

The Effectiveness of Supply Chain Management in Enhancing Project Management Outcomes

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Abstract

Supply Chain Management (SCM) plays a critical role in improving the efficiency and effectiveness of project management across various industries. This paper explores the effectiveness of SCM on project management outcomes in local municipalities, focusing on key performance indicators such as cost reduction, time management, risk mitigation, and quality control. Effective SCM integration within project management frameworks minimizes delays, optimizes resource allocation, and improves overall project performance. The research highlights how the SCM strategies such as just-in-time (JIT) delivery, and risk mitigation contribute to enhanced project execution. By streamlining supply chain processes, organizations can mitigate uncertainties, minimize waste, and improve collaboration among stakeholders. This paper also examines case studies where efficient SCM has led to successful project completion and identifies challenges such as supply chain disruptions, vendor management issues, and compliance risks. The findings suggest that companies that prioritize robust SCM practices achieve better project outcomes in terms of cost efficiency, quality assurance, and stakeholder satisfaction. Additionally, integrating SCM principles into project management enhances operational efficiency and resilience, making it a vital component for achieving strategic project goals. Future research should explore advanced digital technologies and sustainable SCM practices to further optimize project success. A mixed method approach has been adopted, grounded in a pragmatic research philosophy. Data was analyzed by employing SPSS version 29.2. The findings suggest that integrating SCM principles into project management not only streamline processes but also increases the likelihood of meeting project goals, particularly in large-scale and complex projects.

Keywords: supply chain management, project management, key performance indicators, resource allocation, quality

1. Introduction

Infrastructure development projects in local municipalities face multiple challenges ranging from insufficient funds, budget constraints, political interference, maladministration and poor governance (Durdyev and Hosseini 2020). Latent conditions impede the municipality's ability to deliver projects effectively. The reasons for delays in public sector project delivery, according to the assessment of Thusi and Selepe (2023), are labor shortages, unqualified workers, owner delays in evaluating and approving design papers, and project owner delays in progress payments. Nee, Beatrice and Yong (2022) reviewed the construction time performance of Malaysian public projects. Rather than project characteristic characteristics, the study discovered that delays are caused by variables related to excusable delays. With the use of factor analysis, Mahajan and Narkhede (2024) investigated the reasons for delays in construction projects and discovered poor site management, scope revisions, late payments to suppliers and contractors, and inadequate project planning. Gurgun, Koc and Kunkcu (2024) found that poor site management, inadequate planning, and a lack of materials were hindrances that deter attaining effective project management delivery. The aim of the study is to explore the effectiveness of the integration

between supply chain and project management. With a focus on how effective resource allocation, supplier management, procurement, and logistics all contribute to project success, this study explores the integration of SCM practices within project management frameworks, emphasizing how efficient procurement, logistics, supplier management, and resource allocation contribute to the success of projects. Key findings from the research reveal that THLM lacks effective supply chain management procedures. The study's findings indicate that late payments to contractors and suppliers are the most significant cause that instigate project delays

2. Literature Review

2.1. Background

From a corporate point of view, successful Project management is described by achieving a continuous stream of project objectives with consideration of time, cost, quality, at a desired performance level, while deploying resources efficiently and effectively, providing value to stakeholders (Kerzner, 2025). In the field of project management, Chen (2023) asserts that the supply chain is essential to the project's successful completion. A project's cost, schedule, and quality results can all be greatly impacted by how well its supply chain works. In implementing service delivery

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across the nation, municipalities are essential. According to Widjaja (2024), infrastructure projects are known to stimulate economic growth and social well-being. The Local Government: Municipal System Act 32 of 2000, mandates municipalities with the implementation of service delivery and developmental projects to improve the quality of life of residents and contribute to economic development (Mbedzi 2023). Nevertheless, implementing such projects does not come without challenges. It is against this backdrop that measures are sought to streamline operations to deliver quality output.

2.2. Supply Chain Management Challenges in Local Municipalities

In South African local municipalities, supply chain management (SCM) faces many obstacles that affect governance, financial efficiency, and service delivery. Sibanda, Zindi and Maramura (2020) pointed out several challenges in local municipalities which include insufficient planning and forecasting, bureaucratic and inefficient processes, fraud and corruption. Other constraints highlighted by Maramura and Ruwanika (2023) are supplier's challenges, poor governance and budget restraints, the effect of which often leads to the inability to meet developmental goals and compromised service delivery.

2.3. Project Management Challenges in Local Municipalities

Project management in local municipalities in South Africa faces several unique challenges due to socio-economic, political, and operational factors. Notable key challenges encountered are shortage of skilled personnel, political interference, corruption and mismanagement of funds, legislative and regulatory bottlenecks, poor monitoring and evaluation (Munzhedzi and Phago 2020; Van der Walddt and Fourie 2022).

2.4. Mitigating factors to enhance SCM effectiveness in Project Management

It is often known that supply chain management (SCM) and project management (PM) are closely related fields that, when properly coordinated, can greatly improve organizational effectiveness and produce superior results. Common features in both fields include planning, execution, monitoring, and controlling processes to achieve specific objectives (Tang 2021). Whereas SCM focuses on the flow of goods, information, and resources across a network to meet customer demand, PM is primarily concerned with the execution of temporary, goal-specific initiatives within defined constraints of time, cost, and scope. To maximize the contribution of the two disciplines, there should be careful planning and effective utilization of resources to optimize performance (Elisa, Nabella and Sari 2022). Both SCM and PM accentuate strategic planning and effective utilization of resources.

The integration of SCM into PM enhances resource allocation, visibility and control. Consequently, linking supply chain management and project management is essential for operational synergy. It is widely accepted that this integration enhances efficiency, mitigates risks, supports innovation, and ultimately ensures successful project delivery in competitive and dynamic business environments. Strategic advantage can be achieved significantly by organizations that invest in bridging these two domains. The built industry, encompassing sectors like construction, architecture, engineering, and urban planning, is a cornerstone of economic development and societal progress. It involves the design, construction, and maintenance of infrastructure such as buildings, roads, bridges, and public spaces. The industry is highly dynamic, influenced by factors such as technological advancements, economic conditions, environmental sustainability, regulatory frameworks, and evolving customer needs. Diagram 2.1 below illustrates the Supply chain-project management value chain.

3. Research Methodology

This paper adopted a mixed-methods approach, grounded in a pragmatic research philosophy. Biesta (2021) asserts that the pragmatism research philosophy suggests that research questions should be central, and the choice of methods should be guided by their usefulness in addressing these questions. This approach allows for a comprehensive understanding of the complex relationship between SCM and project management outcomes by integrating both qualitative data and quantitative data. Whereas quantitative data will provide a statistical overview of the phenomenon, qualitative data, on the other hand, will offer in-depth insights into the experiences and perspectives of stakeholders. Thembisile Hani Local Municipality is one of the municipalities under eNkangala District Municipality which controls six local municipalities including THLM.

3.1. Population and Sample

The population of interest comprises all professionals within the eNkangala District Municipality involved in project management and supply chain management. This includes, but not limited to, project managers, procurement officers, finance officials, senior management, and other relevant stakeholders. A purposive sampling technique was utilized to select a representative sample, considering various factors such as size, geographic location and historical project performance. Primary data was collected from sample of 78 participants within the district. The technique guaranteed that the study captures a diverse range of experiences and contexts.

3.2. *Sample strategy*

For quantitative methodology, the paper adopted a stratified random sampling technique within each selected municipality to ensure proportional representation of different professional categories. A sufficient sample size was determined using a power analysis to ensure adequate statistical power for detecting significant relationships. For qualitative methodology, a purposive sampling technique was employed to select interview participants based on their experience and involvement in project management and supply chain processes. This ensured the inclusion of individuals with diverse perspectives and in-depth knowledge. The sample size was guided by data saturation, until no new significant information emerged.

3.3. *Data Collection Instruments*

For quantitative methodology, a structured questionnaire was developed based on a thorough review of the literature on SCM and project management effectiveness. The questionnaire included key elements such as: demographic information, Project performance, SCM implementation and overall project success. A (1-5) Likert scale was utilized to measure outcomes. The questionnaire was pilot-tested with a small group of professionals to ensure clarity, validity, and ease of completion before final distribution. The questionnaire was administered online using Google Forms to facilitate data collection and analysis. For qualitative methodology, a semi-structured interview guide was developed to guide the semi-structured interviews. The interview guide included open-ended questions designed to explore the following:

- i. Perceptions of the role of SCM in project management;
- ii. Challenges and barriers to effective SCM implementation in the municipality;
- iii. Examples of successful and unsuccessful projects and the role of SCM in their outcomes;
- iv. Suggestions for improving SCM practices to enhance project management outcomes, and
- v. Impact of SCM on specific project aspects such as time, cost, quality, stakeholder satisfaction.

With the help of current technology, interviews were conducted via a video conferencing, considering logistical considerations. All interviews were audio-recorded with the participant's prior consent and transcribed verbatim for analysis.

3.4. *Data Analysis Techniques*

Quantitative data was examined using the Statistical Package for the Social Sciences (SPSS) version 29.2. The analysis in this study primarily focused on descriptive statistics. Thematic analysis was utilized to

analyze the qualitative data collected from the semi-structured interviews. The analysis included Transcription and Familiarization, Coding, Theme development, Interpretation and Reporting.

4. *Findings and Discussion*

Results from the study reveal that THLM lacks effective supply chain management procedures. Key findings from the research reveal that SCM significantly impacts on time, project cost, schedule, and quality. The study's findings indicated that late payments to contractors and suppliers were the most significant cause of instigating project delays. There is a need for effective collaboration between SCM and PM teams for success. The main reason for project delivery delays, according to Shivambu and Thwala (2019), is suppliers' late payments. These results are consistent with those of a study on Kenyan local administrations by (Barsemoi, Mwangagi and Asienyo 2014). The study of Hoque (2022) establishes that one of the main issues affecting service delivery in South African municipalities is the lack of necessary supply chain skills and capabilities. Another significant discovery is that ineffective execution of some management tasks and responsibilities causes project completion delays, which impacts the municipality's ability to provide services. Findings reveal a greater need for technological improvements in the current systems in order to streamline supply chain processes and improve project success. The public sector in its current form faces a unique challenge in implementing SCM and PM due to regulatory constraints and bureaucratic processes. Results point to the municipality's capacity to complete projects on schedule due to critical factors, such as clear scope definition, effective communication, employee training, investing in emerging technology, allocating sufficient resources, and work plan.

4.1. *Descriptive Statistics of the respondents*

Table 1 displays the descriptive statistics of the study participants. Over half (66.1%) of the participants were women, while 33.9% were men. Many participants were general workers (35.7%), followed by supervisors (16.1%), artisans (17.9%), technicians (16.1%), and others (15.1%). Regarding educational qualifications, 48.2% of participants held a certificate as their highest level of education, 32.1% had a diploma, 16.1% had a degree, and just 3.6% had a master's degree. Additionally, the study found that 26.8% of participants had less than six years of work experience, 33.9% had 6 to 10 years, and 39.3% had 11 to 15 years of experience.

Table 1: Descriptive statistics of the respondents

Variable		n (%)
Gender	Male	19 (33.9)
	Female	37 (66.1)
Job title	General workers	20 (35.7)
	Supervisors	9 (16.1)
	Artisans	10 (17.9)
	Technicians	9 (16.1)
	Other	8 (15.1)
Academic qualification	Certificate	27 (48.2)
	Diploma	18 (32.1)
	Degree	9 (16.1)
	Masters	2 (3.6)
	PhD	-
Length of service (years)	1 - 5	15 (26.8)
	6 - 10	19 (33.9)
	11 - 15	22 (39.3)
	16+	-

- n (%) = number (percentage)

To assess the reliability of the items, the researchers employed Cronbach's alpha coefficient (α). Reliability refers to the internal consistency of the construct(s) and their stability (Nunnally & Bernstein, 1994). The Cronbach's alpha value ranges from 0 to 1, and according to Bagozzi and Yi (1998), an α value greater than 0.6 indicates data consistency and reliability for analysis. In this study, the value of α was greater than 0.7 in each section, indicating that all the items agreed on each other (Table 2).

between 1.00 and 5.00. The result reveals that respondents generally agree that intentional actions, such as delayed payments to contractors and suppliers, contribute to project delivery delays in THLM (MS = 3.95). On the other hand, respondents were neutral about statements such as "THLM complies with the MFMA of 2003 in implementing projects" (MS = 3.38), "THLM has effective supply chain management practices" (MS = 2.98), and "Payments to suppliers are made within 30 days" (MS = 2.92). Additionally,

Table 2: Reliability Statistics

Section	Items	Cronbach's alpha
Deliberate practices that delay project delivery in THLM	5	0.725
Impact of late payments on project delivery	5	0.809
Impact of late payments on project delivery	4	0.891
Management practices that delay project delivery in THLM	5	0.774
OVERALL	14	0.882

4.2. *Deliberate practices that delay project delivery in THLM*

Table 3 presents the level of agreement or disagreement among respondents regarding the idea that THLM employs strategies to implement the MFMA Act of 2003, despite intentional activities that lead to delays in the municipality's project delivery. A Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to assess responses, with a mean score (MS)

respondents strongly disagreed with the statement that workers possess adequate supply chain management skills and competencies (MS = 2.28).

4.3. *Impact of late payments on project delivery*

Table 4 demonstrates that the mean scores (MS) for all items assessing the impact of late payments on project delivery exceeded 3.5. This suggests that the majority of respondents agreed that late payments result in several negative effects on project completion,

including causing workers to strike (MS = 4.07), prolonging the construction timeline (MS = 4.01),

current employees combined with better planning and communication strategies.

Table 3: Deliberate practices that delay project delivery in THLM

Contributor	Response in percentage (%)					MS
	1	2	3	4	5	
Late payments to contractors and suppliers contribute to project delays	-	12.5	-	44.6	42.9	3.95
THLM complies with the MFMA of 2003 in implementing projects	8.9	16.1	23.2	23.2	28.6	3.38
THLM has an effective supply chain management practices	1.8	35.7	28.6	32.1	1.8	2.98
Payments to suppliers are made within 30 days	1.8	39.3	28.6	28.6	1.8	2.92
Employees have an adequate supply chain management skills and competencies	35.7	33.9	17.9	10.7	1.8	2.28

Source: Author's construction

Table 4: Impact of late payments on project delivery

Outcome	Response in percentage (%)					MS
	1	2	3	4	5	
Workers strike on project site	0.0	0.0	14.3	39.3	46.4	4.07
The construction program is prolonged	0.0	0.0	16.7	42.9	41.1	4.01
Skilled employees leave the project	5.4	3.6	12.5	46.4	32.1	3.78
Projects experience cost and time overruns	3.6	3.6	14.3	44.6	33.9	3.82
Contractor runs out of working capital (cash flow problems)	0.0	12.5	23.2	32.1	32.1	3.68

leading to the departure of expert personnel from the project (MS = 3.78), contributing to time and budget overruns (MS = 3.82), and causing contractors to run out of working capital, leading to cash flow problems (MS = 3.68).

4.4. Measures for improving the performance of the supply chain management unit

Table 5 reveals that the mean scores (MS) for 75% of the items related to enhancing supply chain management performance to improve project delivery in THLM fall between 3.5 and 4.0. This suggests that most respondents believe the following actions could boost THLM's project delivery: increasing staff numbers (MS = 3.77), providing training for current staff (MS = 3.88), and adopting the latest and most effective supply chain management procurement system (MS = 3.58). On the other hand, 25% of the items had an MS close to 3, indicating that respondents were neutral about the idea that improving project delivery in THLM could be achieved by utilizing

4.5. Management responsibilities

4.5.1. Management practices that delay project delivery in THLM.

Table 6 below illustrates the respondents' level of agreement or disagreement with management practices that may contribute to delays in project delivery at THLM. Forty percent of the items (1 and 2) show mean scores (MS) greater than 3.5, indicating that the respondents agree that certain management practices lead to delays, such as delayed approvals (MS = 3.94) and late payments to suppliers and contractors (MS = 3.90). Additionally, respondents were either neutral or disagreed with the statement that senior management is consistently available when needed, with an MS of 2.71, suggesting that this is not a significant factor in causing project delays. Furthermore, 40% of the items (4 and 5) had MS values below 2.5, indicating that respondents disagreed with the notion that senior management follows effective procedures to improve project delivery, including approving projects within

Table 5: Impact of late payments on project delivery

Measures/action	Response in percentage (%)					MS
	1	2	3	4	5	
Propose training of the existing staff members	0.0	7.1	16.1	37.5	39.3	3.88
Increase the number of staff members	0.0	10.7	17.9	37.5	33.9	3.77
Introducing the latest most and efficient supply chain management procurement system	0.0	10.7	30.4	35.7	23.2	3.58
Utilize the existing staff members but strengthen proper planning and communication	12.5	30.4	17.9	35.7	3.6	2.91

Source: Author's construction

Table 6: Impact of late payments on project delivery

Contributor	Response in percentage (%)					MS
	1	2	3	4	5	
Late approvals contribute to project delays	0.0	3.6	14.3	44.6	37.5	3.94
Late payments are made to contractors and suppliers	1.8	1.8	17.9	41.1	37.5	3.90
Senior management is always available when required	21.4	25.0	32.1	12.5	8.9	2.71
Changes in scope are approved within a reasonable time frame	33.9	30.4	21.4	7.1	7.1	2.39
Projects are approved within a reasonable time frame	39.3	39.3	19.6	1.8	0.0	2.08

Source: Author's construction

appropriate time frames (MS = 2.08) and granting revisions to project scopes in a timely manner (MS = 2.39).

5. Conclusion and further research

The paper has revealed that effective SCM is crucial for enhancing project management outcomes in the Thembisile Hani Local Municipality. By properly implementing strategic SCM practices, municipalities can successfully address resource constraints, thereby reducing costs, with improved stakeholder satisfaction, and ultimately enhance the successful delivery of projects. This research paper contributes to the body of knowledge by providing a comprehensive framework for understanding how SCM and PM are interconnected in the municipal context, highlighting the potential for

improved project performance, and identifying key strategies for effective SCM implementation. Future studies should focus on conducting empirical studies to validate the framework and explore the impact of specific SCM practices on project outcomes in differently graded municipalities.

References

- Bagozzi, R.P. and Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science*, 16(1), pp.74–94.
- Barsemoi, H., Mwangagi, P. and Asienyo, B.O., (2014). Factors influencing procurement performance in private sector in Kenya. *International Journal of Innovation and Applied Studies*, 9(2), p.632.
- Biesta, G., (2021). PRAGMATISM AND THE PHILOSOPHICAL FOUNDATIONS OF MIXED METHODS RESEARCH¹. *SAGE handbook of mixed methods in social & behavioral research*, p.95.
- Bougie, R. and Sekaran, U. (2019). *Research methods for business: A skill building approach*. Hoboken: John Wiley & Sons.

- Chen, H.L., (2023). Influence of supply chain risks on project financial performance. *International Journal of Production Economics*, 260, p.108870.
- Durdyev, S. and Hosseini, M.R., (2020). Causes of delays on construction projects: a comprehensive list. *International journal of managing projects in business*, 13(1), pp.20-46.
- Elisa, Z.P., Nabella, S.D. and Sari, D.P., (2022). The influence of role perception, human resource development, and compensation on employee performance Universitas Ibnu Sina. *Enrichment: Journal of Management*, 12(3), pp.1606-1612.
- Gurgun, A.P., Koc, K. and Kunkcu, H., (2024). Exploring the adoption of technology against delays in construction projects. *Engineering, Construction and Architectural Management*, 31(3), pp.1222-1253.
- Hoque, I., (2022). Why suppliers struggle to deliver defect-free products to buyers: a buyer–supplier dyadic perspective. *Journal of Fashion Marketing and Management: An International Journal*, 26(5), pp.852-869.
- Kerzner, H., (2025). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons.
- Mahajan, G. and Narkhede, P., (2024). Integrating BIM with Digital Technology Trends in the Construction Industry: Implementation Insights for 2023. *Library of Progress-Library Science, Information Technology & Computer*, 44(3).
- Maramura, T.C. and Ruwanika, J.M., (2023). Identifying the challenges in SCM: Evidence from Mangaung metropolitan municipality. *Cogent Business & Management*, 10(2), p.2217640.
- Mbedzi, L., (2023). *The role of code of conduct in enhancing service delivery in local government with specific reference to Mopani District Municipality* (Doctoral dissertation).
- Munzhedzi, P.H. and Phago, K., (2020). Necessitating a Germane developmental local government agenda in South Africa: A post COVID-19 contemplation. *African Journal of Governance and Development*, 9(1.1), pp.181-199.
- NEE, T.S., BEATRICE, J. and YONG, L., (2022). Occurrence and Impact Analysis for Time-Related Risks in Malaysia Public Infrastructure Projects. *Journal of Sustainability Science and Management*, 17(6), pp.104-127.
- Nunnally, J. and Bernstein, I., (1994). *Psychometric Theory 3rd edition* (MacGraw-Hill, New York) [online]
- Sibanda, M.M., Zindi, B. and Maramura, T.C., (2020). Control and accountability in supply chain management: Evidence from a South African metropolitan municipality. *Cogent Business & Management*, 7(1), p.1785105.
- Tang, H., (2021). *Quality planning and assurance: Principles, approaches, and methods for product and service development*. John Wiley & Sons.
- Thusi, X. and Selepe, M. M. (2023). The Impact of Poor Governance on Public Service Delivery: A Case Study of the South African Local Government. *International Journal of Social Science Research and Review*, 6 (4), pp. 688-697.
- Van der Waltd, G. and Fourie, D., (2022). Ease of doing business in local government: push and pull factors for business investment in selected South African municipalities. *World*, 3(3), pp.470-486.
- Wei, X., Prybutok, V. and Sauser, B., (2021). Review of supply chain management within project management. *Project Leadership and Society*, 2, p.100013.
- Widjaja, G., (2024). Infrastructure investment policy to boost economic growth and increase employment. *International Journal of Financial Economics*, 1(2), pp.418-426.