). Role of Learning Theories in Training While Training the Trainers. *Int. J. Acad. Res. Business Soc. Sci.* 02(11), 181–189.
- [2] Ajzen, I. (1985). "From Intentions to Actions: A Theory of Planned Behavior," in *Action Control: From Cognition to Behavior*. Editors J. Kuhl and J. Beckmann (Berlin, Heidelberg: Springer), 11–39. doi:10.1007/978-3-642-69746-3_2
- [3] A. A., Olayiwola, J., Ogunseju, O., and McFeeters, D. (2020). Cyber-Physical Postural Training System for Construction Workers. *Automation in Construction* 117, 103272. doi:10.1016/j.autcon.2020.103272
- [4] Akomah, B. B., Ahinaquah, L. K., and Mustapha, Z. (2020). Skilled Labour Shortage in the Building Construction Industry within the central Region. *Baltic J. Real Estate Econ. Construction Manag.* 8 (1), 83–92. doi:10.2478/bjreecm-2020-0006
- [5] Anderson, L. W., and Krathwohl, D. R. (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman. Antonis,
- [6] K., Daradoumis, T., Papadakis, S., and Simos, C. (2011). Evaluation of the Effectiveness of a Web-Based Learning Design for Adult Computer Science Courses. *IEEE Trans. Educ.* 54 (3), 374–380. doi:10.1109/TE.2010.2060263
- [7] Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioral Change. *Psychol. Rev.* 84 (2), 191–215. doi:10.1037/0033-295X.84.2.191
- [8] Bass, B. M., and Vaughan, J. A. (1968). *Training in Industry: The Management of Learning*. Belmont, Calif.: Wadsworth.
- [9] Begum, R. A., Siwar, C., Pereira, J. J., and Jaafar, A. H. (2009). Attitude and Behavioral Factors in Waste Management in the Construction Industry of Malaysia. *Resour. Conser. Recycl.* 53 (6), 321–328. doi:10.1016/j.resconrec.2009.01.005
- [10] Bena, A., Berchiolla, P., Coffano, M. E., Debernardi, M. L., and Icardi, L. G. (2009). Effectiveness of the Training Program for Workers at Construction Sites of the High-Speed Railway Line between Torino and Novara: Impact on Injury Rates. *Am. J. Ind. Med.* 52 (12), 965–972. doi:10.1002/ajim.20770
- [11] Bhandari, S., and Hallowell, M. (2017). Emotional Engagement in Safety Training: Impact of Naturalistic Injury Simulations on the Emotional State of Construction Workers. *J. construction Eng. Manag.* 143 (12). doi:10.1061/(ASCE)CO.1943-7862.0001405
- [12] Bloom, B. S. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals*. New York, NY: D. McKay.
- [13] Bressiani, L., and Roman, H. R. (2017). The Use of Andragogy in Civil Construction Capacity Building Courses. *Gestão & Produção* 24 (4), 745–762. doi:10.1590/0104-530x2245-17
- [14] Cho, C.-S., Mazze, C. E., Dika, S. L., and Gehrig, G. B. (2015). Enhancing Construction Education: Implementing Habitat for Humanity Projects as Service-Learning for Construction Materials. *Int. J. Construction Educ. Res.* 11 (1), 4–20. doi:10.1080/15578771.2014.915274
- [15] Choudhry, R. M. (2014). Behavior-based Safety on Construction Sites: A Case Study. *Accid. Anal. Prev.* 70, 14–23. doi:10.1016/j.aap.2014.03.007
- [16] Detsimas, N., Coffey, V., Li, Z. M., and Mei, L. (2016). Workplace Training and Generic and Technical Skill Development in the Australian Construction Industry. *J. Manag. Develop.* 35 (4), 486–504. doi:10.1108/JMD-05-2015-007
- [17] Douglas-Lenders, R. C., Holland, P. J., and Allen, B. (2017). Building a Better Workforce. *Et* 59 (1), 2–14. doi:10.1108/QRAM-10-2015-0095
- [18] 10.1108/et-10-2015-0095 *Frontiers in Built Environment* | www.frontiersin.org June 2021 | Volume 7 | Article 6359789



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