JOURNAL OF BUSINESS MANAGEMENT & INNOVATION
www.jbmij.org
JBMI Insight

Effect of Supply Chain Technology Integration On Performance of Non-Governmental Organizations in Western Region, Kenya

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Publication Date: January 2026

Abstract

The aim of this research was to explore the effect of Supply Chain Technology integration on performance of Non-Governmental Organizations in Western region in Kenya. This study objective was to determine the effect of Supply Chain Technology integration on performance of Non-Governmental Organizations. The study employed positivism research paradigm and an explanatory research design to determine the cause-and-effect relationships between the study variables. The target population of this study comprised of 25 non-governmental organizations located in western region. Within these organizations, 375 staff with a sample size of 194 respondents was selected using Yamane's Formulae from different departments such procurement, logistics, finance, public relations and warehousing. The study also targeted 12 beneficiaries who included both male and female. Stratified and simple random sampling technique was employed to select the staff within the NGOs and beneficiaries were selected using purposive sampling. Primary data was collected by using the questionnaire as the main research instrument while the information from the beneficiaries was collected using Focus Group Discussion. Cronbach alpha (α) of 0.7 and above was employed to test the instruments' reliability. Face validity was applied to determine if the instrument would measure what it is supposed to measure. Quantitative data was analyzed by employing descriptive statistics such as means, standard deviations, frequencies and percentages. The data was also analyzed using ANOVA, Regression and correlation analysis. The qualitative data obtained from the Focused Group Discussion with selected beneficiaries was analyzed using thematic analysis and was presented in narrative form. The finding was Technology integration ($\beta = 0.474$, $p = 0.000$) had a positive and had a significant effect on performance of NGOs in Western region. The hypothesis tested was rejected since the p value for the variable was <0.05. The study concluded that Supply Chain Technology integration is key driver of performance among NGOs in western Kenya. The study recommends that NGOs should strengthen their Supply Chain Technology Integration.

Keywords: *Supply Chain Technology Integration, Performance*

Background of The Study

In Kenya, Non-Governmental Organizations (NGOs) play a crucial role in addressing social and economic challenges in various regions (Odira, 2021). Therefore, the efficiency of their operations is vital for the successful implementation of projects and the achievement of their objectives. In order to achieve this, most of the NGOs have implemented some of the SCI and its practices such as information sharing, collaboration, operational integration through coordination and stakeholder integration in order to achieve optimal performance. This is supported by Musyoki and Ngugi (2017) who revealed that supply chain management practices, such as information sharing, collaboration, and integration of stakeholders, have a positive impact on the procurement performance of NGOs in Kenya. NGOs like Save the Children has used SCI to improve the delivery of humanitarian aid to refugees. By working closely with suppliers and other stakeholders, Save the Children has been able to reduce the time it takes to deliver aid to refugees by 50% (Save the children Kenya, 2022). This is also supported by Musyoki and Ngugi (2017) who indicated that supply chain management practices, such as information sharing, collaboration, and integration of stakeholders, have a positive impact on the procurement performance of NGOs in Kenya. Nyile, Shale and Osoro (2021) established that some NGOs in Kenya such as the Humanitarian aids organizations have integrated its supply chain by leveraging technology to track the distribution of aid materials. This could result in more efficient delivery to remote areas, positively impacting project timelines and beneficiary satisfaction. They concluded that supply chain integration was positively associated with performance of humanitarian aid organizations.

Statement of the Problem

Non-Governmental Organizations (NGOs) play a pivotal role in addressing socio-economic challenges in the Western region of Kenya. These organizations rely on effective supply chain systems to deliver essential services such as healthcare, education, and disaster relief. However, many NGOs in the region face persistent challenges in managing their supply chains, leading to inefficiencies, increased costs, and delays in service delivery (Odira, 2021). These issues hinder their ability to achieve organizational goals and satisfy the needs of beneficiaries. A report by the NGO Coordination Board of Kenya (2021) revealed that 70% of NGOs in Kenya experience significant supply chain challenges, including poor coordination, inadequate information sharing, and inefficiencies in procurement and logistics. Despite this, NGOs in the Western region struggle with fragmented supply chains due to limited technological integration, weak stakeholder collaboration, and poor information sharing practices (Apaa, 2022).

Objective

To determine the effect of Supply Chain Technology Integration on performance of Non-Governmental Organizations in Western region, Kenya.

Hypothesis

H_o1: Supply Chain Technology integration has no significant effect on performance of Non-Governmental Organizations in Western region, Kenya.

Literature Review

Zhao and Lee (2021) investigated the impact of technology integration on organizational performance: evidence from global NGOs. A quantitative approach was used, analyzing survey

data from 150 global NGOs. Structural equation modeling (SEM) was employed to examine the effects of technology integration on performance outcomes. The research demonstrated that technology integration particularly in project management and communication led to enhanced performance metrics, including increased donor engagement, improved program outcomes, and greater accountability. The study emphasized the role of data analytics in decision-making processes.

Nguyen and Tran (2022) studied the role of information technology in enhancing performance in social enterprises and NGOs. This qualitative study utilized case studies of five social enterprises and NGOs across Southeast Asia. Data were collected through interviews and focus groups, followed by thematic analysis. The findings indicated that technology integration improved stakeholder engagement and operational transparency. Social enterprises that effectively utilized technology reported higher levels of community impact and resource mobilization, showcasing the transformative potential of digital tools in driving performance. Chen and Wu (2024) explored on integrating Technology into NGO Operations: Effects on Organizational Effectiveness. A mixed-methods approach was employed, combining quantitative surveys of 120 NGOs with qualitative interviews of key stakeholders. Data were analyzed using both statistical methods and thematic analysis. The results indicated that technology integration through digital tools for project management, communication, and fundraising led to improved organizational effectiveness. NGOs reported enhanced collaboration with stakeholders, increased transparency, and better resource allocation. The study highlighted the necessity of training and capacity building for effective technology use.

Kumar and Singh (2023) conducted a study on technology Adoption and Performance in Non-Governmental Organizations: Insights from India. A cross-sectional survey targeting 100 NGOs was conducted in India, using structured questionnaires to gather data on technology use and performance outcomes. Data analysis included descriptive statistics and multiple regression analysis. The study found that technology adoption, particularly in fundraising and program monitoring, was positively correlated with organizational performance. NGOs that adopted cloud-based solutions and mobile applications reported increased efficiency in operations and better engagement with beneficiaries.

Omondi and Muli (2020) study on technology integration and its impact on performance in Non-Governmental Organizations in Kenya. This study used a descriptive survey design, targeting 80 NGOs in Kenya. Data were collected through structured questionnaires, and regression analysis was employed to assess the relationship between technology integration and organizational performance. The study found that integrating technology in operations such as using management information systems and communication tools significantly improved operational efficiency and service delivery in NGOs. Enhanced data management and reporting capabilities were noted as key benefits of technology adoption.

The study narrowed down to technology integration because existing studies on technology integration often focus on large NGOs or urban contexts, with little attention paid to smaller or rural-based NGOs. Additionally, many studies examine technology adoption in terms of donor-driven requirements rather than as a strategic tool for improving efficiency and outreach. There is no robust research on how leveraging technology can enhance performance metrics like service delivery, monitoring and evaluation, and stakeholder engagement. This objective fills a crucial

knowledge gap by exploring how technology integration can address operational inefficiencies and improve outcomes for NGOs in this specific context.

Methodology

Research Design

This study adopted an explanatory research design to examine the cause-and-effect relationship between supply chain integration and the performance of non-governmental organizations in the Western region of Kenya. The design was appropriate because it enables the researcher to test hypotheses and determine the cause-and-effect relationship as well as influence of various dimensions of supply chain integration on NGO performance using statistical analysis. This approach aligned with the study's objective of establishing clear linkages between the independent and dependent variables.

Target Population

The target population of this study comprised of 25 non-governmental organizations located in western region. Within these organizations, 375 staff with a sample size of 194 respondents was selected using Yamane's Formulae from different departments such procurement, logistics, finance, public relations and warehousing. The study also targeted 12 beneficiaries who included both male and female.

Sample Size and Sampling Frame

Stratified and simple random sampling technique was employed to select the staff within the NGOs and beneficiaries were selected using purposive sampling

Research Instruments

Primary quantitative data was collected using structured questionnaires administered to selected NGO employees. Focused Group Discussion was used to get qualitative data from the beneficiaries.

Data Analysis

Quantitative data was analyzed by employing descriptive statistics such as means, standard deviations, frequencies and percentages. The data was also analyzed using ANOVA, Regression and correlation analysis by using statistical package for social science (SPSS) Version 26.0. The data was then presented using frequency distribution tables for easier understanding. The qualitative data obtained from the Focused Group Discussion with selected beneficiaries was analyzed using thematic analysis and was presented in narrative form.

Findings and Discussions

Descriptive Statistics

According to the information shown in table 1, these are descriptive data that are intended to assess the degree to which technology integration affects NGOs' performance.

Table 1: Descriptive Statistics: Supply Chain Technology Integration

N=140; 5- strongly Agree, 4 is Agree, 3 is fairly agree 2 is Disagree and 1 is strongly disagree

No.	Technology Integration		SA	A	N	D	SD
1.	The use of data analytics tools has significantly enhanced the efficiency of NGO operations.	Freq	23	65	28	24	0
		%	16.4	46.4	20.0	17.1	0.0
2.	The technology adoption rate has increased and has improved communication within the organization and with key stakeholders	Freq	48	38	1	29	24
		%	34.3	27.1	0.7	20.7	17.1
3.	Digital tools facilitate better project management in NGOs.	Freq	17	66	5	34	18
		%	12.1	47.1	3.6	24.3	12.9
4.	Training staff on technology use has a positive effect on our NGO performance.	Freq	74	15	0	36	15
		%	52.9	10.7	0.0	25.7	10.7
5.	Technology through internet plays a crucial role in enhancing the service delivery of NGOs.	Freq	7	54	36	39	4
		%	5.0	38.6	25.7	27.9	2.9
6.	Our NGO has a clear plan for ongoing technology development and maintenance.	Freq	49	17	51	0	23
		%	35.0	12.1	36.4	0.0	16.4
7.	Our NGO has effectively integrated technology through mobile applications into our operations.	Freq	3	17	63	36	21
		%	2.1	12.1	45.0	25.7	15.0
	Overall Mean						

Source: Field Data (2025)

Among the participants in the survey, 16.4% strongly agreed and 46.4% agreed that the use of data analytics tools has significantly enhanced the efficiency of NGO operations. Conversely, 20.0% were neutral, while 17.1% disagreed and none strongly disagreed. This reveals that a majority of respondents viewed data analytics positively.

On whether the increased technology adoption rate has improved communication within the organization and with key stakeholders, 34.3% strongly agreed and 27.1% agreed, but a notable 20.7% disagreed and 17.1% strongly disagreed, with only 0.7% remaining neutral. This means that although many see positive impacts on communication, experiences vary widely across respondents.

In relation to whether digital tools facilitate better project management, 12.1% strongly agreed and 47.1% agreed, while 3.6% were neutral, 24.3% disagreed, and 12.9% strongly disagreed. Asked if training staff on technology use positively affects NGO performance, more than half of

respondents (52.9%) strongly agreed, with another 10.7% agreeing, indicating strong endorsement. However, 25.7% disagreed and 10.7% strongly disagreed.

Regarding whether technology through the internet plays a crucial role in enhancing NGO service delivery, 5.0% strongly agreed and 38.6% agreed, whereas 25.7% were neutral, 27.9% disagreed, and 2.9% strongly disagreed showing a moderate spread in views.

On whether the NGO has a clear plan for ongoing technology development and maintenance, 35.0% strongly agreed and 12.1% agreed, while 36.4% were neutral and 16.4% strongly disagreed, reflecting general approval but with notable uncertainty or disagreement among some.

Finally, concerning whether the NGO has effectively integrated technology through mobile applications into its operations, only 2.1% strongly agreed and 12.1% agreed, while 45.0% remained neutral, 25.7% disagreed, and 15.0% strongly disagreed. This indicates that most respondents were sure or felt integration through mobile applications was benefiting them.

These findings show that staff in NGOs across Western Kenya generally perceive technology integration as moderately positive for enhancing organizational performance. Areas such as training staff on technology and use of data analytics tools as well as use of mobile phones received the strongest support, suggesting these have been the most impactful or visible.

These results align with broader literature Zhao and Lee (2021) investigated the impact of technology integration on organizational performance: evidence from global NGOs. The research demonstrated that technology integration particularly in project management and communication led to enhanced performance metrics, including increased donor engagement, improved program outcomes, and greater accountability. The study emphasized the role of data analytics in decision-making processes. However, the findings here also suggest that while Western Kenya NGOs have made notable strides, particularly in staff capacity building and leveraging data analytics, more consistent integration especially around mobile platforms and clear communication strategies is needed to fully optimize performance in terms of service delivery.

Qualitative Analysis: Supply Chain Technology integration and Performance of NGOs in Western Region in Kenya

Among the 12 beneficiaries who participated in the FGD, a strong majority approximately 75% (9 out of 12) reported that they had seen or used digital tools introduced by NGOs. These included mobile phones for follow-up calls, SMS alerts to inform them about upcoming activities, and digital registration systems during outreach. As one male beneficiary from Bungoma shared:

"They sometimes use tablets when registering us, and I also get SMS telling me when to come collect items."

However, 25% (3 out of 12) said they had not personally used or noticed any digital tools, explaining that most of their interactions with NGOs were still manual. A woman from Kakamega noted:

"For me, they always write on paper, I have never been told to use a phone or anything digital."

When asked if these digital tools help improve how services are delivered, about 67% (8 out of 12) said yes, emphasizing that SMS reminders and quick data capturing reduced the time spent queuing and minimized errors. As one young man put it:

"Before they started using the phone messages, we would wait long not knowing if the services are there. Now it's faster." Meanwhile, 33% (4 out of 12) were more cautious, saying that while technology seemed to help the NGOs, the benefits to them as beneficiaries were not always clear. A participant commented:

"Sometimes they still delay even with their gadgets, so I can't say it has made a big difference to us."

A majority about 58% (7 out of 12) reported having faced challenges related to technology, such as poor network connectivity, difficulties understanding the devices, or lack of training on what was expected of them. One female participant explained:

"They told us to wait for SMS but the network here is bad, so we ended up missing our turn."

The remaining 42% (5 out of 12) said they had not faced any major problems, largely because the NGO staff handled most of the technical work themselves. As a male beneficiary shared:

"I don't have problems since they are the ones who use the gadgets, they just call out my name when it's my turn."

Finally, when asked for suggestions, about 50% (6 out of 12) recommended that NGOs should provide clear demonstrations or simple training on how to use mobile-based systems, especially for older people. A woman remarked: *"They should show us practically how to check messages or reply, so we don't miss out."*

Meanwhile, 33% (4 out of 12) suggested that NGOs should invest in stronger systems that work even in areas with poor network, or look into offline tools. The remaining 17% (2 out of 12) proposed that NGOs should explore mobile apps that could let them track assistance they have received, though they admitted many in their community might still need help learning how to use such apps. The discussions reveal that technology integration is increasingly visible in NGO operations, with tools like mobile registrations and SMS alerts improving service reach and efficiency. However, gaps in network coverage, direct user training, and community-friendly applications show there is still work to be done to make technology a uniformly reliable part of NGO supply chain and service delivery. This aligns with the broader conclusions of similar studies such as Yusuf and Abubakar (2021), who found that while digital tools significantly improve operational efficiency in NGOs, their impact depends heavily on user capacity and supportive infrastructure. For your study, these insights underline why staff training, community sensitization, and investments in adaptable technology are key to enhancing both supply chain integration and overall NGO performance.

Inferential Statistics

Effect of Supply Chain Technology Integration on Performance of NGOs in Western Region in Kenya

To ascertain the effect of technology integration on performance of NGOs, a regression analysis was conducted. Findings are shown in the subsequent tables.

Table 2: Supply Chain Technology Integration and Performance of NGOs

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.474[a]	.225	.219	.76702	.225	40.082	1	138	.000
a. Predictors: (Constant), Technology Integration									

Source: Field Data (2025)

The study established the link between technology integration and performance of NGOs in Western Region, Kenya is shown by the R value of 0.474 in the model summary tabulation. As a consequence, a rise in technology integration should lead to improved outcomes. The R square, or coefficient of determination, demonstrates that technology integration accounts for 22.5% of the variance in performances (R^2=0.225). This suggests that technology integration had a major bearing on the results achieved. These findings align with previous research that has consistently underscored the positive impact of technology adoption on organizational performance. According to Nguyen and Tran (2022), integration of digital tools in social enterprises significantly improved stakeholder engagement, operational efficiency, and accountability. NGOs that adopted information technology solutions such as data management systems, communication platforms, and digital financial reporting tools were found to perform better in areas such as transparency, resource mobilization, and service delivery. This reinforces the present study's findings that technology serves as an enabler of efficiency and strategic alignment in NGOs.

Table 3: ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.581	1	23.581	40.082	.000[b]
	Residual	81.188	138	.588		
	Total	104.769	139			
a. Dependent Variable: Performance of NGOs						
b. Predictors: (Constant), Technology Integration						

Source: Field Data (2025)

The F test indicates that the model is an excellent fit for describing the variance in the dependent variable, with a value of F = 40.082, P<0.05. In addition, this demonstrates that technology integration is a reliable indicator of performance of NGOs. In a related study, the findings are in agreement with Zafar and Naveed (2020) demonstrated that the adoption of Management Information Systems (MIS) and other digital platforms facilitated better planning, monitoring, and evaluation processes among humanitarian organizations. These systems helped reduce operational delays, improved data accuracy, and enabled better reporting to donors, thereby enhancing organizational credibility and access to funding. The current study mirrors these outcomes, indicating that NGOs in Western Kenya that integrate technology into their operations can experience improved performance across multiple domains.

Table 4: Coefficient

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.143	.373		3.065	.003
	Technology Integration	.643	.102	.474	6.331	.000

a. Dependent Variable: Performance of NGOs

Source: Field Data (2025)

As from Table 4 at a significance level of 0.00<0.05, the unstandardized regression coefficient (β) for technology integration was 0.643. Brown and Grant (2021) argued that digital transformation in non-profit organizations contributes to improved collaboration among stakeholders, more effective program delivery, and enhanced beneficiary tracking. The current findings are in harmony with this argument, as they suggest that improved technological capacity empowers NGOs to serve their communities more efficiently, maintain better relationships with stakeholders, and ensure sustainable impacts. This suggested that a shift of one unit in technology integration would shift performance. Results in NGOs as a consequence of technology integration were estimated using the following regression equation:

$Y = 1.143+0.643X_4$

According to the findings, it is clear that technology integration has a major beneficial impact on performance of NGOs. This suggests that NGOs that have stronger technology integration achieved higher levels of performance. This agrees with Nguyen and Tran (2022) studied the role of information technology in enhancing performance in social enterprises and NGOs. The findings indicated that technology integration improved stakeholder engagement and operational transparency. Social enterprises that effectively utilized technology reported higher levels of community impact and resource mobilization, showcasing the transformative potential of digital tools in driving performance. Moreover, Kariuki and Maina (2023), in their Kenyan context, examined ICT adoption in local NGOs and found that limited integration of technology often leads to inefficiencies and poor communication flows. They emphasized the need for capacity building and investment in digital infrastructure, especially in regions like Western Kenya. The present study provides empirical backing for this view by showing that performance improves significantly with increased technology adoption.

Summary, Conclusion and Recommendation

Summary

The study assessed the effect of supply chain technology integration on performance of non-governmental organizations in Western Region, Kenya. The statistical analysis revealed a significant effect of supply Chain technology integration on performance of NGOs. This showed that technology integration significantly enhanced performance ($\beta = 0.501$; $p = 0.000$).

Conclusion

Given that supply chain technology integration was a significant predictor of performance of NGOs, it was clear that technology integration had a major beneficial effect on performance of non-governmental organizations. This suggests that non-governmental organizations that had integrated technology have achieved higher levels of performance.

Recommendations

To enhance service delivery, efficiency and outreach, NGOs are encouraged to invest in digital tools such as mobile platforms for service delivery, cloud-based data systems, GIS for project mapping, and online monitoring. Additionally, staff and beneficiaries should be trained on digital literacy to ensure effective utilization of technology.

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