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Analysis of Effect of Project Management Maturity on Project Success in the Indian IT Industry

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Abstract: ***The research on topic "ANALYSIS OF EFFECT OF PROJECT MANAGEMENT MATURITY ON PROJECT SUCCESS IN THE INDIAN IT INDUSTRY" analysed project management maturity, project success, project challenges, and the association between project management maturity and project success in the IT industry. A survey was conducted among large, medium, and small firms, combining the nine knowledge areas of the Project Management Body of Knowledge (PMBOK Guide) with a Project Management Maturity Model (PMMM). The results show that integration, cost, and communication processes are mature, as they are at level 4 in maturity, which means that processes are managed and regularly measured. Scope, time, quality, and procurement processes indicated less maturity compared to other processes. HR and risk management showed the least maturity among the nine knowledge core areas. Key areas that require special attention are project control processes, informal communication, and risk management. Lack of communication between project team members, lack of executive support, unclear business objectives, incorrect auditing of processes, inappropriate formal methodologies, and other factors contributed to project challenges. Quadruple constraint, system use, and user satisfaction are important factors for project success. Project management maturity and project success were found to be highly correlated.***
Keywords: IT Industry, Project Management, Management Maturity, Success, India

I. INTRODUCTION

In the last Twenty years, many organizations have started using project management to gain an advantage over their competitors. The organizations that have been most successful have used project management to drive change and reach their business goals.

A. Project Management

Project management is a well-established discipline that has grown significantly over the years. There are now standards, methodologies, international best practices, and bodies of knowledge to educate and inform practitioners. From 1950s, it has gone through several stages of development, including, Critical Path Planning and Network Planning techniques were introduced in the 1950s and 60s, followed by planning and tracking integrated time, cost, and quality using integrated computer systems in the 1970s. In the 1980s, matrix management and training in the role of the Project Manager were introduced, along with the concept of Project Management competencies and Bodies of Knowledge. The 1990s saw the introduction of other Project Management roles, such as Sponsor and User, and the measurement of project success for each role. Programme Management and Project Benefits Management were introduced in the 1990s and 2000s. Finally, Maturity Modelling was introduced in the 2000s and beyond.

B. Project Management Maturity

Good project management is essential for the success of any project, regardless of the field. The popularity of project management has been increasing rapidly over the last decade, with its techniques being used in various industries such as engineering and construction, manufacturing, and computer software development. Without a developed project management system, organizations cannot fully benefit from project management techniques.

In the IT industry, project management has matured over the years due to its constant usage. The term "project management maturity" refers to the level of proficiency and effectiveness of an organization's project management processes, documentation, management, and metrics. Many models have been developed to assess the maturity of project management in different industries. In the IT industry, project management maturity can be evaluated using the nine knowledge areas in the Project Management Body of Knowledge (PMBoK) and the Project Management Maturity Model (PMMM).

The maturity models have five level of maturity ranging from 1 (initial process) to 5 (optimized processes), as given below: -

1) *Maturity level 1 (lowest)*: Initial process (no or little formal and /or documented processes being used)
2) *Maturity level 2*: Structured processes and standards (Basic processes are in place and used most of the time)
3) *Maturity level 3*: Organizational standards and institutionalized processes (majority of project management processes are in place and are used by the majority of people)
4) *Maturity Level 4*: Managed processes (All project management processes are in place and these are regularly measured)
5) *Maturity level 5 (Highest)*: Optimized processes (All project management processes are in place, measured and continually improved upon)

C. Project Success

This study is to understand the maturity of project management in IT industry of India with the help of PMMM and whether there is any association between project management maturity and project success. A successful project is one that is completed on time, within budget, and meets all the requirements for quality and scope. This kind of project delivers good value to the customer. A challenged project is one that is completed, but is either late, over-budget, or doesn't meet all the requirements. This project delivers less value than expected. A failed project is one that is never completed or doesn't meet the customer's requirements. It delivers very little or no value at all. There are many factors that contribute to project success. Few of them are The project manager, Project team, Project, Organization , External environment, Establishing quantitative and measurable KPIs on priority basis, Aligning KPIs with business objectives, Setting realistic / achievable targets and project's quality.

II. REVIEW OF LITERATURE

A study conducted by Kwak and Ibbs in 2000 and Kwak in 2001 analysed the development of a project management maturity model (popularly called Berkeley project management process maturity model) and an analysis methodology to assess the maturity of project management processes. The Berkeley model helped the organization and its people accomplish higher and more sophisticated project management by a systematic and incremental approach. The study by Reginato and Ibbs (2002) showed that companies with high project management maturity benefited from a high return on their project management investment (PM/ROISM) and had a unique advantage in the marketplace due to their superior project management practices. Brooks and Clark (2002) and Kerzner, 2002 evaluated the role of Project Management Maturity Models (PMMM) in improving practice and performing strategic planning for project management. Jugdev and Thomas (2002) determined that project management maturity models are important assessment tools for the professionals. Andersen and Jessen (2003) researched level of project maturity in 13 organizations with a hypothesis that project maturity develops through a maturity ladder where the ladder steps were proposed to be project management, program management and portfolio management. Sonnekus and Labuschagne (2003) in a survey based on Project Management Body of Knowledge and PMMM undertaken to investigate the state of IT projects in South Africa and comparing it with IT Project Management in USA highlighted three key areas that needed special attention and suggestions were made to improve each. Niazi et al (2003) suggested a maturity model that had three dimensions-- maturity stage dimension, CSF dimension and assessment dimension to assess and improve software process improvement (SPI) implementation processes. Cooke and Arzymanow (2003) highlighted the results of an investigation into the nature and extent of variations between project management practices in 21 organizations drawn from six industries on the basis of 10 domains which were identified using qualitative methods. In some industries like petrochemical and defence, project management models are more developed compared to others like pharmaceutical, R&D, construction, telecommunications, and financial services. Bay and Skitmore (2006) conducted a survey in Indonesian companies that do not use project management methodologies to assess their project management maturity using Kerzner's Level 2 assessment tool. Beset (2007) developed a 5-level maturity model to evaluate the current project management maturity level of architectural design offices. Project integration and scope management were highly mature, while project risk management was the least matured function area. Guangshe et al (2008) analyzed the feasibility and limitations of OPM3 in large construction projects in China and proposed key points to improve project management level. Hellered (2010) benchmarked two organizations' project management maturity criteria to compare project teams with similar objectives but not competing with each other.

III.OBJECTIVES OF STUDY

The need for this study arises from the lack of research on project management maturity and project success in the IT industry of India. The IT industry plays a crucial role in the Indian economy, contributing significantly to its GDP (9.6% in 2022).

However, there is limited knowledge about the maturity of project management processes in the industry and the factors that contribute to project success or failure. As the IT industry exports most of its products and services, understanding project management maturity and project success in the industry is crucial for the growth and development of the sector. Thus, the objectives of this study are as under: -

1) To study the project management maturity of IT companies in India.
2) To study the project success, challenges and failure in IT companies of India
3) To study association between IT Project Management Maturity and IT project success.

IV. RESEARCH METHODOLOGY

The methodology used in this research was exploratory, with a focus on studying the project management maturity and success of IT companies in India.

A. Design

Project management is the intricate process of overseeing a project and its various deliverables with the ultimate goal of producing a finished product or service. This process involves identifying the necessary requirements, setting clear and attainable objectives, balancing the competing demands of different stakeholders, and ensuring that everyone involved is working towards a common goal. The Project Management Institute (PMI) produced a set of ethics and standards for project management, which eventually evolved over time to become the PMBoK, a book used to describe the collective knowledge of the project management profession. The PMBoK includes nine areas of knowledge, divided into two main categories: core functions (scope, time, cost, and quality) and facilitating functions (human resources, communication, risk, and procurement), all of which are integrated through management. These knowledge areas are further broken down into processes, which can be mapped onto five process groups: initiating, planning, executing, controlling, and closing - as illustrated in **Table-1** at **Annexure-A** These processes are then applied to a Project Management Maturity Model (PMMM), which is a framework designed to help organizations improve their processes and systems. Project Management Maturity refers to processes, documentation, management, and metrics. This concept of maturity modelling is increasingly being used to map out logical ways to measure project management maturity and improve an organization's services, particularly in IT industry. So, this study tries to determine the maturity of IT Project Management by mapping the nine knowledge areas of the Project Management Body of Knowledge (PMBoK Guide) onto a Project Management Maturity Model (PMMM). The Project Management Maturity is a Independent Variable and Project Success is dependent variable in our statistical model.

B. Sample Design & Sampling

To achieve the goal, all the IT companies in India involved in software development projects for different companies were considered as the population of the study. For the purpose of this study, these companies were further divided into three categories: large, medium, and small IT companies. Large IT companies are those that work for many different industries or domains and provide solutions with employees over 50,000. Medium IT companies work for a few limited industries or domains and provide solutions in the form of software, projects, and the internet with employees ranging from 25,000 to 50,000. Small IT companies work for very few industries with employees less than 20,000. A sample size of ten IT companies was chosen for the study, including 5 large, 3 medium, and 2 small-sized IT companies. From each of the 5 large-scale companies, 5 projects in different industries were chosen, resulting in a total of 25 projects. From each of the 3 medium-scale IT companies, 3 projects in different industries were selected, totalling 9 projects. From each of the 2 small-scale IT companies, 2 projects in different industries were chosen, resulting in a total of 4 projects. A total of 38-40 projects were selected for the study, as large companies provide projects in many domains and small companies provide projects in only one or two domains. Convenience and willingness to respond were the basis for selecting the companies and projects. Primary data was collected from project managers, project coordinators, group leaders, business analysts, IT managers, and other related positions within the selected companies. A total of 38-40 respondents were contacted through tele/message/email. The selected companies were from Noida (being hub of IT companies) and Vadodara (being local city).

C. Data Collection

The data was collected through the survey method using a questionnaire attached as **Annexure - B**. This questionnaire was divided into three subsections. The questionnaire consisted of questions regarding project maturity, project success and other details of projects, and was based on a 5-point scale showing five maturity levels.

The association between project success and project maturity was tested. The questionnaire was pre-tested in two companies. Questionnaire was forwarded through departmental channel to all respondents and feedback was also collected in similar manner. In this study, the correlation and regression were used to observe the relationship between project management maturity (Independent variable) and project success (dependent variable). The details of these statistical techniques are given in subsequent paras

The correlation coefficient is a statistical tool used to assess the strength and direction of the linear relationships between two variables. The most common correlation coefficient is Pearson's correlation coefficient. It is denoted by 'r' which lies between -1 to +1. Its formula is as under: -

$$r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - (\sum x_i)^2}\sqrt{n\sum y_i^2 - (\sum y_i)^2}}.$$

The coefficient of determination is a statistical measure in a regression model and it is square of the coefficient of correlation and is denoted as R_{xy}^2 (or R^2 or 'R-Squared'). The lowest possible value of R^2 is 0 and the highest possible value is 1. The coefficient of determination is used to explain the degree to which independent variables (input variables or predictor variables) explain the variation of dependent variables (output variables or predicted variables) or in other words it measures how well a statistical model predicts an outcome (goodness of fit). The outcome is represented by the model's dependent variable. Although, the coefficient of determination provides some useful insights regarding the regression model, but, it does not disclose information about the causation relationship between the independent and dependent variables and it does not indicate the correctness of the regression model. Therefore, to draw correct conclusions about the model, the analysis of 'coefficient of determination' has also been undertaken. The adjusted R-squared is a modified version of R-squared that accounts for predictors (variables) that are not significant in a regression model. In other words, the adjusted R-squared shows whether adding additional predictors improve a regression model or not. Formula is as under: -

$$\bar{R}^2 = 1 - (1 - R^2)\frac{n-1}{n-p}$$

The Linear regression is a statistical modelling process that compares the relationship between two variables, which are usually independent or explanatory variables and dependent variables. Specific regression formula is used to create visual representations of the data they evaluate. On a graph, these visuals create a line, which linear regression uses to measure the rate of change between two variables. Visually, the relationship between the variables can be shown in a scatter plot. The greater the linear relationship between the dependent and independent variables, the more the data points lie on a straight line. To determine this straight line, linear regression uses the method of least squares. The regression line can be described by the following equation: -

$$\hat{y} = b \cdot x + a$$

Estimated dependent variable; Slope; y intercept; Independent variable

Where. $\hat{y}$ = respective estimate of the y-value. This means that for each x-value the corresponding y-value is estimated. € = Error of estimation (as seen in **figure - 1** below). If all points (measured values) were exactly on one straight line, the estimate would be perfect. However, this is almost never the case and therefore, in most cases a straight line must be found, which is as close as possible to the individual data points. The attempt is thus made to keep the error in the estimation as small as possible so that the distance between the estimated value and the true value is as small as possible.

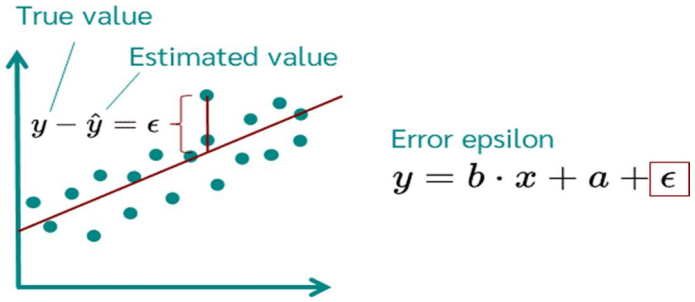

Fig. 1 Linear Regression

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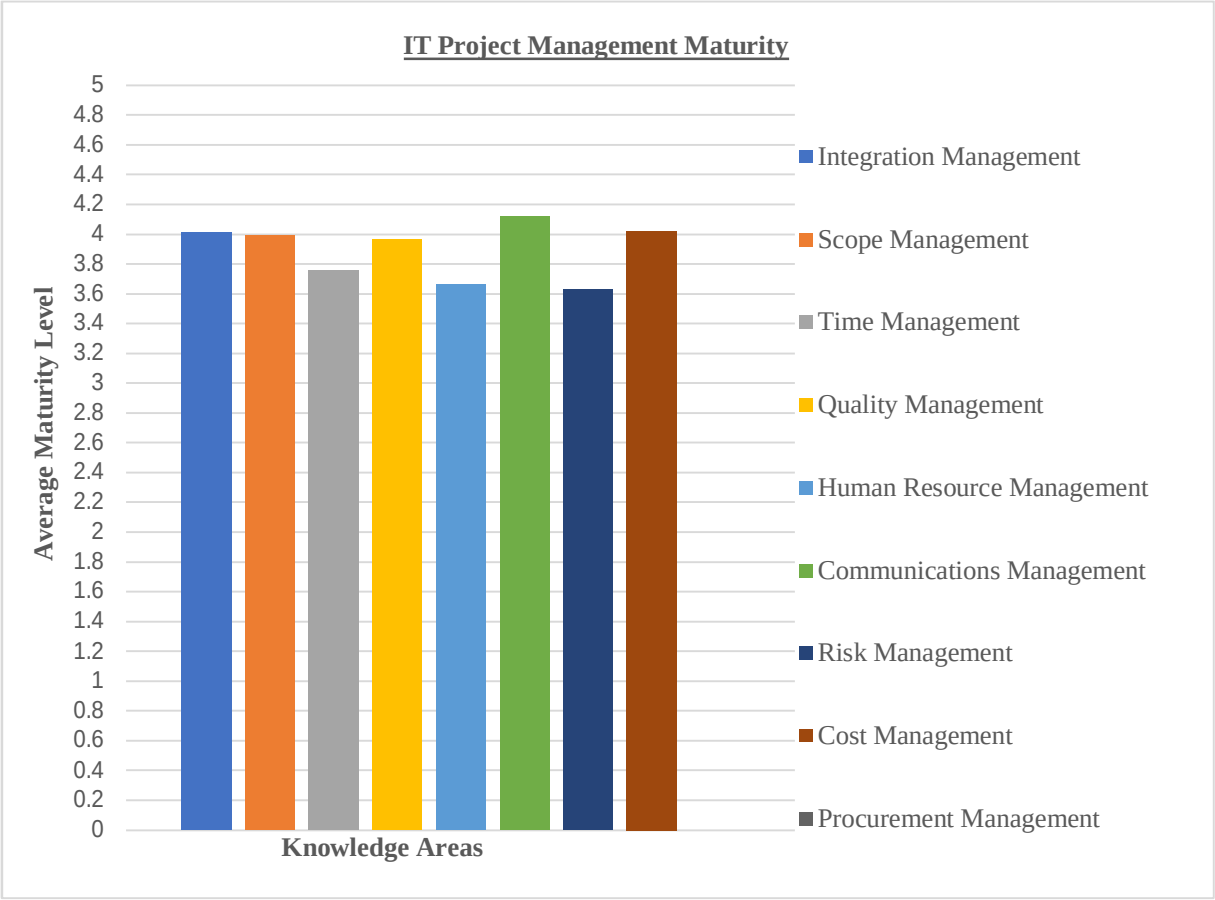
V. FINDINGS

The results of the research have been organized into three distinct categories. The first section outlines the level of project management maturity across nine key core areas. The second section discusses the challenges and successes experienced in various projects. Finally, the third section examines the correlation between project management maturity and project success.

A. Project Management Maturity

The maturity of processes undertaken in the nine knowledge areas of the IT industry, which include scope, time, cost, quality, human resource, communication, risk, procurement, and integration management. Respondents were asked to rate the processes in nine core areas on a 5-point scale ranging from 1 (maturity level - initial level) to 5 (maturity level - optimized level). The findings are given in Table – 2 at Annexure - C. The average maturity levels observed are shown below in Figure - 2 and following are observed from these findings: -



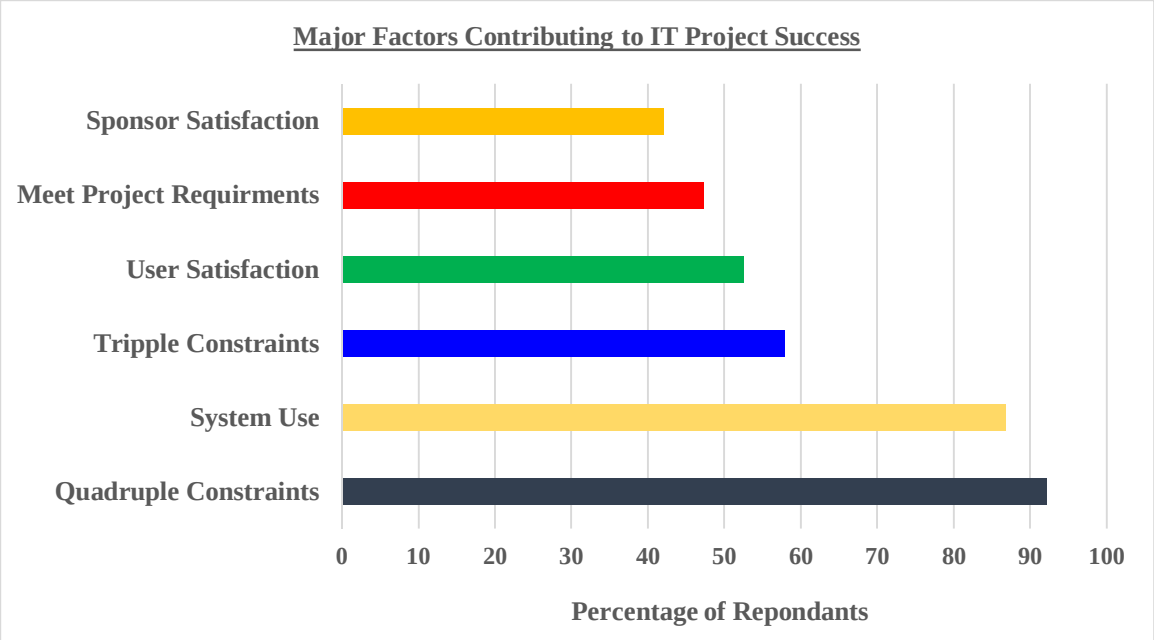
Source: Author's calculations based on primary data
Fig. 2 IT Project Management Maturity

The maturity level for project integration management is 4.01 for all companies, indicating that project planning is done with the stakeholders and behaviour planning efforts to create a project management plan are in place. Planning, execution, and control of projects are coordinated across different knowledge areas and projects. The maturity level of the project scope management was 3.99, showing that the product and scope management are integrated to ensure project success. Also, scope-change-control and verification processes are documented and integrated. Completion of projects on time is one of the major challenges for project managers. The level of maturity in time management for projects was found to be 3.76 in the IT industry, showing that a variety of scheduling tools and techniques are available for effective schedule control and formal schedule control processes and practices are integrated.

Project quality management was found to be at 3.95, indicating that the objectives to achieve high quality project management processes and project quality are integrated. Also, project progress toward accomplishing project quality is quantified, implemented, and integrated. The maturity level of project HR management was found to be at 3.66, indicating that the identification and documentation of project roles and responsibilities are done, both individual and group skills are improved to enhance project performance, team members are tracked for performance and development, and timely feedback is provided. Project communication management was found to be at a maturity level of 4.12, showing that communication plans are made and information on project scope, schedule, cost, risk, quality, human resource, and procurement is collected and disseminated for project performance reporting. Well-defined information distribution paths are in place. Risk management for projects in the IT industry has a maturity level of 3.63, indicating that organizations use past experiences for risk identification, response, and control. Potential risk sources are prepared and reviewed for the use of other Project Management knowledge areas. Also, risk identification, quantification, and response plans are integrated across multiple projects to minimize risk. The cost management of projects was found to be at a maturity level of 4.02 in IT firms. This means that formal resource planning, cost estimating, and budgeting processes are integrated. Also, project stakeholders have wide perspectives of different project cost metrics. Procurement management was found to be at a maturity level of 3.84 for the overall industry. This level of procurement management reflects the establishment of long-term relationships between companies and suppliers. This level of maturity further indicates that consistent project quality is being delivered, and the identification of suppliers and contractors is being planned out carefully. Moreover, the monitoring of contracts is well integrated into multiple levels and each phase of project management, making it an integral part of the entire process. Interestingly, this maturity level seems to be consistent across all types of organizations, including large firms (3.98), medium firms (3.66), and small firms (3.87).

A. Factors Contributing to IT Project Success

The findings as given in Table – 3 at Annexure – D indicate that the factors affecting project success can vary depending on the scale of the company and the nature of the project. In the context of IT companies, the factors that were perceived to be most important in achieving project success were the quadruple constraint and system use, with 92.11% and 86.84% of the respondents rating them highly, respectively. The triple constraint was also considered an important factor, with 57.89% of the respondents acknowledging its impact on project success. Moreover, user satisfaction was rated as an important factor by 52.63% of the respondents, while meeting project requirements and sponsor satisfaction were identified as key factors by 47.37% and 42.10% of the respondents, respectively. These findings highlight the importance of a multi-faceted approach in ensuring project success in IT companies. The six major factors contributing to project success are shown below in Figure - 3.

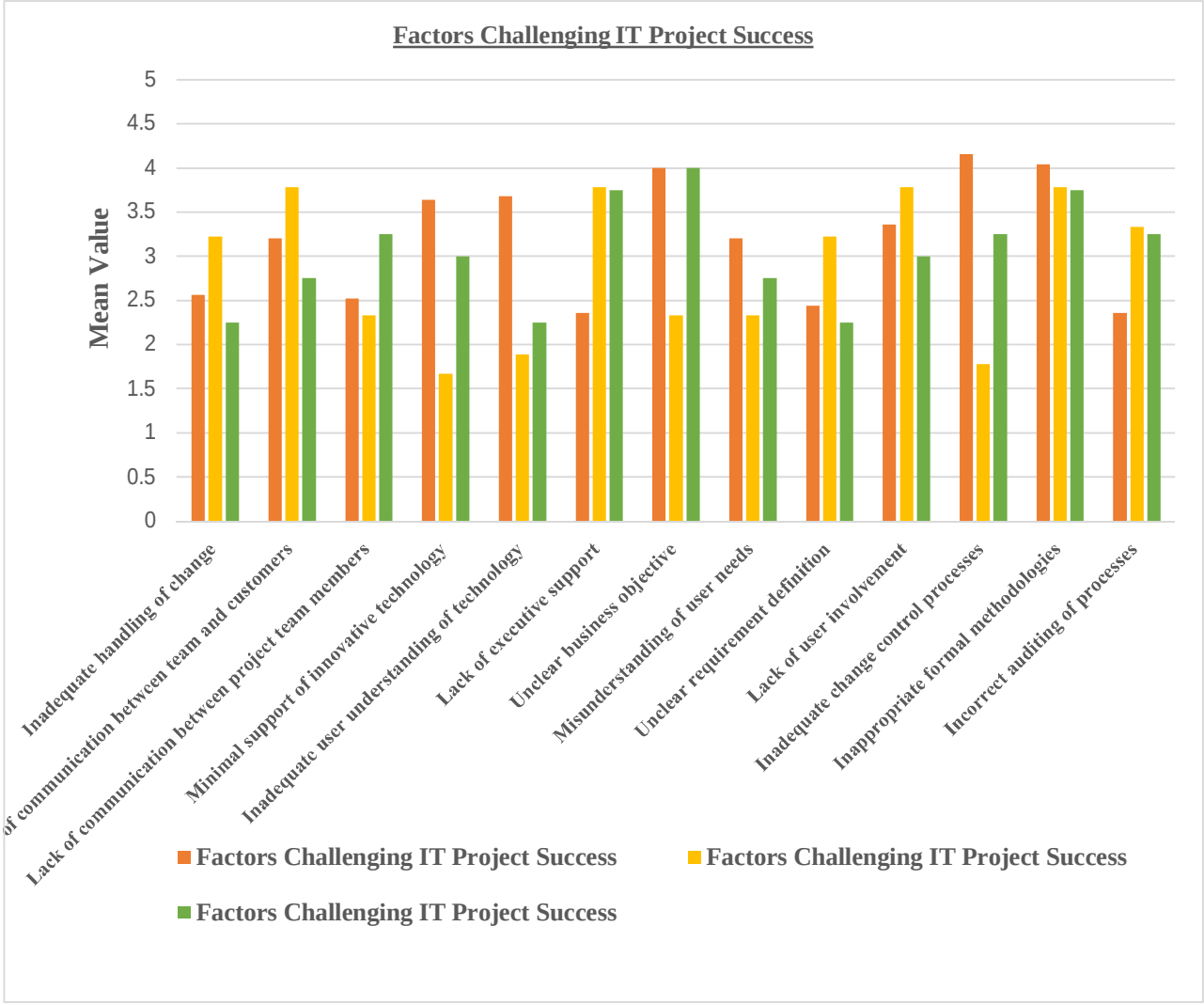


Source: Author's calculations based on primary data

Fig. 3 Major Factors Contributing to IT Project Success

B. Factors Challenging IT Project Success

The findings given in Table – 4 at Annexure - E indicates that inadequate change control processes (with a mean score of 4.16), inappropriate formal methodologies (4.04), and unclear business objectives (4.00) are the main factors that lead to project challenges in large-scale companies. In medium-scale companies, factors such as lack of communication between team and customers (3.78), lack of user involvement (3.78), and lack of executive support (3.7) were found to affect project efficiency. For small-scale companies, lack of communication between project team members (3.25), lack of executive support (3.75), unclear business objectives (4.00), incorrect auditing of processes (3.25), and inappropriate formal methodologies (3.75) were identified as important factors that challenged a project. In the IT industry as a whole, inappropriate formal methodologies (3.85), unclear business objectives (3.44), lack of user involvement (3.38), lack of executive support (3.29), lack of communication between team and customers (3.24), and inadequate change control processes (3.06) were found to be the main factors that led to project challenges. The six factors challenging project success are shown below in Figure - 4.



Source: Author's calculations based on primary data

Fig. 4 Factors Challenging IT Project Success

C. Relation between IT Project Management Maturity and Project Success

The Regression equation gives out the relation between project management maturity and project success. The linear equation obtained was ***y = 5.9x -20.611***. At horizontal axis project management maturity is taken and at vertical axis project success. **Figure - 5** below shows that there was a linear relationship between project management maturity and project success i.e, maturity of project management in IT companies led to project success.

The slope of the regression line (5.9) indicates that for every unit increase in project management maturity, the project success score increased by 5.9 units. The y-intercept (-20.611) indicates that when the project management maturity score is zero, the project success score is -20.611. The high correlation coefficient (R=0.966) indicates a strong positive relationship between project management maturity and project success. This suggests that as the level of project management maturity increases, the likelihood of project success also increases. The coefficient of determination (R2=0.952) indicates that 95.2% of the variability in project success can be explained by the variability in project management maturity. This suggests that project management maturity is a significant predictor of project success. The adjusted R2 value of 0.909 suggests that the model has a good fit and is not overfitting the data. This means that the relationship between project management maturity and project success is not only strong but also reliable and can be generalized to other IT companies.

TABLE-5
RELATION BETWEEN PROJECT MANAGEMENT MATURITY AND PROJECT SUCCESS

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.966	0.952	0.909	0.0514234

Source: Author's calculations based on primary data

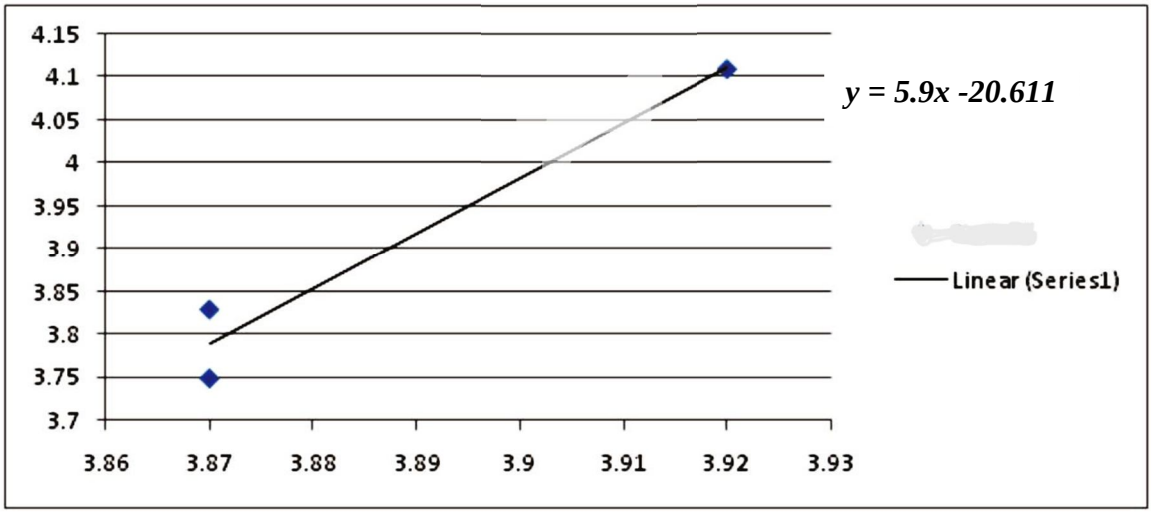


Fig. 5 Scatter Diagram (Relation Between PMM & Project Success)

VI. CONCLUSION

The study revealed that surveyed IT companies had a maturity level of 4.1, indicating that all project management processes were in place but not optimized. Project integration management, cost, and communication processes were more mature as compared to other processes. However, less maturity was found in HR and risk management. The study also identified communication as a major factor affecting both project success and challenges. While formal communication processes and procedures were matured, informal communication channels needed attention. Risk management also required attention as most project challenges could be avoided and managed before they impact the project. The study found a high correlation between project management maturity and project success, indicating a high success rate of projects in the industry and its continuous growth.

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Annexure-A

TABLE – 1
MAPPING OF PROJECT MANAGEMENT PROCESSES TO PROCESS GROUPS & KNOWLEDGE AREAS

Process Groups / Knowledge Areas	Initiating	Planning	Executing	Controlling	Closing
Project integration management	-	Project plan management	Project plan execution	Integrated change control	-
Project scope management	Initiation	Scope planning Scope definition	-	Scope verification	-
Project time management	-	Activity definition Activity sequencing Activity duration estimating Schedule development	-	Schedule developing	-
Project cost management	-	Resource planning Cost budgeting Cost estimating	-	Cost control	-
Project quality management	-	Quality planning	Quality assurance	Quality control	-
Project HR management	-	Organization planning Staff acquisition	Team development	-	-
Project communication management	-	Communication planning	Information distribution	Performance reporting	Admin control
Risk project management	-	Risk management planning Risk identification Qualitative risk analysis Quantitative risk analysis Risk response planning	-	Risk monitoring and control	-
Project procurement management	-	Procurement planning Solicitation planning	Solicitation Source selection	-	Contract close out

Source: PMBOK Guide

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Annexure-B

Survey Questionnaire

This questionnaire is developed for analysis of the effect of project management maturity on project success in the Indian IT industry. This questionnaire is divided into Three parts Part-A, Part-B & Part-C: -

SECTION - A

Project Management Maturity. Please rate each of the following statements according to the maturity levels on the previous page, by making a **TICK** mark in the appropriate box. If your organization does not implement a specific section, please mark the N/A (not applicable) box.

1. Overall Level of Maturity		1	2	3	4	5
What do you think the overall level of project management maturity is in your organization?						
2. Project Integration Management	N/A	1	2	3	4	5
a. Project Plan Development Integrating and coordinating all project plans to create a consistent, coherent document.						
b. Project Plan Execution Executing the project plan by performing the activities included therein.						
c. Integrated Change Control Coordinating changes across the entire project.						
3. Project Scope Management	N/A	1	2	3	4	5
a. Initiation Authorizing the project or phase.						
b. Scope Planning Developing a written scope statement as the basis for future project decisions.						
c. Scope Definition Subdividing the major project deliverables into smaller, more manageable components.						
d. Scope Verification Formalizing acceptance of the project scope.						
e. Scope Change Control Controlling changes to project scope.						
4. Project Time Management	N/A	1	2	3	4	5
a. Activity Definition Identifying the specific activities that must be performed to produce various project deliverables.						
b. Activity Sequencing Identifying and documenting interactivity dependencies.						
c. Activity Duration Estimating Estimating the number of work periods that will be required to complete individual activities.						
d. Schedule Development Analyzing activity sequences, activity durations and resource requirements to create the project schedule.						
e. Schedule Control Controlling changes to the project schedule.						
5. Project Cost Management	N/A	1	2	3	4	5
a. Resource Planning Determining what resources and what quantities of each should be used to perform project activities.						

b. Cost Estimating Developing an estimate of the costs of the resources required to complete project activities.						
c. Cost Budgeting Allocating the overall cost estimate to individual work activities.						
d. Cost Control Controlling changes to the project budget.						
6. Project Quality Management	N/A	1	2	3	4	5
a. Quality Planning Identifying which quality standards are relevant to the project and determining how to satisfy them.						
b. Quality Assurance Evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards.						
c. Quality Control Monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance.						
7. Project Human Resource Management	N/A	1	2	3	4	5
a. Organizational Planning Identifying, documenting and assigning project roles, responsibilities and reporting relationships.						
b. Staff Acquisition Procuring the required human resources and assigning it to the project.						
c. Team Development Developing individual and group competencies to enhance project performance.						
8. Project Communications Management	N/A	1	2	3	4	5
a. Communications Planning Determining the information and communications needs of the stakeholders.						
b. Information Distribution Making required information available to project stakeholders in timely manner						
c. Performance Reporting Collecting and disseminating performance information. This includes status reporting, progress measurement, and forecasting.						
d. Administrative Closure Generating, gathering, and disseminating information to formalize a phase or project completion.						
9. Project Risk Management	N/A	1	2	3	4	5
a. Risk Management Planning Deciding how to approach and plan the risk management activities for a project.						
b. Risk Identification Determining which risks might affect the project and documenting their characteristics.						
c. Qualitative Risk Analysis Performing a qualitative analysis of risks and conditions to prioritize their effects on project objectives.						
d. Quantitative Risk Analysis Measuring the probability and consequences of risks and estimating their implications for project objectives.						

e. Risk Response Planning Developing procedures and techniques to enhance opportunities and reduce threats to the project's activities.						
f. Risk Monitoring and Control Monitoring residual risks, identifying new risks, executing risk reduction plans, and evaluating their effectiveness throughout the project life cycle.						
10.Project Procurement Management	N/A	1	2	3	4	5
a. Procurement Planning Determining what to procure and when.						
b. Solicitation Planning Documenting product requirements and identifying potential sources.						
c. Solicitation Obtaining quotations, bids, offers, or proposals, as appropriate.						
d. Source Selection Choosing from among potential sellers.						
e. Contract Administration Managing the relationship with the seller.						
f. Contract Closeout Completion & settlement of contract, including resolution of any open items.						

SECTION - B

Factors Challenging IT Project Success. Please rate each of the following statements by making a **TICK** mark in the appropriate box. If any specific section is not applicable, please mark the N/A (not applicable) box: -

Factors Challenging IT Project Success	N/A	1	2	3	4	5
A. Inadequate handling of change						
B. Lack of communication between team and customers						
C. Lack of communication between project team members						
D. Minimal support of innovative technology						
E. Inadequate user understanding of technology						
F. Lack of executive support						
G. Unclear business objective						
H. Misunderstanding of user needs						
I. Unclear requirement definition						
J. Lack of user involvement						
K. Inadequate change control processes						
L. Inappropriate formal methodologies						
M. Incorrect auditing of processes						
N. Other factors						

Factors contributing in IT Project Success. Please rate each of the following statements by making a **TICK** mark in the appropriate box. If any specific section is not applicable, please mark the N/A (not applicable) box: -

Factors Challenging IT Project Success	N/A	1	2	3	4	5
A. Triple constraint (cost, time and scope)						
B. Quadruple constraint (cost, time, scope and quality)						
C. Delivery of business benefits						
D. Meet project requirements						

E. User satisfaction						
F. Sponsor satisfaction						
G. Steering group satisfaction						
H. Stakeholder satisfaction						
I. System implementation						
J. System use						

SECTION – C

Project Details. Please answer each of the following: -

A. Which type of company you are working in? (Small / Medium / Large)	
B. How many employees are there in your Company?	
C. How many years of experience you have in IT Project Management?	
D. **Total** number of projects completed in last 1 year by your company	
E. Number of **successful** projects in last 1 year	
F. Number of **failed** projects in last 1 year	
G. Number of **challenged** projects in last 1 year	

Annexure-C

TABLE -2

PROJECT MANAGEMENT PROCESSES IN LARGE, MEDIUM AND SMALL IT COMPANIES

Type of Companies	Large companies (n=25)		Medium companies (n=9)		Small companies (n=4)		Average of all companies (n=38)	
Processes	Mean	t-value	Mean	t-value	Mean	t-value	Mean	z-value
Processes related to the project integration management								
Working with stakeholders in development of project	3.88	6.06	4.44	8.22	4.00	2.45	4.10	22.58
Behaviour planning efforts to create a project management plan are coordinated	4.20	7.34	4.11	5.55	3.50	1.73	3.93	15.07
Coordinating changes that affect project's deliverables	3.96	5.71	4.33	5.66	3.75	1.57	4.01	20.75
Overall	4.01		4.29		3.75		4.01	
Processes related to project scope management								
Defining and documenting the features and functions of projects.	4.04	6.59	4.11	4.26	4.50	3.00	4.21	29.81
Working with stakeholders in the creation of a project scope statements and definition	4.00	7.07	3.89	3.41	4.25	5.00	4.04	35.59
Subdividing major project deliverables	3.36	3.16	3.89	4.44	3.25	1.00	3.5	9.05
Controlling changes of project scope	4.16	7.77	4.22	4.4	4.25	2.61	4.21	165.53
Overall	3.89		4.02		4.06		3.99	

Processes related to project time management								
Defining specific activities that team members and stakeholder perform	4.12	7.72	4.12	7.72	4.00	2.44	4.08	96.41
Estimating resources and duration of work period to complete activities	4.28	9.44	4.28	9.44	2.50	-1.73	3.68	5.61
Analysing activity sequencing for project schedule	3.64	4.23	3.64	4.23	3.25	1.00	3.51	13.65
Controlling and managing changes to proj schedule	3.92	7.18	3.92	7.18	3.50	1.73	3.78	20.89
Overall	3.99		3.99		3.31		3.76	
Processes related to project quality management								
Planning for quality standard and quality assurance for project	4.04	7.07	4.00	4.24	3.75	3.00	3.93	35.80
Controlling specific project results to ensure quality standards	4.00	7.74	3.67	4.03	4.25	2.61	3.97	20.60
Overall	4.02		3.83		4.00		3.95	
Processes related to project human resource management								
Identifying and documenting project roles and responsibilities	3.96	7.10	4.33	5.65	3.75	3.00	4.01	21.45
Building individual and group skills to enhance project performance	3.56	3.64	3.89	3.41	4.00	--	3.81	21.69
Tracking team member performance &development	2.48	-3.38	4.13	3.81	3.75	1.56	3.45	3.18
Providing timely feedback	4.36	9.71	1.89	-4.26	4.00	2.45	3.41	1.89
Overall	3.59		3.56		3.87		3.66	
Processes related to project communication management								
Communication plan and defined information distribution path	4.40	9.16	4.11	4.26	4.50	5.19	4.33	40.96
Collecting & disseminating information related to project, forecasting	4.04	7.07	3.67	4.00	4.00	--	3.90	27.72
Overall	4.22		3.89		4.25		4.12	
Processes related to project risk management								
Risk management planning	3.04	0.27	4.44	5.96	3.25	1.00	3.57	4.68
Risk identification, mitigation strategies and risk response and control processes	3.40	3.09	3.67	4.00	4.00	2.45	3.69	14.68
Overall	3.22		4.05		3.65		3.63	

Processes related to the project cost management								
Estimating of the costs of the resources needed to complete a project	4.28	8.68	4.33	8.00	4.50	5.19	4.37	70.32
Allocating the overall cost estimate to individual work items of project	3.96	6.53	4.00	4.24	4.50	5.19	4.15	23.62
Controlling changes to the project budget	3.64	4.57	3.78	3.50	3.25	1.00	3.5	11.40
Overall	3.96		4.03		4.08		4.02	
Processes related to project procurement management								
Planning and identification of supplier and contractor	3.92	7.18	3.44	2.53	3.75	3.00	3.70	17.96
Monitoring contract performance	4.04	7.07	3.89	3.42	4.00	2.45	3.97	76.60
Overall	3.98		3.66		3.87		3.84	
Overall average	3.87		3.92		3.87		3.88	

Source: Author's calculations based on primary data

Annexure-D

TABLE - 3
FACTORS CONTRIBUTING TO IT PROJECT SUCCESS

Type of Companies / Factors Contributing to Project Success	Large companies (n=25)		Medium Companies (n=9)		Small Companies (n=4)		Average of all Companies (n=38)	
	No. of respondents	%	No. of respondents	%	No. of respondents	%	No. of respondents	%
Triple constraint (cost, time and scope)	14	56	6	66.66	2	50	22	57.89
Quadruple constraint (cost, time, scope and quality)	23	92	8	88.88	4	100	35	92.11
Delivery of business benefits	1	4	-	-	1	25	2	5.26
Meet project requirements	13	52	5	55.55	0	0	18	47.37
User satisfaction	12	48	4	44.44	4	100	20	52.63
Sponsor satisfaction	10	40	4	44.44	2	50	16	42.10
Steering group satisfaction	10	20	4	44.44	-	-	14	36.84

Stakeholder satisfaction	5	20	2	22.22	1	25	8	21.05
System implementation	2	8	0	0	2	50	4	10.53
System use	23	92	9	100	2	50	33	86.84

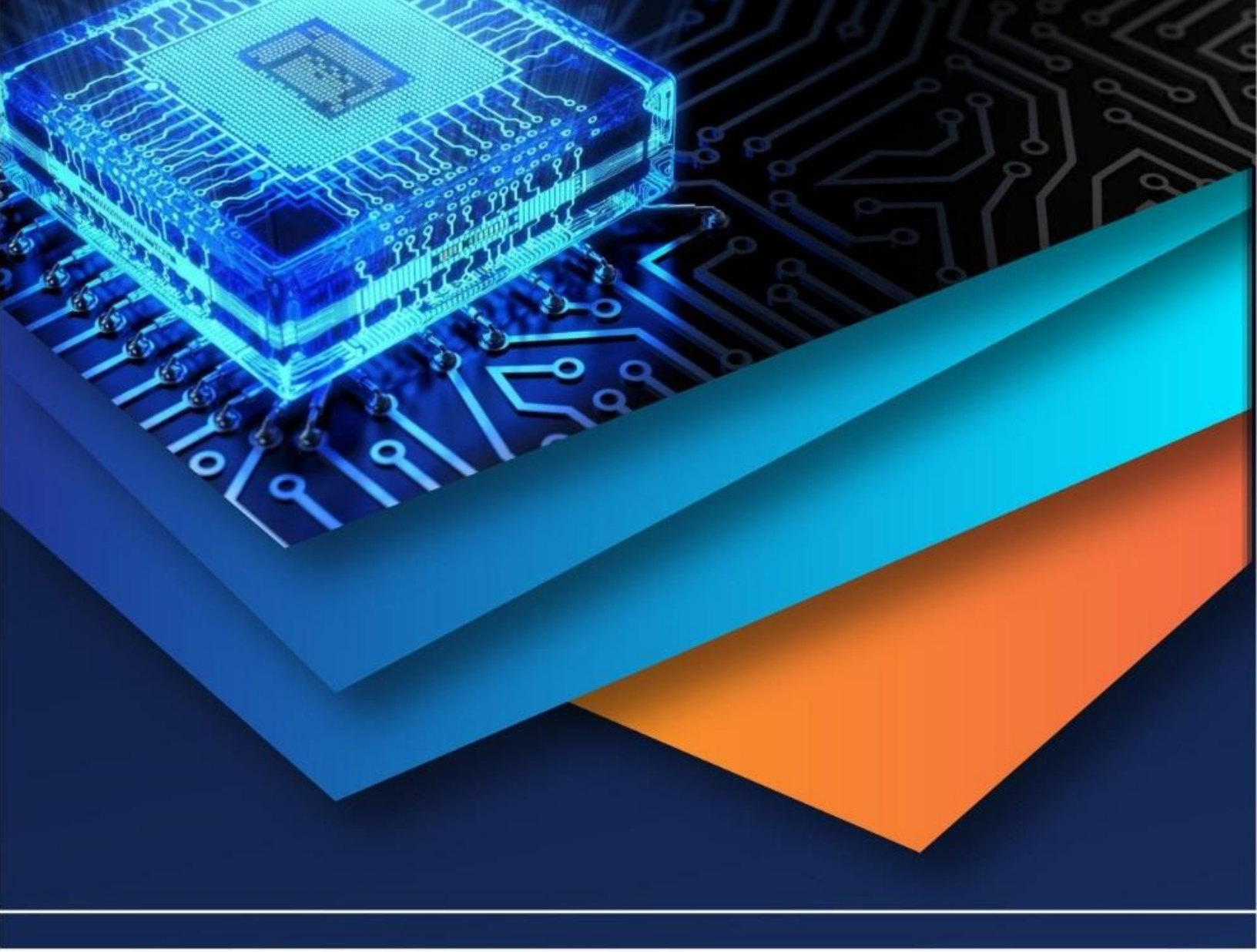
Source: Author's calculations based on primary data

Annexure-E

TABLE - 4
FACTORS CHALLENGING IT PROJECT SUCCESS

Type of Companies / Factors leading to project being challenged	Large companies (n=25)		Medium companies (n=9)		Small companies (n=4)		All companies Average (n=38)	
	Mean	t-value	Mean	t-value	Mean	t-value	Mean	z-value
Inadequate handling of change	2.56	-3.77	3.22	1.51	2.25	-3.00	2.67	4.14
Lack of communication between team and customers	3.20	1.73	3.78	5.29	2.75	-1.00	3.24	2.84
Lack of communication between project team members	2.52	-4.09	2.33	-4.00	3.25	1.00	2.70	3.85
Minimal support of innovative technology	3.64	6.53	1.67	-8.00	3.00	--	2.77	1.41
Inadequate user understanding of technology	3.68	7.14	1.89	-10.0	2.25	-3.00	2.60	2.62
Lack of executive support	2.36	-6.53	3.78	5.29	3.75	3.00	3.29	2.20
Unclear business objective	4.00	10.00	2.33	-4.00	4.00	--	3.44	2.82
Misunderstanding of user needs	3.20	1.73	2.33	-4.00	2.75	-1.00	2.76	3.43
Unclear requirement definition	2.44	-4.80	3.22	1.51	2.25	-3.00	2.63	4.46
Lack of user involvement	3.36	3.67	3.78	5.29	3.00	--	3.38	6.00
Inadequate change control processes	4.16	9.29	1.78	-5.50	3.25	1.00	3.06	3.69
Inappropriate formal methodologies	4.04	8.51	3.78	5.29	3.75	3.00	3.85	4.60
Incorrect auditing of processes	2.36	-6.53	3.33	2.00	3.25	1.00	2.98	0.23
Other factors	3.04	0.44	4.33	5.66	4.25	2.61	3.87	7.44

Source: Author's calculations based on primary data



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