

Determinants of Efficiency of SMEs Transport Operations in Tanzania: A Case of Mkuranga District

Irene A. Finias¹, Benitha Myamba²

¹Student, Logistics and Supply Chain Management Programme, National Institute of Transport
Dar es Salaam, Tanzania

²Head, Logistics and Transport Management, National Institute of Transport
Dar es Salaam, Tanzania

¹irenefinehas@gmail.com

²benitha9@yahoo.com

Abstract —Transport costs remain a heavy burden for small and medium enterprises (SMEs) in peri-urban Tanzania, where weak infrastructure and poor coordination limit operational efficiency. Guided by the Technology Acceptance Model, this study examined the effects of perceived usefulness, perceived ease of use and intention to use digital mobility platforms on transport operation efficiency among SMEs in Mkuranga District, Pwani Region. A cross-sectional survey design with a quantitative approach was adopted. Structured questionnaires were administered to SME operators selected by simple random sampling, and 153 usable responses were obtained (73.2%). Reliability, descriptive, correlation and multiple regression analyses were performed. The regression model was significant, and explained 72.6% of the variance in transport operation efficiency. Intention to use had the strongest effect, followed by perceived usefulness and perceived ease of use. The study concludes that digital mobility platforms can improve the transport efficiency of peri-urban SMEs. It recommends that operators deepen their use of the platforms and that policymakers and platform providers strengthen digital infrastructure, digital skills and platform reliability.

Keywords — digital mobility platforms, Technology Acceptance Model, transport operation efficiency, small and medium enterprises, Mkuranga District

I. INTRODUCTION

A. Background

Transport is one of the largest cost centers for small and medium enterprises (SMEs) in developing countries [1]. In Tanzania, where road transport dominates, SMEs face high transport costs arising from poor route planning, weak coordination with transport providers and the lack of real-time tracking. These inefficiencies raise fuel, vehicle and administrative costs and reduce profitability and competitiveness [2]. Mkuranga District in Pwani Region lies close to Dar es Salaam but still faces infrastructural and informational constraints that add to this burden [3].

Digital mobility platforms offer SMEs affordable and efficient logistics services. On-demand applications support last-mile delivery, specialized platforms move larger consignments between regions [4], and social commerce tools and digital payments help SMEs overcome infrastructure barriers [5], [6]. Digital logistics platforms have improved efficiency, supply chain resilience and competitiveness in maritime logistics [7] and have improved the timeliness and product condition of distribution among South African SMEs [8]. In East Africa, digital platforms have reduced the cost and time of moving cargo along major routes, although infrastructure gaps remain [9].

Despite these advances, digital logistics adoption remains low among SMEs in peri-urban and rural Tanzania [10], and uptake is shaped by technological, organizational and environmental factors [11]. Limited digital capability, infrastructure constraints and organizational resistance slow platform uptake [12], and many Tanzanian SMEs remain at an early stage of digital transformation [13].

B. Problem Statement and Objectives

SMEs in Mkuranga District depend on manual booking systems and paper documentation, which are associated with inefficient logistics planning and weak transport coordination [14], [15]. Evidence from the region indicates that digital platforms can improve operational efficiency by strengthening information flow and reducing coordination delays and freight-related costs [9], yet financial limitations and infrastructure gaps reduce the practical benefits SMEs derive from them [13]. What remains poorly understood is the empirical link between technology-acceptance beliefs about digital mobility platforms and SME transport efficiency at the district level.

The general objective was to examine the determinants of efficiency of SMEs' transport operations in Mkuranga District. The specific objectives were to determine the effects of perceived usefulness, perceived ease of use and intention to use digital mobility platforms on transport operation

efficiency. The study offers evidence relevant to SME owners, policymakers and local authorities, digital platform providers and researchers.

C. Theoretical Foundation

The study is guided by the Technology Acceptance Model (TAM), which holds that technology adoption is determined by two beliefs: perceived usefulness (PU), the degree to which a person believes that a system would enhance job performance, and perceived ease of use (PEOU), the degree to which using the system would be free of effort [16]. These beliefs shape intention to use (IU), which in turn drives actual use and performance outcomes. In this study, PU is the extent to which SMEs believe that digital mobility platforms reduce transport costs and improve efficiency [7]; PEOU is the extent to which they find the platforms simple to learn and operate; and IU is their willingness to adopt and keep using the platforms to manage transport activities. Transport operation efficiency (TCR) is how effectively time, fuel, labor, capital and vehicle capacity are used to move goods at the lowest possible cost [17], and is measured through fuel, maintenance and overall transport costs, empty trips and delivery efficiency [1].

TAM is simple, empirically well supported and suited to quantitative measurement of adoption beliefs, which fits the positivist, survey-based approach of this study. It has been criticized for ignoring social influence, organizational culture, cost constraints and infrastructural barriers, and for assuming rational decision making [18]; these factors are therefore treated as limitations rather than modelled variables.

D. Literature Review and Hypotheses

1) Perceived Usefulness: [19] found that perceived usefulness positively influenced the intention to adopt digital logistics technologies in Ethiopia, although infrastructure, human capacity and policy support were also strong factors. [13] reported that perceived usefulness was a strong driver of higher digital technology adoption among 390 Tanzanian SMEs, and Candy [12] found that digital payments and logistics technologies improved efficiency and coordination among 218 boda boda operators in Nairobi. [20] showed that predictive analytics and ICT expertise improved logistics efficiency among Tanzanian procuring entities. None of these studies measured the effect of perceived usefulness on SME transport efficiency directly. Hence, **H₁**: perceived usefulness of digital mobility platforms significantly influences transport operation efficiency.

2) Perceived Ease of Use: [15] found among 313 South African SMEs that logistics information technology improved timeliness and product condition, and Inmor et al. [21] found among 400 Thai SMEs that automation and real-time data systems significantly improved operational efficiency. In Tanzania, e-commerce adoption was positively related to transportation and information management [22], and information systems usage was linked to lower transport-related costs at the Port of Dar es Salaam [23]. In a study of maritime logistics firms, usefulness and user experience were stronger predictors of platform adoption than ease of use [7].

These studies did not isolate ease of use as a determinant of SME transport cost outcomes. Hence, **H₂**: perceived ease of use of digital mobility platforms significantly influences transport operation efficiency.

3) Intention to Use: [13] found that SMEs more willing to adopt digital systems gained greater operational benefits. [24] reported that AI tools such as dynamic routing reduced fuel use, downtime and shipping costs in Tanzania, and [25] found that digital technology strengthened the logistics performance of 230 SMEs. [26] and Eduardo and [27] showed that digital logistics start-ups and low-cost digital tools improve service efficiency and reduce costs, but mostly in developed markets and without measuring SMEs' intention to use them. Hence, **H₃**: intention to use digital mobility platforms significantly influences transport operation efficiency.

E. Conceptual Framework

Fig. 1 presents the conceptual framework. It posits a direct positive relationship between each TAM construct and transport operation efficiency, which is measured through fuel cost, maintenance cost, empty trips, overall transport expenses and delivery efficiency.

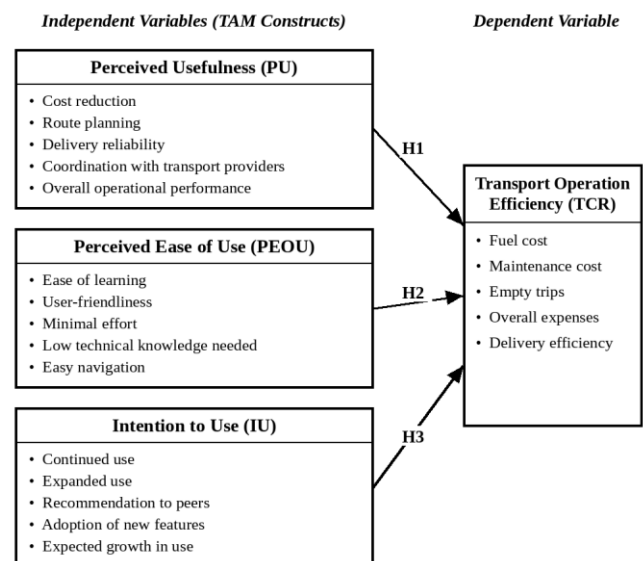


Fig. 1 Conceptual Framework of the Study

II. METHOD

A. Research Design

The study adopted a positivist philosophy [28], which holds that reality is objective and can be measured through structured instruments and statistical analysis, and a cross-sectional survey design. Data were collected from a sample at a single point in time, which suited the aim of testing the relationships among perceived usefulness, perceived ease of use, intention to use and transport operation efficiency within a limited timeframe.

B. Study Area, Population, and Sample

The study was conducted in Mkuranga District, Pwani Region, Tanzania, close to the industrial hub of Dar es

Salaam. The district has become increasingly industrial, with 128 factories reported in 2024 [29], and many of its businesses depend on road transport. Evidence from Tanzania and other African countries shows that digital solutions can improve logistics efficiency, although infrastructure and skills limitations restrict the gains [30], [14], [31].

The target population comprised SMEs in Mkuranga District engaged in the transportation and distribution of goods. According to records of the Mkuranga District Council Trade Office, this population was estimated at 436 SMEs; micro-enterprises were excluded because of the informal nature of their transport operations. The sample size was determined with Yamane's formula [32], $n = N / [1 + N(e)^2]$, where $N = 436$ and $e = 0.05$, which gives $n = 436 / 2.09 \approx 209$. Respondents were selected by simple random sampling, so that every SME had an equal chance of selection, which limits selection bias.

C. Data Collection and Instrument

Primary data were collected with a structured, paper-based questionnaire administered by the researcher and research assistants, who were present to clarify unclear items. The questionnaire used five-point Likert items (1 = strongly disagree, 5 = strongly agree), adapted from Teo [33] and Matari and Temba [34]. Each construct was measured with five items: PU (cost reduction, route planning, delivery reliability, coordination, overall performance), PEOU (ease of learning, user-friendliness, minimal effort, low technical knowledge, easy navigation), IU (continued use, expanded use, recommendation to peers, adoption of new features, expected growth in use) and TCR (fuel costs, maintenance costs, empty trips, overall transport expenses, delivery efficiency). Construct scores were the mean of the five items. Only respondents who confirmed active use of at least one digital mobility platform were included, and forms with substantial missing responses were excluded.

D. Validity and Reliability

Content validity was ensured through review of the questionnaire by experts in logistics, transport and research methodology. Construct validity was supported by aligning the items with established theory and empirical studies on technology adoption and logistics performance. The questionnaire was piloted on a small sample of SMEs with characteristics similar to the study population, and internal consistency was assessed with Cronbach's alpha, using 0.70 as the acceptance threshold.

E. Data Analysis

Data were coded and analyzed with IBM SPSS Statistics version 27. Frequencies, percentages, means and standard deviations summarized respondent characteristics and the study constructs. Mean scores were interpreted as follows: 1.00–1.80 very low, 1.81–2.60 low, 2.61–3.40 moderate, 3.41–4.20 high and 4.21–5.00 very high. Pearson correlation examined the direction and strength of bivariate relationships, and multiple linear regression tested the hypotheses using the model in (1), where TCR is transport operation efficiency, PU perceived usefulness, $PEOU$ perceived ease of use and IU

intention to use. The assumptions of linearity, independence of observations, normality of residuals, homoscedasticity and absence of multicollinearity and influential outliers were checked before interpreting the results.

$$TCR = B_0 + B_1PU + B_2PEOU + B_3IU + \varepsilon \quad (1)$$

F. Ethical Considerations

Participation was voluntary, respondents were informed of the purpose of the study, and they could withdraw at any stage without penalty. Confidentiality and anonymity were maintained, and the data were used solely for academic purposes. Permission was obtained from the local government offices in Mkuranga District and the National Institute of Transport, which issued a research authorization letter.

III. RESULT AND DISCUSSION

A. Response Rate and Respondent Profile

209 questionnaires distributed, 153 were completed and usable (Table I), a response rate of 73.2%, which is adequate for statistical analysis. Table II summarizes the respondent profile. Slightly more respondents were female (53.6%) than male (46.4%), and most were aged 26–35 years (45.1%) or 36–45 years (26.1%). Business experience was 1–3 years for 34.0% of respondents and above 10 years for 14.4%, so the sample included both newer and more established SMEs.

TABLE I
QUESTIONNAIRE DISTRIBUTION AND RESPONSE RATE

Item	<i>n</i>	Percentage
Questionnaires distributed	209	100.0
Returned and usable	153	73.2
Not returned or excluded	56	26.8

Source: Field data (2026).

TABLE II
RESPONDENT PROFILE (N = 153)

Characteristic	<i>n</i>	Percentage
Gender		
Female	82	53.6
Male	71	46.4
Age (years)		
18–25	25	16.3
26–35	69	45.1
36–45	40	26.1
46 and above	19	12.4
Business experience (years)		
1–3	52	34.0
4–6	41	26.8
7–10	38	24.8
Above 10	22	14.4

Source: Field data (2026).

B. Reliability and Descriptive Statistics

Cronbach's alpha exceeded 0.70 for every construct (Table III), ranging from .803 to .828, which indicates good internal consistency. Respondents agreed that digital mobility

platforms are useful ($M = 3.98$) and easy to use ($M = 3.96$), that they intend to keep using them ($M = 3.96$), and that their transport operations had become more efficient ($M = 3.95$).

TABLE III
RELIABILITY AND DESCRIPTIVE STATISTICS OF STUDY VARIABLES

Variable	Items	α	M	SD
Perceived usefulness	5	.816	3.98	0.62
Perceived ease of use	5	.813	3.96	0.61
Intention to use	5	.803	3.96	0.61
Transport operation efficiency	5	.828	3.95	0.65

Note: M = mean on a five-point scale; SD = standard deviation; α = Cronbach's alpha. Source: Field data (2026).

At item level, better coordination with transport providers scored highest within perceived usefulness ($M = 4.04$, $SD = 0.79$), followed by reduced transport costs ($M = 4.03$) and route planning ($M = 4.02$), whereas delivery reliability scored lowest and varied most ($M = 3.88$, $SD = 0.88$), which may reflect seasonal rains on unpaved roads, vehicle breakdowns and uneven network coverage outside Mkuranga town. Within perceived ease of use, minimal effort scored highest ($M = 4.03$, $SD = 0.76$), while user-friendliness ($M = 3.92$) and ease of learning ($M = 3.93$) scored slightly lower, possibly reflecting differences in prior digital literacy. In intention to use, expecting to increase platform use over time scored highest ($M = 3.98$) and willingness to recommend platforms to peers lowest ($M = 3.93$). In transport operation efficiency, decreased overall transport expenses scored highest ($M = 3.98$, $SD = 0.86$), and minimized empty or unnecessary trips lowest ($M = 3.88$, $SD = 0.85$), which suggests that wasted trips remain a persistent challenge.

C. Correlation Analysis

Table IV shows that all three constructs were positively and significantly correlated with transport operation efficiency. Intention to use had the strongest association ($r = .797$), followed by perceived usefulness ($r = .794$) and perceived ease of use ($r = .784$). The predictors were also strongly intercorrelated ($r = .793$ to $.797$), so their overlap should be borne in mind when interpreting their unique effects in the regression model.

TABLE IV
PEARSON CORRELATION MATRIX

Variable	1	2	3	4
1. Perceived usefulness	1			
2. Perceived ease of use	.793	1		
3. Intention to use	.797	.797	1	
4. Transport operation efficiency	.794	.784	.797	1

Note: All correlations are significant at the 0.01 level (two-tailed). $N = 153$. Source: Field data (2026).

D. Regression Analysis and Hypothesis Testing

The regression model was statistically significant, $F(3, 149) = 131.283$, $p < .001$. The multiple correlation was $R =$

.852, and the three constructs jointly explained 72.6% of the variance in transport operation efficiency ($R^2 = .726$; adjusted $R^2 = .720$; standard error of the estimate = 0.345), leaving 27.4% attributable to factors outside the model. Table V presents the coefficients. All three constructs had positive and significant effects, so H_1 , H_2 and H_3 were supported. Intention to use had the largest effect, followed by perceived usefulness and perceived ease of use; the standardized coefficients show the same order ($\beta = .329$, $.318$ and $.269$). The fitted model is

$$TCR = 0.086 + 0.333 PU + 0.287 PEOU + 0.351 IU.$$

TABLE V
MULTIPLE REGRESSION COEFFICIENTS

Predictor	B	SE	t	p
(Constant)	0.086	0.197	0.438	.662
Perceived usefulness	0.333	0.083	4.037	<.001
Perceived ease of use	0.287	0.084	3.420	.001
Intention to use	0.351	0.085	4.135	<.001

Note: Dependent variable = transport operation efficiency; B = unstandardized coefficient; SE = standard error. Source: Field data (2026).

E. Perceived Usefulness and Transport Operation Efficiency

Perceived usefulness had a strong, positive and significant effect on transport operation efficiency ($B = 0.333$, $p < .001$). This is consistent with TAM, which treats perceived usefulness as a primary determinant of technology use and its outcomes [16]. It agrees with [19], who found that perceived usefulness positively influenced the intention to adopt digital logistics technologies in Ethiopia, and with [13], who reported it as a strong driver of adoption among Tanzanian SMEs. It also mirrors the efficiency and coordination gains that [12] found among transport micro-enterprises in Nairobi. Whereas those studies linked usefulness to adoption intention or general firm performance, the present study shows that it is directly associated with transport operation efficiency, the outcome that matters most to SMEs in this peri-urban corridor.

F. Perceived Ease of Use and Transport Operation Efficiency

Perceived ease of use also had a significant positive effect, although the smallest of the three ($B = 0.287$, $p = .001$). This supports the TAM proposition that ease of use, alongside usefulness, shapes engagement with a technology [16]. It is in line with [15], who found that logistics information technology improved timeliness and product condition among South African SMEs, with Inmor et al. [21], who reported that automation and real-time data systems improved SME efficiency in Thailand, and with [23], who linked information systems usage to lower transport-related costs at the Port of Dar es Salaam. The smaller effect is consistent with [7], who found usefulness and user experience to be stronger predictors than ease of use among maritime firms. Usability therefore appears to be not only a precondition for adoption but also a contributor to cost outcomes, though a less decisive one than the other two constructs.

G. Intention to Use and Transport Operation Efficiency

Intention to use was the strongest predictor of transport operation efficiency ($B = 0.351$, $p < .001$) and had the strongest correlation with it ($r = .797$). TAM positions behavioral intention as the most immediate antecedent of actual use and its outcomes [16]. The result aligns with [13], who found that SMEs more willing to adopt digital systems gained greater operational benefits, with [24], who reported that willingness to use AI-driven supply chain tools reduced fuel use, downtime and shipping costs in Tanzania, and with [25], who found that digital technology strengthened SME logistics performance. Studies such as [26]-[27] did not measure SMEs' intention to use digital tools or link it to transport cost outcomes. The present results suggest that sustained commitment to using the platforms, more than initial perceptions of usefulness or ease of use, most directly drives efficiency gains.

H. Integrated Discussion

Taken together, the three constructs explained 72.6% of the variance in transport operation efficiency, which supports the applicability of TAM in a peri-urban Tanzanian SME context and extends its relevance beyond the large-firm and developed-market settings in which much of the reviewed literature was situated [7], [26], [27]. Usefulness and ease of use are necessary conditions for adoption, but it is the sustained willingness to use and expand engagement with platforms that most directly translates into lower fuel and maintenance costs, fewer unnecessary trips and lower overall transport expenses.

IV. CONCLUSIONS

A. Conclusions

The study concludes that perceived usefulness, perceived ease of use and intention to use digital mobility platforms each positively and significantly influence the transport operation efficiency of SMEs in Mkuranga District, and that together they explain 72.6% of its variance. Intention to use is the most influential construct, followed by perceived usefulness and then perceived ease of use. The adoption of digital mobility platforms therefore has significant potential to improve the transport efficiency of peri-urban SMEs. The benefits are conditional, since delivery reliability and the minimization of empty trips received the lowest ratings.

B. Recommendations

1) SME Operators: Operators should move beyond occasional use and integrate digital mobility platforms into routine route planning, coordination with transport providers and cost tracking to maximize savings.

2) Policymakers: Government bodies and local authorities, including Mkuranga District Council, should support digital literacy programs, basic technical training and better digital infrastructure, particularly for SMEs with lower digital literacy.

3) Platform Providers: Providers should improve delivery reliability and the minimization of unnecessary trips, for example through better route optimization and offline

functionality for areas with poor roads or inconsistent network coverage.

C. Contributions and Limitations

The study applies TAM to SME transport operations in a district outside the major cities and shows how its three constructs relate to transport efficiency within a single model. It also gives SME owners, platform providers and policymakers evidence on where to focus. Its limitations are the focus on one district and on SMEs engaged in transportation and distribution, the sampling of active platform users only, reliance on self-reported perceptions, strong intercorrelation among the predictors, and the cross-sectional design.

D. Directions for Future Research

Future studies should use longitudinal designs to examine how the effect of platform adoption evolves, add variables that TAM does not capture, such as infrastructure quality, social influence and organizational capacity, and compare multiple districts or regions of Tanzania.

ACKNOWLEDGMENT

The author thanks the supervisor, Benitha Myamba, for guidance and constructive criticism; the management and staff of the National Institute of Transport and Mkuranga District Council for their cooperation and permission to carry out the study; and the owners and operators of SMEs in Mkuranga District who shared their experiences.

REFERENCES

- [1] M. Gonzalez-Navarro, R. D. Zárate, and R. Jedwab, "Land transport infrastructure in developing countries," *VoxDev*, 2023. [Online]. Available: <https://voxdev.org/voxdevlit/land-transport-infrastructure/land-transportation-landscape-developing-countries>
- [2] S. Namakula, "Transportation management systems and freight cost reduction in Uganda," *Int. J. Supply Chain Logist.*, vol. 9, no. 2, pp. 41–52, 2025, doi: 10.47941/ijsc.2531.
- [3] World Bank, *Enhancing Connectivity through Transport Infrastructure*. Paris, France: OECD Publishing, 2018, doi: 10.1787/9789264304505-en.
- [4] A. Mnyanyi and O. K. Mburu, "Digitalization in logistics and supply chain management for SMEs," *Bus. Manag. Rev.*, vol. 28, no. 1, pp. 45–62, 2025.
- [5] J. J. Masele and J. Chibehe, "Digital marketing strategies and SMEs performance in Tanzania," *Cogent Bus. Manag.*, vol. 11, no. 1, Art. no. 2415533, 2024.
- [6] S. Lekule, "Digital technologies usage for SMEs businesses' continuity in Tanzania," *Inf. Dev.*, vol. 54, no. 1, pp. 11–25, 2024.
- [7] Y. Liu, S. Zhao, and S. Zhao, "Adoption of digital logistics platforms in the maritime logistics industry: Based on diffusion of innovations and extended technology acceptance," *Humanit. Soc. Sci. Commun.*, vol. 12, no. 1, 2025, doi: 10.1057/s41599-025-04969-8.
- [8] D. Mhlanga and T. Moloi, "COVID-19 and the digital transformation of small and medium enterprises in South Africa," *J. Econ. Behav. Stud.*, vol. 12, no. 3, pp. 1–12, 2020.
- [9] C. R. Raphael, "Digitalization of logistics in East Africa: Potentials and bottlenecks," *Science Mundi*, vol. 5, no. 2, pp. 418–426, 2025, doi: 10.51867/scimundi.5.2.39.
- [10] W. P. Mtega, R. Bernard, A. C. Msungu, and R. Sanare, "Using mobile phones for improving agricultural information access for rural communities in Tanzania," *Electron. J. Inf. Syst. Dev. Ctries.*, vol. 74, no. 1, pp. 1–16, 2016.

- [11] H. O. Awa, O. U. Ojiabo, and L. E. Orokor, "Integrated technology–organization–environment (TOE) framework for technology adoption," *J. Enterp. Inf. Manag.*, vol. 30, no. 6, pp. 893–921, 2017.
- [12] C. Candy, "E-commerce practices and performance of SMEs in the boda boda sector in Nairobi City County, Kenya," *SAGE Global Publishers*, vol. 9, no. 1, pp. 657–672, 2025.
- [13] D. Utonga and C. S. Tundui, "Modelling the determinants of the levels of digital technology adoption among SMEs in Tanzania," 2026, pp. 1–27.
- [14] M. Semkunde, "Digitalization in logistics and supply chain management for agro-processing SMEs in Tanzania," *Bus. Manag. Rev.*, vol. 28, no. 1, 2025, doi: 10.56279/bmr. v28i1.8828.
- [15] O. Omoruyi, A. Antwi, A. Mwanza, R. E. Mabugu, and E. A. N. Dakora, "Logistics information technology and its impact on SME network and distribution performance: A structural equation modelling analysis," *Logistics*, vol. 9, no. 4, pp. 1–21, 2025.
- [16] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Q.*, vol. 13, no. 3, pp. 319–340, 1989.
- [17] A. Burda, "Components and influencing factors of transport costs in logistics," *Knowl. Horiz. Econ.*, vol. 7, no. 1, pp. 107–109, 2015.
- [18] L. M. Leila, E. Kirimi, and N. Rintari, "Influence of procurement practices on SMEs' growth in Samburu County," *J. Bus. Strateg. Manag.*, vol. 5, no. 1, pp. 43–57, 2020, doi: 10.47941/jbsm.501.
- [19] M. D. Tadesse, G. Gebresenbet, D. Ljungberg, and L. Tavasszy, "The technology acceptance model for digitalised logistics in low-income countries: The case of Ethiopia," *Res. Transp. Bus. Manag.*, vol. 63, Art. no. 101507, 2025.
- [20] D. N. Shatta, B. Mwakyeya, N. Mgawe, and B. Myamba, "The effects of digital technologies on green logistics performance in Tanzania: A moderation and mediation analysis using PLS-SEM," *Int. J. Papier Public Rev.*, vol. 5, no. 4, pp. 1–16, 2024.
- [21] S. Inmor, K. Rangsom, E. Šírová, and S. Wongpun, "The influence of logistics technology innovation on the efficiency of operations in small and medium-sized businesses in Thailand," *J. Appl. Data Sci.*, vol. 6, no. 3, pp. 1525–1541, 2025.
- [22] M. G. Ngussa, V. Mruma, and A. Nawaz, "Analysis of effects of e-commerce on supply chain management to facilitate the entrepreneurship in Tanzania," *IOSR J. Bus. Manag.*, vol. 22, no. 4, pp. 1–13, 2020, doi: 10.9790/487X-2204010113.
- [23] J. Mlimbila and U. O. L. Mbamba, "The role of information systems usage in enhancing port logistics performance: Evidence from the Dar es Salaam port, Tanzania," *J. Shipp. Trade*, vol. 3, no. 1, 2018, doi: 10.1186/s41072-018-0036-z.
- [24] S. A. Dayar and M. J. Mwendapole, "Assessment on the impact of artificial intelligence driven supply chain software's in reducing shipping cost in Tanzania," *World J. Innov. Mod. Technol.*, vol. 8, no. 4, pp. 61–95, 2024.
- [25] O. Issah, S. Agyei Baah, E. Appiah-Kubi, and H. Kwame Afriyie, "Logistics capabilities, supply chain performance and SMEs sustainability: The moderating effect of digital technology," *Afr. J. Procure. Logist. Supply Chain Manag.*, vol. 8, no. 1, pp. 89–107, 2025.
- [26] J. Mikl, D. M. Herold, M. Ćwiklicki, and S. Kummer, "The impact of digital logistics start-ups on incumbent firms: A business model perspective," *Int. J. Logist. Manag.*, vol. 32, no. 4, pp. 1461–1480, 2020.
- [27] J. Eduardo and M. Aguayo, "Quantifying the impact of low-cost digitalisation on the economic performance of logistics SMEs," Jul. 2025.
- [28] M. Saunders, P. Lewis, and A. Thornhill, *Research Methods for Business Students*, 7th ed. Harlow, U.K.: Pearson, 2015.
- [29] J. Mwendapole, "Jafo wants designated industrial zones countrywide," *The Guardian*, Jul. 13, 2024. [Online]. Available: <https://ippmedia.com/the-guardian/business/read/jafo-wants-designated-industrial-zones-countrywide-2024-07-13-102547>
- [30] A. Oluwakoya, "Investigating the role of digital platforms in improving freight logistics and supply chain management in West Africa," *ASRIC J. Soc. Sci. Humanit.*, vol. 4, no. 2, 2023.
- [31] G. Chengula, "Drivers for digital transformation by manufacturing small and medium enterprises (SMEs) in Tanzania for sustainable supply chains," *Ghana J. Geogr.*, vol. 17, no. 3, 2025.
- [32] T. Yamane, *Statistics: An Introductory Analysis*, 2nd ed. New York, NY, USA: Harper & Row, 1967.
- [33] T. Teo, "Factors influencing teachers' intention to use technology: Model development and test," *Comput. Educ.*, vol. 57, no. 4, pp. 2432–2440, 2011.
- [34] T. Matari and E. Temba, "Harnessing performance through digital technology adoption: An empirical analysis of SMEs in the Tanzanian fruit juice processing industry," *Cogent Bus. Manag.*, 2025.