RESEARCH ARTICLE　　　　　　　　　　**OPEN ACCESS**

EVALUATING THE DEVELOPMENT OF LEADERSHIP COMPETENCIES OF TELECOMMUNICATION PROJECT MANAGERS : A SCENARIO PLANNING APPROACH

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Abstract: The future of project management in the telecommunications industry is not just a distant possibility but a rapidly approaching reality. Driven by unprecedented technological advancements and a complex project environment, this transformation is imminent. This paper explores the development of leadership competencies among project managers in this volatile landscape through a combination of transactional and transformational leadership styles in facing future challenges. Using a scenario planning methodology, the author identifies critical drivers through a PESTLE analysis. The author then employs a 2x2 matrix to categorize environments based on two key uncertainties in the telecommunications industry: project complexity and technological uncertainty. This results in a Telecommunications Project Scenario Matrix, consisting of four future scenarios, namely Stability, Complexity, Innovation, and Disruption Quadrants. These scenarios present distinct challenges and opportunities for project managers, ultimately shaping the leadership competencies required for success in combining transactional and transformational styles. The analysis suggests five leadership development actions. This insight will be valuable for academics and project management practitioners in the telecommunications industry.

Keywords: Project Management, Scenario Planning, Telecommunication, Transactional Leadership, Transformational Leadership

Abstrak: Masa depan manajemen proyek di industri telekomunikasi merupakan kenyataan yang segera terjadi. Didorong oleh kemajuan teknologi yang belum pernah terjadi sebelumnya dan lingkungan proyek yang kompleks, maka perubahan di industri telekomunikasi menjadi sangat cepat. Penelitian ini mengeksplorasi pengembangan kompetensi kepemimpinan manajer proyek dalam lanskap yang penuh ketidakpastian ini melalui kombinasi gaya kepemimpinan transaksional dan transformasional dalam menghadapi tantangan masa depan. Dengan menggunakan metodologi Perencanaan Skenario, penulis mengidentifikasi pendorong utama dengan analisis PESTLE. Kemudian, penulis menggunakan matriks 2x2 untuk mengkategorikan lingkungan berdasarkan dua ambiguitas penting dalam industri ini yaitu kompleksitas proyek dan ketidakpastian teknologi. Hal ini menghasilkan matriks rencana

skenario proyek telekomunikasi, yang terdiri dari empat kuadran skenario masa depan yaitu Kuadran Stabilitas, Kompleksitas, Inovasi, dan Disrupsi. Skenario ini menghadirkan tantangan dan peluang yang berbeda bagi para manajer proyek, yang membentuk kompetensi kepemimpinan yang diperlukan untuk sukses dalam mengombinasikan gaya kepemimpinan transaksional dan transformasional. Analisis ini merekomendasikan lima tindakan pengembangan kepemimpinan. Wawasan ini akan bermanfaat bagi akademisi dan praktisi manajemen proyek di industri telekomunikasi.

Kata Kunci: Kepemimpinan Transaksional, Kepemimpinan Transformasional, Manajemen Proyek, Perencanaan Skenario, Telekomunikasi.

INTRODUCTION

In the era of highly developed digital transformation, the telecommunications industry plays a very vital role in supporting increased technological accessibility, public service innovation, global connectivity and driving the digital economy. In the telecommunications industry, Human Resources competencies are needed that are in line with the development of business technology and digital (Ikhsan et al., 2023). Human resources who have high creativity are really needed in the era of volatility, uncertainty, complexity, ambiguity (VUCA) to create innovations that support Digital Business (Ikhsan et al., 2023). Project managers in this industry face extremely complex challenges, including the need to manage high-risk projects, rapidly changing technological dynamics, and diverse stakeholder expectations. Therefore, the leadership competence of project managers is a crucial element that influences the successful implementation of telecommunications projects. The results of Ramadhani (2023) analysis show that the leadership competence of project managers positively influences the performance of project-based organizations in Indonesia. However, various studies show that the development of leadership competencies for project managers often still focuses on traditional approaches that are less adaptive to being published in the future. In the context of project management in the telecommunications industry, this approach is inadequate due to the need to respond to change proactively and strategically. To answer these challenges, an innovative approach is needed in developing project manager competencies, one of which is through scenario planning. Using scenario planning, telecommunications companies can build scenarios to promote strategic planning and adapt to the new environment (Sparks and McCann, 2021).

The scenario planning approach offers a framework that allows project managers to prepare for a variety of possible futures, hone strategic leadership skills, and increase agility in

decision making. Scenario planning has proven effective in helping organizations to anticipate change and formulate adaptive strategies (Mungkasa, 2022) This research aims to explore how the scenario planning approach can be applied in developing the leadership competencies of telecommunications project managers, with the hope of increasing their readiness to face future challenges. This research is expected to provide theoretical and practical contributions to strengthening the leadership capacity of project managers in the telecommunications Industry.

Telecommunication Project Management

The telecommunications industry is on the brink of a new era, a digitilization has transformed our current world through the introduction of disruptive technologies such as IoT, artificial intelligence, and 5G (Gupta and Jha, 2015; Khan et al 2017). Telecommunications project management is the process of planning, organizing, implementing, monitoring and completing projects related to telecommunications infrastructure or services. These projects include network development, implementation of new technologies, system upgrades, and provision of telecommunications services such as broadband, cellular networks, or IoT devices.

As the environment becomes increasingly dynamic and complex, the role of project managers is not just evolving but becoming more crucial than ever. Effective project management must adapt to the fast-paced sector's swift technological changes and varying consumer demands. Project Manager. The Project managar has significant contribute to the success of change efforts and enhance project resilience in telecommunication project (Kumar, 2021).

Transactional Leadership and Transformational Leadership

Leadership is the process through which people are influenced in some way to accomplish goals, generally group goals (Craddock 2009). The Leadership style combines traits, skills, and behaviors that leaders employ when interacting with employees (Lussier and Achua 2003). Two of organizations most well-known leadership styles are transformational and transactional (Bass & Avolio, 1996). Burn (1978) developed these concepts by taking inspiration from Maslow's pyramid of needs.

Transactional leadership is a style that focuses on interpersonal transactions between the leader and employees, involving an exchange relationship (Bycio, 1995). It pertains to the interaction between the leader and the team to address their needs (Bass, 1999). Transactional relationships involve rewarding the team for activities the leader requests (Bass, 1999).

Transactional leadership is characterized by four different traits: continuous reward, management by exception (active), management by exception (passive), and laissez-faire (Bass, 1999).

Transformational leadership involves leaders who act as role models and motivate others through their confidence and enthusiasm, creating a feeling of satisfaction and gratitude among their followers (Bass & Avolio, 1990). Transformational leaders can aid individuals in progressing from lower levels of survival-focused needs to higher levels, as per Maslow's hierarchy (Kelly 2003; Yukl 2006). Transformational leaders have the power to inspire their followers to transcend their interests. They can have a strong and significant influence on the people who follow them and focus on the individual developmental needs of each follower. Additionally, they assist their followers in seeing existing problems in new and innovative ways, raising their awareness of issues (Robbins dan Judge, 2009). Transformational leadership is defined by four aspects: idealized influence, intellectual stimulation, inspirational motivation, and individualized consideration.

Holzmann and Mazzini (2020) mentioned that the key topic in successful project management is leadership. Their research in the creative industries found that transformational leadership is the most favorable for successful projects, followed by the transactional leadership style. Both styles are strongly correlated with project success positively. As Bass (1999) aptly puts it, "The best leaders are those who possess both transactional and transformational leadership skills". Regarding Transactional leadership, Laissez-faire behavior should be categorized as an avoidance leadership style.

Scenario Planning

Schoemaker (1995) describe scenario planning as a strategic tool that produces several plausible (plausible) future scenarios rather than simply predicting outcomes. This approach helps organizations manage future uncertainty by identifying weaknesses and preparing for new challenges to maintain business continuity. Schwartz (1997) defines scenario planning as a method for understanding possible future situations. According to Ringland (1998), this is an important aspect of strategic planning that uses tools to address uncertainty and consider assumptions about changes in the business landscape. The minimum time horizon for scenario planning (five years) rules out its use in most project management applications (Craddock (2009).

The scenario planning process typically (Schwartz,1997) consists of the following steps:

1. Define the Scope: Identify the specific issue (focal issue) or question the scenario planning will address. This sets the boundaries for the analysis

2. Identify Key Drivers (driving force): Gather data to identify critical factors influencing future developments. These may include political, economic, social, technological, legal, and environmental factors (PESTLE analysis)

3. Analyse Uncertainties: Distinguish between certain and uncertain factors. Focus on uncertainties critical for the issue, as these will shape the scenarios

4. Develop Scenarios: Based on the key drivers and uncertainties, create a set of distinct scenarios. Each scenario should reflect a plausible future and explore different paths and outcomes

5. Analyse Implications: Assess the implications of each scenario for the organization. Consider how strategies may need to adapt to each possible future

6. Monitor and Update: Review and update the scenarios regularly as new information and trends emerge. This ensures they remain relevant and valuable

Previous research by author using SEM PLS method has demonstrated that the combination of Transactional and Transformational leadership of project managers significantly influences project performance within the telecommunications industry (Misbahuddin et al., 2024). Another research by author using Fuzzy-AHP method shown the requirement to improve the project manager leadership competences (Misbahuddin et al., 2025). Based on these two researches, further research require for the future scenarios. Therefore, the objective of this research is to analyzes how combination of transactional and transformational leadership competencies can be adapted to meet the demands of project managers in the telecommunication industry over the next five years. By employing a scenario planning approach, we will anticipate the varying contexts project managers may encounter and develop insights into the leadership competencies necessary for success.

METHOD

The study combines a review of existing literature and in-depth interviews with fifteen experts from academic, consultancy, and practitioner in Telecommunication project

management in Indonesia. The research was conducted from July 2024 until September 2024. To explore the competencies required for transactional and transformational leadership style, we adopted a Scenario Planning methodology, a strategic tool designed to help organizations prepare for multiple potential futures by identifying key uncertainties and trends (Schoemaker, 1995). We follow the process steps from defining the scope, identifying key drivers supported with PESTLE analysis, analyzing the top two critical uncertainties, developing the four quadrant matrix scenarion, analyzing implications, then monitoring and updating. The Four quadrants matrix is minimal approach in scenario planning which is appropriate when overview of all elements in the environment reveals that with two criteria or factors are enough and can be used to determine future developments (Schwartz 1997; Pillkahn 2008).

RESULTS AND DISCUSSION

In order to answer the objective, we conducted the research process and the results were as follows:

a) The first step we define the focal point of the research as analyzing the transactional and transformational leadership competence development of Project Managers in telecommunication industries for the future using scenario planning.

b) Secondly, we identify the key drivers of critical factors that influence future developments using the PESTLE approach as depicted in Table 1. Then the experts provide asessement on the level of Impact and the level of Uncertainty using three scales (low, medium and high). Based on the level of Impact and Uncertainty we defined the Critical Priority. The High Impact and the High Uncertainty is the 1st Critical Priority.

Table 1. Driving Force by PESTLE analysis

No	Driving Force by PESTLE	Impact level	Uncertainty level	Critical Priority
1	Political: regulatory changes, government political and policy stability	Medium	Medium	2
2	Economic: demand and investment trend, Project Complexity (scope, cost, resource, scheduling, agility)	High	High	1
3	Social: consumer expectations, demographics shifting, youth engagement, cultural diversity.	Medium	Medium	2
4	Technology: Rapid technology advancement (AI, IoT, Robotics, Cyber Security, 5G), emerging technology disruption to business.	High	High	1

5	Legal: Compliance, data protection laws, intellectual property	Medium	Medium	3
6	Environment: Sustainability and climate-related changes	Medium	Medium	3

c) The third step, based on the PESTLE results, selects the top two ambiguities: economics (project complexity) and technology (technology uncertainty).
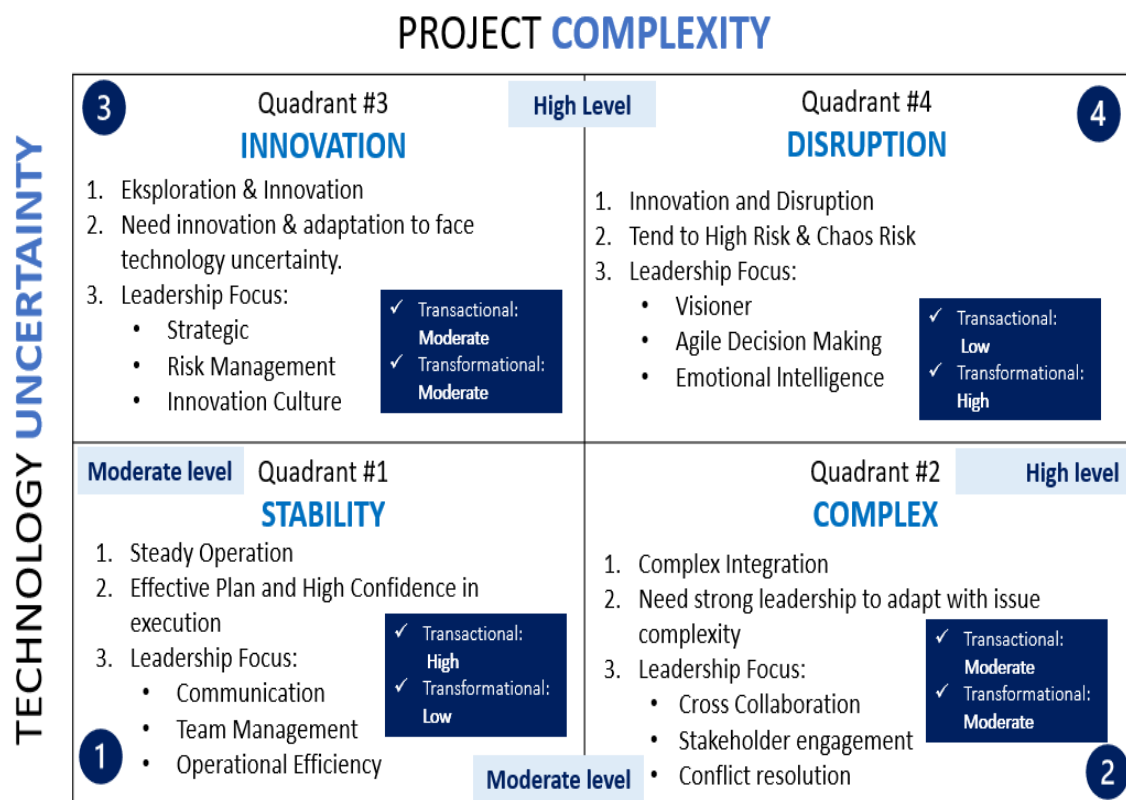
Project Complexity:

This dimension reflects the intricacy of the projects involved, influenced by many factors. Based on literature review regarding project complexity by Morcov et al (2020), the project complexity includes (a) Complexity due to size such as of resources (scale of team, number of stakeholders organizations i.e. subcontractors, customers, partners, investors, users), size of capital investment (budget), number of deliverable, efforts (man-days), and duration of the project. (b) Complexity due to variety such as geographic distribution, variety of the interest of stakeholders and variety of interdependencis among people, process and products. Projects with high complexity often require extensive coordination among diverse team. Based on Caressa and Pirozzi (2022) propose both (a) an innovative approach to manage effectively the complex projects and (b) an innovative model to assess effectively the relevant complexity levels of project,

Technology Uncertainty

The uncertainty of technology in telecommunication is accelerated by the convergence of innovation between Telco operators and web based IP services (Arnold and Dunaj 2007). This dimension captures the unpredictability of technological advancements and associated risks. It ranges from stable environments where technologies are well understood to rapidly changing landscapes where innovations can disrupt existing processes rapid advancements in AI, IoT, and 5G demand adaptability from project managers as these technologies can disrupt existing business models and complicate project planning. The disruptive emergence of 5G is creating new dynamics, and uncertainties about the future of related industries, causing major challenges to existing business models (Cave 2018). Increasing cybersecurity risks (Vargas and Tien 2022), increasing Internet of Things (Saragih et al,. 2021) and the influence of Artififial Inteliegenc (McMillan and Varga 2022).

d) The fourth step (Develop Four Quadrants Plausible Scenario)

This step is developing a 2x2 matrix that categorizes scenarios along two key dimensions: project complexity and technology uncertainty, resulting in four quadrant scenarios. as shown in Figure 1. The Matrix is called Matrix of Telecommunication Project Scenario Planning.

Figure 1. Matrix of Telecommunication Project Scenario Planning

The description of four quadrant scenario in Figure 1 are as follows:

1) Quadrant 1: Moderate Complexity, Moderate Uncertainty (Stability Quadrant)

This scenario represents a stable environment where projects are routine, and technologies are well understood. Project managers must focus on operational efficiency and team cohesion, with effective communication essential for aligning team members with project objectives (Kerzner 2020). Critical skills required include communication (Rajhan 2018), team management (Pachura 2018) and operational efficiency (Zidane and Olsson 2017). In this skenario, the transactional leadership style is dominant than transformational. The transactional leadership (High) while transformational leadership (Low).

2) Quadrant 2: Very High Complexity, Moderate Uncertainty (Complexity Quadrant)

This scenario involves highly complex projects within a stable technology landscape. Leadership competence should emphasize cross-functional collaboration and problem-solving (Edmondson, 2018). Essential skills include cross-functional collaboration (Yin et al 2023) stakeholder engagement (PMI 2021), and conflict resolution (Njeri and Ngufi 2021). In this skenario, the transactional leadership style and transformational should be balance. The transactional leadership (Moderate) and transformational leadership (Moderate).

3) Quadrant 3: Moderate Complexity, Very High Uncertainty (Innovation Quadrant)

Projects in this quadrant are moderately complex but face significant uncertainty due to rapidly evolving technologies Project managers must develop strategic foresight and adaptability leadership . Key skills include strategic foresight (Hadjinicolaou et al, 2022), risk management (Samimi 2020) and Innovation (Wasono and Furinto 2018). In this skenario, the transactional leadership style and transformational should be balance. The transactional leadership (Moderate) and transformational leadership (Moderate).

4) Quadrant 4: Very High Complexity, Very High Uncertainty (Disruption Quadrant)

This quadrant is characterized by high complexity and substantial technological uncertainty , particularly in developing new technologies (Kelley and Clark, 2021) which tend to disruption situation (MIT Sloan Management Review 2021). . Telecommunication is one of industries that having significant impact of digital disruption (Wasono and Furinto 2018). Project managers must demonstrate visionary leadership and agile decision-making (Saragih et al 2021). Essential skills include visionary leadership (Kirkpatrick and Locke, 1991; Kadhum et al 2023), Agile decision-making (Kurniawana and Hambsalb 2019) and emotional intelligence (Vierimaa 2013; Goleman 2020). In this skenario, the transformational leadership style is dominant than transactional. The transactional leadership (Low) while transformational leadership (High).

By creating Scenario Planning in the context of facing technological complexity and uncertainty by mapping four possible scenarios, it will help project managers anticipate each situation by applying the appropriate leadership focus. This matrix can then be called the Telecommunications Project Scenario Matrix which is a reference for four possible scenarios in telecommunications project management. This matrix explains the characteristics of each

scenario including the proportion of transactional and transformational leadership styles in each scenario.

e) The fifth step Analysis of Implications and Strategy

This step is to Analyze the Implications. In this step, you need to assess the implications of each scenario for the organization and consider how strategies may need to adapt to each possible future. As the telecommunications industry continues to evolve within project complexity and technology uncertainty, the competencies required for leadership among project managers become increasingly complex. Based on the four scenarios, the worst implication will be in the Disruption Quadrant. In anticipating this Disruption condition, the program can be developed as follows:

1) Leadership Training and Development Programs: These programs develop leadership skills in project managers, allowing them to explore new opportunities while efficiently executing current projects. Training focuses on strategic decision-making, innovation management, and team adaptability, enhancing organizational navigation in complex environments. The objective of leadership training is to reduce the gap competence in leadership of Project Manager (Tang, 2019).

2) Change management development program. This program equips project managers with skills for managing change in uncertain environments, Strengthening change management is crucial for maintaining organizational performance during disruptions (Hiatt, 2020; Kotter, 2021). Change management and leadership development are closely related (Errida and Lotfi 2021).

3) Stakeholder Relationship development program. This program enhances stakeholder engagement and relationship management skills, Strong relationships are crucial for project support and success in complex environments. PMI (2021) emphasizes the importance of developing stakeholder management skills for project managers.

4) Project Management development program. This program enhances project management skills in agile methodologies, risk management, and strategic planning for telecommunications, equipping managers to navigate new technologies and market complexities (PMI, 2021).

5) Telecommunication Technology development program. This program enhances technical skills in telecommunications, covering 5G, IoT, and network infrastructure. It ensures that

project managers understand emerging technologies and can integrate them into projects amid rapid change. To integrate the technical competence with leadership competence is required in dynamic environment (Zaman et al, 2022)

f) The sixth step (Monitoring and Updating)

The final step in scenario planning is monitoring and updating, as planning is an iterative process that requires continuous re-evaluation. Regularly reviewing and updating scenarios is essential as new information and trends emerge. The monitoring of scenario planning is analogous to monitoring project management indicators to determine if they suggest a fundamental change in the project management environment (Craddock, 2009)

CONCLUSION

Based on the results and discussion conducted by the researcher, the following conclusion was obtained:

Project management faces unprecedented challenges and opportunities in the rapidly evolving telecommunications sector due to technological advancements and increasing project complexities. This paper highlights the critical need to develop the Leadership competencies of the Project Managers using a combination of transactional and transformational leadership styles among project managers to navigate these complexities effectively.

By employing a scenario planning methodology, we developed as a novelty of the research called "the Matrix of Telecommunication Project Scenario Plan". We analyzed vital drivers and uncertainties that shape the future landscape of telecommunications project management. The Matrix consists of four distinct scenarios, namely Stability, Complexity, Innovation, and Disruption, each presenting unique challenges that demand tailored leadership competencies.

As project managers contend with varying levels of project complexity and technological uncertainty, balancing exploring new opportunities with exploiting existing capabilities emerges as essential. This dual focus enables managers to foster innovation while ensuring operational efficiency, ultimately leading to successful project outcomes. To address these challenges, we propose five targeted development programs: (1) Leadership Training and Development to enhance strategic decision-making and innovation management, (2) Change Management Development to equip managers for handling organizational change with a focus on team engagement, (3) Stakeholder Relationship Development to improve skills in

stakeholder engagement for project, (4) Project Management Development to focus on agile methodologies and risk management in telecommunications, and (5) Telecommunication Technology Development to strengthen technical competencies in emerging technologies like 5G and IoT.

The iterative nature of scenario planning highlights the need for ongoing monitoring and updating of strategies as new trends emerge. Organizations must prioritize continuous learning and adaptability to thrive in a dynamic landscape. This paper asserts that developing leadership competencies is essential for the future success of project managers in the telecommunications industry.

REFERENCES

Arnold, H., & Dunaj, M. (2007). "Enterprise Architecture and Modularization in Telco R&D as a Response to an Environment of Technological Uncertainty." Presented at the International Conference on Intelligence in Next Generation Networks (ICIN), Bordeaux, 2007.

Bass, B. M., & Avolio, B. J. (1996). "Multifactor Leadership Questionnaire." Published in the Western Journal of Nursing Research, 18(2), 1996, pages 112-121.

Bass, B. M. (1999). "Two Decades of Research and Development in Transformational Leadership." Published in the European Journal of Work and Organizational Psychology, 8(1), 1999, pages 9-32.

Burns, J. M. (1978). Leadership. New York: Harper & Row, 1978.

Bycio, P., Hackett, R. D., & Allen, J. S. (1995). "Further Assessments of Bass's (1985) Conceptualization of Transactional and Transformational Leadership." Published in the Journal of Applied Psychology, 80(4), 1995, pages 468-478.

Cave, M. (2018). "How Disruptive is 5G?" Published in Telecommunications Policy, 42(8), 2018, pages 653-658.

Caressa, M., & Pirozzi, M. (2022). "An Innovative Integrated Approach to Manage Effectively the Complex Projects, Programs, and Portfolios." Published in the PM World Journal, 11(1), January 2022.

Craddock, W. T. (2009). "What Are the Roles of Scenario Planning in Project Management?" Presented at PMI® Global Congress 2009—EMEA, Amsterdam, North Holland, The Netherlands.

Edmondson, A. C. (2018). The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth. Hoboken, NJ: Wiley, 2018.

Errida, A., & Lotfi, B. (2021). "The Determinants of Organizational Change Management

Success: Literature Review and Case Study." Published in the International Journal of Engineering Business Management, 13, 2021.

Goleman, D. (2020). Emotional Intelligence: Why It Can Matter More Than IQ. New York: Bantam, 2020.

Gupta, A., & Jha, R. K. (2015). "A Survey of 5G Network: Architecture and Emerging Technologies." Published in IEEE Access, 3, 2015, pages 1206-1232.

Hadjinicolaou, N., Yannakou, K., & Kader, M. (2022). "Using Strategic Foresight to Improve Future Readiness of Project Management." Published in the International Journal of Smart Business and Technology, 10(2), 2022, pages 1-12.

Hiatt, J. M. (2020). ADKAR: A Model for Change in Business, Government, and Our Community. Loveland, CO: Prosci, 2020.

Holzmann, V., & Mazzini, L. (2020). "Applying Project Management to Creative Industries: The Relationship Between Leadership Style and Project Success." Published in the Journal of Organizational Culture, Communications and Conflict, 24(1), 2020, pages 1-17.

Ikhsan, I., Enas, E., & Kusniawati, A. (2023). "Kompetensi Sumber Daya Manusia di Era Transformasi Industri 4.0 dan Digital 5.0 untuk Meningkatkan Produktivitas Kerja Karyawan." Published in Maeswara: Jurnal Riset Ilmu Manajemen dan Kewirausahaan, 1(5), 2023, pages 60-72.

Khan, A. A., Rehmani, M. H., & Rachedi, A. (2017). "Cognitive-Radio-Based Internet of Things: Applications, Architectures, Spectrum Related Functionalities, and Future Research Directions." Published in IEEE Wireless Communications, 24(3), 2017, pages 17-25.

Kadhum, A. H., Muttar, L. A., & Khait, A. A. (2023). "The Role of Visionary Leadership in Achieving Strategic Change Through Strategic Improvisation." Published in the South Asian Journal of Social Sciences and Humanities, 4(4), 2023, pages 12-50.

Kelley, T., & Clark, K. (2021). The New Innovation Playbook: Strategies for Disruptive Change. Boston, MA: Harvard Business Review Press, 2021.

Kelly, M. L. (2003). "Academic Advisers as Transformational Leaders." Published in The Mentor: An Academic Advising Journal, 5(3), 2003.

Kerzner, H. (2020). Project Management: A Systems Approach to Planning, Scheduling, and Control (12th ed.). Hoboken, NJ: Wiley, 2020.

Kirkpatrick, S. A., & Locke, E. A. (1991). Leadership: Do traits matter? *The Academy of Management Executive*, Volume 5, Issue 2, pages 48–60.

Kotter, J. P. (2021). Leading Change. Boston, MA: Harvard Business Review Press, 2021.

Kumar, V. (2021). The Role of Project Managers in Change Management Initiatives. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 11(2), 694-719.

Kurniawana, R., & Hamsalb, I. M. (2019). Achieving decision-making quality and organisational agility in innovation portfolio management in Telecommunication 4.0. International Journal of Innovation, Creativity and Change, 8(6), 332-356.

Lussier, R., & Achua, C. (2003). Leadership: Theory, Application, Skill Development. Thomson South Western.

McMillan, L., & Varga, L. (2022). A review of the use of artificial intelligence methods in infrastructure systems. Engineering Applications of Artificial Intelligence, 116, 105472.

Morcov, S., Pintelon, L., & Kusters, R. J. (2020). Definitions, characteristics and measures of IT project complexity-a systematic literature review. International journal of information systems and project management, 8(2), 5-21.

Misbahuddin, M., Maarif, M., Suroso, A.I., & Triyonggo, Y. (2024). The linkage between leadership style of project manager and project performance: Evidence from the telecommunication industry. Journal of Project Management, 9(3), 163-182.

Misbahuddin, M., Maarif, M., Suroso, A.I., & Triyonggo, Y. (2025). Selecting a priority strategy to enhance the ambidextrous leadership competence of project managers in the telecommunication industries. Journal of Project Management, 2025, 10(2), 383-392

MIT Sloan Management Review. (2021). The Next Age of Disruption Cambridge, MA MIT Press..

Mungkasa, O. (2022). Optimalisasi Peran dan Fungsi Forum Penataan Ruang sebagai Wadah Kolaborasi Pemangku Kepentingan. Researchgate. Net.

Njeri, N., & Ngufi, P. (2021). Role of Conflict Resolution on the Performance of a Project Team in Kiambu County, Kenya.

Pachura, A. (2018). What matters in project team management?. Polish Journal of management studies, 17.

Pillkahn, U. (2008). Using trends and scenarios as tools for strategy development: shaping the future of your enterprise. John Wiley & Sons.

PMI. (2021). A guide to the project management body of knowledge (PMBOK® Guide) (7th ed.). Project Management Institute.

Rajhans, K. (2018). Effective communication management: A key to stakeholder relationship management in project-based organizations. IUP Journal of Soft Skills, 12(4), 47-66.

Ramadhani, S. N. (2023). Pengaruh Kompetensi Kepemimpinan Manajer Proyek terhadap Kinerja Organisasi Berbasis Proyek di Indonesia dengan Kompleksitas Proyek sebagai Variabel Moderator (Doctoral dissertation, Universitas Gadjah Mada).

Ringland, G. (1998). Scenario Planning: Managing for the future. England: West Sussex.

Robbins, S. P., & Judge, T. A. (2018). Essentials of organizational behavior. Pearson.

Schwartz, P. (1997). Art of the long view: planning for the future in an uncertain world. John Wiley & Sons.

Samimi, A. (2020). Risk management in information technology. Progress in Chemical and Biochemical Research, 3(2), 130-134.

Saragih, L. R., Dachyar, M., & Zagloel, T. Y. M. (2021). Implementation of telecommunications cross-industry collaboration through agile project management. Heliyon, 7(5).

Schoemaker, P. J. (1995). Scenario planning: a tool for strategic thinking. MIT Sloan Management Review.

Sparks, B., & McCann, J. (2021). Scenario Planning for a Post-Pandemic Workplace. International Management Review, 17(2), 23.

Tang, K. N. (2019). *Leadership and Change Management*. Springer.

Vargas, P., & Tien, I. (2022). Methodology to quantitatively assess impacts of 5G telecommunications cybersecurity risk scenarios on dependent connected urban transportation systems. ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering, 8(2), 04022004.

Vierimaa, J. C. (2013). Emotional Intelligence and Project Leadership. An Explorative Study.

Wasono, L. W., & Furinto, A. (2018). The effect of digital leadership and innovation management for incumbent telecommunication company in the digital disruptive era. International Journal of Engineering and Technology, 7(2.29), 125-130.

Yin, Z., Caldas, C., de Oliveira, D., Kermanshachi, S., & Pamidimukkala, A. (2023). Cross-functional collaboration in the early phases of capital projects: Barriers and contributing factors. Project Leadership and Society, 4, 100092.

Yukl, G. (2006). Leadership in Organizations, 9/e. Pearson Education India.

Zaman, U., Khan, M. N., Raza, S. H., & Farías, P. (2022, May 17). Fall Seven Times, Stand Up Eight: Linking Project Management Innovation, Project Governance, and High-Performance Work Practices to Project Success. Frontiers Media, 13.

Zidane, Y. J. T., & Olsson, N. O. (2017). Defining project efficiency, effectiveness and efficacy. International Journal of Managing Projects in Business, 10(3), 621-641.