

Author: Amit Johnsonbabu

Reinventing the role of Project manager in the Artificial intelligence era

Theme: Project Management Leadership-> In a Rapid changing world

Keywords:

Artificial intelligence, Machine learning,Bot,Cognitive

Abstract:

Advances in Artificial intelligence has reduced the need of human intervention in repetitive rule based tasks. This will enable the project managers to focus on higher customer value creating opportunities and Stakeholder management rather than operational mundane activities. Project managers will be empowered to measure and model project parameters with help of cognitive intelligent solutions provided by machine learning algorithms. Project managers will be able to get more insights in stakeholder management, risk modeling, intelligent resource scheduling and managing project constraints with intelligent use of data models. This white paper provides perspective on the paradigm shift in the empowerment provided to PM role in the realm of cognitive intelligence

Intent:

Currently there is a lot of hype, concerns around how AI can impact the workforce, whether in terms of reskilling or workforce transition. In line with the developments project managers need also to be prepared to adopt the future. Purposeful AI will help the project managers to add value in different phases of project lifecycle. Usage of Machine learning in project management landscape help project managers to forecast Stakeholder behaviors, revenue and risks based on historical data and organization knowledge base. Successful implementation and maturity of a project management AI platform depends on ability organization to capture right data at different stages in a project and Knowledge management strategy to capture the knowledge and experience of its workforce. All these changes reinforce Project managers in near future should relook their span of activities and work along with computers and algorithms

Table of Contents

Contents

Introduction.....	4
The 9 Project Knowledge Areas	4
Integration Management	5
Scope Management	6
Cost Management.....	7
Time management	7
Risk Management	8
Quality	8
Stakeholder	8
HR	8
Communication	9
Procurement.....	9
PMI's Talent Triangle.....	9
Technical Project Management	10
Strategic& Business Management.....	10
Leadership.....	10
Conclusion.....	11

Introduction

Artificial intelligence is the ability of a computer to perform certain tasks which require intelligence like

- Logical deductions and inference
- Learning and adaption
- Ability to understand natural language/speech
- Ability to make decisions on
 - ✚ Past experience
 - ✚ Insufficient information
 - ✚ Conflicting information

Usage of AI in project management is on the rise and way things are going it will help project managers to take smart decisions and effectively manage the triple constraints. Project management AI help to uncover new insights, automate mundane tasks and understand key project performance parameters. Cap Gemini is using the IBM Cognitive computing system IBM Watson in improving the efficiency of resource deployment in project by allocating the right resources to project. Infosys is using a AI based knowledge platform which collects and aggregates organizational data from people, processes and legacy systems into a self-learning knowledge base.

Computers will assist the Project manager or perform the following tasks in near future

- Defining the scope of a project
- Aligning with other business areas
- Analyzing risks
- Developing project schedules, timelines, and budgets
- Assigning tasks to the appropriate resources
- Implementing software and other technical components
- Assessing project outcomes
- Track issues

The 9 Project Knowledge Areas

As per PMI there are nine knowledge areas which covers all or most of the Project Managers activities



Figure 1PM Knowledge Domains

This Paper explores the usage of AI as an enabler by project Manager in the knowledge domains based on my assessment

Integration Management

Intelligent Bots act as digital assistant to Project Managers. Bots can be integrated with an existing Personal assistant like Siri or corona or other digital channels and respond to Project manager's queries. Consider the scenario when the project Manager can get real time information using natural language from intelligent systems than going to multiple touch points

1. When the task X is expected to be completed?
- 2 How is the resource availability looking like today?

Each project manager will be able to update tasks, issues, schedules dynamically with the help of instructions to intelligent bots.

Project Management Knowledge system have lot of historical data and organization learning. An Artificial intelligent based Project management system can mine information from web. Corelating the information from various sources machine learning algorithms can predict potential issues and risks affecting the project not only from project organization scope but also external environmental factors

- Historical weather data could be used to predict delays on a construction project.

- Better predictions of resource usage and quality metrics for a project based on a new domain or technology

Imagine a scenario when Cognitive intelligent systems are able to interface with external world

- An iot sensor device on a lab sensor identifies a Temperature /Pressure variance and send an automatic alert to PM in his mobile device
- Instantly the PM Assistant Bot create an issue entry in Project management system
- Project manager will assign the task to a team member to investigate
- Team member investigates and records corrective and preventive measure for the issue in the Project management system
- Later, when the project manager is planning their next project, a machine learning algorithm alerts them to where a similar issue is likely to arise in the new project, enabling the project manager to proactively address the issue.

Scope Management

Defining Work breakdown structure(WBS) is a key planning in project management as this is the basis for scheduling, controlling and assigning resources. AI can be applied to develop a comprehensive WBS and reduce the probability of omitting key tasks from the WBS.

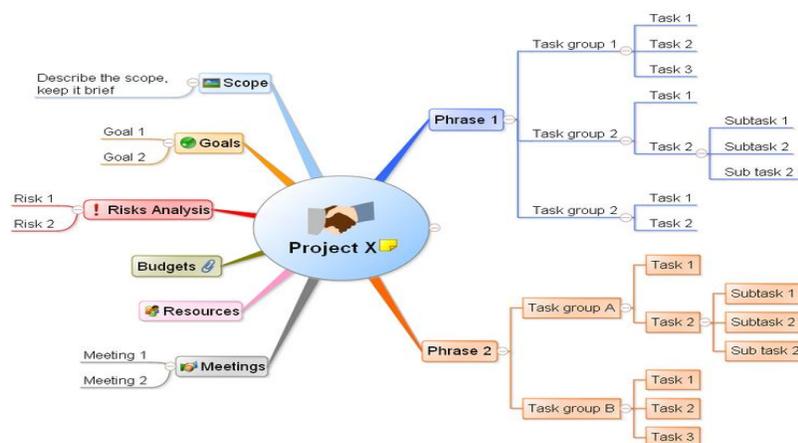


Figure 2 MindMap

Mind map is a powerful tool used in Project management to map entities, relationship and constraints in a project context by the project team. Project management systems which support machine learning algorithms can convert the mind maps to Semantic network and further extract WBS tasks and the

relationship between the tasks. Expert systems can also use organization knowledge base to suggest project schedule and Key performance indicators based on historical data.

Another example can be usage of AI in Operational Process harmonization in multiple geographies for a multinational company. Regional process owner can document the current process in their country using Business process modelling notation(BPMN) in a BPM platform. Expert systems can analyze the Process across multiple geographies and suggest an optimized process which can be used across the organization.

Cost Management

Primary need of any business is to be profitable. Accurate cost estimation is critical to success of any project. Cost estimation is an engineering knowledge oriented engineering task. There are multiple cost models available and comparison between different models for different cost elements are required for project success. Lifecycle and Product development cost can be estimated using statistical methods like component regression and neural network algorithms. Machine learning systems are deployed to forecast project cost using the historical data. Intelligent dashboards enable to monitor real time project cost metrics and drilldown to lowest level of details where Project manager's attention is required. AI based Robotic process automation system can be used for releasing the project manager's effort from operational activities like invoice entry and reconciliation.

Time management

Scheduling Bot could harness the learning from previous projects and suggest number of possible schedules based on the project context and triple constraints. Artificial Neural network can sequence the project activities based on functional requirements. Intelligent schedulers can readjust the project schedule based on the project progress and team performance level. Cisco's project assistant Spark is a project assistant which help Project team to update task status by entering a natural language text in a chat window.

The AI assistant can plan and forecast the required resources based on an estimation model that it maintains with data from the project itself and other projects. The AI assistant can determine if the project is on track and if there are tasks at risk that are on the critical path. A prerequisite to many of the functions that the AI assistant can provide is the access to data. For example, project team members must record time at the task and deliverable level.

Risk Management

Artificial intelligence supports quantitative risk management by understanding the risk thresholds in a particular project context. Machine learning combined with Monte Carlo simulation can support project manager in risk evaluation and simulation. Fuzzy logic is used to assess risks in infrastructure projects to model probability distributions. Intelligent systems can alert project manager on upstream opportunities (Positive risk) and Downstream obstacles (negative risk) by real time analysis of project data.

Quality

Project managers can utilize cognitive technologies to gauge the project quality and get insights at next level. Cognitive technologies can be deployed to review key project documents like contracts. With usage of natural language processing capabilities project manager's AI assistant can scan through complex contracts and understand the key terms, dependencies and commitments. Project managers can spend their valuable time to focus on enhancing quality and exercise their professional judgment rather than spending their energy in reading through tons of documentation. Project team can deploy cognitive technologies to 100% of technical documentation review rather than sampling. Machine learning could be used to recognize, extract and ensure availability of expected documentation and Natural Language processing will enable do understand the exceptions and anomalies. Project management will be provided advanced statistical analysis on the quality of documentation and recommended actions by intelligent Project dashboards.

Stakeholder

AI Assistant will be able to utilize Sentimental analysis algorithms to mine through the Key communication emails from Customers and understand Customer Satisfaction at any point of time. Project management assistant will also be able to understand Stakeholder analysis based on text analysis and provide recommendations on how to engage with them. The analysis is also benefiting the project manager in aligning and committing the stakeholders to the project goals.

When a majority of the routine tasks have been delegated to the AI assistant, the project manager can apply his creative and Professional skills in managing the Stakeholder expectations.

HR

An AI Assistant can guide new project managers to manage complex projects efficiently using the historical data and learnings from knowledge database. Resourcing bot can match the Skills required for the project with the resource availability in the organization and recommend the resources. It can also identify the training required based on the resource skill matrix and assign the necessary training. In case there is a hiring requirement for project, resource bot can scan data sources like LinkedIn and identify suitable and available candidates. It then automatically reaches out to these candidates with offers. It can interface with

planning bot and assign tasks to Freelance candidates. Once the work is completed and validated the bot the bot coordinates with your accounts payable system to pay the freelancer. The planning bot automatically updates the plan and pushes the data to the BI dashboards.

Communication

Cognitive systems helps in automating the generation of periodic status reports to stakeholders .Project manager would be able to plan more effort for Personalized communication with stakeholders.Intelligent Project management systems can automatically track the task progress and status from team members and PM intervention will be required only on an exception based scenario.Project manager can also harness machine learning to analyse social networks like twitter feeds ,facebook comments ,web reviews to understand the enduser feedback ,concerns ,perceptions for a product which is rolled out to a mass market. These insights enable the project manager to prioritize the requirements from the product backlog. Going forward the project manager need also to plan for communication protocols for Communication between AI Assistants in Project, Customer and vendor landscape to enable project success.

Procurement

AI will able to provide a risk analysis and credit check of Suppliers and recommend the right supplier to Project manager. The next generation of spend analytics will also see computers programmed to cross-check each invoice as they are being entered and spot any inconsistency or error. AI-powered Procurement Bot will be able to speak with buyers and suppliers about orders in a conversational interface. AI is helping drive cost reduction and compliance agenda through procurement by generating real time visibility of the spend data. The spend data is automatically classified by AI software and is checked for compliance and any exceptions in real time

PMI's Talent Triangle

Technical Project Management, Business and strategic management skills and leadership are three sides of talent triangle. Artificial intelligent Support and enable the Project Manager to perform their role in each of these buckets ,Some areas larger than others



Figure 3/PMI Talent Triangle

Technical Project Management

Technical project management is the application of the knowledge domains defined in different phases of the project. Artificial intelligent with Project management assistants, bots and machine learning can play role in providing data driven insights and recommendation to manage the activities. Project manager's effort towards operational activities would be significantly reduced.

Strategic& Business Management

Expertise and knowledge of Project Manager in the domain in which project is executed contributes significantly to Project Manager's success. Project manager need to align with what are key value levers and how the project will help the organization for a successful business outcome.AI based system will help project manager to model the dependent parameters and predict outcomes of the project.

Leadership

These are Skills and behaviors related to leadership which enable the Project manager to manage the stakeholders and take them through the project journey. It is ability to achieve goals, Keep the project team motivated, stakeholder management and make right decisions. This is the area which Project manager can focus while some of the effort of project manager in other areas can be supplemented by AI. Most often this is the area which gets backseat during a project and contribute to project failure. Aligning all stakeholders to a shared goal is the key to Project success.

Conclusion

Artificial intelligent will help project managers to increase value add in project by optimizing their effort in maximizing project success and freeing up from repetitive operational tasks. Project manager would be able to work towards establishing Project goals, improve product quality , Optimize cost, align seamlessly with Project team, vendor pools, and geographical locations. . However Human intuition, feelings, ideas, emotions and passion cannot be replaced by AI, thus a project manager will be needed in future. Project manager in the near future need to adopt in this paradigm shift of understanding and using the cognitive intelligence to their advantage. As Elon musk CEO of Tesla motors Mentioned” Humans must merge with machines or become irrelevant in the AI Age”

References

- [1]<https://www.infosys.com/nia>
- [2] <http://www.cio.com/article/3050325/leadership-management/the-augmented-project-manager.html>
- [3] <https://liliai.blog/>
- [4] <https://www.ciklum.com/white-papers/artificial-intelligence-changes-project-management/>