

Major Project (4th Semester)

“Study on Web based Project Management in Construction: Current state,
recent trend”



**Under the esteem guidance of
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Submitted by

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May 2023

II. CERTIFICATE

This is to certify that Mr. Gaurav Suman, have completed the project titled “Study on Web based Project Management in Construction: Current state, recent trends” under the guidance of ***Mr Mohit Beniwal, Associate Professor***, as part of Master of Business Administration (MBA) curriculum of Delhi School of Management, New Delhi. This is an original piece of work and has not been submitted elsewhere .

Dr Archana Singh

Head of Department

Delhi School of Management,
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III. DECLARATION

I, the undersigned, hereby declare that the project report entitled, “Study on Web based Project Management in Construction: Current state, recent trends” submitted to the **Delhi School of Management**, Delhi Technological University, New Delhi, in partial fulfilment of the requirement for the award of the degree of Master of Business Administration under the guidance of **Prof. Mohit Beniwal**, Associate Professor is my original work, and the conclusions drawn therein are based on the material collected by myself.

The Report submitted is my own work and has not been duplicated from any other source. I shall be responsible for any unpleasant moment/situation.

Place: New Delhi

Date: 19.05.2023

Name: GAURAV SUMAN

Roll No.: 2K21/EMBA/14

IV. ACKNOWLEDGEMENT

A successful project is the result of teamwork and co-ordination that includes not only the group of developers who put forth the ideas, logic, and efforts but also those who guide them. So, at the completion of the project, I feel obliged to extend my gratitude towards all those who made valuable contributions throughout my training period.

I am thankful for all the knowledge, guidance, and support imparted by Dr / Prof. Archana Singh, H.O.D, Delhi School of Management to me who gave me invaluable knowledge during the project period.

In addition, I wish to convey a deep sense of gratitude towards Dr Archana Singh, Head of the Department, Delhi School of Management at any time I needed.

In the end, just as significantly, I would like to express my sincere thanks to, Prof. Mohit Beniwal, Prof. Saurabh Agrawal and all the other staff members who have provided me with excellent knowledge and support throughout my Post Graduation.

I am very much thankful to my parents for their continuous support.

V. EXECUTIVE SUMMARY

The construction sector has entered a new phase with the start of the new millennium. A decade ago, the idea of managing such projects using web-based methods seemed like a vision, but it is now much more feasible. Internet and related technologies (such as Intranet and Extranet) can be used efficiently to accomplish contractual, organisational, and informational integration throughout the construction process.

Significant changes in the project management environment over time have shifted businesses from sticky notes to enterprise SaaS based solutions. Organisations must keep up with these developments or risk failing as project management continues to significantly evolve with the introduction of emerging technologies and management paradigms.

This has become more apparent recently because 2020 is such a tumultuous year. The effects of the widespread closures and global lockdowns experienced at the time are still being felt in 2023. As businesses scurry to adopt cutting-edge project management techniques, those disruptions have undoubtedly influenced future trends in project management.

In this paper, my attempt has been in the line with to identify the factors and the most recent trends that have been active in Project management, as myself has been involved in the Construction industry. This paper also provides an overview of existing and new web-based processes and tools, including virtual online design studios, online bidding, online project management, and project monitoring and control via webcams. Emerging trends in Information and Communication Technology based building project management are investigated and highlighted

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Abbreviations

EVM Earned Value Management
EVA Earned Value Analysis

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 What is Construction?

Construction is a process where a portable plant is set up, materials are brought to the site, and after the operation is over, the plant is moved away, leaving its output standing. Its outputs are of immobile in nature such as airports, roads and tunnels, power plants and nuclear plants etc.

Why it is important?

The said industry contributes about 12% of the world's GDP and employs a wide range of auxiliary goods and services, such as raw materials, chemicals, electrical equipment, and related services, making it vital to the world economy.

1.1.2 Construction Industry in India

India's construction industry is an important indicator of the prosperity of the nation because it creates investment opportunities in several related businesses. The contribution of the construction sector to the national GDP in 2011–12 was around 8.2%, or \$670,778 crores (US\$ 131 billion) at factor cost. The sector is divided into small and medium-sized contractors that carry out the work in the field as subcontractors as well as a select few sizeable businesses that are involved in construction activities across all segments. There were little over 500 manufacturing companies in India producing construction equipment in total in 2011. The industry is labor-intensive and employs around 49.5 million people, including indirect jobs.

1.1.3 Characteristics of Construction Industry

Following are the parts of the characteristics:

I) Physical nature

- Large, Heavy and Expensive
- Require large working area

II) Use of Product

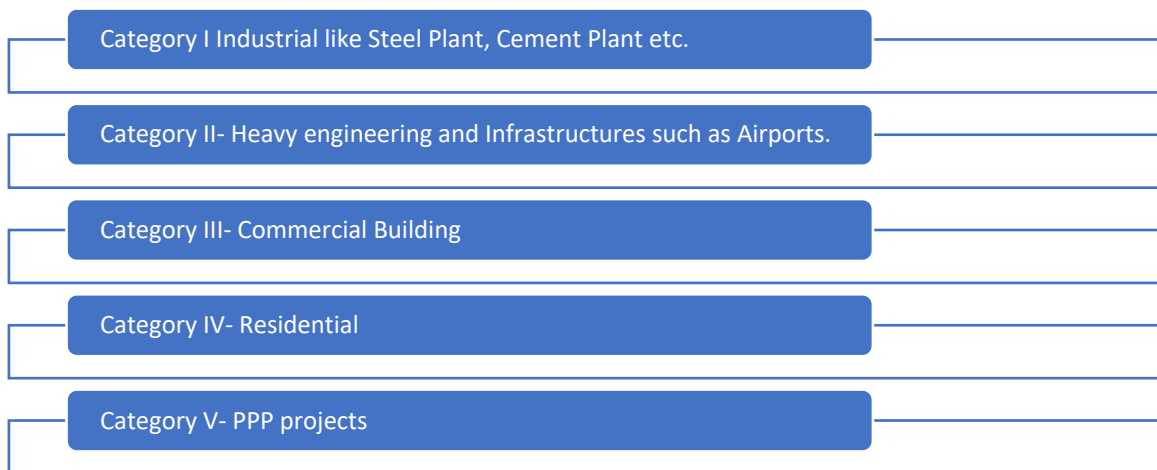
- Provide basic infrastructure to economy
- A social investment
- Provides direct employment

- III) Many parties involved in the process like Owner, Architect, Contractor, sub-contractors, materials and equipment services, labour employment.

1.1.4 What is Project?

Project is anything that has a specified START and END point as well as defined OBJECTIVES that indicate when it has been completed. In actuality, the majority of projects rely on constrained RESOURCES to achieve their goals.

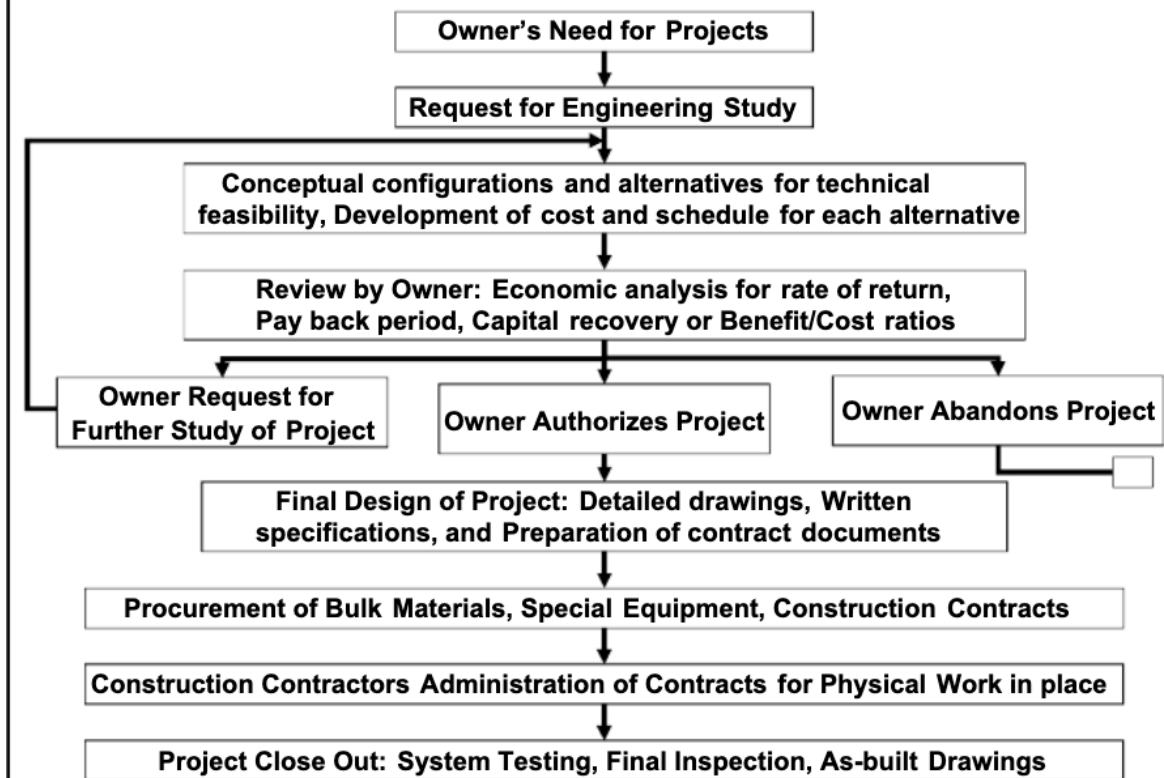
Types of Projects under Construction Industry.



1.1.5 Phases of Projects

- Business Planning
- Conceptual Design
- Detailed design
- Procurement
- Construction
- Testing, Start-up & Implementation
- Operations & Utilization
- Decommissioning

Phases of a Project II

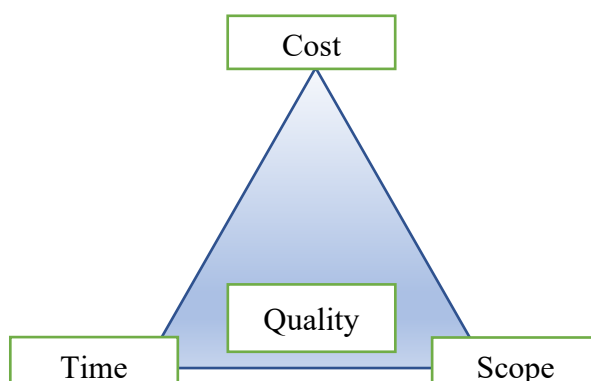


1.1.6 What is Project Management ?

A method of managing a project's human and material resources to achieve established objectives for scope, quality, time, and cost as well as participant satisfaction.

1.1.7 What is Construction Management ?

Construction management is the activity of managing the construction process. The construction manager is in charge of managing the essential resources utilised in building, such as labourers, independent contractors, tools, and materials resources revenue, expenditures, and cash flows and duration.



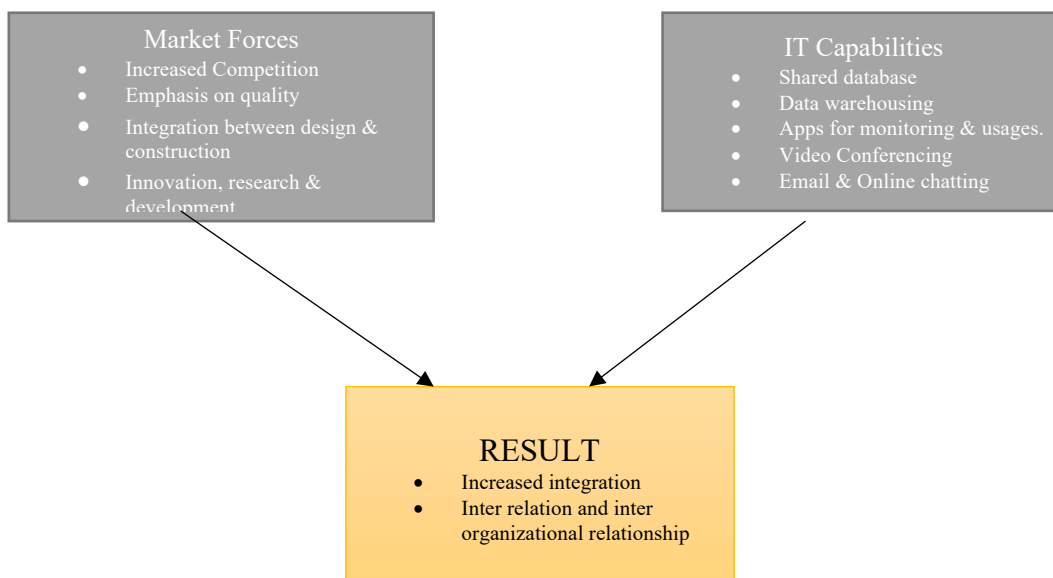
1.2 Impacts of Information Technology in Construction ?

Construction is a multi-organizational activity that relies heavily on the exchange of massive, complex data. The successful completion of a project depends on the communication and data exchange between the project teams being accurate, effective, and timely. An increasing need for effective information processing and exchange is influenced by the degree of job ambiguity, the number of organisational units involved, and the degree of interconnection among the units. Information sharing between participating organisations and inside organisational units can significantly integrate the building processes.

Information technology (IT) is expanding opportunities for the construction sector, and as a result, design and construction organisations are being faced with new challenges. IT can no longer be seen as a supplement to conventional methods of construction but rather as an innovative force that opens up fresh possibilities for structuring and managing construction businesses.

However, there are following points in which IT is helping Construction Industry

- Contribution in better quality management
- Efficient collaboration like design quality, reduces error & rework
- Improved cost control
- Advanced BIM and 3D pre view
- Enhances relationship with clients
- Elevates safety training
- Cloud based information sharing Apps
- Provides opportunities to innovate



1.2.1 Information Management & Services

All aspects of data gathering, archiving, organisation, and retrieval are covered by the information management area of IT. Internal (project/company) and external (industry) standards are essential for complete integration in the process. Shared databases, data normalisation techniques, data warehousing, barcode technology, and CAD graphics are a few examples of advancements in this area. Most construction firms today use the internet as one of their most effective and potent advertising methods.

A company's website often includes a corporate profile, a list of services or goods, current projects, open opportunities, and a section for public input. The employee directory, business policy, bulletins, and manuals are just a few examples of the materials made available to personnel via intranets. Details about outgoing projects that are presented to the business partners, e.g. project description, contract documentation, project documents or Project Directory, may be included in extranets.

1.2.2 Web Based Construction Project Management

As an outcome of the convergence of information services, communication, and computing functionality in Web technologies, construction professionals may now manage Web-based projects online. Because of its benefits over competitors or because their clients forced them to, this technology has been adopted by many construction companies around the world.

1.2.3 Virtual online design related support

Utilising audio and video conferencing, the virtual design studios enable interactions between designers and specialists from various locations. They can enter the same virtual reality realm by using the same screen and programme. This enables talking about almost any topic without having to go.



1.2.4 Online Bidding System

There are already numerous uses for one-way electronic bidding systems. These allow bidders to deliver bids on paper and download bid packages from websites, while occasionally bids must also include data on CDs. Some companies have recently developed online systems that enable bid documents to be uploaded and changed prior to the bid deadline in order to facilitate two-way bidding. This will decrease a substantial amount of paperwork, saving time and money.

1.2.5 Project Administration & Monitoring

The online project management systems can offer constant updates on the project's status, a list of consultants, vendors, and suppliers, project drawings and specifications, project control reports, and the ability to make change orders online. Many construction firms are implementing such systems to improve communication between the main office and the remote project sites, which could save time and money. During the pandemic, the construction of the bridges, which was built in a remote area, is a great illustration of how this technology was used. With the advent of Web technology, it was possible for scattered construction teams to effectively collaborate as one team while exchanging images, papers, and live recordings

Use of Web Cams & other video conferencing App

It may seem like a tiny step to use dedicated video cameras to remotely monitor building sites through the Internet, but the Web-cam's unflinching eye could prove crucial to a project management revolution. The 24-hour digital views and archives of project progress are acting as neutral dispute arbiters, among other things. No matter the weather or safety situation, Web cams continuously record images, saving you hours or even days of journey time. Additionally, each photograph has a date and time stamp and is saved for archival purposes.

Also, I have used Google meet to conduct monitoring and providing necessary instruction through it.

1.2.6 Setting up Web based PMO

When a company in the construction industry chooses to employ a Web-based project management system, it has two alternatives for how to build the system: either internal development or involving a certified consultant to do this task.

The business requires the following hardware, software, and interfaces for the first choice.

- i) A robust server for computing and information transfer.
- ii) The capacity to securely access information within the project circle via the Internet, Intranet, or Extranet.
- iii) Software for managing construction projects on the web that was created specifically with the organisational and requirements of the enterprise in mind.

Companies with modest resources can create their own web-based project management systems using the second approach. To meet the needs of the business's Internet advertising, consultants may be recruited to create a Web page. Commercial Web-based programmes like Primavera, etc. can be used for additional services.

1.2.7 Recent Trends in Construction Project Management

Whatever trends in managing projects will we observe with regards to resource allocation, teamwork, techniques, and tools? How will the participants' roles in the project environment change? What fresh difficulties will the PMO face?

I. Trend 1: Artificial Intelligence in Project Management

The ChatGPT chatbot has been generating headlines in the media since late 2022. This bot generates replies from publicly available data that are, for the most part, shockingly accurate. The artificial intelligence (AI) technology has so far been taught using data from the internet through 2021.

We observe an upward trend in the use of AI in the workplace. At this point, general queries are frequently extremely well served by technologies like ChatGPT. This does not apply, however, to responses to questions about problems specific to a particular project, for instance, as the bot lacks the necessary unique data.

Presently, tool manufacturers largely advertise AI support, which can also be obtained from the project data already there with adequate reporting. There is currently no more data produced by AI with extra value. Following areas would benefit from AI support:

- a) Auto resource level

b) Automatic project plan updates.

II. Trend 2: AI enabled Software such as BIM, StormCAD etc.

To increase the overall effectiveness and accuracy of construction projects, artificial intelligence can be applied in BIM for activities like collision detection, material optimisation, predictive maintenance, and energy efficiency analyses.

III. Trend 3: AI enabled Project Management tool

By supporting and enhancing human actions, enable the project management process. These solutions combine infinite processing power with machine learning to give meaning to data and support critical business choices.

IV. Trend 4: Resource planning is becoming increasingly crucial

AI-driven software systems have advanced to the point where they can now read, recognise voice, carry out transactions, place orders, make forecasts, and carry out various business resource management-related operations

V. Trend 5: Soft and social skills for project managers

Non-technical abilities known as "soft skills" define how you collaborate and communicate with others. Unlike hard talents, such as data analytics or programming, they may not be something you learn in a school. Instead, they demonstrate your manner of speaking, work ethic, and working style.

VI. Trend 6: Emotional intelligence and mental health skills for project managers

Due to their high self-awareness, emotionally intelligent project managers are able to align their aims and behaviours in order to effectively interact with others. They are aware of the effects of their verbal and nonverbal cues. Share some of your feelings and opinions while keeping in mind how others might respond.

CHAPTER 2

OBJECTIVES OF THE STUDY

2.1 OBJECTIVES OF STUDY

- To identify the Web based construction project management: Trends and potentials
- To identify what are the factors which is shaping the Project Management
- Null Hypothesis : No relation between the current trends and project management techniques.
- Alternative hypothesis: Some relation between the trends and ongoing project management

2.2 SCOPE OF STUDY

The main ideas are derived from a combination of our own experience and information from public sources. Based on evaluations and estimates, you will be able to implement the best techniques for your project management environment.

Through a set of questionnaires asked from a PMO, of an design firm based at Kolkata, India. Their inputs have been written after interviewing them and the questionnaires were prepared

CHAPTER 3

LITERATURE REVIEW

3.1 Literature Review

Why it is necessary to study the implication of ICT in Construction project Management?

To understand the implementation of web based solutions in construction project management has emerged with the introduction of AI such as ChatGPT and its prospected application in the existing system. How well is the professionals are ready to accept the changes if so ever happen.

Why is required the most recent trends in Project management and its application?

It is always believed that the amendments are studied for a goal in management that is better decision making. The applicability and study will eventually help and also prepares us for the changes and so on the industry.

How the literature was reviewed ?

The literature “ Web based Construction Project Management: Current state, Trends and Potentials: Ahmad, Irtishad, Ahmed, Syed M and Azhar, Salman published in 2000 was taken in consideration. The journal was studied thoroughly and found relevant to the topic.

Similarly, a journal related to the topic and most recent, Strasser, Johann and Paules, Anna; was also studied to find the recent trends and how ICT is shaping the current Construction project management.

Subsequently, the topics was implemented on a small sized PMO and further studied about the trends and its application for the possibilities in India.

CHAPTER 4

RESEARCH METHODOLOGY/ DESIGN

4.1 Methodologies

The methodology are the systematically way to solve the research problems. It encourages the researcher to conduct their work in a scientific manner. It includes many methods that are typically used by a researcher to investigate his research problem, as well as the reasoning behind them.

4.2 Research Design

A research design is the arranging of parameters for data collecting and analysis in a way that could lead to process economy. It refers to scheduling in advance the gathering of pertinent information and the analytical methods to be employed while keeping the research's goal and time constraints in mind.

Types of research designs considered are as follows:

- Exploratory research.
- Conclusive research
 - i. Descriptive research.
 - ii. Causal research
- Performance monitoring design.

Descriptive research design was the methodology utilised in this study. It consists of several types of surveys and fact-finding inquiries. design. It includes surveys and fact-finding enquiries of different kinds.

Explanation of Method

43 corporate employees are expected to take in a survey that is based on research to determine the most recent trends in building project management. We chose descriptive and exploratory research, both of which heavily relied on primary data. It will therefore be required to research the procedure. The analysis would

make use of the random sampling technique. of data. The sample covered the employees from all engaged staff.

Sampling Techniques

The simple random sampling technique was employed in the selection of the sample.

Sample size:

43 Employees

DATA COLLECTION

Study Conducted

The primary data was collected through personal interview based on the structured questionnaire.

Primary Data

Information acquired regarding meeting strategy and unaware perception. The information is obtained through the operation of several divisions and, in addition, through interviews with the directors of a sizable number of offices. Additionally, it is acquired with the aid of staff members.

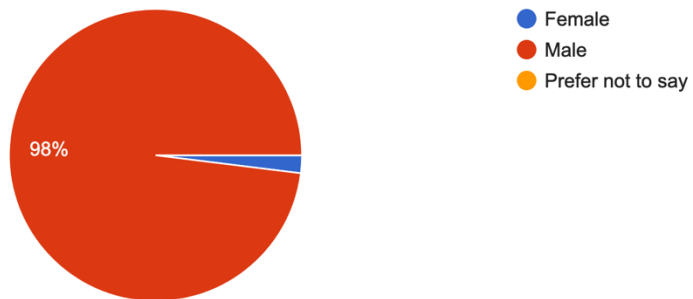
Secondary Data:

The information gathered through the company's website and the Internet is classified as secondary data.

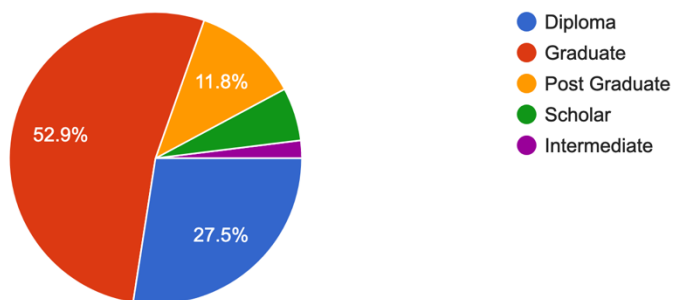
CHAPTER 5

DATA ANALYSIS AND DATA INTERPRETATION

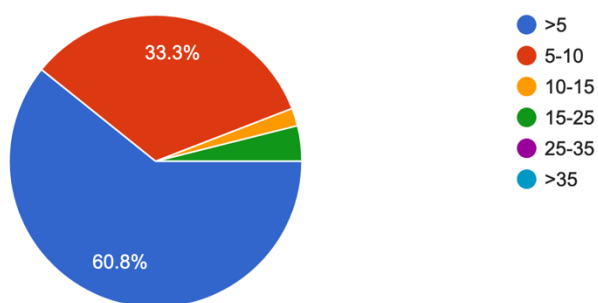
Gender ?
51 responses



Your highest educational Qualification?
51 responses

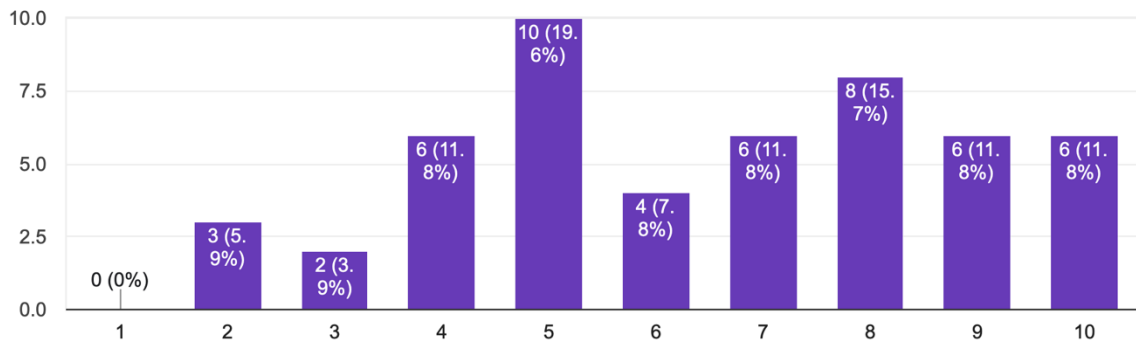


Year of experience in Construction sector?
51 responses



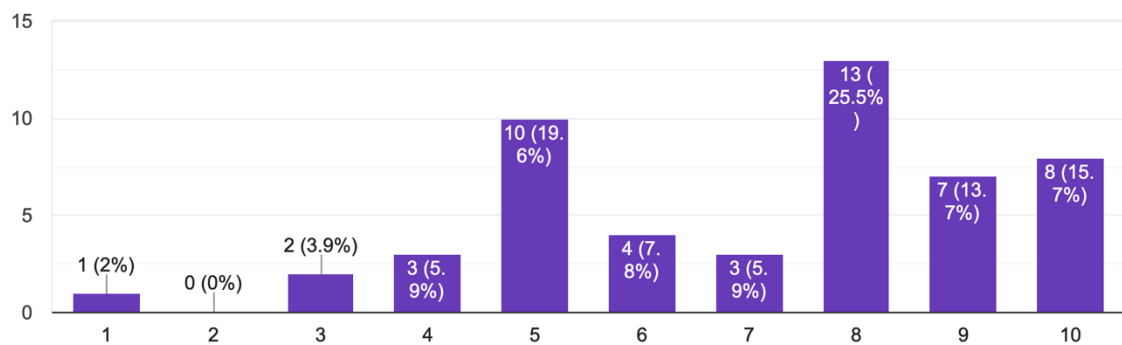
Please rate if you believe that introduction of Artificial Intelligence (AI) is current trend in Construction Project Management?

51 responses



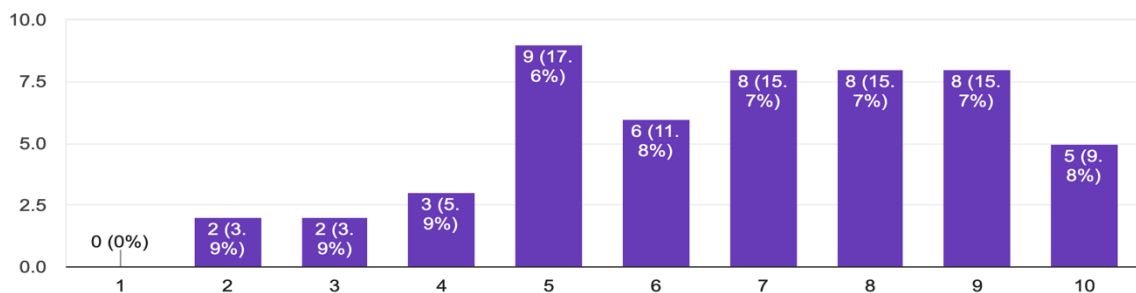
Please rate if you believe that AI enabled tools such as BIM, Water/Sewer/Drain design will help in project management ?

51 responses



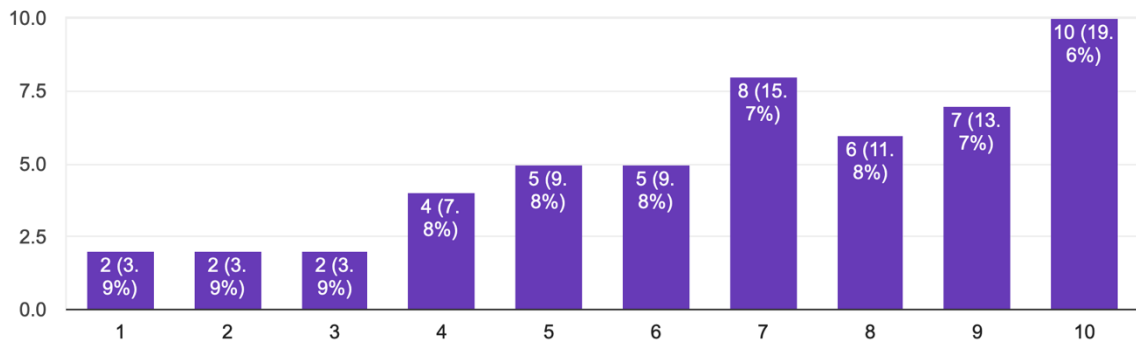
How satisfactory will you find that the AI enabled project management tool will be more resourceful ?

51 responses



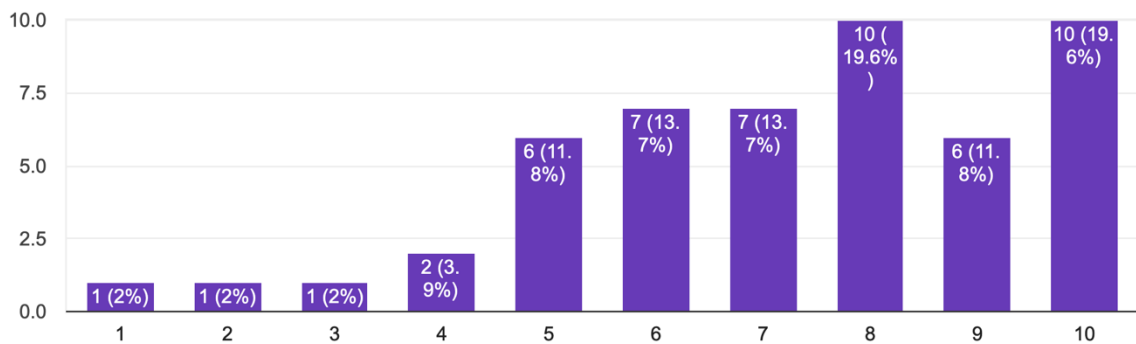
Please rate if you were given a chance to work remote, it may have the good source for exploring and learning?

51 responses



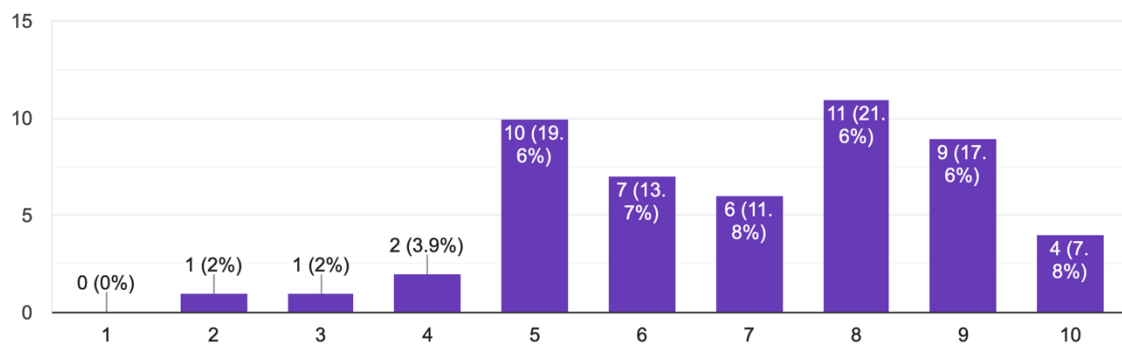
Please rate if you believe that the Project Manager should be more emotionally intelligent ?

51 responses



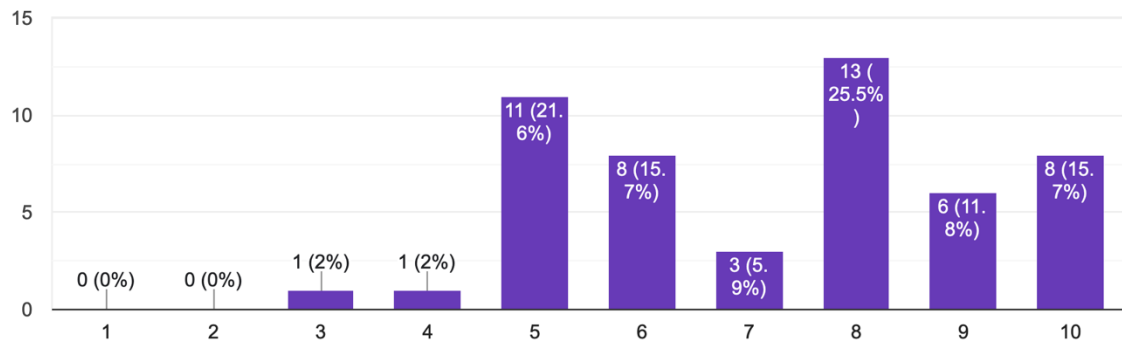
Please rate if you believe that more Data Analytics tools should be used in project management techniques such as delay analysis or resource management?

51 responses



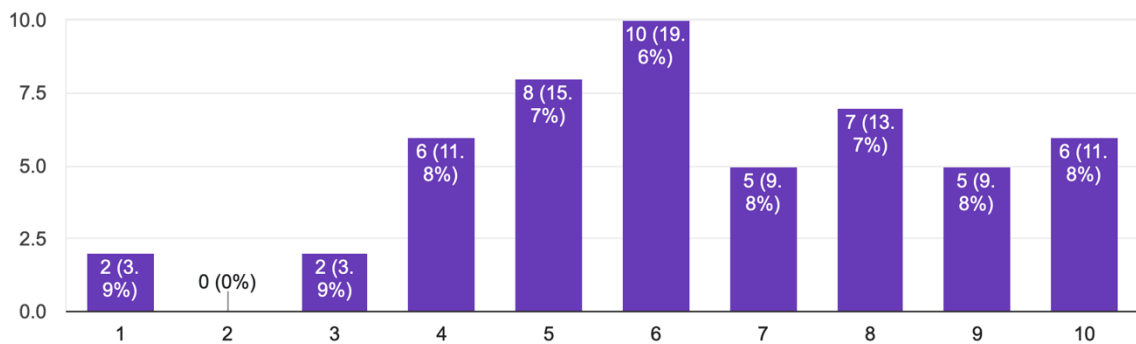
Please rate if you believe that the soft skills such as organizational behaviors shall be part of project management as compared to conventional?

51 responses



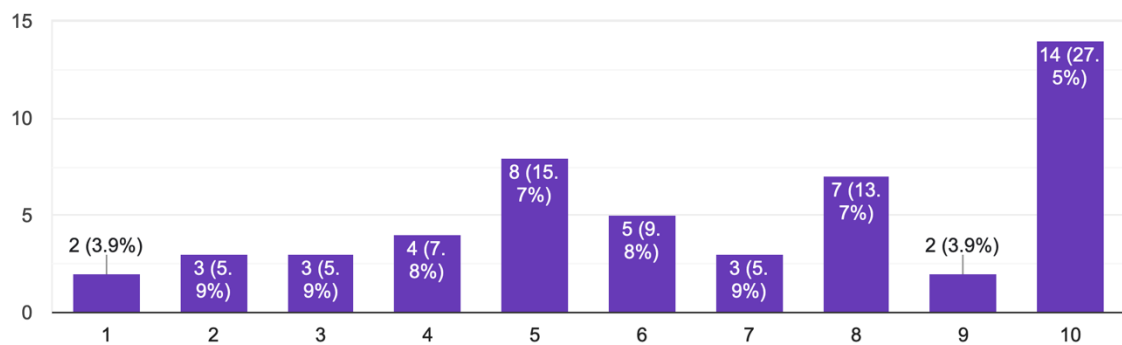
How much satisfied are you that the Cloud based operations in Construction management?

51 responses



In construction industry, do you believe that 'mental health' is also being considered nowadays, please rate

51 responses



Correlations

Notes

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Year of experience in Construction sector?	1.38	.492	42

Correlations

		belief_AI	Year of experience in Construction sector?
belief_AI	Pearson Correlation	1	.035

	Sig. (2-tailed)		.825
	N	42	42
Year of experience in Construction sector?	Pearson Correlation	.035	1
	Sig. (2-tailed)	.825	
	N	42	42

Nonparametric Correlations

Notes

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a. Based on availability of workspace memory

Correlations

	Year of experience in Construction sector?
belief_AI	

Spearman's rho	belief_AI	Correlation Coefficient	1.000	.055
		Sig. (2-tailed)	.	.730
		N	42	42
	Year of experience in Construction sector?	Correlation Coefficient	.055	1.000
		Sig. (2-tailed)	.730	.
		N	42	42

Frequencies

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		Please rate if you believe that the soft skills such as organizational behaviors shall be part of project management as compared to conventional? How much satisfied are you that the Cloud based operations in Construction industry do you believe that 'mental health' is also being considered nowadays, please rate
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.00

Statistics

		Please rate if you believe that introduction of Artificial Intelligence (AI) is current trend in Construction Project Management?	Please rate if you believe that AI enabled tools such as BIM, Water/Sewer/ Drain design will help in project management ?	How satisfactory will you find that the AI enabled project management tool will be more resourceful ?	Please rate if you were given a chance to work remote, it may have the good source for exploring and learning?	Please rate if you believe that the Project Manager should be more emotionally intelligent ?	
N	Valid	42	42	42	42	42	42
	Missing	0	0	0	0	0	0
Std. Deviation		2.461	2.358	2.212	2.739	2.356	2.356
Minimum		2	1	2	1	1	1
Maximum		10	10	10	10	10	10

Statistics

		Please rate if you believe that the soft skills such as organizational behaviors shall be part of project management as compared to conventional?	How much satisfied are you that the Cloud based operations in Construction management?	In construction industry, do you believe that 'mental health' is also being considered nowadays, please rate
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N	Valid	42	42	42
	Missing	0	0	0
Std. Deviation		1.930	2.416	2.873
Minimum		3	1	1
Maximum		10	10	10

Frequency Table

Please rate if you believe that introduction of Artificial Intelligence (AI) is current trend in Construction Project Management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	3	7.1	7.1	7.1
	3	2	4.8	4.8	11.9
	4	4	9.5	9.5	21.4
	5	9	21.4	21.4	42.9
	6	4	9.5	9.5	52.4
	7	4	9.5	9.5	61.9
	8	5	11.9	11.9	73.8
	9	5	11.9	11.9	85.7
	10	6	14.3	14.3	100.0
	Total	42	100.0	100.0	

Please rate if you believe that AI enabled tools such as BIM, Water/Sewer/Drain design will help in project management ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.4	2.4	2.4
	3	2	4.8	4.8	7.1
	4	3	7.1	7.1	14.3
	5	8	19.0	19.0	33.3
	6	3	7.1	7.1	40.5
	7	3	7.1	7.1	47.6
	8	10	23.8	23.8	71.4
	9	4	9.5	9.5	81.0
	10	8	19.0	19.0	100.0
	Total	42	100.0	100.0	

How satisfactory will you find that the AI enabled project management tool will be more resourceful ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	4.8	4.8	4.8
	3	2	4.8	4.8	9.5
	4	2	4.8	4.8	14.3
	5	7	16.7	16.7	31.0
	6	5	11.9	11.9	42.9
	7	8	19.0	19.0	61.9
	8	6	14.3	14.3	76.2
	9	5	11.9	11.9	88.1
	10	5	11.9	11.9	100.0
	Total	42	100.0	100.0	

Please rate if you were given a chance to work remote, it may have the good source for exploring and learning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	4.8	4.8	4.8
	2	2	4.8	4.8	9.5
	3	2	4.8	4.8	14.3
	4	4	9.5	9.5	23.8
	5	5	11.9	11.9	35.7
	6	3	7.1	7.1	42.9
	7	6	14.3	14.3	57.1
	8	4	9.5	9.5	66.7
	9	6	14.3	14.3	81.0
	10	8	19.0	19.0	100.0
	Total	42	100.0	100.0	

Please rate if you believe that the Project Manager should be more emotionally intelligent ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.4	2.4	2.4
	2	1	2.4	2.4	4.8
	3	1	2.4	2.4	7.1
	4	2	4.8	4.8	11.9
	5	4	9.5	9.5	21.4
	6	6	14.3	14.3	35.7
	7	6	14.3	14.3	50.0
	8	7	16.7	16.7	66.7
	9	4	9.5	9.5	76.2
	10	10	23.8	23.8	100.0
	Total	42	100.0	100.0	

Please rate if you believe that more Data Analytics tools should be used in project management techniques such as delay analysis or resource management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.4	2.4	2.4
	3	1	2.4	2.4	4.8
	4	2	4.8	4.8	9.5
	5	10	23.8	23.8	33.3
	6	4	9.5	9.5	42.9
	7	4	9.5	9.5	52.4
	8	8	19.0	19.0	71.4
	9	8	19.0	19.0	90.5
	10	4	9.5	9.5	100.0
	Total	42	100.0	100.0	

Please rate if you believe that the soft skills such as organizational behaviors shall be part of project management as compared to conventional?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	2.4	2.4	2.4
	4	1	2.4	2.4	4.8
	5	10	23.8	23.8	28.6
	6	7	16.7	16.7	45.2
	7	2	4.8	4.8	50.0
	8	11	26.2	26.2	76.2
	9	4	9.5	9.5	85.7
	10	6	14.3	14.3	100.0
	Total	42	100.0	100.0	

How much satisfied are you that the Cloud based operations in Construction management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	4.8	4.8	4.8
	3	2	4.8	4.8	9.5
	4	6	14.3	14.3	23.8
	5	7	16.7	16.7	40.5
	6	5	11.9	11.9	52.4
	7	5	11.9	11.9	64.3
	8	6	14.3	14.3	78.6
	9	4	9.5	9.5	88.1
	10	5	11.9	11.9	100.0

Total	42	100.0	100.0	
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In construction industry, do you believe that 'mental health' is also being considered nowadays, please rate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.4	2.4	2.4
	2	3	7.1	7.1	9.5
	3	3	7.1	7.1	16.7
	4	4	9.5	9.5	26.2
	5	7	16.7	16.7	42.9
	6	4	9.5	9.5	52.4
	7	2	4.8	4.8	57.1
	8	4	9.5	9.5	66.7
	9	2	4.8	4.8	71.4
	10	12	28.6	28.6	100.0
	Total	42	100.0	100.0	

Oneway

Notes

Output Created		19-MAY-2023 17:05:20
Comments		
Input	Active Dataset	DataSet1
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	Split File	<none>
	N of Rows in Working Data File	42
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
Syntax		ONEWAY belief_AI BY YearofexperienceinConstructionsector /ES=OVERALL /MISSING ANALYSIS /CRITERIA=CILEVEL(0.

		95).
Resources	Processor Time	00:00:00.01
	Elapsed Time	00:00:00.00

ANOVA

belief_AI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.249	1	.249	.050	.825
Within Groups	200.322	40	5.008		
Total	200.571	41			

ANOVA Effect Sizes^{a,b}

		Point Estimate	95% Confidence Interval	
			Lower	Upper
belief_AI	Eta-squared	.001	.000	.086
	Epsilon-squared	-.024	-.025	.063
	Omega-squared Fixed-effect	-.023	-.024	.062
	Omega-squared Random-effect	-.023	-.024	.062

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

CHAPTER 6

CONCLUSION

- Web-based technologies have only lately been adopted by the construction sector, despite their rapid expansion and extensive use in practically all sectors, including manufacturing and services.
- The article demonstrated that by creating appropriate Web-based solutions and properly implementing them to difficulties in the construction industry, significant benefits may be realised.
- With the use of Web-based technology, construction companies and project site offices can be run more efficiently and with higher cost savings can be made. Construction project management is experiencing an unparalleled opportunity as technology develops and becomes more accessible.
- You now know which project management developments are, in our opinion, foreseen. The areas of resource planning, collaboration, roles, methodologies, and tools have received significant attention from us.

REFERENCES

1. Ahmad, I., Russell, J.S. and Abou-Zeid, A., 1995, Information technology (IT) and integration in the construction industry, *Construction Management and Economics*, 13, 163-171.
2. Ahmad, I., and Ahmed, S.M., 2001, Integration in the Construction Industry: Information Technology as the Driving Force, In *Proceedings of the 3rd International Conference on Project Management*, (Singapore: Nanyang Technical University).

QUESTIONNAIRE

1. Gender?
Female
Male
Prefer not to say
2. Your highest educational Qualification?
Diploma
Graduate
Post Graduate
Scholar
3. Year of experience in Construction sector?
>5
5-10
10-15
15-25
25-35
>35
4. Please rate if you believe that introduction of Artificial Intelligence (AI) is current trend in Construction Project Management?
5. Please rate if you believe that AI enabled tools such as BIM, Water/Sewer/Drain design will help in project management ?
6. How satisfactory will you find that the AI enabled project management tool will be more resourceful ?
7. Please rate if you were given a chance to work remote, it may have the good source for exploring and learning?
8. Please rate if you believe that the Project Manager should be more emotionally intelligent ?
9. Please rate if you believe that more Data Analytics tools should be used in project management techniques such as delay analysis or resource management?
10. Please rate if you believe that the soft skills such as organizational behaviours shall be part of project management as compared to conventional?

11. How much satisfied are you that the Cloud based operations in Construction management?
12. In construction industry, do you believe that 'mental health' is also being considered nowadays, please rate