

Analysing the Impact of Stakeholder Management Using IMS, to Mitigate Project Risk in Information Technology Projects

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Abstract

The study examines the important components of the influence of stakeholder management using Information Management System (IMS) on risk management in an IT project setting. The research employs a primary data analysis approach to comprehend and analyse trends in the use of IMS, as well as its benefits and drawbacks in attaining effective project management. This study attempts to explore the relationship between project success and project risk, as well as how stakeholder management using IMS may assist increasing the project success with improved delivery quality. This research has used quantitative data from questionnaire survey to triangulate the findings with secondary data gathered from the literature. This also contributes to the study's reliability for future research or implementation initiatives. Recommendations were offered for both implementation and future work aimed at enhancing understanding and closing research gaps. The outcomes of the analysis were reviewed, and conclusions were drawn on the study objectives.

Keywords: Information management systems (IMS), Stakeholder management, Risk management, risk handling, PMIS, Project success, Stakeholders, Risk, Stakeholder risk integration, IT project, Information Technology.

1. Background of Research:

Because of the poor success rate of IT projects in recent years, successfully managing the risks of information technology (IT) projects remains a major concern for enterprises regardless of whether the project is outsourced or not. According to the Standish group's 2011 Chaos study, just 37% of projects produced the desired results, while 63% of initiatives suffered schedule, budget, and function issues (Curtis, 2012). Outsourced initiatives are much bleaker. According to the Aberdeen Group, over half of all outsourced projects fail, and 76% of organisations say vendor management expenses are greater than projected (**Marchewka & Oruganti, 2013**).

Various researchers like **(Betts & Lansley, 1995; Caniëls & Bakens, Ralph J. J. M., 2012; Radujković & Sjekavica, 2017)** recorded that engaging and managing stakeholder effectively and dynamically is a must have requirement for engineering project success. It has been found that most of the failed engineering project haven't been met their customer's expectation due to the lack of procedures, methods and tools for the proper management and control of its stakeholders **(Hill, 2010)**.

Information Management System is a system that consist of tools and techniques to collect, segregate and integrate the output of the total project management effort **(Raymond & Bergeron, 2008; Taherdoost & Brard, 2019)**. The IMS can be used all along the life cycle of the project from initiation to close out, and it can be manual or automated system.

Risk management is a continuous process by which the PM forecast and identify the key risk that may happen to the project. There may be positive or negative risk. Positive risk is the opportunity that benefits the project and negative risk adversely affect the project success **(de Araújo, Maria Creuza Borges et al., 2017; Serrador & Rodney Turner, 2014)**. Likewise the stakeholders the risk also progressively change with the project lifecycle and time. This shows that there is a need for the integration of data from the stakeholder management to improve the knowledge of effective risk handling in the project.

On projects of any significance, this management procedures generates a huge volume of data regarding the aspect of stake and associated risks. Managing such a high volume data manually create redundant work along with the wastage of resource and time **(Cheung, 1999; Leach, 2014)**. There lies the significance of IMS. An effective IMS ensures good project communication and transparency and thereby improves execution and outcome, no matter the project size.

2. Problem Statement:

During the lifecycle of the project itself the stakeholders that need to be managed changes. There is no single system or method that can be used to manage all the stakeholders and keep track of them. Because of the poor success rate of IT projects in recent years, successfully managing the risks of information technology (IT) projects remains a major concern for all enterprises regardless of whether the project is outsourced or not.

The major cause for the failure is the lack of proper planned stakeholder management which results in poor stakeholder engagement and improper risk handling. During the lifecycle of the project, either the stakeholders that need to be managed changes their priority or new stakeholders were added to the project (Mukherjee, 2019). According to Alhawari (2012), the Standish Group's 2004 "CHAOS" study updated and incorporated data from several thousand software development projects, reveals that only 28 percent of an IT (Information Technology) projects were completed on time and on budget, down from a previous high of 34 percent. Another 18 percent (up from 15%) was cancelled before completion of the development cycle, and the remained 51 percent were completed over-budget, behind schedule, and contained fewer functions than originally specified.

This revelled the need for such a research work to investigate and identify the Impact and use of the IMS on stake management for the risk mitigation and project success in IT industry, in order to address the paucity of research in this field. There is not enough research has been carried out in this segment of the stakeholder management that focuses on how the data or knowledge from the stakeholder management can be used for tracing and handling risk, through the successful implementation and use of IMS.

Considering the above issue this research aims the following question, ***"What techniques are used in the IT sector to manage stakeholders and the risks associated with them, and how does the implementation of IMS influence these practises?"***

To answer this research, question this research is aimed to improve understanding of the advantages and effect of stakeholder management in IT projects using IMS. The study also focuses on understanding the motivations and challenges to the effective implementation of IMS in IT projects, in order to achieve the intended project outcome through effective stakeholder and risk management.

3. Literature Review

3.1`Information Technology Industry an Overview:

The IT (Information Technology) industry is a broad word that encompasses a wide range of information technology-related businesses. As a result, when we refer to the IT industry, we are referring to any organisations or divisions within businesses that design, manage, or run information technology systems (Supply, 2009; Yasin, 2019; PMSOFT, 2020).

From the reviews done it has found that the impact of Covid aided the boom of IT industry like never before during the span of 2020- 2021, along with these advancement in the industry the challenges and competition that it needed to face also got higher (**Cakmakaci, 2019**).

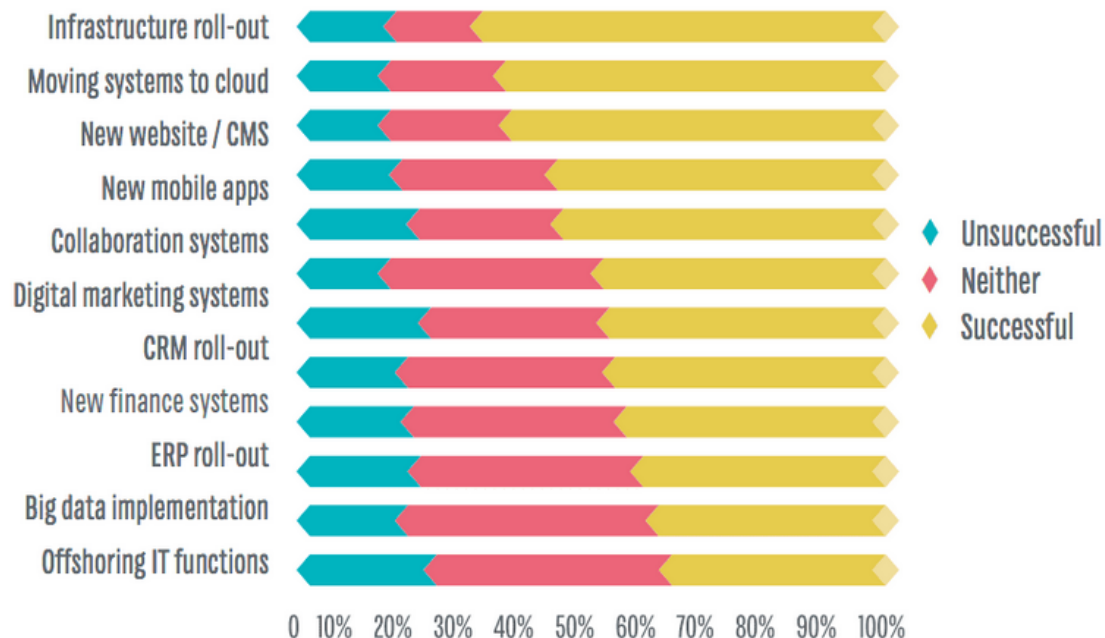


Figure 1: Failure rate of IT projects based on varying technological domain adapted from KMPG creative CIO survey 2016

IT industry is facing regular business and organisational transformations due to the huge development and inventions happening in the engineering sector. With the help of virtual communication technologies and software's IT industries set a whole new standard for the office or organisational culture during this pandemic time (**Smith, 2000; Maruping, 2019; Chen, 2009**).

IT industry can be segmented into the following divisions -

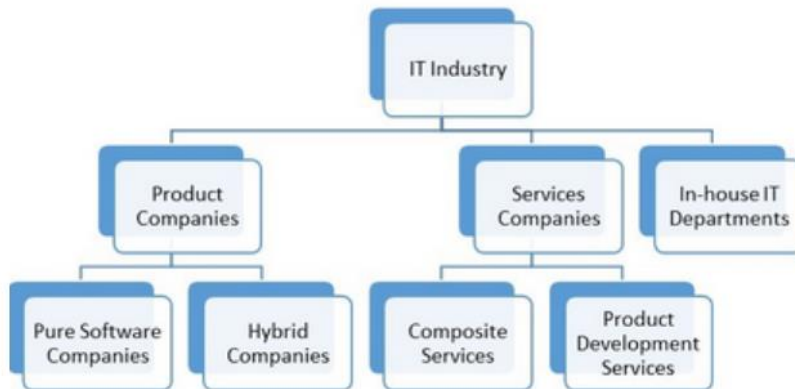


Figure 2: Business segmentation in IT industry

3.2 IT Projects Challenges and Trends:

The key challenges that IT industries are facing from literatures (**Cakmakaci, 2019; The Chartered Institute for IT,2020; Taniguchi,2017; Mesquita,2020, Maruping,2019; Poveda-Bautista,2018**) are analysed and listed down below,

1. **Global market competition:** The challenges the IT industry face is immersive in the global market, the product or service that it creates should overcome the hurdle of the technological, geographical, economic, political, and environmental barriers.
2. **High rate of technological Obsolescence:** Due to the rapid changes happening in the engineering and technological sector the demand for new and latest technologies are high in the market.
3. **Ordinary Business model disruption:** Most of the industries are respective of their domain adapt and use IT as an enabling technology and they use it to integrate and improve their business in all the possible ways.
4. **Product and service quality and security:** The acceptance of IT is getting wider, as IT becomes more integrated into conventional businesses like manufacturing, automotive, construction etc.

3.3 Reasons for Information Technology Project Failures:

Since it is a complex and diversely changing industry, IT projects are complicit for experiencing a high failure rate. As shown in 2009 IDC (International Data Corporation)

research data on Improving IT Project cited in **(Alami, 2016)** in his research for the cause of IT project failure said that the Outcomes of 25% of IT initiatives fail completely. According to the same survey, up to 50% of projects require revisions and redesigns, and 20% to 25% do not deliver a return on investment (ROI). The research findings cited in journals like **(Whittaker, 1999; Neimat, 2005; Gupta et al., 2019; Ermakova et al., 2021)** resembles the same inference founded by **Alami (2016)** and proved the findings are correct and exact. The researchers have also found various other causes for the failure

Which are,

1. Improper Communication with stakeholders, **(Alami, 2016)**: which results in inadequate data and requirement collection and lead to fall in meeting their demands.
2. Improper requirement gathering resulting in Unrealistic time or resource estimates. **(Neimat, 2005; Gupta et al., 2019; Ermakova et al., 2021).**
3. Poor planning **(Raymond, 2008; Radujković, 2017)**
4. Scope creep or Feature creep: Which results in unnecessary changes which decrease the quality and results in wasting resource and effort **(Littau, 2010).**
5. Improper reporting and tracking of the project **(Freeman, 2017; Kujala, 2019).**
6. Poor visibility of the project progression **(Bendell, 2020).**
7. Lack of proper risk forecasting and mitigation **(Kujala, 2019).**

From these studies it has made clear that the stakeholders and the risks connected with them are accountable for 80% of IT project failures **(Freeman et al. 2017).**

3.4 Roles of Stakeholder Management in IT Projects:

This section offers a comprehensive summary of the studies conducted on SM till date. From the research work of **Pedrini & Ferri. (2019)**, the concept of stakeholders was first introduced by Stanford research institute in 1963. In other words, it is a chance to decrease risk associated with fulfilling undesirable needs or low-value outputs **(Nguyen et al., 2018; Habisch et al., 2011).**

IT sector stakeholders are divided into two groups: internal stakeholders and external stakeholders **(Parmar, 2010)**. Internal stakeholders include top management, project owners, project visionaries, project teams, support staffs, and internal customers. Project customers,

rivals, suppliers, vendors, and other possible external elements that may affect the project, such as government and public bodies, are examples of external stakeholders.



Figure 3: Stakeholder types (Parmar, 2010)

As per the research of **S. Harrison.et al (2010)**, the firm who knows the exact utility functions of the stakeholders will be the one which gives better environment to collaborate with them in responding to their requirements and technological challenges. Such firms will have higher business strategic flexibility, which means it can adapt to demands and opportunities in a volatile and uncertain competitive environment (**S.Harrison.et al, 2010**). And authors like (**Meier, 2013; Samadi, 2014; Pedrini, 2019; Yasin, 2019**) inferred comparable results to agree this finding.

IT stakeholder management is more dynamic than any other industry (**Missonier, 2014; Lehtinen, 2019**), the steps in IT stakeholder management involves in following steps -



3.5.1 Stakeholder Management Tools in IT Projects:

It is essential for the project manager to ensure using right practices and tools for the efficient utilisation of the stakeholders in Favour of the companies' goals (**Harrison, 2010**). It is critical to make SM easier and more productive by keeping everything simplified and organised using the right tools (**Eskerod, 2014**). Tools used by the IT firms varies depending on the size of the organisation, complexity of the project or the number of the stakeholders they are dealing with (**Kärkliņa & Pirta, 2018**).

Commonly used stakeholder management tools and their comparison is given below.

No.	Feature	JIRA	Redmine	Axosoft	Assembla	Wrike	Asana	VersionOne	ActiveCollab	Taiga
1	Collaboration tool	√	√	√	√	√	√	√	√	√
2	Task management	√	√	√	√	√	√	√	√	√
3	Time tracking	√	√	√	√	√	Plug-in	√	√	Plug-in
4	Resource planning	Plug-in*	Plug-in	√	√	√	√	√	√	
5	Product backlog management	√	Plug-in	√	√	√	√	√	√	√
6	Sprint management	√	Plug-in	√	√	√	√	√	√	√
7	Bug/issue management	√	√	√	√	√	√	√	√	√
8	Kanban board	√	Plug-in	√	√	√	√	√	√	√
9	Gantt chart	Plug-in	√			√	Plug-in		√	
10	Reports	√	Plug-in	√	√	√	Plug-in	√	Plug-in	

Figure 5: Comparison of different stakeholder management tools (Kärkliņa & Pirta, 2018)

3.5.2 Risk management in IT projects:

Risk is considered as a negative factor in IT sector because it leads to cost overruns, project delays and failures. As **PMI (2013)** finds six risk management processes in IT industry which are: planning risk management, identify risks, conduct a qualitative risk analysis, perform quantitative analysis, plan responses and control the risks cited in **Lanz and Tomei (2016)**.

Identification of source of risk is essential for the effective mitigation of the risk in IT industry, which helps in controlling the trigger and eliminating it. As per the findings of authors (**Serrador, 2014; Xia, 2018; Kerzner, 2022; Sirisomboonsuk, 2017; Ermakova, 2021**),

there are main 4 source of risk in IT project that are Task, organisation, Technology and market.

- **Task:** Each IT project is a collection of tasks, and the likelihood and effect of failure grow when IT is used for complicated and interrelated activities.
- **Organisational:** When users or stakeholders are uncertain about the initiative and take part just marginally or not at all, the likelihood of failure increases.
- **Technological:** this is predictable source of risk, that the changes in technologies might adversely affect the IT projects that it will cause increased learning time and performance uncertainties.
- **Market Uncertainties:** IT project are becoming more risky and complex because of the greater market uncertainty about the competitive environment, technology, rate of adoption by stakeholders.

Categories of Risk Factors	AUTHORS					
	Alter 1979	McFarlan 1981	Davis 1982	Vitale 1986	Parker et al. 1988	Clemons 1991
Task Factors:						
Changes to System Features		X			X	X
Changes in User Departments	X	X	X		X	
Experience of Users & Analysts	X	X	X		X	X
Complexity of Tasks	X	X	X		X	X
Availability of Requirements	X		X		X	X
Size of Project/Investment	X	X			X	X
Organizational Factors:						
User Attitudes toward Project	X	X	X			X
Management/Political Support	X	X	X	X	X	X
Maturity in Use of Computing			X		X	
User Participation	X	X	X			
Technological Factors:						
Need for New Hardware	X	X			X	X
Changes in Operating Systems	X	X			X	X
Use of Standard Packaged Software					X	X
Changes in IS Infrastructure					X	X
Market Factors:						
Strategic Value of Project				X	X	X
Adoption by External User Groups					X	X
Vulnerability to Established Firms				X		X
Competitive Forces				X		X
Regulatory/Legal Environment				X		

Figure 6: comparison of categories of risk factor from various literature (Ermakova, 2021)

3.6.1 Influence and Adaptability of Information Management systems in IT projects:

Information management system is the collection of tools and techniques used for the effective management of the project (**Flyvbjerg et al., 2002; Mok et al., 2015; Caron and Salvatori, 2015**). During the project lifecycle the project risk management and stakeholder management along with other business functions generates huge volume of data that need to be effectively managed and integrated for the successful handling and close out of the project (**Achterkamp and Vos, 2008**). This can be integrated, managed and utilised using appropriate IMS modules such as PMIS (Project Management Information Systems), which is a specialized IMS sub-system for project management that can be used to monitor and control projects throughout the project lifecycle (**Hwang and Ng, 2016**). There is no single management strategy or tool that is suitable for all project situations (**Freeman et al., 2010**).

As a result, project management in IT project environments needs a dual perspective: one directed at the project goals using standard planning and control procedures, and another directed at the stakeholders, whose expectations and attitudes may have an impact on project success which is recorded and reported using IMS (**Leach, 2014**). The character of projects as a coalition of interest groups has been discussed throughout the literatures analysed from this perspective (**Newcombe, 2003**) cited in **Caron and Salvatori (2015)**. Project stakeholder management strives to reduce stakeholder uncertainty that might negatively affect the project and promote possible support for project goals (**Cleland, 1998; Aaltonen, 2011**). T

3.7 Necessity of Adopting IMS for Better Stakeholder Management in IT Industry:

Managing the project stakeholders, who generates a source of threat or opportunity for the project, deserves greater attention (**Pekkinen & Aaltonen, 2015; Samadi, 2014; Huemann et al (2016); Gupta, 2019; Caron & Salvatori, 2015**). The link between stakeholders and project risks in many industries like construction, Manufacturing etc., have already been highlighted in the literature.

The IMS helps the integration of risk management through effective SM by enabling traceability of the impact to the source of risk as shown in figure below (**Caron & Salvatori, 2015**).



Figure 7: Risk to source traceability diagram (Caron & Salvatori, 2015)

As per the survey done by **(Caniëls & Ralph 2012)**, IMS helps in reducing the decision-making time, better allocation of resources, monitoring of engagements and better reporting. This helps in generating greater value for the stakeholders while also lessening opposition to changes that lead to project success.

3.7.1 Application and Integration of Information aided Risk handling and Stakeholder Management using IMS:

As per the research from **Caron and Salvatori (2015)**, the integration of RM and SM is inevitable for,

1. Assist management in determining how much attention to devote to each stakeholder because of a quantitative study of the stakeholder's salience based on risk;
2. Identifying effective techniques and practices to influence each stakeholder by a review of the project risks derived from the stakeholder

The conceptual model for integration of SM and RM proposed by **Caron and Salvatori (2015)** is shown in figure below. Literature works of authors like **(Radujković, 2014; Taherdoost, 2019; Xia, 2019; Gossy; 2008; Bendell, 2020)** made similar inferences in their literatures to the model proposed by **Caron and Salvatori (2015)**.

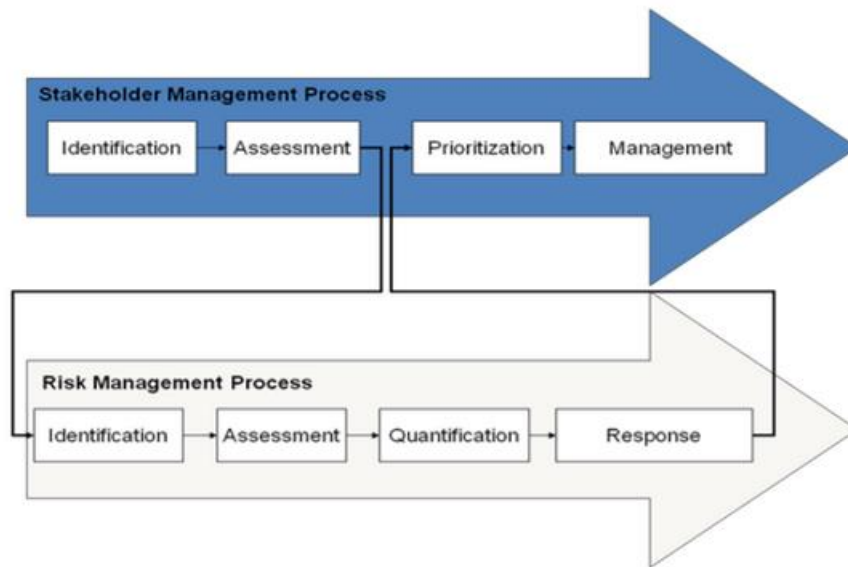


Figure 8: Proposed conceptual RM and SM integration model by Caron and Salvatori (2015)

Project stakeholder management involves several procedures, including stakeholder identification, stakeholder evaluation, stakeholder prioritisation, and stakeholder management (**Caron and Salvatori, 2015**). Risk management also entails several activities, including risk identification, risk assessment, risk quantification, and risk response planning (**Pekkinen & Aaltonen, 2015**).

The stakeholder management process in an integrated approach might leverage data supplied by the project risk management process to assess stakeholder salience and develop relevant management methods (**Freeman, 2017**). Once the project stakeholders have been identified and assessed using a Stakeholder Register, we can determine the project risks listed in the Risk Register that stem from each stakeholder. During the risk quantification phase, the influence that risks originating from a certain stakeholder can have on project performance is considered as an indicator of stakeholder **Caron and Salvatori (2015)**.

The dynamic progression is described by the above-mentioned sequence - stakeholder's interests, objectives, requirements and expectations, disposition and behaviour, available resources, actions, and consequences for the project - represents a systematic approach to identify the possible strategies aimed at interrupting the sequence and impeding any unfavourable impact on the project, e.g., by responding to inflection points. As the project advances, team must also establish a monitoring and control approach that considers changing conditions throughout the project's life cycle (**Lehtinen et al., 2019**).

4 Research Method:

4.1 Quantitative Data Collection:

The questionnaire for the survey has been constructed, and it is entirely based on the insights gained from the literature review that are linked with the research questions. All the questions were closed loop and Likert scale is used to study the response of the participants towards the subject under investigation. The questionnaire is structured and distributed among the selected participants using the JISC online survey tool. The questions have 1-5 Likert scale where 5 is strongly agree and 1 is strongly disagree. The created questionnaire is constructed and distributed among 42 participants using the university JISC survey platform. The demographics of the survey participants are listed below.

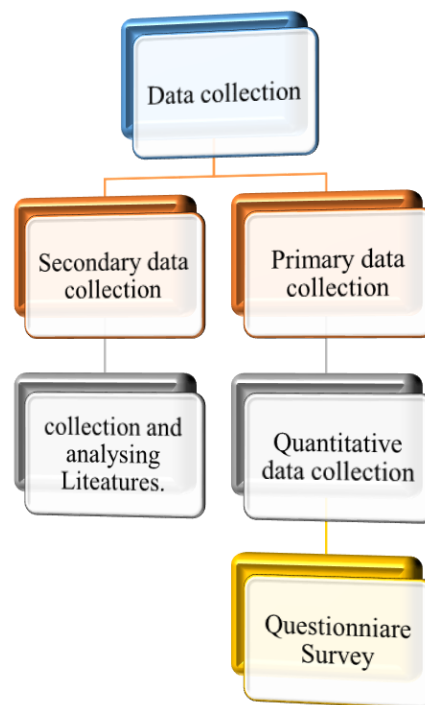


Figure 9: Data collection steps

4.2 Response Rate:

The study focused on collecting data from PM (Project Management), senior delivery Managerial roles IT employees and other key IT roles that working in UK (United Kingdom) or India. Questionnaire is sent out to 42 selected key roles in various IT company that deals

with products and services. Among these 30 were fully filled and returned, thus making a response rate of 71%. In research from **Wu et al. (2022)**, for online surveys more than 70% of response rate is excellent and any response rate above 50% is sufficient to make the conclusions. Hence this surveys response rate is acceptable, and the data collected is sufficient for further studies.

Item	Frequency	Percentage
Returned Questionnaires	30	71.42
Unreturned Questionnaires	12	28.58
Total	42	100

Table 1: Survey response rate

4.3 Reliability Test Results:

The study adopted Cronbach alpha technique to identify the reliability of the questionnaire and data collected. As stated in (**Yasar & Cogenli, 2014**), Cronbach Alpha coefficient has been calculated with a value range of 0 to 1. If the value is closer to one it shows high reliability and consistency of data. Cronbach Alpha coefficient value of obtained for the study is 0.94 which indicates that the variable of the study is consistent and reliable.

Scale Reliability Statistics	
Cronbach's α	
scale	0.944

[3]

Figure 10: Cranach test results obtained from Jamovi

4.4 General Demographic Information about Participants:

Level of Education:

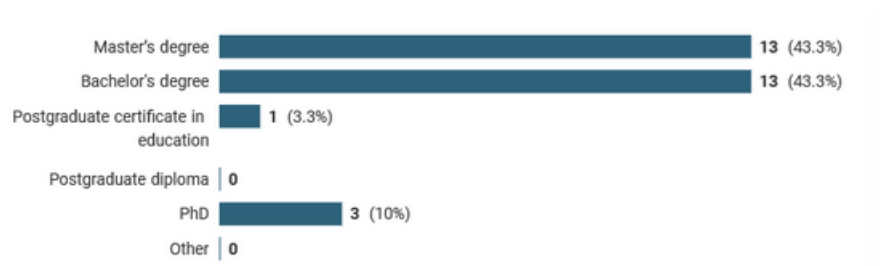


Figure 11: Level of education bar diagram

The educational background of the survey participants is depicted in the bar graph above. According to the research, more than 80% of the participants obtained at least a bachelor's degree, and 43.3 percent finished their master's equivalent education. 10% of the participants had a PhD and 3.3 percent had a certificate equivalent to a postgraduate degree.

Organisational Role and Year of Experience in the Domain:

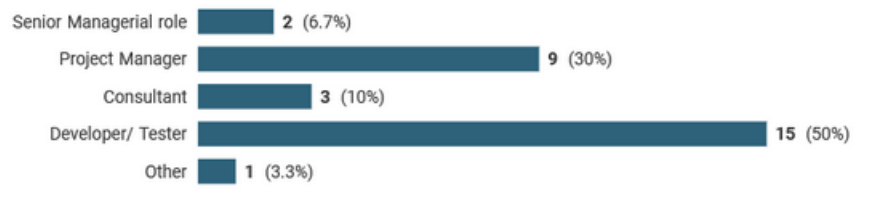


Figure 12: Organisational role

According to the roles and responsibilities bar diagram, most of the replies come from critical project jobs such as developers and testers, accounting for 50% of the survey results. Project managers' responses account for 30% of the total survey. The remaining 20% of the responses are summarised by jobs such as senior management, consultant, and business analyst. Because of the time limitation of collecting survey data, it is assumed that participation from senior management and other critical roles such as business analysts was extremely low.



Figure 13: Work experience

The experience bar graph above illustrates that the survey participants are well experienced in their roles and have enough subject knowledge, and the substantial number of replies from 1-3 years' experience proves the constantly shifting roles in the IT business.

Size of the companies:

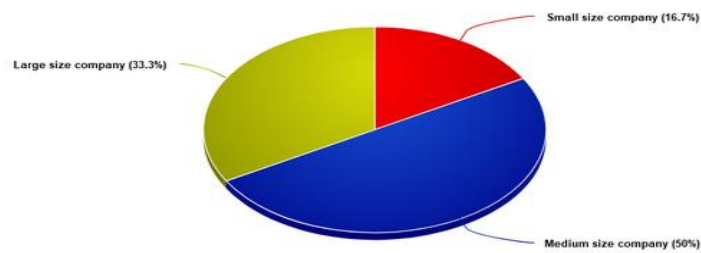


Figure 14: Organisational size pie chart

According to the pie chart, 80 percent of poll participants work for a large or medium-sized organisation. Participants from small businesses make for the remaining 15-16% of overall survey responses. High involvement from big or medium-sized organisations may result in the inference being based on this organisation, which is also an inferred as a limitation of the study.

4.5 Quantitative Data Collected on Questionnaire:

Based on the literature study, the questionnaire is divided into three sections. The first segment consisted of questions about the influence and adaptability of IMS on the IT projects. The second segment focuses on IMS's efforts to improve the quality of IT project delivery and service. Finally, segment three includes questions on the adaptation of IMS for stakeholder management, the relationship of stakeholder management in IT risk management, the impact of stakeholder management using IMS in the IT project, and how it helps project success.

As seen below, the data acquired for each section is summarised in tables using percentages.

4.5.1 Percentage of participation on “The Impact, influence and adaptability of IMS on the IT projects”:

Q.NO	Question	Strongly Agree (%)	Agree (%)	Slightly agree (%)	Disagree (%)	Strongly Disagree (%)
1	Does your organisation have a PMO (programme management office)?	43.3	26.7	23.3	3.3	3.3
2	Does all the department in your organisation shares data in-between to integrate the business management effort?	33.3	40	10	16.7	0
3	All employees have access to the data they required and have visibility to company IT operations and functions for the effective functioning in a project.	40	23.3	26.7	3.3	6.7
4	Your company uses Information management systems like ERP, PMIS (Project Management Information Systems), HR (Human Resources) management software, Payrolls etc., for the effective handling of data.	60	33.3	3.3	0	3.3
5	Does your company use latest versions of program/project management software's and tools (Examples like: Ms project, Jira, Primavera etc.)	56.7	26.7	10	3.3	3.3
6	The Organization uses collaboration tools (Google docs, Teams, Skype, Lotus) for communications with the key Stakeholders or clients.	73.3	16.7	3.3	3.3	3.3
7	Does the use of IMS have improved target monitoring and reporting significantly in your company.	40	43.3	13.3	0	3.3
8	Adapting Information Management systems has helped in improving employee productivity	40	46.7	13.3	0	0
9	IMS incorporates flexibility to the work culture which makes it more effortless	36.7	46.7	13.3	3.3	0
10	IMS is involved in all the stages of the project in your company, from initiation to closing and reporting.	50	33.3	13.3	0	3.3
11	IMS has helped the project to close out faster than usual paper-based projects	50	20	26.7	0	3.3
12	Use of IMS tools in data collection are easier as compared to previous paper-based process	53.3	26.7	13.3	6.7	0
13	Use of IMS has helped your company to set and incorporates quantitative targets and milestones at planning stage.	26.7	60	10	0	3.3
14	IMS helps to track, report, and coordinate the project activities.	36.7	53.3	10	0	0

15	Use of IMS has enabled better management of departmental data needs and increased data transparency.	33.3	43.3	20	3.3	0
16	Use of IMS has made the decision-making process faster.	43.3	36.7	16.7	3.3	0
17	The usage if IMS has helped your company to monitor the changes and variations	30	50	13.3	3.3	3.3
18	The IMS helped your organisation to compare and analyse data easily.	43.3	33.3	20	3.3	0
19	Use of IMS has facilitated better knowledge management and transfer for the organization	55.6	33.3	7.4	3.7	0
20	Use of IT has helped improve collaboration activities with partners, customers, and Key personals.	46.7	40	13.3	0	0

Table 2: Data display of questionnaire segment one in percentage

4.5.2 Percentage participation on “IMS's efforts to improve the quality of IT project delivery and service”:

Q.NO	Question	Strongly Agree	Agree	Slightly agree	Disagree	Strongly Disagree
21	The implementation of IMS improved product and service quality to the stakeholders	43.3	43.3	10	0	3.3
22	The IMS helped to facilitate better reporting and communication with the sponsors and business stakeholders	41.4	51.7	6.9	0	0
23	Use of IMS has improved planning and execution activities of projects in reaching its stakeholders.	26.7	56.7	16.7	0	0
24	IMS helped in preventing scope creep and there by eliminates project delays	36.7	43.3	20	0	0

Table 2: Percentage of participation on questionnaire segment two

4.5.3 Percentage participation on “The impact of stakeholder management using IMS in the IT project”:

Q.NO	Question	Strongly Agree	Agree	Slightly agree	Disagree	Strongly Disagree
25	Do you agree to the statement that "Stakeholders creates most of the risk in the IT project".	16.7	46.7	30	3.3	3.3
26	Do you support the statement that the stakeholder management data is highly potential for proper risk handling?	46.7	36.7	16.7	0	0

27	Do you support that both stakeholder management and risk management data can be integrated using customisable IMS.	40	36.7	20	3.3	0
28	Do you agree that the IMS helps in managing the stakeholder and risk effectively with active data storage and analysis?	36.7	50	10	0	3.3
29	Do you agree that the IMS helps in active monitoring and control of the risks associated with the stakeholder?	30	53.3	16.7	0	0
30	Do you think that adapting IMS will help in improving stakeholder engagement and retention?	43.3	36.7	6.7	10	3.3
31	IMS helps the internal and external stakeholders to collaborate each other.	31	48.3	10.3	6.9	3.4
32	Do you think the Stakeholder management with IMS is more effective and efficient than traditional stakeholder management	40	43.3	6.7	6.7	3.3
33	IMS will help the PM to predict the risk and helps in composing the mitigation plans by facilitating analysis and comparison of previous data.	40	40	13.3	6.7	0
34	IMS helps in integrating stakeholder management and risk management	30	53.3	6.7	6.7	3.3
35	IMS improves the project success rate through eliminating unwanted risks by favouring effective stakeholder handling.	30	46.7	20	3.3	0
36	Do you think that companies with IMS have more probability of project and business success than other companies without IMS?	26.7	50	20	0	3.3

Table 4: Percentage of participation on questionnaire

4.5.4 Descriptive statistical analysis of quantitative data:

The acquired data will be explained using statistical methods such as mean, mode, standard deviation, and correlation. This section investigates the relationship and correlation between the questionnaire variables such as stakeholder management, IMS, risk management, and project success.

4.5.5 Descriptive statics for the Impact, influence, and adaptability of IMS on the IT projects:

The questionnaire is designed to identify the answer for the research question. Various questions that investigate the use and impact of IMS in IT industry is covered in this section.

The conclusion from the data obtained indicates that IMS have a strong impact over the IT industry in tracking, monitoring, managing and the smooth prosecution of the project. The mean and standard deviation is calculated for the obtained data and inferences made from the analysis is given below.

Q.N O	Question	Mean	Median	Standard deviation
1	Does your organisation have a PMO (programme management office)?	4.3	4	1.07
2	Does all the department in your organisation shares data in-between to integrate the business management effort?	3.9	4	1.06
3	All employees have access to the data they required and have visibility to company IT operations and functions for the effective functioning in a project.	3.87	4	1.20
4	Your company uses Information management systems like ERP, PMIS, HR management software, Payrolls etc., for the effective handling of data.	4.7	5	0.81
5	Does your company use latest versions of program/project management software's and tools (Examples like: Ms Project, Jira, Primavera etc.)	4.3	5	1.02
6	The Organization uses collaboration tools (Google docs, Teams, Skype, Lotus) for communications with the key Stakeholders or clients.	4.53	5	0.973
7	Does the use of IMS have improved target monitoring and reporting significantly in your company.	4.17	4	0.93
8	Adapting Information Management systems has helped in improving employee productivity	4.27	4	0.691
9	IMS incorporates flexibility to the work culture which makes it more effortless	4.17	4	0.791
10	IMS is involved in all the stages of the project in your company, from initiation to closing and reporting.	4.27	4.5	0.944
11	IMS has helped the project to close out faster than usual paper-based projects	4.13	4.5	1.04
12	Use of IMS tools in data collection are easier as compared to previous paper-based process	4.27	5	0.944
13	Use of IMS has helped your company to set and incorporates quantitative targets and milestones at planning stage.	4.07	4	0.828
14	IMS helps to track, report, and coordinate the project activities.	4.27	4	0.64
15	Use of IMS has enabled better management of departmental data needs and increased data transparency.	4.07	4	0.838
16	Use of IMS has made the decision-making process faster.	4.20	4	0.822

17	The usage if IMS has helped your company to monitor the changes and variations	4	4	0.927
18	The IMS helped your organisation to compare and analyse data easily.	4.7	4	0.87
19	Use of IMS has facilitated better knowledge management and transfer for the organization	4.4	5	0.79
20	Use of IT has helped improve collaboration activities with partners, customers, and Key personals.	4.3	4	0.71
	Total Average	4.3	4.4	0.899

Table 5: Mean and standard deviation of questionnaire

As shown in table above the average mean for the questionnaire segment is 4.3, and the average standard deviation for the questions is 0.899, indicating that the participants are in strong agreement that the IMS has a large positive effect on the IT project environment.

4.5.6 Descriptive statistics on IMS's efforts to improve the quality of IT project delivery and service:

This segment of the questionnaire focuses on the investigation of research aim. The questions strongly analyse the impact of IMS over quality of project delivery reporting and project visibility.

Q.NO	Question	Mean	Median	Standard deviation
21	The implementation of IMS improved product and service quality to the stakeholders	4.23	4	0.898
22	The IMS helped to facilitate better reporting and communication with the sponsors and business stakeholders	4.34	4	0.614
23	Use of IMS has improved planning and execution activities of projects in reaching its stakeholders.	4.10	4	0.662
24	IMS helped in preventing scope creep and there by eliminates project delays	4.17	4	0.747
	Total Average	4.21	4	0.72

Table 6: Mean and standard deviation for questionnaire segment two

The data analysis yielded an average mean of 4.24 and a standard deviation of 0.72, indicating that IMS-aided project delivery is more efficient and effective.

As seen by the statistics presented above (Question 21 to 24), all participants believe that the IMS aids in forecasting and controlling scope creep through effective usage and analysis of project data. Slight variations in responses may be related to the extent of IMS implementation

in different corporate projects or the varied types of tools they utilise along with lack of proper integration as noted in questions 2 and 3.

4.5.7 Descriptive data on the impact of Stakeholder Management and Risk Management using IMS in the IT project:

The questions examine the influence of SM (Stakeholder Management) and RM on IT projects, how IMS promotes a favourable environment for the easy implementation of SM in IT projects, and how IMS aids in the integration of SM with risk management to prevent unnecessary risk and achieve project success.

Q.NO	Question	Mean	Median	Standard deviation
25	Do you agree to the statement that "Stakeholders creates most of the risk in the IT project"?	3.70	4	0.915
26	Do you support the statement that the stakeholder management data is highly potential for proper risk handling?	4.30	4	0.750
27	Do you support that both stakeholder management and risk management data can be integrated using customisable IMS.	4.13	4	0.860
28	Do you agree that the IMS helps in managing the stakeholder and risk effectively with active data storage and analysis?	4.17	4	0.87
29	Do you agree that the IMS helps in active monitoring and control of the risks associated with the stakeholder?	4.13	4	0.681
30	Do you think that adapting IMS will help in improving stakeholder engagement and retention?	4.7	4	1.11
31	IMS helps the internal and external stakeholders to collaborate each other.	3.97	4	1.01
32	Do you think the Stakeholder management with IMS is more effective and efficient than traditional stakeholder management	4.3	4	1.0
33	IMS will help the PM to predict the risk and helps in composing the mitigation plans by facilitating analysis and comparison of previous data.	4.13	4	0.9
34	IMS helps in integrating stakeholder management and risk management	4	4	0.92
35	IMS improves the project success rate through eliminating unwanted risks by favouring effective stakeholder handling.	4.03	4	0.809
36	Do you think that companies with IMS have more probability of project and business success than other companies without IMS.	3.97	4	0.890
	Total Average	4.5	4	0.87

Table 3: Mean and standard deviation for questionnaire segment three

The data collected shows an average mean of 4.5, indicating that respondents agreed that IMS has a positive impact over SM and RM. Average standard deviation is 0.87, which is due to the differences in implementation and utilisation of IMS system, lack of customisability of IMS system, or difference in opinion that SM alone will not lead to project success.

According to the data analysis (Question 25 to 36), the majority of respondents believe that IMS integration will provide them a competitive advantage in risk prediction, management, and mitigation. A minor variation in the statistics displayed might be attributable to differences in organisational backdrop or the types of approaches utilised to manage the project.

4.5.8 Inferential Statistical analysis of quantitative data collected:

Pearson's correlation analysis is used for inferential statistical analysis. **Obilor et al. (2018)** stated that the correlation is utilised to statistically analyse the relationship between two variables. The person's coefficient is measured between -1 and 1, where value closer to 1 indicates high correlation and -1 indicates poor correlation. This can be stated as the degree to which the two variables change correspondingly. Open-source statistical tool Jamovi is used for the purpose of inferential data analysis.

4.5.8.1 Correlation between Implementation of IMS and stakeholder management:

The correlation coefficient was performed to establish the strength of the association between the research variables IMS implementation and stakeholder management, and the results obtained are as shown below.

Pearson's r	0.647 ***
p-value	< .001

Figure 15: result of correlation analysis for IMS implementation and stakeholder management obtained from jamovi

The findings reveal a positive Pearson r coefficient value of 0.647, indicating a strong relationship between IMS adoption and stakeholder management. Hence from the data gathered and analysed, we can infer that the IMS aids in the effective and efficient management of stakeholders in the IT project setups.

4.5.8.2 Correlation between Integration of SM and Risk Handling using IMS:

Pearson's r	0.606 ***
p-value	< .001

Figure16: result of correlation analysis for integration of SM and RM using IMS

The correlation analysis between the variable SM implementation using IMS and risk management produced a coefficient value of 0.606. The significant correlation can be attributed to the participants' shared belief that integration of SM and RM is attainable with good IMS deployment.

4.5.8.3 Correlation between IMS implementation on SM and RM and Project Success:

Pearson's r	0.481 **
p-value	0.007

Figure 17: Results of correlation analysis of implementation of IMS for SM and RM with project success

The correlation study conducted to identify the influence of SM and RM integration on project success yielded a positive correlation coefficient value of 0.481, which is comparatively low compared to the other two, and this is inferred because of the high standard deviation in opinion that implementing IMS for SM and RM alone will not be sufficient for ensuring project success.

5. Discussion:

This section presents the quantitative data findings.

Sl No	Quantitative Data
1	Participants agreed that the IMS will aid in the integration of stakeholder management data with risk management, allowing for improved risk management and risk mitigation. The statistical analysis also showed strong correlation between implementation of IMS and RM and SM integration
2	Participants are unanimous in their belief that implementing IMS will increase the chances of project success by improving stakeholder management and risk management.
3	According to the statistics, the IMS will aid in project monitoring, control, and management, hence boosting project delivery quality.
4	According to the data, the participants believe that the customization and complexity of the tools and processes are the most important factors determining the cost of the IMS and the time necessary for its implementation.
5	According to the data, the IMS will aid in improved departmental data coordination and integration, which aids in planning, forecasting, and executing better organisational strategies, as well as stakeholder management.
6	Based on the analysed data, it is concluded that the IMS will aid in improving employee productivity and reduce stress by preventing over utilization of resources and enabling employees to obtain the correct data at the right time to make better crucial business choices avoiding unwanted risks.
7	The findings will help in understanding that implementing IMS will help improving the stakeholder and risk management when compared with the standard SM and RM techniques that is usually employed.

Table 8: Analysis and discussion of findings from quantitative data

As per the quantitative data is collected it shows considerable parallelism in terms of opinions regarding the influence of the IMS on stakeholder management and risk management. This data suggests that the adoption of IMS will enhance the process of stakeholder management, and these data could be utilized for better management and tracking of risk. According to the findings, there is a strong relationship that exists between the implementation of IMS and project success in modern organisational setups. Detailed discussions on the key variables are given below in the following sections.

5.1 Impact of the implementation of IMS in IT projects:

From the data analysis (4.5.5 & 4.5.6) it is revealed that the participants are aware of the capabilities and application of information management or associated data management systems or software's. The findings from the quantitative data revealed that participants are viewing IMS as a rapidly expanding futuristic sector of technology that aids in project comprehension and execution along with the close collaboration and engagement of stakeholders. Employees are united in their belief that implementing IMS at all levels of the project would revolutionise data management, hence increasing project success and lowering risk. These employee perceptions are similar like the authors' (**Cakmakaci , 2019; Mesquita,2020; khan, 2014; Freeman et al, 2017; Caron & Salvatori, 2015**) findings that cited in the literature review.

From the survey findings, it is discovered that the organisational size, requirements, and culture have a major influence on the adoption of IMS systems. This might have a significant impact on the type of system adopted, as well as the amount of integration and data visibility that available for the employees. This can be linked to the high standard deviation seen in several survey answers, as all the participants come from diverse organisational backgrounds.

According to the data obtained, large organisations choose in-house created data management systems or highly customizable third-party data management solutions based on project or customer requirements. Smaller businesses that are more focused on operations can benefit from deploying simple software products such as Excel or MS Project with zero to minimal data integration. Thus, it gives more details to the findings concluded by (**Blomquist, 2021**) stating that organisational size do affect the SM (Stakeholder Management) and related System implementation

The collected data also talks about the influence of project management approaches and the PMO office on IMS adoption and implementation. Findings also showed that participants showed strong interest on the usage of latest versions of program/project management software's and tools (Examples like: Ms project, Jira, Primavera etc.) These tools will help in improving the requirement gathering, resource allocation tracking and monitoring the project progress with great visibility.

As cited in (**Alami, 2016; Neimat, 2005; Gupta et al., 2019; Ermakova et al., 2021**), IT project faces a risk of failure because of inadequate stakeholder management. From the lights of the inferences made from the data analysis, this can be controlled by adapting the suitable IMS systems for managing the data associated with the stakeholder and risk, depending on the requirement of the project. The implementation will help in overcoming the project challenges like global market competition, technological obsolescence, business disruption and improving product service quality and security as cited in (**Taniguchi,2017; Mesquita,2020; Supply, 2009; Bendell and Huvaj,2020; Cakmakaci, 2019**).

5.2 Impact on the usage of IMS implementation for stakeholder and risk management in IT projects:

As per the reviewed literatures, stakeholder management and risk management are two sides of the same coin. According to (Nguyen et al., 2018; Habisch et al., 2011; Pedrini, 2019; Hwang and Ng, 2016), IT stakeholders are most dynamic in nature and most of the potential risks in an IT project are caused by stakeholders owing to inadequate handling of their varying requirements. Inferences from S. Harrison et al (2010) stated that, the proper information and data regarding the stakeholder is vital for the organisation to facilitate better collaboration environment with the stakeholders in responding to their requirement and technological challenges. Participants of this research agreed with the inference made by researchers that the implementation of IMS will create better collaboration opportunities and effective utilisation and management of data generated through that. This will lead to better requirement gathering and aligning the project along with the objectives which reduce the scope creep and project overshoot.

From the data analysed (4.5.7 & 4.5.8.2), participants feel that the SM and RM can be integrated utilising appropriate technologies. According to the research (Nguyen et al., 2018; Habisch et al., 2011; Pedrini, 2019), some organisations are leveraging in-house built tools to make this integration feasible and making use of the selective stakeholder related data for proper risk handling and management. The results reveal that this integration occurs during the assessment stage of SM management where data obtained from the Stakeholder analysis identification and assessment feeds as the reference for the risk management process. This will empower the PM in taking critical decision making regarding the project which is one of the major success factor criteria for IT project success as per Xia (2018). Hence the inference made validates the integration model proposed by Caron and Salvatori (2015) proved that it is suitable for IT SM and RM integration.

From the research of (Gossy, 2008), the organisational culture or size along with departmental data segmentation is the major challenge to this integration. And this analysis proved that this can be overcome by adapting suitable tools and protocol for ensuring effective integration and security of data integrated. The inferential analysis along with comparison of the collected data revealed that adaptation of IMS systems for SM and RM improves organisational performance incorporating flexibility for the changes. It enhances the process of stakeholder engagement and risk monitoring. The implementation helps in tracking risk to the source and mitigating it

also helps in risk predictions and pre-mitigation before the event occurs. The IMS has reduced the decision-making time and enhanced visibility which helps in better identification and mitigation of the risks. This validates the earlier inferences done by Blomquist (2021) on the impact of integrating SM and RM is right and it holds true for dynamic IT project environments.

5.3 Impact of Stakeholder Management and Risk Handling aided with IMS on project success and quality of project deliveries:

Correlation between IMS implementation on SM and RM (4.5.6 & 4.5.8.3) and project success shows positive moderate relationship. This relationship can be increased by improving in project performance in terms of meeting deadlines, respecting budgets and meeting specifications can be obtained indirectly however, through the system's impacts on project managers **(Raymond & Bergeron, 2008)**. They also highlighted that the more project managers perceive their task to be positively impacted by their use of project management software, greater is their belief in the positive contribution of this software to the attainment of their projects' performance objectives. According to the research done by **(Taherdoost, 2019)**, one of the main factors for IT project success is the capacity of the project to converge and convince all stakeholders on a common ground of the project's aim. And the researchers like **(Taniguchi, 2017; Mesquita, 2020, Maruping, 2019; Poveda-Bautista, 2018; Leach, 2014)** inferred quality as the customer's assessment of the service and product. According to the correlation findings, there exists a strong relationship between adequate stakeholder participation and perceived quality. The evidence supports the conclusion that by good stakeholder management, the organization may increase the likelihood of adding more value to its products and services by avoiding under or over-utilization of resources, hence improving the product and service quality. Findings reveals a high agreement on using IMS for SM and Risk Management will decreases the negative effect on stakeholders, which in turn helps to increase the chance of project success.

According to the findings of this correlation and table 5, tools and techniques are extensively employed in organisations to achieve excellent project control and management. Thus, deploying IMS and thereby integrating stakeholder and risk management can aid in providing vital data to these tools and systems that may assist the PM in key decision making.

5.4 Key findings and inferences obtained through the research:

The study using both primary and secondary data (Literature review) uncovered that implementation and utilisation of IMS in IT organisation have a huge positive impact over the project activities like stakeholder and risk management. It is being inferred that along the project lifecycle, the project activities create huge volume of data and information which is needed to be managed and utilised effectively to create effective project decisions to overcome the change hurdles. From above analysis it is found that the IMS implemented companies are doing these activities more effectively and efficiently than the companies which is sticking with traditional data management practices. From the data analysis a general trend identified is that the participants unanimously agrees that the implementation of IMS or any sort of data management tool system like that will improve the way company manage the data, it helps in creating data integration and knowledge collation to make effective and cunning business decisions by exploiting the collected business data. The IMS also will help in storing and back tracing history of data which helps in effective knowledge transfer and risk handling in IT project environment.

According to the research analysis the IMS helps in effective integration of the SM and RM utilising data generated from both these activities (Caron, F., & Salvatori, F. 2015). Which improves the traceability of the risk to the source and mitigating it by avoiding the triggers. This integration will be helpful in effectively managing the stakeholders in more human resource intensive industry like IT. From the research analysis it has been identified that the risk associated with project stakeholders are accountable for most of the IT project failures (Pedrini, 2019; Eskerod, 2014). The stakeholders change or the existing ones evolves with their priorities during the lifecycle of the project, this change makes it hard for the PM (Project Manager) to management stakeholders effectively with the primitive paper based or other ordinary methods. This justified the requirement for customisable and user-friendly technological solutions like IMS for effectively collecting, storing and make use of this stakeholder data that created along the project cycle.

This empowers the PM and team members and enhance their ability to understand, engage and manage these stakeholders more efficiently and effectively. The quality of the project delivery can be improved by this, as quality is the solely depended on the stakeholder's perception on the product or service which can be influenced by exploiting the data. The research concludes that the IMS systems that need to be implemented depends solely on the organisational size,

project properties, and nature of the stakeholders that need to be managed. The customisability of the IMS system is the unique feature that make it convenient and adaptable than any other systems, which helps in adding flexibility to the project in adopting change management.

The findings supports the stakeholder value theory proposed by freeman and helps in value generation by effective collaboration of the stakeholders with the project team. The system helps in improving the visibility and data availability within the company, which makes it easy for the project manager to convey and coordinate the project activities like resource allocation, budget allocation, issue fixing, taking feedbacks and tracking. The data collected through IMS can be used to find the value generating and non-value generating task and thereby improve the project strategy by removing the non-value generating ones. The data collected can be used for identifying trends and forecasting internal and external risk to respond quickly to it.

The major limitations of this implementation and integration that found during the research were the excessive cost of implementation and customisation, organisational size and culture, resistance to change, Time limitations for trainings and induction etc. The inflated cost of implementation makes this non ideal for small size organisation with low project requirement to justify it. Most of the big IT firms because of their requirement either make their own systems or outsource it from third party product companies. It is inferred that adopting the systems that enables more customisation is always better since it can avoid rapidly changing the entire system for different requirement, which creates huge losses in terms of money and time for training it.

5.5 Recommendations for IT businesses for the effective and successful use of IMS for stakeholder management and risk management:

The purpose of this recommendation is to provide useful insight that assists businesses in understanding and identifying the need for IMS deployment for their project management activities. In addition to that, methods and procedures for successfully implementing the IMS system for handling SM and RM are suggested. Following are the suggested recommendations:

- All IT organisations should develop a customer-based data centric culture in which business decisions are driven by the conclusions drawn from analysing trends and patterns in project management data. This can be achieved through adopting technology solutions like IMS.

- Companies should tailor their data management systems to the nature of their project, their organisational structure, culture, project methodology, stakeholders' requirement and organisational capabilities. This enables the firm to utilise the features of the system to its fullest to achieve business functions efficiently.
- The IMS systems selected should be customisable so that the firm can account for change management and helps in responding to organisational and project changes quickly.
- Change management activities should be planned to ensure the successful implementation of the IMS by reducing the stakeholder resistance to change. This helps in communicating the requirement of change to both internal and external stakeholders.
- Proper training and induction to the system should be given to both internal and external stakeholders.
- The companies should ensure complete departmental and business data integration to achieve all the benefits of the IMS. This helps in the effective conduction of SM and RM by utilising the data.
- Companies with projects of high data security requirement should plan data management through project to project integration rather than departmental integration.
- The IT firms should empower their employees by providing right data at right time, which will enhance the productivity and efficiency thereby reduce failures.
- The steps for change implementation for making use of IMS for SM and RM is given below.

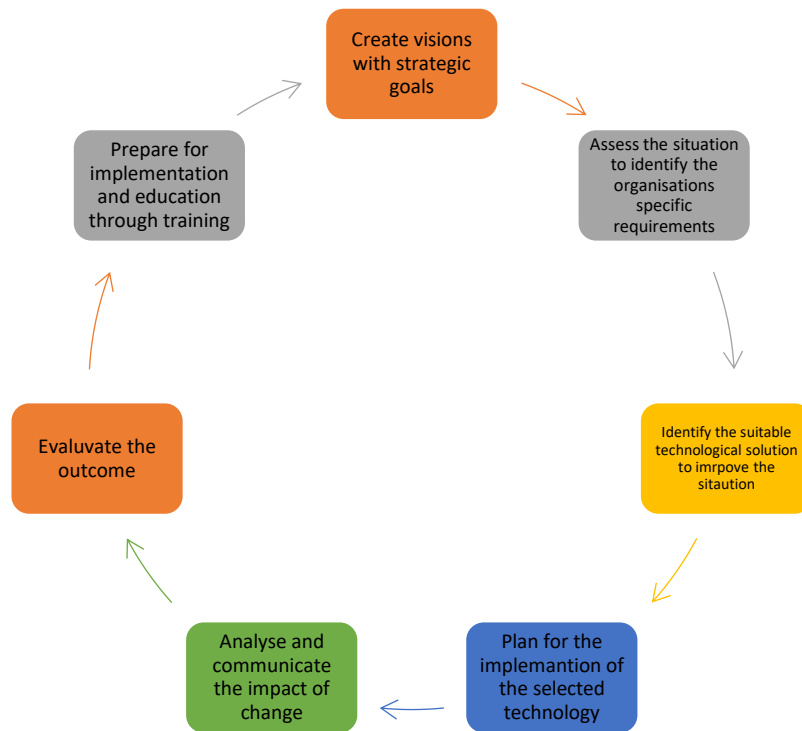


Figure 18: Steps to implement change

IT organisations can make use of this recommendations for either future implementation of new IMS systems or improving their existing data management systems for effective IT project stakeholder and associated risk management for project success.

6. Limitation

The limitations of this research are the elements that hinders the smooth conduction of the research. If these are not addressed effectively, it has an impact on the quality of the overall research effort. One of the limitations was Lack of availability of research and case studies in the selected topic and domain. The study of stakeholder management in IT projects using IMS is an understudied issue, making it difficult to identify relevant case studies and research works, to refer to or benchmark the study. This issue is eliminated by utilising both primary and secondary data and designing suitable research strategy to collect and analyse information regarding the topic. The other limitation is wider selection of topics and each of the individual research variable like SM, RM and IMS are separate disciplines in project management. As a future improvement these limitations will be addressed to improve the research outcome.

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