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Integration of Project Planning, Virtual Team Development, and Leadership to Support Technology Innovation Downstreaming at PT Teknologi Gotong Royong (GORO): A Literature Review

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Abstract. This study aims to analyze how the integration of project planning, virtual team development, and leadership in encouraging the downstreaming of technology innovation (HIT) at PT Teknologi Gotong Royong (GORO). The method used is a Systematic Literature Review (SLR) of eight scientific journals published during the 2020–2025 period, focusing on project management, digital technology, and leadership integration. The findings confirm that the success of innovation downstreaming at GORO is critically dependent on the synergy of these three factors. Project planning leveraging digital technology and Artificial Intelligence (AI) enhances the efficiency of communication and decision-making. Virtual team development enables crucial cross-location collaboration, although it is constrained by issues like low digital literacy and inadequate infrastructure. Furthermore, adaptive and transformational leadership is proven capable of enhancing creativity, mitigating resistance to change, and strengthening the effective implementation of innovation projects. The study concludes that successful technology innovation downstreaming requires a strategic combination of technological innovation, continuous improvement of human resource digital competency, and visionary, adaptive leadership. Key recommendations include increasing digital training, strengthening technological infrastructure, and accelerating the regulation and standardization of innovative products to boost national competitiveness.
Keywords: Project Planning, Virtual Teams, Leadership, Technology Innovation Downstreaming, Artificial Intelligence

INTRODUCTION

Technology illiteracy is a term that refers to people who are not skilled in using modern technology such as computers and smartphones. This term is sometimes used to label people who are considered left behind in technology. However, not everyone understands what technology actually is. Information technology is the study of designing, implementing, developing, supporting, or managing computer-based information systems, especially hardware and software. Technology is created from innovations, and innovations also help the growth of technology. It means there is a two-way relationship between innovation and technology.

The development of digital technology in the era of Industrial Revolution 4.0 and Society 5.0 has changed how organizations plan, collaborate, and make strategic decisions. Digitalization is not only about using new systems, but also changing work culture, organization structure, and

innovation governance (Supratikta, 2025). The integrated use of big data, artificial intelligence (AI), Internet of Things (IoT), and information systems can improve efficiency, information accuracy, and the ability of organizations to respond to market changes in real time.

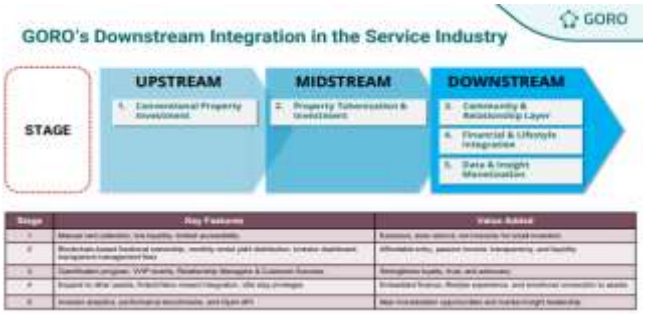
In project management, digitalization supports project planning to be more systematic, measurable, and adaptive to risks. According to the Project Management Institute (2021), project planning is a management process that includes planning benefits, success criteria, scope, quality, time, resources, cost, risks, and communication to create a project management plan. Effective project planning is not only about scheduling and resource allocation, but also how technology supports coordination, performance monitoring, and data-based decisions (Marjohan et al., 2025).

Management information systems are important to make sure data is integrated across work units. This helps project collaboration run well even when team members work from different locations (Ibrahim et al., 2024). With the growth of digital work, the concept of virtual teams becomes more important. Virtual teams allow organizations to bring experts from different locations to work together using digital communication technology. Although it gives flexibility, virtual teams also face challenges like digital literacy problems, limited social interaction, and the need for leaders who can manage remote teamwork. Adaptive and transformational leadership is needed to keep communication, motivation, and collaboration culture strong (Kimura, 2024).

The use of information systems in human resource management can improve accuracy in performance evaluation, monitoring, and employee retention. Human Resource Information Systems (HRIS) provide objective performance data and support decisions for continuous skills development (Savitri et al., 2024). Technology integration in planning and managing human resources becomes an important foundation for successful innovative organizations.

Human resource planning is also very important in this era. According to Yafi et al. (2025), strategic and data-based HR planning helps companies prepare for future skill needs and respond well to technology disruption such as automation and AI. With digital project planning, adaptive HR strategy makes sure the organization has the right skills to maintain innovation and operational efficiency.

Effective HR planning includes continuous training, targeted recruitment, and data-based workforce analysis to identify skill gaps and improve employee adaptability. This is in line with the innovation downstreaming process at PT Teknologi Gotong Royong (GORO). Project planning must be integrated with digital HR development and leadership transformation to maintain competitiveness in Industry 4.0 (Yafi et al., 2025).



This situation can be seen at PT Teknologi Gotong Royong (GORO), a company that works on technology innovation downstreaming through asset tokenization products. Their technology-based transformation needs not only technical innovation, but also the synergy of digital project planning, virtual team development (Jakarta-Bali), and visionary leadership that can manage change and reduce organizational risks. Innovation Downstreaming can only be successful when there is alignment between technology, people, and adaptive management structure.

Therefore, the research gap lies in the limited understanding of how the integration of project planning, virtual teams, and leadership can directly support the success of technology innovation downstreaming in modern organizations, especially at PT Teknologi Gotong Royong. This study uses a literature review to examine how these three aspects work together to support innovation sustainability within the company.

Based on the research gap and theoretical framework, the hypotheses in this literature review are as follows:

H1: The integrated application of Digital Project Planning, Virtual Team Development, and Adaptive/Transformational Leadership positively influences the success of Technology Innovation Downstreaming at PT Teknologi Gotong Royong (GORO).

H1a: AI-based Digital Project Planning and Data Analytics improve efficiency and accuracy in Innovation Downstreaming.
H1b: Virtual Team Development supported by digital communication technology enhances cross-location collaboration and accelerates Innovation Downstreaming.
H1c: Adaptive and Transformational Leadership reduces internal resistance, improves digital capability, and strengthens project sustainability.

LITERATURE REVIEW

The success of Technology Innovation Downstreaming (HIT) in digital organizations such as PT Teknologi Gotong Royong (GORO) depends on the strategic integration between project management, team capability, and leadership quality. This section provides a literature review related to these key variables.

A. Digital Project Planning and the Role of Artificial Intelligence (AI)

Effective project planning is a very important foundation for the success of Technology Innovation Downstreaming. Today, project management is changing from traditional methods to the use of advanced technology. This shift improves efficiency through AI and digitalization because technology increases accountability, transparency, and real-time monitoring in management operations (Eryc & Deu, 2024). It also supports better project planning at GORO

Artificial Intelligence (AI) becomes very important in project management in Society 5.0. AI can improve communication and faster decision-making between leaders and teams (Fahlevi, 2021). Advanced project control now combines traditional methods such as Earned Value Management (EVM) with new technologies like Building Information Modeling (BIM) and Machine Learning (ML). This combination provides better control of cost and schedule (Karlina et al., 2025). This is useful for reducing budget risks and delays in HIT projects at GORO.

Data Analytics, including K-Means Clustering, can give useful insights for customer segmentation and service personalization (Anggraeni, 2025). These analytics support project planning because they help predict market demand and increase the possibility of HIT products being accepted in the market.

B. Virtual Team Development and Digital Challenges

GORO has a distributed team between Jakarta and Bali. Because of that, Virtual Team Development is a key factor. Virtual teams depend on good communication tools. AI technology can help increase the effectiveness of communication (Fahlevi, 2021). The use of Information and Communication Technology (ICT) allows the company to reach wider markets and respond faster to market changes (Amory et al., 2025).

However, there are important challenges such as low digital literacy and poor digital infrastructure in some areas (Amory et al., 2025; Karlina et al., 2025). These problems make it difficult for virtual teams to use digital project planning tools (like BIM or ML) effectively. Therefore, accountability and collaboration (Eryc & Deu, 2024) must be improved. It requires leadership that can build trust and maintain team performance while working remotely.

C. The Role of Adaptive and Transformational Leadership

Leadership is the main driver that ensures project planning can be implemented and virtual teams can work together when facing change. In a challenging business environment, Adaptive Leadership is important to improve team performance (Fauziyah et al., 2024). Adaptive leaders motivate team members to accept new things and create creative ideas. This supports innovation and smooth project planning.

Transformational Leadership is also needed to increase performance and accelerate digital transformation (Cahya et al., 2025). This leadership style strengthens employee commitment and supports organizational change. However, leaders must also handle problems like resistance to change and low digital skills. Leaders must be able to manage complex regulations (Awaludin, 2023) and make sure virtual teams have enough competence to use data analytics in product development.

D. Technology Innovation Downstreaming (HIT): Goals and Requirements

Technology Innovation Downstreaming (HIT) is a process of transferring technological innovation to industry through commercialization and market adoption. The main goal is to increase national independence and reduce import dependency (Awaludin, 2023)

One important aspect of HIT is technology transfer through licensing agreements. It requires national standards (SNI) and product certification before market adoption. The success of HIT at GORO, especially for asset tokenization products, needs a roadmap that focuses not only on technical development (supported by Digital Project Planning), but also on regulations and market acceptance (managed through Leadership).

Therefore, HIT must integrate technology, human resources, and adaptive management to achieve success.

RESEARCH METHODS

This research uses a qualitative approach with a Systematic Literature Review design to analyze the integration of Project Planning, Virtual Team Development, and Leadership in supporting Technology Innovation Downstreaming. The main data sources were taken from the Crossref and Google Scholar database, limited to scientific journal articles published between 2020 and 2025 to ensure updated findings.

The search strategy used a combination of keywords that represent the key variables, such as: “Integrated Framework” AND “Project Planning” AND “Virtual Team” AND “Leadership” AND “Technology Commercialization”. After screening based on title relevance, abstract, and discussion of at least two key variables, eight (8) journals were selected as the final sample.

The data from these selected journals were analyzed using Thematic Synthesis. This method focuses on identifying consistency, contradictions, and relationships between variables. The result of the analysis was then used to build a strong argument in the literature review and identify the research gap related to the context of PT Teknologi Gotong Royong.

RESULTS AND DISCUSSION

RESULTS

The literature review shows that the success of Technology Innovation Downstreaming (HIT) at PT Teknologi Gotong Royong (GORO) is strongly influenced by the integration of three main factors. Technology-based Project Planning is confirmed by (Fahlevi, 2021) and (Eryc & Deu, 2024), who state that the use of Artificial Intelligence (AI) in project management is very important to support communication, faster decision making, and better project efficiency. Advanced techniques such as Earned Value Management (EVM), Building Information Modeling (BIM), and Machine Learning (ML) can strengthen cost and schedule control, even if the implementation still faces challenges such as low digital skills and high cost (Karlina et al., 2025).

This is also in line with (Supratikta, 2025), who explains that technology-based resource planning using the Internet of Things (IoT), AI, and Big Data Analytics can increase efficiency, accuracy, and speed of strategic decisions in modern organizations. In PT Teknologi Gotong Royong (GORO), this supports data-based project planning and faster coordination between units, especially in technology downstreaming projects that need real-time collaboration across different places.

For Virtual Team Development, the teams at GORO who work in Jakarta and Bali depend on ICT to collaborate. ICT helps them improve operational efficiency and competitiveness (Amory et al., 2025). However, the literature also shows challenges such as low digital literacy and different infrastructure levels (Amory et al., 2025; Karlina et al., 2025). Meanwhile, effective Leadership is very important. Adaptive Leadership (Fauziyah et al., 2024) and Transformational Leadership (Cahya et al., 2025) can motivate the team to accept new ideas and build stronger commitment. Leadership also helps reduce resistance to change (Cahya et al., 2025). In addition, overall HIT success is supported by Data Analytics for market segmentation (Anggraeni, 2025), and the need

for regulation, national standards (SNI), and product certification for commercialization (Awaludin, 2023).

DISCUSSION

1. Hypothesis Testing and Integration Synergy

The literature strongly supports the Main Hypothesis (H1), which says that the synergy of Project Planning, Virtual Teams, and Leadership is very important. Digital Project Planning gives a clear roadmap with data support. Leadership makes sure the Virtual Team stays motivated and able to follow the roadmap. AI integration in planning (Fahlevi, 2021) helps reduce communication risks in virtual teams (Karlina et al., 2025), which supports Hypotheses 1a and 1b. Transformational Leadership is needed to turn resistance into commitment (Cahya et al., 2025). This leadership role connects advanced technology systems and the low digital skills of employees (Amory et al., 2025), strongly supporting Hypothesis 1c.

2. Relevance for PT Teknologi Gotong Royong (GORO)

In GORO, which focuses on property asset tokenization, this integration is urgent. Tokenization has high risks and strict regulations. Accurate Planning using BIM and ML (Karlina et al., 2025) is important to avoid cost and schedule problems. For the team working in Jakarta and Bali, Adaptive Leadership (Fauziyah et al., 2024) is needed to manage different work cultures and ensure standard procedures in blockchain adoption. Market validation is also important; Data Analytics for segmentation (Anggraeni, 2025) helps GORO design token products that match customer needs in a sensitive and diverse market.

3. Digital Challenges and Strategic Implications

Even though integration works well, the literature highlights two main challenges that GORO leaders must face. Similar to Marjohan et al. (2025), digital transformation can create digital stress and resistance when employees are not ready to use new systems. This also happens in GORO, where digital project systems need high employee readiness to keep motivation and teamwork high.

The two key issues are:

- Digital Skill Gaps, where low digital literacy (Amory et al., 2025) makes it difficult for the virtual team to use AI and ML tools.
- Infrastructure and Regulation, including expensive technology, limited data infrastructure (Karlina et al., 2025), and complicated regulation and standardization requirements (Awaludin, 2023).

These problems need strategic leadership, especially in digital training and working with regulators.

CONCLUSION AND RECOMMENDATION

The success of PT Teknologi Gotong Royong (GORO) in implementing Technology Innovation Commercialization (HIT) is determined by the effective integration of three main pillars: Digital Project Planning, Virtual Team Development, and Leadership. Digital project planning supported by technology and artificial intelligence (AI) significantly improves communication quality, accelerates decision-making, and enhances the accuracy of project risk control. Meanwhile, Virtual Team Development enables cross-location collaboration that is more flexible and responsive to project dynamics. Transformational and Adaptive Leadership acts as a key driver that unifies these aspects, fostering commitment, accelerating innovation adoption, and overcoming resistance to technology-driven changes. Therefore, this study validates the Main Hypothesis that the synergy of these three factors forms the foundation of HIT success at GORO.

Nevertheless, the literature review also highlights several strategic challenges that must be anticipated to ensure optimal commercialization. These challenges include low digital competency among some human resources, disparities in technology infrastructure, and the significant costs associated with digital system adoption. In addition, the success of technology commercialization is strongly influenced by external factors such as regulatory frameworks, product standardization (e.g., SNI), and certification processes that serve as prerequisites for technology marketability.

To ensure sustainability and acceleration of HIT, several strategic actions are recommended. First, continuous capacity-building and digital literacy enhancement for virtual teams are essential to strengthen their capabilities in utilizing technologies such as AI and data analytics. Second, leadership should prioritize investment in adaptive digital infrastructure while simultaneously taking proactive measures to fulfill regulatory compliance in financial-technology and property-related sectors. More broadly, this study emphasizes the necessity of close collaboration between industry and government in establishing a supportive commercialization ecosystem, enabling innovations such as GORO's asset tokenization products to compete not only at the national level but also globally.

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