

Importance of Artificial Intelligence in Technology Project Management

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Abstract

Considering the volume of information technology (IT) project management failures occurring in businesses that strive to become fully digitalized, the present paper uses diagnosis and prescriptive analyses to propose effective digital solutions using qualitative secondary data from published research. Results indicate that successful technology project management (TPM) should consider highly qualified TPM professionals, skills, milestones, processes and budgeting in addition to observing standard project management methodologies tailored to the core business activities. The integration of artificial intelligence (AI) in information technology projects has proven to reduce project challenges while optimizing management of project scope, time, cost and resources besides big data management, automation, quality control, risk awareness and project productivity increase. Results revealed that digital-orientated companies have been allocating 46%, 46%, 52% and 39% of their budget to cover potential needs regarding digital upgrading on cloud computing, data security, ERP systems and project management. Furthermore, the key AI requirements for effective IT project deployment reside in apportioning 74%, 73%, 71% and 68% of the staff to security operations, Analytics platforms, Business workflow automation and cloud platforms respectively. However, the executors, the executors' project implementation phases comprising analysis, design, test, setup, deployment, training and support should be aligned with the receptors' project stages that include As-is process analysis, documented process, To-Be processes, process modelling, legacy system readiness, training and system support to guarantee a conclusive IT project deployment.

Keywords

Technology, Project Management and Artificial Intelligence.

1. Introduction

The Fourth Industrial Revolution has revolutionized all sectors of business and operations management in tech industries including project management. IT projects include software implementation, database management, technological installation, web development, network configuration, IT system recovery and mobile app development among others. According to the report published by the Project Management Institute (2017), the market need for project talent has considerably evolved in the last decade with companies and organisations seeking project-orientated roles and positions. Technology project management (TPM) focuses on achieving a specific requirement for business evolvment using predefined techniques, budget, resources, skills and time compared to traditional project management operations. Considering that companies and organisations constantly struggle with IT projects due to their expensiveness, expansiveness, longer commitments, several stakeholders and intense market competition (Deloitte, 2022), improving return on investment on technology projects has become the main priority of businesses. It can only be guaranteed if project outcomes are well defined, a strong project team is assembled with a support system and most importantly when the project plan itself is reasonable and adapted to the core business activities (Deloitte, 2022).

Based on the Internet of Things (IoT), artificial intelligence can enable business performance through data analysis, streamlining workflows, data predictions, automated processes and time-savings (Ntaskmanager, 2022). Most worldwide companies apply artificial intelligence in the IT sector to detect security intrusions, complex technological problems and internal compliance compared to other fields like finance, marketing and customer services

(Ntaskmanager, 2022). The PMBOK guide stated the components of effective project implementation including the management of project scope, time cost, quality control, human resources, communication and risk (PMBOK, 2004). Many businesses embark on the procedures of IT project deployment without researching and understanding the principles and methodologies associated with it. In combination with the industrial Internet of Things (IIoT), companies have a choice between project management software like Grant project, Open workbench and Microsoft project for single projects and Artemis, Planisware, Planning force and Microsoft project portfolio server for massive projects (Gorecki, 2015).

The objective of this paper is to highlight the importance of integrating artificial intelligence in technology project management.

2. Review of Literature

2.1 Project Management Ideologies

To achieve sufficient project management (PM), specific principles and practices are prescribed for efficiency purposes and sustainability over time. According to Teamboard (2022), PM principles should include project objectives, project deliverables, budget and milestones definition together with the monitoring and evaluation of the project progress and risks. At the basic level, PM principles cover the scope, time, budget, risk and communication associated with the project (Project Management Institute, 2017). Following the PRINCE2 Foundation and the Project Management Professional (PMP), maintainable project management should apply the ideologies of defining project aims, getting sponsors, roles and responsibilities, budgeting and scheduling, and transparency (Fernandes et al., 2018), organizational alignment and risk management and project implementation strategies (Tech-Act, 2022). Fernandes et al. (2018) further indicated that client and project management require empathy, team engagement, customer understanding, ownership of success and failure and positive customer responses. Some authors emphasized project estimation, accountability and responsibility, a solid financial control system constant revision and success measurement for efficacy in the long run (Project-Tracker, 2022). The dynamic digital era calls for constant adaptation to new products and approaches as well as an unstable environment where customer behaviour, business processes, organizational culture and project requirements are in constant change. This situation has enabled the flexibility and leveraging of PM techniques through the adoption of both agile (Conforto and Amaral, 2016) and traditional approaches also known as hybrid approaches (Azenha et al. 2021). IT project management follows methodologies such as PMBOK, agile, waterfall, Prince2 and business process modelling to ensure efficient project implementation (Project Management Institute, 2017).

2.2 IT Project Management Requirements

From small to large IT projects, implementation methodology can vary to accommodate business requirements. However, the project can follow a waterfall, agile or hybrid methodology and the core project phases will still include 6 phases namely requirements, design, setup, testing, installation and maintenance (Projectmanager, 2022). About 44% of ICT projects fail without meeting business goals, 43% are delivered late and under budget, while 18% of them completely fail partially due to the lack of strategic initiatives (Deloitte, 2022). According to Capterra (2022), TPMent is extremely important for business survival in this industrial revolution era provided that the business plans and goals include scheduling and budgeting besides participation and communication between stakeholders. A successful deployment of IT project depends on the skills held by IT managers, assistants and directors to ensure follow-up, analysis and reporting. Considering that IT project touches many areas of the companies, IT stakeholders should have technology skills, strong communication skills, strategic planning, quality management, problem-solving, analysis capacity and risk management (Projectmanaegr, 2022). Whether from internal or external factors, a project success should consider the impact of project-related factors, human-related factors, project procedures, external environment and project management actions (Alias et al., 2014). Incorporating digital tools in PM allows the improvement of techniques and processes using building information modelling to improve flexibility and scalability in the construction sector (Bosch-Sijtsema and Gluch, 2021). This is equally applicable in other sectors using system modelling in correlation with existing business processes. The leadership style applied by the project leaders is quite important for the project's progress. Zulch (2014) argued that project managers should have the ability to apply different leadership styles like contingency, patch goal, visionary, action-centred and behavioural to accommodate specific situations for the continuation of the project and not stick to one predefined style.

2.3 Artificial Intelligence

Whatever the size of the company or the project to be implemented, IT projects remain complex and involve diverse technicalities that are not always found in human skills. Since most IT projects are related to advanced technology, the use of artificial intelligence (AI) enables the detection of minimum differences and interferences based on embedded sensors. The higher rate of failure of ICT projects has led to the introduction of AI in project deployment. Employing AI in project management ensures problem-solving, robotics, communication, recognition, knowledge representation and machine learning (Ruchi and Srinath, 2018).

3. Methods

Using desktop research techniques, this study applied diagnosis and prescriptive analyses to propose the benefits of embedding artificial intelligence in technology project management for efficiency improvement at the socioeconomic and environmental levels.

This paper employed qualitative secondary data collected from the published survey conducted by Ntaskmanager (2022) and Capterra (2022) to investigate the importance of successful technology project implementation. The Ntaskmanager survey, which involved 835 global companies, was conducted in the 2017 to identify the number of companies using AI in their daily businesses. The survey conducted by Capterra in 2018 included 715 USA-based small, medium and big enterprises. This case study is employed in this paper to extract standard techniques of IT project deployment applicable in different economic sectors in different countries around the world, especially in South Africa.

4. Results and Discussion

4.1 Requirements for Successful Technology Project Management

The study observed following requirements as vital for businesses to run a successful technology project management.

Highly Qualified TPM Professionals: Such professionals can be from the junior level like project coordinators, project assistants and project management support, senior levels like senior project managers, portfolio managers and program managers and expert levels like project management office director, director of projects and Head of projects.

Technology Project Management Skills: In addition to mastering soft competencies regarding PM applications, the professional project managers should have strong skills in critical thinking, communication, conflict management and change management given the unstable characteristics of resources planning, agile methodologies and hybrid project management.

Technology Project Management Milestones: Achieving successful implementation of TPM requires efficiency in planning, resource allocations, time management, stakeholders' management, planning and scheduling and on-time service delivery.

Technology Project Management Process: Specific processes are defined and implemented to complete a TPM such as analysis, design, test, system configuration, training, deployment and customer support. Each implementation phase involves different resources and stakeholders.

IT Project Budgeting: Investing in new technologies has become the modern way of doing things which enables ambitious companies to define specific budgets for potential IT projects. The survey conducted by Capterra among 715 USA-based small and medium businesses revealed that decision-makers have inserted a 2-year budget line for technological upgrading of their organisations to develop competitive advantage in all business functions (Capterra, 2022) as depicted in figure 1 below. It indicates that digital-orientated companies have been allocating 46%, 46%, 52% and 39% of their budget to cover potential needs regarding digital upgrading on cloud computing, data security, ERP systems and project management (Figure 1).

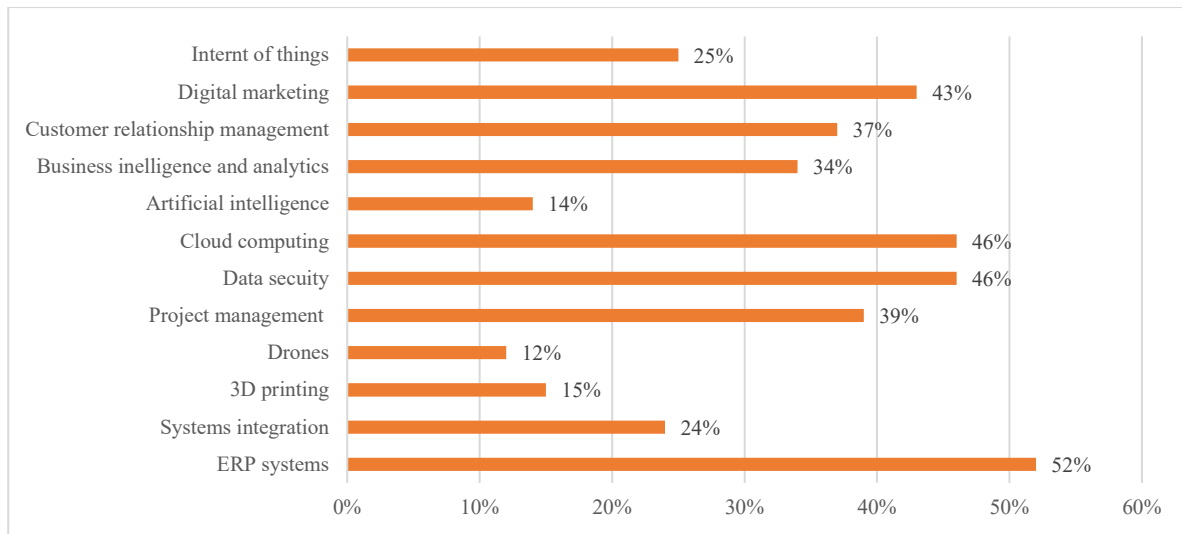


Figure 1. IT project budgeting fields

4.2 Technology Project Management Challenges and Opportunities

Observations revealed that companies and organizations adopt digital transformation as followers not as leaders without any profound commitment to change leading the project implementation failure. Implementing companies should have an internal project leader who holds the above-mentioned skills to guide preparation for the drastic changes to occur. Project implementation phases from the implementers should match the ones from the implementing companies to limit discrepancies, delays and failures (Table 1). For the executors, the project implementation phases comprise analysis, design, test, setup, deployment, training and support whereas the project stages include As-is process analysis, documented process, To-Be processes, process modelling, legacy system readiness, training and system support for the receiving company or organization.

Table 1. In and out TPM mapping

	Analysis	Design	Test	Setup	Deployment	Training	Support
As-is process Analysis	X						
Documented Process	X						
To-Be Processes		X	X				
Process Remodelling				X			
Legacy System readiness					X		
Training						X	
System Support							X

From the setting of project goals and its actual implementation, numerous limitations occur in different phases including delays in the project schedule, lack of competent resources, inaccurate task scheduling, budget misalignment and ultimately the lack of analytics to evaluate the project progress and efficiency compromising assessment of project risks. Implementing companies tend to not use practical PM software to manage their project but rely on the indications from the implementers who sometimes change the technology and the project methodology in the middle of the project taking advantage of the lack of knowledge from the customer side. Integration of systems involved in the operations and their scalability complicate the setup phases especially when systems are managed by different service providers using different system architecture designs. A considerable budget amount is required to ensure the procurement of new technologies besides licensing fees to service providers. Project resource dependency, inaccurate timelines estimation, inexperienced project manager and changes in project aims are caused by the lack of change management operations in alignment with the ongoing IT project. Despite the above challenges, the followings are the criteria that implementing companies and organisations can use as indications of a well-implemented project:

- Real-time dashboards providing the live status of operations and resources
- IP project portfolio and program tracking using Gantt Chart
- Real-time and fast reports using embedded analytics.
- Ongoing task monitor using workflow management
- Waterfall methodology guiding the step-by-step project deployment and protecting the customers from the whole project failure.
- Work breakdown structure correlated with the project duration.
- Leadership and good governance

4.3 Artificial Intelligence and Technology Project Management

Artificial intelligence technology enables the following technical enhancement in business activities for both small and big companies while limiting the number of encountered challenges.

- Automation of Robotic processes
- Prediction of project duration with accurate completion times per project stage.
- Outcomes prediction per project stage
- Availability of suitable project management software
- Completion of routine tasks
- Improved analytic reports and improved knowledge management ecosystem
- Quality control and risk awareness
- Resources management efficiency
- Customer experience improvement
- Effective project cost management
- Project productivity increase
- Improved stakeholder management
- Outsourcing reduction and upgraded project management qualifications (Ntaskmanager, 2022).

These components of effective project execution are SMART meaning that they are: Specific to a particular project; Measurable through project outputs and customer satisfaction; Achievable considering the size of the business, skilled labour, project resources and budget allocation to ensure return on project investment; Relevant given the need for business to get digitalized to improve on-time service delivery and customer expectations and; Time-Bound based on the allocated resources, availability of the executors and the licensing requirements.

Based on the benefits associated with the adoption of artificial intelligence to boost technology project management, Figure 2 represents the percentage of staffing requirements in digital organizations (Ntaskmanager, 2022). This indicates that a successful project deployment also depends on the skills held by the project human resources considering that digitalizing a company affects all departments and functional units where different skills are applied. A list of standard skills required for a smooth project application should pertain to several work fields. The majority of the IT projects require digital skills as follows: 66% IT automation, 68% Cloud platforms, 61% Data platforms, 57% Machine learning, 42% End-user support, 74% Security operations, 71% Business workflow automation, 73% Analytics platforms, 55% Customer interaction automation, 45% Enterprise systems, 21% Network administration, 15% Data center operations, 25% Applications maintenance, 53% Project management, 45% Enterprise architecture and 23% System administration. However, only a few of these skills can be required in one single and massive IT project considering the diversification of IT projects tailored to the core business activities in different economic sectors. This figure equally depicts that the key AI requirements for effective IT project deployment reside in security operations, analytics platforms, business workflow automation and cloud platforms.

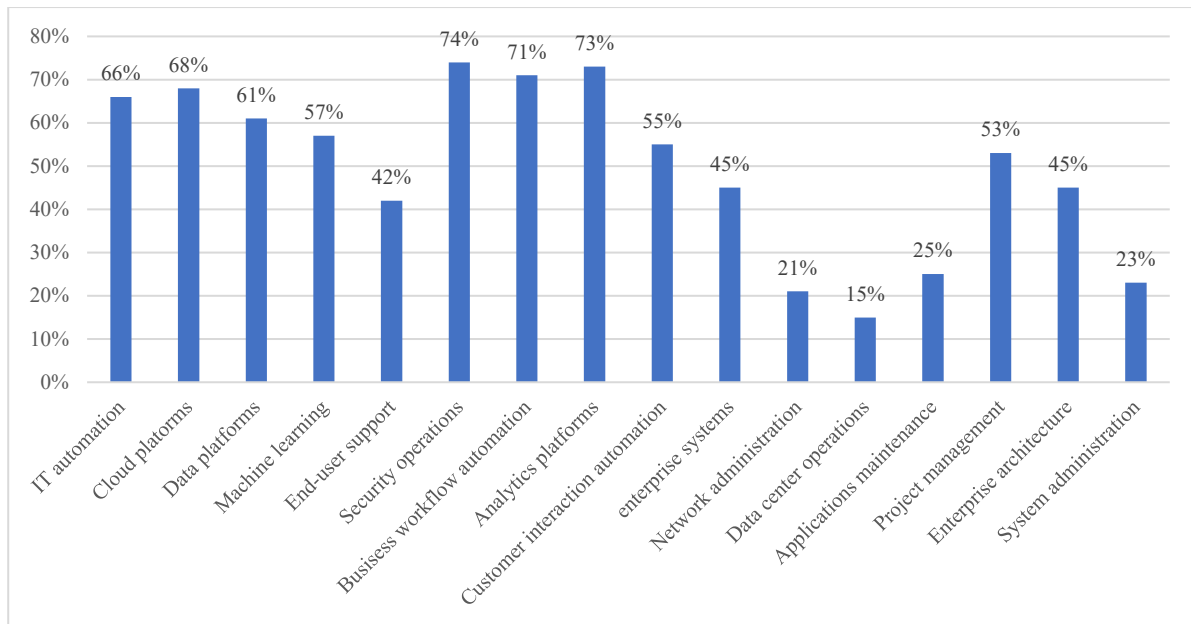


Figure 2. IT projects Vs AI staffing

5. Conclusion

Upgrading to digital innovations requires specific components to be put in place to ensure market positioning and competitive edge assurance. In doing so, several IT projects should be deployed to achieve customer expectations and satisfaction through software development, business reengineering, cloud computing, cybersecurity and continuous web development using artificial intelligence for efficiency enhancement. Challenges associated with technology project management are considerably reduced once the technology of artificial intelligence is deployed together with project techniques and methodologies. Additionally, opportunities for staffing requirements improve offering employment at a large scale.

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