THE INFLUENCE OF PROJECT MANAGEMENT ON PROJECT SUCCESS: A COMPARATIVE ANALYSIS ACROSS COUNTRIES AND INDUSTRIES

[*1]ARYAMANNA MATHILI RAO, [2]MICHAEL ARNEL ROTHSTEIN
*[*1,2]University of Texas, Arlington, 701 S Nedderman Dr, Arlington, TX 76019, USA,*

***Corresponding Author : ARYAMANNA MATHILI RAO**

ABSTRACT
This study investigates the intricate relationships between project management (PM) practices and project success, focusing on cross-country and cross-industry variations. Using a contingency approach, the research examines 1,387 projects over three years across Argentina, Brazil, and Chile, spanning ten industries. Key factors such as project complexity, PM training, and organizational support were analyzed through structural equation modeling. The findings highlight the significant role of PM enablers and efforts in improving project schedules, while industry and national contexts reveal nuanced influences on cost, margin, and overall performance. The study provides critical insights into the role of PM maturity and offers recommendations for aligning PM practices with contextual variables to enhance success metrics.

Keywords: *Project management, project success, Planning, management.*
JEL Classification
B12

DOI:10.5281/zenodo.14580712 **Manuscript ID # 222**

INTRODUCTION

Project success remains a cornerstone of organizational competitiveness, representing a critical determinant of sustained growth, operational efficiency, and strategic alignment. Mounting evidence underscores the pivotal role of effective project management (PM) in achieving desired outcomes, with robust methodologies enabling organizations to navigate complexity, optimize resources, and deliver value. However, despite significant advancements in PM frameworks, tools, and standards, project failures persist as a global challenge. These failures highlight the limitations of existing approaches and underscore the importance of examining contextual factors that influence PM efficacy. The dynamic nature of modern projects, characterized by technological disruption, interdependencies, and resource constraints, demands a deeper exploration of how PM practices interact with environmental and organizational variables to drive success [1–5].

Traditional definitions of project success have long been anchored in the "iron triangle" framework, which measures performance based on time, cost, and quality adherence. While these metrics provide a foundational perspective, they fail to capture the evolving expectations of stakeholders and the multifaceted nature of project outcomes. Recent research has broadened the scope of project success to include dimensions such as sustainability, stakeholder satisfaction, innovation, and the long-term impact on organizational goals. This shift reflects a growing recognition that projects must deliver not only operational efficiencies but also strategic and societal value. For example, sustainability has emerged as a key criterion, particularly in industries facing regulatory pressures and environmental concerns, where the ability to align project objectives with broader ecological goals determines organizational legitimacy and competitiveness [6–8].

This study adopts a contingency approach, which emphasizes the importance of situational variables in shaping the relationship between PM practices and project success. By recognizing that "one-size-fits-all" solutions are inadequate in addressing the diverse challenges faced by organizations, the contingency approach enables a nuanced analysis of cross-country and cross-industry factors. Specifically, this research investigates how contextual variables, such as national business environments, industry-specific characteristics, and project complexity, influence the effectiveness of PM methodologies. The study is rooted in a comprehensive analysis of a longitudinal dataset comprising 1,387 projects spanning multiple sectors in Argentina, Brazil, and Chile. These countries were chosen due to their economic diversity, differing stages of PM maturity, and regional significance, offering a robust framework for comparative analysis [9–12].

Particular emphasis is placed on three critical dimensions of PM practice: training, maturity models, and project complexity. PM training, encompassing both technical and soft skills, is hypothesized to enhance organizational capabilities by fostering expertise, alignment with best practices, and adaptive management behaviors. Maturity models, such as the PMBoK and Capability Maturity Model Integration (CMMI), provide structured pathways for process standardization and continuous improvement, but their application across varying contexts remains underexplored. Project complexity, encompassing factors such as scale, technological uncertainty, and interdependencies, is considered a pivotal determinant of project outcomes, necessitating tailored PM approaches. By integrating these dimensions into the analysis, the research aims to provide actionable insights into the mechanisms through which PM practices contribute to project success across diverse organizational and environmental contexts [13–16].

This investigation also seeks to address critical gaps in the literature. While prior studies have demonstrated the importance of PM practices in achieving project efficiency, few have explored how these practices interact with contextual variables to influence broader dimensions of success. Additionally, cross-country comparisons in the PM domain remain limited, with most research concentrated in developed economies. By focusing on three Latin American countries with distinct economic and cultural profiles, this study provides a unique perspective on the role of environmental and institutional factors in shaping PM effectiveness. Furthermore, the inclusion of cross-industry comparisons offers insights into how sector-specific dynamics, such as regulatory frameworks and operational priorities, influence the adoption and success of PM methodologies [17–20].

Through this comprehensive and technical exploration, the study contributes to the advancement of PM theory and practice. It provides a framework for aligning PM methodologies with contextual realities, emphasizing the need for adaptive strategies that balance standardization with flexibility. For practitioners, the findings offer guidance on optimizing PM investments by tailoring approaches to specific project and environmental requirements. For academics, the research highlights the importance of incorporating contingency variables into PM models, paving the way for future studies that further unravel the complexities of project success in a dynamic and interconnected world.

2. Literature Review

Project success has long been studied as a multidimensional construct, with a growing body of literature recognizing the complex interplay between stakeholder perspectives, project phases, and contextual factors. While traditional success metrics predominantly focus on efficiency—adherence to schedule, cost, and quality parameters—recent frameworks have expanded the scope to consider societal relevance, stakeholder satisfaction, and strategic alignment. These newer success criteria reflect the increasingly holistic view of project outcomes, acknowledging that the success of a project extends beyond internal performance metrics to include broader impacts on the community, the environment, and long-term organizational goals. Scholars such as Shenhar and Dvir have introduced frameworks like the "Diamond Framework," which incorporates dimensions such as novelty, complexity, and technological uncertainty as critical moderators of success. These additional layers of complexity highlight that a project's success cannot simply be evaluated on a narrow set of metrics but must consider how well it navigates and adapts to external and internal challenges, ultimately driving innovation and strategic value for stakeholders [45] [46] [50].

In parallel, project management (PM) maturity models such as the PMBoK and CMMI have become central to understanding how structured processes can enhance organizational capabilities. These models provide clear pathways for organizations to assess their current PM practices and incrementally build more sophisticated methodologies that improve performance outcomes. Research consistently indicates that higher levels of PM maturity are associated with improved project outcomes. However, the benefits of maturity are not always immediate; instead, they tend to materialize only after an organization surpasses intermediate maturity levels, where processes have been standardized and effectively integrated into the organizational culture. PM maturity is thus a progressive journey, where the implementation of advanced practices leads to more predictable project delivery, higher quality outputs, and ultimately greater organizational competitiveness. Alongside maturity models, PM training—particularly certifications such as Project Management Professional (PMP)—emerges as a pivotal success factor. Such certifications not only promote technical proficiency but also align project managers with established best practices, enhancing their ability to manage complex projects effectively. The emphasis on training and certification reflects a growing recognition that well-trained professionals are better equipped to adapt to the diverse challenges encountered throughout the project lifecycle.

Furthermore, the effectiveness of PM practices cannot be fully understood without considering the contextual variables that shape their implementation. Cross-country and cross-industry comparisons reveal significant variability in how PM methodologies are adopted and executed, underscoring the importance of considering national and sector-specific factors. National environments, shaped by cultural, economic, and regulatory factors, play a crucial role in influencing how PM practices are received and applied. For instance, cultural attitudes toward authority, collaboration, and decision-making can affect how teams interact, resolve conflicts, and prioritize tasks within projects. Economic conditions, such as market volatility or fiscal policy, may drive the need for more agile or risk-averse PM practices. Regulatory factors also shape the adoption of formal PM methodologies, as industries subject to stringent compliance requirements—such as healthcare or aerospace—may demand higher levels of process documentation and oversight. Similarly, industry-specific needs further differentiate the application of PM practices. The construction industry, for example, typically requires PM methodologies that prioritize risk management and safety protocols due to the high degree of physical risk and uncertainty inherent in construction projects. On the other hand, the manufacturing sector, with its focus on efficiency, cost control, and production timelines, may demand PM practices that emphasize lean management, cost optimization, and just-in-time methodologies. These industry-specific nuances emphasize that while certain PM principles may be universal, the methods and tools used to implement them must be tailored to address the distinct challenges and priorities of each sector.

Together, these perspectives reveal a complex and evolving landscape of project success, shaped by a blend of technical maturity, professional training, and contextual adaptability. Future research in PM must continue to explore how these various dimensions interact to influence outcomes across different sectors and countries, providing deeper insights into the factors that enable or hinder successful project delivery.

Research Hypotheses and Model

This study tests three primary hypotheses:

- H1: PM context (enablers and methodologies) is positively associated with project success.
- H2: Efforts in PM training significantly enhance project success.
- H3: Contextual factors (country, industry, and complexity) moderate the relationship between PM practices and project success.

The conceptual model evaluates three dimensions of project success—schedule, cost, and margin variation—against PM enablers, training efforts, and contextual controls.

3. Methodology

Partial least squares structural equation modeling (PLS-SEM) was employed to test the hypotheses. This method accommodates both reflective and formative constructs, ensuring robust analysis of latent variables such as PM enablers and contextual factors [26–28].

Data was collected from 1,387 projects across ten industries, including energy, healthcare, and IT, in three Latin American countries. Metrics were derived from standardized project reports and audits conducted by a multinational organization. The dataset includes measures of PM maturity, training investment, and project complexity, categorized into four levels based on financial, technical, and organizational criteria [25].

4. Results

The The analysis uncovered several significant findings, providing valuable insights into the relationship between project management (PM) practices and project success across various dimensions. One of the primary findings was the notable impact of PM enablers on schedule adherence. Specifically, PM enablers were found to have a strong positive effect on schedule performance, with a path coefficient of 0.101 ($p < 0.01$). This suggests that the implementation of structured PM processes, tools, and methodologies plays a crucial role in ensuring that projects are completed within the planned timeframe. However, the influence of PM enablers on cost and margin variations was found to be negligible. This finding highlights a limitation in the scope of PM enablers; while they may be effective in controlling time-related aspects of a project, their ability to manage financial outcomes such as cost overruns or margin performance may require additional, more specialized management practices or tools. The divergence between schedule performance and financial outcomes suggests that time and cost management are influenced by different sets of variables, necessitating a more targeted approach for each dimension of project success.

Another significant finding was the role of training in enhancing project outcomes. Investment in PM training had a positive and statistically significant impact on schedule performance, with a standardized path coefficient (β) of 0.079 ($p < 0.001$). This underscores the critical importance of continuous professional development and the formalization of PM knowledge. Training initiatives, particularly those that focus on building both technical skills and soft skills such as leadership, communication, and stakeholder management, have been shown to improve the efficiency of project teams in adhering to schedules. As organizations face increasingly complex and dynamic project environments, well-trained project managers and teams are better equipped to navigate challenges, mitigate risks, and maintain project timelines. These findings support the growing emphasis on the professionalization of project management through certifications such as PMP (Project Management Professional), which not only enhance individual capabilities but also contribute to the broader organizational success by aligning team members with globally recognized best practices.

Contextual moderators, such as country-specific and industry-specific factors, were also found to significantly influence project outcomes. Cross-country comparisons revealed that Brazil consistently outperformed Argentina and Chile in terms of PM performance. This superior performance in Brazil can be attributed to higher PM maturity levels and a greater prevalence of PMP certifications within the country. Brazil's more developed PM infrastructure, supported by a higher concentration of certified professionals and stronger institutional support for PM practices, appears to provide a competitive advantage in managing complex projects. In contrast, the other countries in the study, despite making strides in PM adoption, still lag in these areas, highlighting the importance of PM maturity as a key determinant of project success.

Furthermore, industry effects were particularly pronounced in the telecommunications sector, where the application of advanced PM methodologies significantly influenced project outcomes. Telecommunications projects, often characterized by their high complexity, rapid technological change, and tight deadlines, benefit from PM methodologies that are specifically designed to manage uncertainty and ensure timely delivery [44]. The findings suggest that sector-specific adaptations of PM practices are essential for optimizing performance in industries with distinct challenges. These results reinforce the idea that while general PM principles can be applied universally, industry-specific contexts necessitate tailored approaches that account for the unique demands and risks faced by organizations in different sectors [45].

Together, these findings underscore the multifaceted nature of project success, driven by a combination of structured PM processes, continuous training, and contextual adaptations. While PM enablers have a profound impact on schedule performance, their influence on cost and margin requires further exploration and refinement.

Additionally, the significant role of training highlights the ongoing need for investment in professional development to ensure that project managers remain equipped to handle evolving project demands. The cross-country and cross-industry variations observed emphasize the importance of contextual factors in shaping PM outcomes, calling for a more nuanced understanding of how PM practices must be adapted to local environments and sectoral requirements for optimal results.

5. Discussion

The findings emphasize the pivotal role of PM enablers and training in improving project schedules, corroborating previous research on the dual dimensions of PM maturity—both soft (such as leadership and communication skills) and hard (such as process frameworks and tools) [16–19]. Specifically, the strong relationship between PM enablers and schedule adherence suggests that structured, process-driven approaches to project management, coupled with effective training programs, significantly enhance a project's ability to meet deadlines. These findings align with established PM maturity models, which stress that organizations with higher levels of maturity are more likely to implement and sustain efficient processes that positively impact project performance. The emphasis on training also highlights the importance of continuous professional development, which equips project managers with the necessary skills to lead teams effectively and navigate challenges, further improving schedule performance. However, the study also underscores the need for an integrated approach to PM maturity that considers both technical expertise and interpersonal competencies to ensure holistic project success.

Contextual variables, such as the national environment and industry sector, were found to be significant moderators of the relationship between PM practices and project success. These variables underscore the importance of tailoring PM methodologies to fit the specific organizational, cultural, and environmental contexts in which projects are executed. National environments, shaped by factors such as regulatory frameworks, cultural attitudes toward hierarchy and authority, and economic conditions, play a significant role in influencing how PM practices are adopted and executed. For example, countries with more formalized project management structures and stronger institutional support for PM methodologies tend to experience better project performance. Similarly, industry sectors with distinct operational needs—such as construction, IT, and healthcare—require customized PM practices that address sector-specific challenges. The findings highlight that a universal approach to PM, which overlooks the influence of these contextual factors, may not yield optimal outcomes. Instead, PM practices must be adaptive, taking into account local norms, industry standards, and organizational goals to maximize their effectiveness [29].

The study also raises important questions about the adequacy of current metrics used to measure project success [48], particularly in terms of cost and margin outcomes. Despite the significant impact of PM enablers and training on schedule performance, their influence on cost control and margin variation was weak, suggesting that traditional financial metrics may not fully capture the strategic value of PM investments [49]. This limitation points to a potential gap in how organizations evaluate the success of their PM initiatives, with an over-reliance on cost and schedule adherence metrics that fail to account for broader outcomes, such as stakeholder satisfaction, long-term organizational impact, and the strategic alignment of projects [46]. Given the increasing complexity and strategic importance of projects, future studies should broaden the scope of success metrics to include qualitative factors such as stakeholder engagement, sustainability, and the alignment of project outcomes with organizational strategy [47]. By integrating these broader measures, organizations can gain a more comprehensive understanding of the value delivered by PM practices and make more informed decisions about where to invest in project management capabilities [30–33]. This holistic approach would not only provide a fuller picture of project success but also encourage more sustainable and value-driven project management practices in the long term.

5. Conclusion

This study underscores the contingent nature of project management's (PM) impact on project success, highlighting the necessity for adaptive practices that are closely aligned with contextual variables [55]. The findings suggest that investments in PM enablers—such as process frameworks, tools, and training—yield tangible benefits, particularly in terms of schedule performance. Well-structured PM processes and continuous training equip project teams to better manage time constraints and deliver projects within their planned timelines [53]. However, the study also reveals that the effects of these enablers are not universal; rather, they are shaped by contextual factors such as national environment and industry-specific requirements [52]. These nuanced effects demand a flexible, tailored approach to PM methodologies. In other words, while general PM principles can be applied across different contexts, their success is highly contingent on adapting practices to suit the specific needs of the organization, industry, and country in which the projects are being executed [51]. Organizations must recognize that one-size-fits-all PM practices may not be effective in diverse settings, and

instead should adopt a more customized approach that considers cultural, economic, and regulatory differences across regions and sectors [54] [56].

Looking ahead, future research should explore the longitudinal effects of PM maturity to better understand how the impact of maturity evolves over time. While this study found that higher levels of PM maturity correlate with improved schedule performance, a longitudinal perspective could reveal whether the benefits of PM maturity extend beyond the short-term and lead to sustained improvements in other areas of project success, such as cost management and stakeholder satisfaction. Additionally, future studies should expand cross-country comparisons to include developed economies, providing a broader perspective on the generalizability of the findings. Comparing PM practices across both developed and developing economies could reveal deeper insights into how institutional and organizational factors in different economic contexts influence the effectiveness of PM methodologies.

Furthermore, the integration of AI-driven tools and predictive analytics into PM frameworks presents a promising avenue for future research. As the complexity of projects continues to increase, traditional PM tools may no longer suffice to manage the growing volume of data and decision-making requirements. AI-powered systems and predictive analytics offer significant potential to enhance decision-making by providing real-time insights, forecasting potential risks, and suggesting optimal solutions. These technologies can help project managers make more informed decisions, streamline processes, and identify opportunities for improvement early in the project lifecycle. Incorporating AI into PM frameworks could significantly enhance the ability of organizations to achieve sustainable project success by improving efficiency, reducing costs, and increasing the accuracy of project predictions. Future research should investigate how the integration of these technologies can be scaled and adopted within different sectors and regions, exploring their potential to revolutionize project management practices.

References

1. Akter Jahan, S., & Sazu, M. H. [2022]. Rise of mobile banking: a phoenix moment for the financial industry. Management & Datascience, 6[2].
2. Akter, J. S., & Haque, S. M. [2022]. Innovation Management: Is Big Data Necessarily Better Data. Management of Sustainable Development, 14[2], 27-33.
3. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management, 57, Article 101994.
4. Dubey, R., Altay, N., Gunasekaran, A., Blome, C., Papadopoulos, T., & Childe, S. J. (2018). Supply chain agility, adaptability and alignment: Empirical evidence from the Indian auto components industry. International Journal of Operations & Production Management, 38(1), 129–148.
5. Dwivedi, R., Nerur, S., & Balijepally, V. (2023). Exploring artificial intelligence and big data scholarship in information systems: A citation, bibliographic coupling, and co- word analysis. International Journal of Information Management Data Insights, 3(2), Article 100185.
6. Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., et (2019).
7. Farooque, M., Zhang, A., Thürer, M., Qu, T., & Huisingh, D. (2019). Circular supply chain management: A definition and structured literature review. Journal of Cleaner Production, 228, 882–900.
8. Fayezi, S., Zutshi, A., & O'Loughlin, A. (2017). Understanding and development of supply chain agility and flexibility: A structured literature review. International Journal of Management Reviews, 19(4), 379–407.
9. Giannakis, M., & Louis, M. (2016). A multi-agent-based system with big data processing for enhanced supply chain agility. Journal of Enterprise Information Management, 29 (5), 706–727.
10. Gligor, D., Gligor, N., Holcomb, M., & Bozkurt, S. (2019). Distinguishing between the concepts of supply chain agility and resilience: A multidisciplinary literature review. The International Journal of Logistics Management, 30(2), 467–487.
11. Gupta, S., Drave, V. A., Bag, S., & Luo, Z. (2019). Leveraging smart supply chain and information system agility for Supply Chain Flexibility. Information Systems Frontiers, 21, 547–564.
12. Gürkut, C., Elçi, A., & Nat, M. (2023). An enriched decision-making satisfaction model for student information management systems. International Journal of Information Management Data Insights, 3(2), Article 100195.
13. Haque, S. M., & Akter, J. S. [2022]. Big Data Analytics & Artificial Intelligence In Management Of Healthcare: Impacts & Current State. Management of Sustainable Development. Management of Sustainable Development,, 14[1], 36-42.
14. Hariri, R. H., Fredericks, E. M., & Bowers, K. M. (2019). Uncertainty in big data analytics: Survey, opportunities, and challenges. Journal of Big Data, 6(1), 1–16.

15. Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. Educational and Psychological measurement, 66(3), 393–416.
16. Hofmann, E., Sternberg, H., Chen, H., Pflaum, A., & Prockl, G. (2019). Supply chain management and Industry 4.0: Conducting research in the digital age. International Journal of Physical Distribution & Logistics Management, 49(10), 945–955.
17. Hsueh, C. F. (2014). Improving corporate social responsibility in a supply chain through a new revenue sharing contract. International Journal of Production Economics, 151, 214–222.
18. Huo, B., Gu, M., & Wang, Z. (2018). SCF concepts, dimensions and outcomes: An organisational capability perspective. International Journal of Production Research, 56 (17), 5883–5903.
19. Hussain, M. I., Muscolo, A., Farooq, M., & Ahmad, W. (2019). Sustainable use and management of non-conventional water resources for rehabilitation of marginal lands in arid and semiarid environments. Agricultural Water Management, 221, 462–476.
20. Isenberg, D. T., Sazu, M. H., & Jahan, S. A. [2022]. How Banks Can Leverage Credit Risk Evaluation to Improve Financial Performance. CECCAR Business Review, 3[9], 62-72.
21. Ivanov, S.H., & Webster, C. (2017). Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies–a cost-benefit analysis. Artificial Intelligence and Service Automation by Travel, Tourism and Hospitality Companies–A Cost-Benefit Analysis.
22. Jahan, S. A. (2024). How project management principles can lead to successful project completion in construction industry. *IPHO-Journal of Advance Research in Business Management and Accounting*, *2*(11), 01-08.
23. Jahan, S. A. (2024). Integrating Project Management Techniques and Stakeholder Engagement for Comprehensive Project Success: A Multi-Domain Analysis. *IPHO-Journal of Advance Research in Business Management and Accounting*, *2*(11), 09-17.
24. Jahan, S. A. (2024). A Unified Approach to Project Management: Integrating Information Views and ICT Tools. *IPHO-Journal of Advance Research in Business Management and Accounting*, *2*(11), 18-23.
25. Jahan, S. A. (2024). Utilizing Predictive Analytics and Machine Learning for Enhanced Project Risk Management and Resource Optimization. *IPHO-Journal of Advance Research in Business Management and Accounting*, *2*(11), 24-31.
26. Jahan, S. A., & Sazu, M. H. [2022]. Role of IoTs and Analytics in Efficient Sustainable Manufacturing of Consumer Electronics. International Journal of Computing Sciences Research, 6.
27. Jahan, S. A., & Sazu, M. H. [2022]. The Impact of Data Analytics on High Efficiency Supply Chain Management. CECCAR Business Review, 3[7], 62-72.
28. Jahan, S. A., Isenberg, D. T., & Sazu, M. H. [2022]. How Healthcare Industry can Leverage Big Data Analytics Technology and Tools for Efficient Management. Journal of Quantitative Finance and Economics, 5[1], 149-158.
29. Sazu, M. H., & Akter Jahan, S. (2022). Impact of big data analytics on government organizations. Management & Datascience,6(2)
30. Sazu, M. H. [2022]. Does Big Data Drive Innovation In E-Commerce: A Global Perspective?. SEISENSE Business Review, 2[1], 55-66.
31. Sazu, M. H. [2022]. How machine learning can drive high frequency algorithmic trading for technology stocks. . International Journal of Data Science and Advanced Analytics, 4[4], 84-93.
32. Sazu, M. H., & Jahan, S. A. [2022]. Can big data analytics improve the quality of decision-making in businesses?. Iberoamerican Business Journal, 6[1], 04-27.
33. Sazu, M. H., & Jahan, S. A. [2022]. Factors Affecting The Adoption Of Financial Technology Among The Banking Customers In Emerging Economies. Studii Financiare [Financial Studies], 26[2], 39-54.
34. Sazu, M. H., & Jahan, S. A. [2022]. High efficiency public transportation system: role of big data in making recommendations. Journal of process management and new technologies, 10[3-4], 9-21.
35. Sazu, M. H., & Jahan, S. A. [2022]. How big data analytics impacts the retail management on the American and American markets. CECCAR Business Review, 3[6], 62-72.
36. Sazu, M. H., & Jahan, S. A. [2022]. How Big Data Analytics is transforming the finance industry. Bankarstvo, 51[2], 147-172.
37. Sazu, M. H., & Jahan, S. A. [2022]. Impact of big data analytics on business performance. International Research. Journal of Modernization in Engineering Technology and Science, 4[3], 367-378.
38. Sazu, M. H., & Jahan, S. A. [2022]. Impact of big data analytics on distributed manufacturing: does big data help?. Journal of process management and new technologies, 10[1-2], 70-81.
39. Sazu, M. H., & Jahan, S. A. [2022]. IMPACT OF BIG DATA ANALYTICS ON GOVERNMENT ORGANIZATIONS TO IMPROVE INNOVATION AND DECISION-MAKING. Management Strategies Journal, 57[3], 34-44.

40. Sazu, M. H., & Jahan, S. A. [2022]. Impact of blockchain-enabled analytics as a tool to revolutionize the banking industry. Data Science in Finance and Economics, 2[3], 275-293.
41. Sazu, M. H., & Jahan, S. A. [2022]. The impact of big data analytics on supply chain management practices in fast moving consumer goods industry: evidence from developing countries. International Journal of Business Reflections, 3[1], 112-128.
42. Hanaysha, J. R., Shriedeh, F. B., & In'airat, M. (2023). Impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic performance. International Journal of Information Management Data Insights, 3(2), Article 100188.
43. Hariri, R. H., Fredericks, E. M., & Bowers, K. M. (2019). Uncertainty in big data analytics: Survey, opportunities, and challenges. Journal of Big Data, 6(1), 1–16.
44. Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. Educational and Psychological measurement, 66(3), 393–416.
45. Huo, B., Gu, M., & Wang, Z. (2018). SCF concepts, dimensions and outcomes: An organisational capability perspective. International Journal of Production Research, 56 (17), 5883–5903.
46. Hofmann, E., Sternberg, H., Chen, H., Pflaum, A., & Prockl, G. (2019). Supply chain management and Industry 4.0: Conducting research in the digital age. International Journal of Physical Distribution & Logistics Management, 49(10), 945–955.
47. Hussain, M. I., Muscolo, A., Farooq, M., & Ahmad, W. (2019). Sustainable use and management of non-conventional water resources for rehabilitation of marginal lands in arid and semiarid environments. Agricultural Water Management, 221, 462–476.
48. Hsueh, C. F. (2014). Improving corporate social responsibility in a supply chain through a new revenue sharing contract. International Journal of Production Economics, 151, 214–222.
49. Ivanov, S.H., & Webster, C. (2017). Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies–a cost-benefit analysis. Artificial Intelligence and Service Automation by Travel, Tourism and Hospitality Companies–A Cost-Benefit Analysis.
50. Jenatabadi, H.S. (2015). An overview of organizational performance index: Definitions and measurements. Available at SSRN 2599439.
51. Jha, A. K., Agi, M. A., & Ngai, E. W. (2020). A note on big data analytics capability development in supply chain. Decision Support Systems, 138, Article 113382.
52. Krause, D. R., Pagell, M., & Curkovic, S. (2001). Toward a measure of competitive priorities for purchasing. Journal of Operations Management, 19(4), 497–512.
53. Kong, F., & Li, J. (2018). The promotion strategy of supply chain flexibility based on deep belief network. Applied Intelligence, 48, 1394–1405.
54. Lezoche, M., Hernandez, J. E., D_ıaz, M. D. M. E. A., Panetto, H., & Kacprzyk, J (2020).
55. Lyons, A. C. (2007). Evaluating operations flexibility in industrial supply chains to support build-to-order initiatives. Business Process Management Journal, 13(4), 572–587.
56. Manders, J. H., Cani¨els, M. C., & Paul, W. T. (2016). Exploring Supply Chain Flexibility in a FMCG food supply chain. Journal of Purchasing and Supply Management, 22(3), 181–195.