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Abstract- The paper is about understanding the current process in automation execution process and application of project management practices to it. The project is of automation of more than 6000 sites across the India for IOCL. The current model is waterfall model. After the study it is observed that there is lack of project management and project planning in the project. This affects the timeline and cost of project. The main objective is to introduce PM. Since agile practices are excellent for communication management and project controlling, the report proposes agile approach for current process. Since there are limitations for complete agile implementation, a mix approach, combining agile and waterfall can be used. Along with agile there are many other trends which can be applied to improve project efficiency. Report suggests visual project management, emotional intelligence as a tool for the project. Paper focuses on process and tools for implementation of risk management. It also checks the effectiveness of risk management plan.

Keywords: *project management (PM), risk management, visual project management.*

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Implementation of Risk Management in IOCL Tender Driven Project – A Case Study

Viraj Sant [α] & Dr. D.N. Raut [σ]

Abstract- The paper is about understanding the current process in automation execution process and application of project management practices to it. The project is of automation of more than 6000 sites across the India for IOCL. The current model is waterfall model. After the study it is observed that there is lack of project management and project planning in the project. This affects the timeline and cost of project. The main objective is to introduce PM. Since agile practices are excellent for communication management and project controlling, the report proposes agile approach for current process. Since there are limitations for complete agile implementation, a mix approach, combining agile and waterfall can be used. Along with agile there are many other trends which can be applied to improve project efficiency. Report suggests visual project management, emotional intelligence as a tool for the project. Paper focuses on process and tools for implementation of risk management. It also checks the effectiveness of risk management plan.

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I. Introduction

ABC company provides equipment and services for forecourt management. Company provides automation solution through which all equipment on fuel station and communicate with each other and push the real time data on host. This study is about the implementation of risk management for execution project in the service field. It mostly refers on how to implement risk management process and where to implement it.

Lack of scope change management, poor communication, poor data handling, planning and prioritization of activities are the important observations of study. Since project is carried out across India and managed from several locations, stakeholder management is also important in the project. Current practices lag in terms of risk management. The purpose is to ensure that all the risks (process, system, people, external events, and financial risk) are managed effectively so that the company mission and vision are not affected and all company Key Performance Indicators (KPI) (Quality, Cost, Delivery, Accountability, and Continuous Improvement) are achieved.

Methods like training, brainstorming, checklist, survey and risk score matrix are used to determine the results. These methods are initially obtained from literature review that has been conducted in the early stage of the study. Lastly, this study also will measure the] effectiveness of the implementation of risk management process.

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II. Literature Review

Vandersluis, Chris studied Application agile methodology to non-software enterprise projects. He said, Agile thinking was never designed to be restricted to just software development [4]. Priyam Dhani and Dr. Tanu Sharma studied HISTORY, MODELS AND MEASURES of emotional intelligence. This paper sought to review the literature on emotional by discussing the history of EI to the different theories and measures of EI. Lavanya, N. & Malarvizhi presented paper on risk management. This paper presents the structured Risk Management process followed at Nokia Siemens Networks that helps avoid crisis situations and incorporate learning from past mistakes[2] C. WU and S. H. HSIEH studied Visual Project Management based on questionnaires and industry interviews, the research in this paper prototypes a visual project management information system (VisPMIS) for effectively solving project related problems such as information and system integration among different project participants and engineering application systems.

III. Risk Management Process

Risk management is a process of identifying risk, planning responses to those risks, and monitoring them throughout the project life cycle. On the other hand, a risk management plan is a document which documents the detailed plan to identify risks, analyze the risks, developing responses, and how to manage the responses. It describes how the risk management activities will be carried out in the project.[1]

Steps in a risk management plan are as follows:

- Plan Risk Management

Plan Risk Management is the process of defining how to conduct risk management activities for a project. The key benefit of this process is that it ensures that the degree, type, and visibility of risk management are proportionate to both risks and the importance of the project to the organization and other stakeholders. Team meeting was carried out to create this plan. Risk management plan is a component of the project

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management plan that describes how risk management activities will be structured and performed

- Identify Risks

Identify Risks is the process of identifying individual project risks as well as sources of overall project risk and documenting their characteristics. The key benefit of this process is the documentation of existing individual project risks and the sources of overall project risk. It also brings together information, so the project team can respond appropriately to identified risks.

- Analyze Risks

In order to handle the risk, its prioritization must be done. Quantitative and qualitative analysis is done for all identifies risks.

- Planning the Responses

Plan Risk Responses is the process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks. The key benefit of this process is that it identifies appropriate ways to address overall project risk and individual project risks. This process also allocates resources and inserts activities into project documents and the project management plan as needed.

- Monitor and Control the Risks

In order to maintain the established process proper monitoring of plan is required.

Tools may be used –

1) *Interview*– Discussion with expertise and understanding the current scenario through their vision is always helpful. Interview can be taken within the team or expert from outside the team.
2) *Brain storming*- It is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members.
3) *Root cause analysis*– Root cause analysis is an approach for identifying the underlying causes of an incident so that the most effective solutions can be identified and implemented. It's typically used when something goes badly but can also be used when something goes well. Within an organization, problem solving, incident investigation, and root cause analysis are all fundamentally connected by three basic questions:

- What's the problem?
- Why did it happen?
- What will be done to prevent it from happening again?

4) *SWOT analysis*- SWOT matrix is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage. SWOT has been described as the tried-and-true tool of strategic analysis.

- *Strengths*: characteristics of the business or project that give it an advantage over others.
- *Weaknesses*: characteristics of the business that place the business or project at a disadvantage relative to others.
- *Opportunities*: elements in the environment that the business or project could exploit to its advantage.
- *Threats*: elements in the environment that could cause trouble for the business or project

IV. Case Study

The proposed plan is implemented in the project. Few steps are changed based on project requirements are team discussion.

1. Project risk Plan

Following areas are covered and planned in project management plan.

Risk strategy: Identify and Prioritize the risk and attempt the highest affecting risk.

Methodology: A risk register will be created and maintained by the risk management team. Regular meetings will be conducted to plan and mitigate the risk.

Roles and responsibilities: During the planning meeting following responsibilities are defined –

1. Risk management team members – Director, Project manager, Zonal heads, Cross functional team representatives.
2. Decision making – Risk team
3. Budget approval – Director
4. Data collection – Zonal heads
5. Document maintenance and risk mitigation tracker – Project manager

Funding: No separate fund is needed as it is a parallel activity. If fund is needed for risk mitigation plan, it will be approved by director.

Timing: For this project risk register is reviewed and updated during project planning phase. It will be quarterly reviewed with management.

Risk categories: Provide a means for grouping individual project risks. A common way to structure risk categories is with a risk breakdown structure (RBS), which is a hierarchical representation of potential sources of risk An RBS helps the project team consider the full range of sources from which individual project risks may arise. Pl

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Table 1: Risk categories

Risk Category	Extended categories
Technical	Requirements, Technology, Interfaces, Performance, Quality, etc.
External	Customer, Contract, Market, Supplier, etc.
Organizational	Project Dependencies, Logistics, Resources, Budget, etc.
Project Management	Planning, Schedule, Estimation, Controlling, Communication, etc.

Definitions of risk probability and impacts: Definitions of risk probability and impact levels are specific to the project context and reflect the risk appetite and thresholds of the organization and key stakeholders. The project may generate specific definitions of probability and impact levels or it may start with general definitions provided by the organization. The number of levels reflects the degree of detail required for the Project Risk Management process, with more levels used for a more detailed risk approach (typically five levels), and fewer for a simple process (usually three). Table provides definitions of probability and impacts against three project objectives. These scales can be used to evaluate both threats and opportunities by interpreting the impact definitions as negative for threats (delay, additional cost, and performance shortfall) and positive for opportunities (reduced time or cost, and performance enhancement) [5].

Table 2: Definition of probability and impact

Scale	Probablity	Impact		
		Number of ROs	Cost	Functionality
Very High	Every day	>150	>10L	Very significant impact on overall functionality
High	once a week	100 to 150	5L-10L	Significant impact on overall functionality
Medium	Once a month	50 to 100	1L-5L	Some impact in key functional areas
Low	Once a quarter	10 to 50	10K-1L	Minor impact on overall functionality
Very Low	Once in year	10<	10K<	Minor impact on secondary functions

Probability and impact matrix: Risk is defined in two dimensions: the uncertainty dimension (assessed as probability of occurrence), and the effect dimension (assessed as impact on objectives. The effect on objectives is relatively simple to estimate, as it involves a simple exercise in imagining the situation where the risk happens. Prioritization rules may be specified by the organization in advance of the project and be included in organizational process assets, or they may be tailored to specific project. Opportunities and threats are represented in a common probability and impact matrix using positive definitions of impact for opportunities and negative impact definitions for threats. Descriptive terms (such as very high, high, medium, low, and very low) or numeric values can be used for probability and impact. Where numeric values are used, these can be multiplied to give a probability-impact score for each risk, which allows the relative priority of individual risks to be evaluated within each priority level.

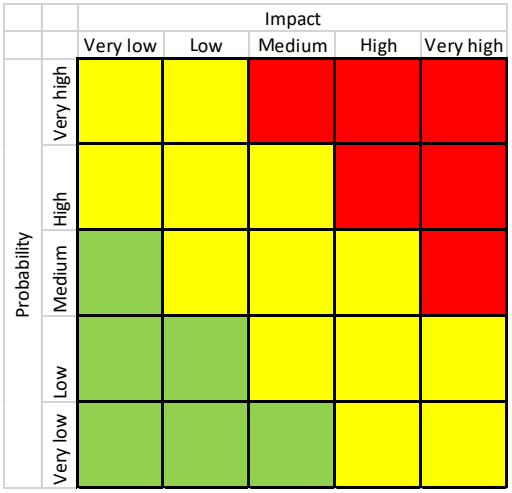


Figure 1: Probability impact matrix

Reporting formats: Reporting formats define how the outcomes of the Project Risk Management process will be documented, analyzed, and communicated. This section of the risk management plan describes the content and format of the risk register and the risk report, as well as any other required outputs from the Project Risk Management processes.

Tracking: A tracker is developed in which all key information related to risk can be record and track. The document consists of risk description, owner, risk mitigation.

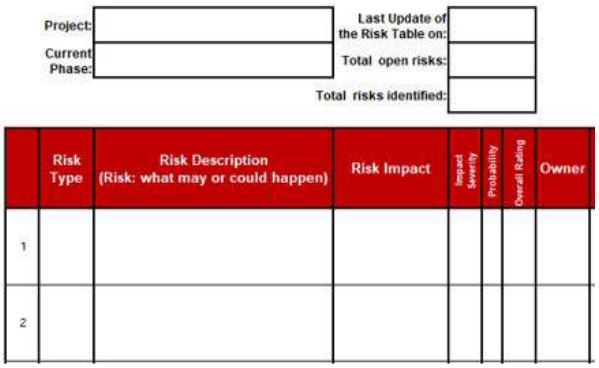


Figure 2: Risk register and tracker

2. Risk identification

This process is performed throughout the project. Following tools are used in the project.

- Document review– The tender is reviewed and studied. As the project is tender driven, it is necessary to review the tender. There is may clause related to payment and service which may create the high risk in the project. Thus, proper understanding of tender is required.
- Information gathering - Data-gathering techniques that can be used are:

1) Interview– Discussion has been done with director and vice president. Risk are identified based on their experience.

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2) Brain storming– A brain storming session is done during a 3-day workshop conducted for automation. All state heads, regional head, head office team were part of this session. Based on quaternary, a list of risk is prepared.
3) Root cause analysis– Consider the following example of RCA done for delay in material delivery.

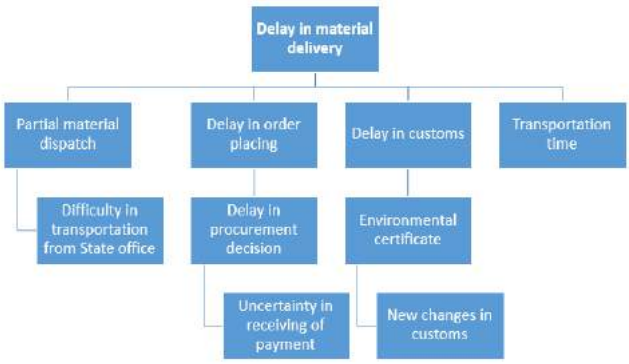


Figure 3: Root cause analysis for delay in material delivery

SWOT analysis: SWOT matrix is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. Consider the SWOT analysis done for project-



Figure 4: SWOT Analysis

Risk identification output

As output of risk identification following risks are recorded in risk register:

Table 3: Risk identification

	Risk Type	Risk Description	Risk Impact
1	Organization/Process	Safety risk Accidents - Road accident during travelling, accident during power on	Death, injury to technician
2	External	Weather issue in IOAOD, PSO in December	Delay in work completion
3	Commercial	Change in value of currency	Affects purchase from other countries
4	External	Dependency on third party vendor	Delay in work completion
5	External	Vendor monopoly	Increase in payments
6	External	Custom issues (Environmental certificate)	Delay in getting the shipment
7	organization/Process	Material theft	Loss of inventory. Monetary loss, delay because of double transportation
8	Organization/Process	Lack of training to engineer	Poor quality work
9	External	Poor contractor work	Poor quality work
10	Organization/Process	Delay in procurement decision	Delay in schedule
11	Organization/Process	Cross functional team	Delay in decision making, poor communication
12	External	Scope change by customer	Preplanning, delay in organization targets
13	Organization/Process	Attrition rate	Delay because of new recruitment and training
14	External	Elections	Contractor team not available
15	External	Festival impact	Delay
16	Technical	Google dashboard failure	Loss of data
17	Commercial	Tender clauses	Delay in Payment
18	Commercial	Cost overrun due to rework	Overbudget, delay

3. Quantitative & Qualitative Risk analysis

As a result of quantitative and qualitative analysis, probability and impact are assigned to identifies risks.

Table 4: Risk register with probability and impact

Risk Type	Risk Description	Risk Impact	Impact Severity	Probability	Overall Rating
Organization/Process	Safety risk Accidents - Road accident during travelling, accident during power on	Death, injury to technician	Very high	Low	10
External	Weather issue in IOAOD, PSO in december	Delay in work completion	Medium	Low	6
Commercial	Change in value of currency	Affects purchase from other countries	Medium	Medium	9
External	Dependency on third party vendor	Delay in work completion	Medium	Very high	15
External	Vendor monopoly	Increase in payments	Medium	Low	6
External	Custom issues (eg Environmental certificate)	Delay in getting the shipment	Medium	Low	6
organization /Process	Material theft	Loss of inventory. Monetory loss, delay because of retransportation	Medium	Low	6
Organization/Process	Lack of training to engineer	Poor quality work	High	Low	8
External	Poor contractor work	Poor quality work	Medium	Low	6
Organization/Process	Delay in procurement decision	Delay in schdedule	High	very low	4
Organization/Process	Working with Cross functional team	Delay in decision making, poor communication	Very low	High	4
External	Scope change by customer	Replanning, delay in organization targets	Medium	Medium	9
Organization/Process	Attrition rate	Delay because of new recruitment and training	Medium	Medium	9
External	Elections	Contractor team not available	Low	Very low	2
External	Festival impact	Delay	Medium	Low	6
Technical	Google dashboard failure	Loss of data	Low	Very high	10
Commercial	Tender clauses	Delay in Payment	Medium	Medium	9
Commercial	Cost over run due to rework	Overbudget,delay	High	Low	8

4. Risk response

Based on the strategies in table 4, mitigation options are identified for the identified risk.

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Table 5: Risk response

Threat	Opportunity
Avoid	Exploit
Transfer	Share
Reduce	Enhance
Accept	Reject

V. Results and Discussion

The impact or effectiveness of applied risk management plan will be evaluated in 2 ways.

- A checklist will be prepared and circulated among key stake holders to check whether all risks are captured or not.

Table 6: Checklist for risk management implementation

Criteria	Progress
Do you have risk management plan?	Yes
Do you have risk management strategy?	Yes
Do you have identified possible stake holders related to automation project?	Yes
Are you aware about risk probability and impact scale?	Yes
Do you have established risk management committee?	Yes
Does the committee have appointed a specific person who is responsible or accountable for risk management?	Yes
Do you have identified methods for risk assessment?	Yes
Do you have standard format for risk capturing?	Yes
Are you capturing newly identified risks in risk register?	Yes
Do you have identified risk treatment plan?	Partial

From the above, it is transformed into a pie chart. Risk treatment plan is in progress.



Figure 5: Percentage of risk management implementation

- Another way of measuring effectiveness is by checking whether mitigation plan is effective or not. A key performance index is identified which are affecting a particular risk. The impact of risk mitigation plan is measured on that KPI.

Table 7: Checklist for risk management implementation [6]

Sr.No.	Risk Management components
1	Effective culture and organization
2	Defined and communicated procedures
3	Level of understanding risk and risk management
4	Establishing criteria for evaluation of risk
5	Identification of risk
6	Registering of risk
7	Analysis of risk
8	Prioritization of risk
9	Appropriate use of risk recording tool
10	Monitoring of risk actions
11	Continues feedback on risk management strategies
12	Regular report to senior management

Among the 12 points mentioned first 9 points are considered, as remaining point will take some time for implementation.

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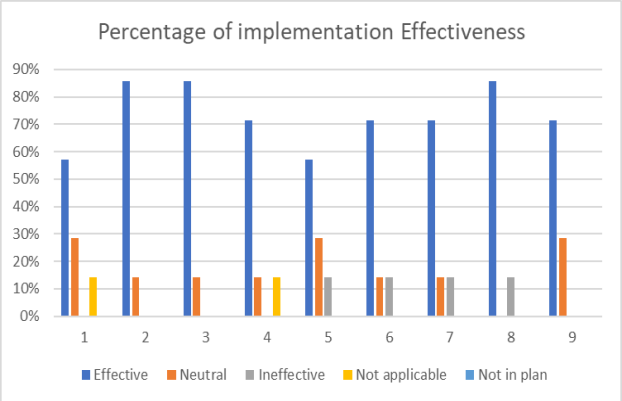


Figure 6: Percentage of implementation effectiveness

The process followed in the system had many gaps. There was failing in terms of timeline and cost because of poor planning, lack of risk management, poor communication. For smooth execution, process need to be modified. Project management is lacking in execution. As the scope is not going to vary once tender is accepted and there are so many structured things in Agile, it is difficult to implement agile in this project. Since agile and execution project have many differences like lead time, cost of equipment. the method can't be applied directly. Visual Project Management helps in data handling and tracking.

VI. Conclusion

ABC company is growing faster in automation business. In order to meet the project targets company is implementing Risk Management plan for the automation project. It can be further expanded to complete service department.

Many problems in project can be avoid or reduced by proper implementation of risk management plan. Many problems in the project can be avoided or addressed in early stage with the help of risk management. A risk management plan is created, and risk analysis is done for the project.

The effectiveness of implemented process is also analyzed. For most of the components, the implemented plan is effective. Risk management may not avoid the problem completely, but it can reduce the impact of problem.

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