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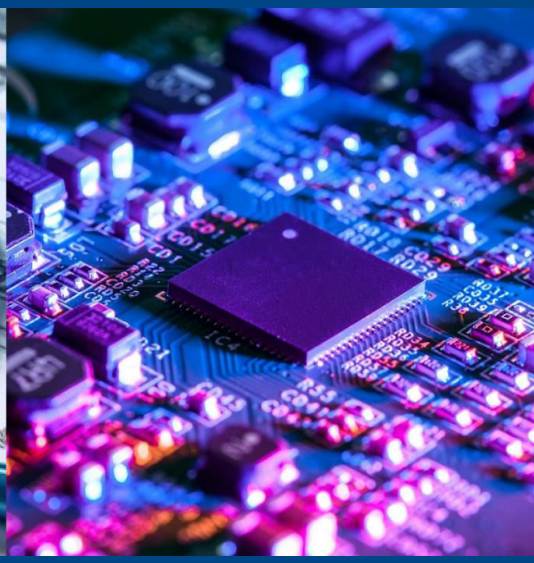

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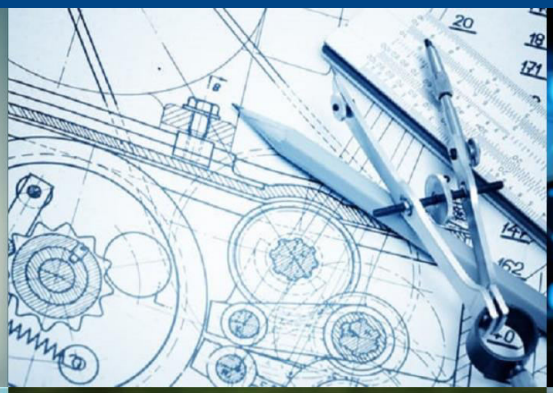

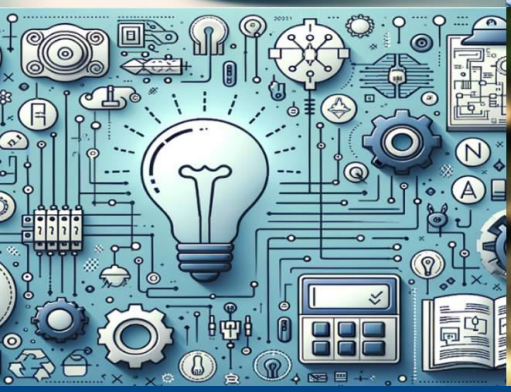

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Strategies for Accelerating Construction Timelines

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ABSTRACT: Timely completion of construction projects is vital for economic success, reputation, and overall project management efficiency. However, contrary to the commonly discussed issue of construction delays, there exist many scenarios where work is completed earlier than scheduled. This study explores the factors, methodologies, management practices, and technological tools that contribute to early completion of construction works. The research is based on case studies, expert interviews, surveys among construction professionals, and secondary data analysis. Findings suggest that effective planning, modern construction technologies like BIM and precast systems, contractor motivation through incentives, and strong stakeholder coordination are major drivers behind early project completion. The study proposes a framework for promoting early completion culture in the construction industry.

KEYWORD: Construction Management, Early Completion, Work Acceleration, Project Management, Productivity, Lean Construction

I. INTRODUCTION

The construction sector often grapples with delays, cost overruns, and quality issues. However, instances of early project completion—though less common—present significant strategic and economic advantages. Early delivery not only enhances client satisfaction and profit margins but also improves market reputation and opens avenues for earlier revenue generation. Despite these benefits, early completion remains an under-researched topic in construction literature.

II. METHODOLOGY

A quantitative research approach was used, involving:

- A structured questionnaire survey distributed to 25 professionals (project managers, engineers, contractors) in Amravati
- Five-point Likert scale responses
- Data analyzed using Relative Importance Index (RII)

The survey assessed opinions on planning, workforce motivation, use of technology, and the impact of financial incentives on project timelines.

III. RESULTS AND ANALYSIS

Key Drivers of Early Completion

Factor	RII
Incentives	0.800
Technology	0.768
Leadership	0.768
Planning	0.712

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Interpretation: Incentives were rated the most influential factor, followed by technology and leadership. Planning remains a fundamental but comparatively under-leveraged factor.

Major Constraints Affecting Early Completion

Constraint	RII
Worker agreements (e.g. unions)	0.784
Labor fatigue/health	0.760
Equipment breakdown	0.736

Interpretation: Labor-related issues are significant barriers. Structured agreements and health-related delays reduce flexibility and responsiveness on-site.

Importance of Planning

The statement "Early project completion is rarely possible without proactive planning" had the highest RII (0.808), confirming the foundational role of planning in project acceleration.

Role of Financial Incentives

Without financial incentives, there is a noticeable decline in urgency (RII = 0.752). Milestone-based rewards improve time management and productivity.

Impact of Technology

Technology Type	RII
Advanced Machinery & Automation	0.768
3D Printing in Construction	0.744
Construction Management Software	0.720

Interpretation: Modern equipment outperforms digital tools in perceived impact on speed, though software and 3D printing also contribute meaningfully.

Workforce Motivation

Motivated teams consistently outperform less engaged ones. Financial and non-financial recognition (RII = 0.760) directly impacts speed and efficiency.

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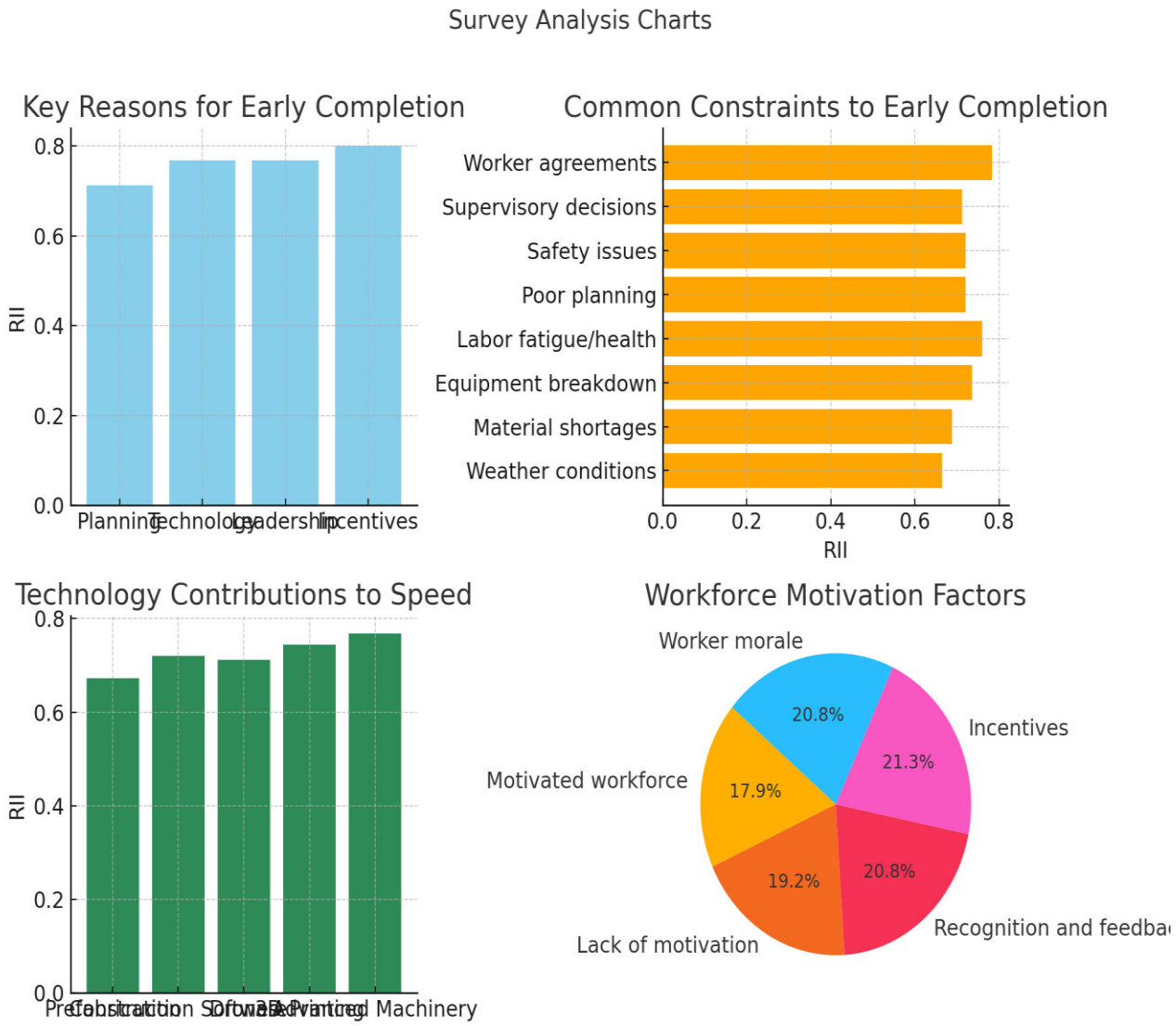

Figure 1: Key Reasons for Early Completion
This bar chart shows that 'Incentives' received the highest RII score (0.800), making it the most significant factor for early project completion. Technology and Leadership followed closely, indicating that effective management and modern methods strongly influence timelines.

Figure 2: Common Constraints Impacting Early Completion
The horizontal bar chart indicates that union-related rules and labor fatigue were top challenges to early project delivery. These findings emphasize the need for human resource planning and flexibility.

Figure 3: Construction Technologies That Accelerate Progress
Among technologies evaluated, advanced machinery and automation led with the highest RII, followed by 3D printing and construction software. These tools are essential to streamline work and reduce manual delays.

Figure 4: Workforce Motivation Factors
This pie chart illustrates the proportional influence of motivation parameters. Incentives and worker morale emerged as dominant contributors to efficiency, underlining the value of recognition and performance-based rewards.

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1. Key Reasons for Early Completion (Bar Chart)
- Incentives (RII = 0.800) were the top driver of early project delivery.
- Technology and Leadership followed closely (RII = 0.768 each).
- Planning, while important, was relatively lower in priority (RII = 0.712).

2. Common Factors Hindering Early Completion (Horizontal Bar Chart)
- Worker agreements/union rules (RII = 0.784) and Labor fatigue/health concerns (RII = 0.760) were top constraints.
- Other barriers included Equipment breakdowns, Poor planning, and Material shortages.

3. Construction Technologies That Accelerate Progress (Bar Chart)
- Advanced Machinery & Automation (RII = 0.768) had the greatest perceived impact.
- 3D Printing and Construction Software also ranked high.
- Prefabrication, although helpful, had slightly lower influence.

4. Workforce Motivation Factors (Pie Chart)
This chart highlights how different aspects of motivation affect project speed:
- Financial/Non-financial Incentives and Recognition were the most impactful.
- Worker morale and Lack of motivation also had notable roles.

IV. CONCLUSION

The study confirms that early project completion is not accidental but the result of deliberate and well-coordinated actions. The most influential enablers include:
- Structured incentive systems
- Advanced construction technologies
- Proactive and continuous planning
- Workforce recognition and motivation

Addressing constraints such as labor fatigue and rigid union rules is also essential. The results suggest that construction firms can achieve early delivery by integrating strategic planning, modern tools, and human resource empowerment from project initiation.

V. RECOMMENDATIONS

1. Develop Robust Incentive Programs: Tie bonuses to milestone achievements to increase urgency and motivation.
2. Emphasize Planning at Every Phase: Use CPM, Gantt charts, and contingency scheduling to stay ahead.
3. Invest in Construction Technology: Deploy automation, drones, and BIM for faster and smarter construction.
4. Enhance Labor Conditions: Address fatigue and provide continuous training, rest periods, and health coverage.

REFERENCES

[1] Abdullah M. Tawfek et. al. “Delay in Construction Projects: Types, Causes and Effects” Project Management Practices, (2018)
[2] Serdar Durdyev et. al. “Causes of delays on construction projects: a comprehensive list” International Journal of Managing Projects in Business, (2018)
[3] Mohd Danish et. al. “Delay In Construction Project” International Journal of Advance Research and Innovative Ideas in Education, Vol-5, Issue-4, (2019)
[4] Abdurezak Mohammed Kuhil et. al. “Causes of Delay in Public Building Construction Projects: A Case of Addis Abeba Administration, Ethiopia” Asian Journal of Managerial Science, Vol.8 No.2, (2019)
[5] James G. Zack et. al. “Early Completion Schedules: A Form Of Contingency Bidding – Revisited” Navigant Consulting, Inc. – (2015)
[6] Benjamin Boahene Akomah et. al. “Contractors’ commitment to early completion of projects” Australian Journal of Science and Technology, Volume 4; Issue 2; (2020)
[7] Abhiram Reddy Anireddy et. al. “Impact of Technology on Construction: The Role of Building Information Modeling (BIM) in Modern Construction Projects” International Journal of Innovative Research in Engineering & Multidisciplinary Physical Sciences • (2024)

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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[8] Doaa Sameer Abdullah et. al. "Impact of Construction Systems on Project Timelines: A Case Study of Multi-Floor Affordable Residential Buildings" International Journal of Sustainable Development and Planning, Vol. 18, No. 10, (2023)
[9] H Agenbag and C Amoah et. al. "The impact of modern construction technology on the workforce in the construction industry" IOP Conf. Series: Earth and Environmental Science (2021)
[10] Kerzner, H. (2017). Project Management: A Systems Approach to Planning, Scheduling, and Controlling. Wiley.
[11] Ghosh, S., & Jha, K. N. (2015). Identifying Causes of Construction Delays in India. Construction Management and Economics.
[12] Shanmugapriya, S., & Subramanian, K. (2016). Investigation of Significant Factors Influencing Time and Cost Overruns in Indian Construction Projects. Journal of Construction Engineering.
[13] Eastman, C., Teicholz, P., Sacks, R., & Liston, K. (2018). BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers. Wiley.
[14] Lean Construction Institute (LCI). (2020). Lean Project Delivery System: An Update. International Journal of Project Management, various volumes.
[15] Ministry of Housing and Urban Affairs (India). (2022). Report on Construction Productivity Trends in India.
[16] PMI (2021). A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – 7th Edition.
[17] Interviews and surveys conducted at Larsen & Toubro and Sobha Ltd. (2024).
[18] McKinsey & Co. (2020). Reinventing Construction: A Route to Higher Productivity
[19] Tsegay Gebrehiweta et. "Analysis of Delay Impact on Construction Project Based on RII and Correlation Coefficient: Empirical Study" Science Direct Procedia Engineering 196 (2017)
[20] Shanshan Zhonget. al. "Key factors affecting the decision-making process for buildings projects in Egypt" Ain Shams Engineering Journal September 2021
[21] AyshaShahidet. al. "Analysis Of Key Performance Factors Affecting Residential Construction Projects In Pakistan" Arabian Journal of Business and Management Review Vol. 3, No. 10, 2015
[22] Ghulam Abbas Niazaiet. al. "Causes of Project Delay in the Construction Industry in Afghanistan"
[23] Shumank Deep et. al. "Review Of Various Delay Causing Factors And Their Resolution By Application Of Lean Principles In India" Baltic Journal of Real Estate Economics and Construction Management November 2017 ISSN:2255-9671
[24] ShitawTafesseet. al. "A Review on the Critical Factors Causing Delay of Delivery Time in Construction Projects" International Journal Of Engineering Technologies-IJET Tafesse, Vol.6, No.4, 2020
[25] Yahya Nasser Alfraidiet. al. "Risk matrix for delay causes in building construction projects in KSA" International Journal of Advanced and Applied Sciences 9 April 2018.
[26] BhawaniDhakalet. al. "Assessment of Delay Factors and its Impacts on Selected Road Construction Supervised by Department of Road" Journal of Advanced Research in Construction and Urban Architecture Volume 6, Issue 2 - 2021
[27] YogitaGajareet. al. "Assessment Of Significant Causes And Effects Of Delays On The Projects Completion Period" IJMTER 2014 e-ISSN:2349-9745
[28] Hussein Abdellatifet. al. "Major Factors Causing Delay in the Delivery of Manufacturing and Building Projects in Saudi Arabia" MDPI ,8 April2019
[29] Anita Rauzanaet. al. "Analysis of Causes of Delay and Time Performance in Construction Projects" IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 13, Issue 5 Ver. III (Sep. - Oct. 2016)
[30] C. Devika Mohan et. al. "Analysis and Modelling of Factors Causing Delay in Road Construction Projects" The Asian Review of Civil Engineering ISSN: 2249 - 6203 Vol. 7 No.1, 2018
[31] Phaniraj K et. al. "Practical Factors Affecting Delay in High Rise Construction – A Case Study in a Construction Organization" International Journal of Engineering Research & Technology (IJERT) 2014
[32] Pai, S.K. and Bharath, J.R., 2013. "Analysis of Critical Causes of Delays in Indian Infrastructure Projects" International Journal of Innovative Work and Development|| ISSN 2278–0211, 2(3),pp.251-263
[33] Chaphalkar, N.B. and Sandbhor, S.S., 2012. "Comparison of provision for escalation in various Indian construction contract forms." Journal of Construction Engineering, Technology & Management.

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