https://doi.org/10.56279/orseaj.special.23

Examining the Determinants for Public Sector Service Delivery Network Optimisation Towards Accelerated Economic Transformation in Zambia

Austin Mwange[1], Bupe Getrude Mutono-Mwanza[2], and Lubinda Haabazoka[3]

Abstract

This study examined the determinants of public sector service delivery network optimisation for accelerated socio-economic transformation in Zambia. A quantitative cross-sectional descriptive survey design was used, with structured questionnaire data collected from 273 public sector officers in government ministries, local authorities and state-owned entities in Lusaka Province. Data were analysed using descriptive statistics, reliability testing, bivariate correlation and forward stepwise regression. The final regression model explained 77.9% of the variance in public sector service delivery network performance ($R^2 = 0.779$) and was statistically significant, $F(5, 267) = 187.80$, $p < .001$. Communication and data sharing quality was the strongest determinant ($\beta = 0.407$, $p < .001$), followed by mutual trust ($\beta = 0.282$, $p < .001$), network governance ($\beta = 0.226$, $p < .001$), digital maturity ($\beta = 0.180$, $p < .001$) and resource allocation efficiency ($\beta = 0.141$, $p < .001$). The study concludes that optimisation requires simultaneous improvement of relational, governance, technological and resource-management capabilities.

Keywords: Inter-organisational collaboration, Public sector service delivery networks, Network governance, Digital maturity, Resource allocation efficiency

Introduction and Background

Public sector service delivery networks, also understood as forms of inter-organisational collaboration, have gained prominence in developing economies as a means of improving the efficiency of public service delivery. Generally, public sector service delivery networks are understood as multi-sector partnerships involving public agencies and, in some cases, private and civic actors collaborating to deliver services that no single organisation can provide efficiently in isolation (Haidar & Bartel-Radic, 2017). Inter-organisational collaboration has therefore become a basis for the effective functioning of contemporary public sector organisations, particularly where service delivery problems cut across administrative boundaries, functional departments and levels of government (Kożuch & Sienkiewicz-Małyjurek, 2016a).

In developing economies such as Zambia, public sector service delivery networks, including arrangements supported by the Public-Private Partnership Act No. 14 of 2009, have been promoted as a means of enhancing the efficiency of public service delivery (Mbaka & Mwange, 2024; Muleya et al., 2020; Republic of Zambia, 2009, 2023). In Zambia, the concept of public sector service delivery networks has gained support as a strategy to enhance public service delivery. For the past two decades, inefficiencies in public service delivery have remained a concern that threatens the socio-economic transformation agenda articulated in the Eighth National Development Plan, 2022–2026 (Republic of Zambia, 2022).

[1] University of Zambia

Email: austin.mwange@unza.ac.zm

[2] University of Zambia

[3] University of Zambia

Fragmented service delivery is important because the Zambian state operates amid rising citizen expectations, limited fiscal space, uneven digital capacity and decentralisation reforms. Citizens expect services to be accessible, timely, coordinated and transparent, yet institutions often operate through separate mandates, parallel systems and weak information sharing. This fragmentation causes duplication, delays, inconsistent standards and inefficient use of public resources. Collaborative service delivery networks are therefore central mechanisms for improving responsiveness, accountability and developmental performance.

There have been several efforts to promote public sector service delivery networks in Zambia. For instance, the Government of Zambia launched the Government Wide Area Network, the National Decentralisation Policy of 2023 and the National e-Government Plan, all of which support public service delivery through inter-organisational networks (Smart Zambia Institute, 2023). Precisely, the National Decentralisation Policy emphasises networking, knowledge and information sharing to enhance public service delivery across Zambia (Republic of Zambia, 2023). The policy logic is that service delivery can improve when institutions coordinate their mandates, share data and resources, and jointly solve public problems rather than acting as disconnected units.

Despite these interventions, many public services in Zambia remain delivered through institutional silos, reducing efficiency and threatening socio-economic transformation (Zawe, 2021). Empirical evidence on how to address this challenge in Zambia remains limited. Public sector delivery continues to be affected by weak coordination among agencies, while existing theoretical and empirical literature provides limited Zambia-specific evidence on critical success factors for effective inter-organisational collaboration.

Most empirical studies on public sector networks have been undertaken in developed economies with stronger institutional capacity, fiscal space and digital infrastructure (Franco et al., 2024; Haidar & Bartel-Radic, 2017; Kożuch & Sienkiewicz-Małyjurek, 2016a, 2016b; Vangen et al., 2015). African studies remain fewer and often focus on specific service areas (Sy & Abubakar, 2024), while Zambian research has concentrated on public-private partnerships or communication gaps within particular institutions (Mbaka & Mwange, 2024; Muleya et al., 2020; Zawe, 2021). Quantitative evidence on the strongest determinants of network optimisation in Zambia is therefore still limited.

The need for this study therefore arises from the practical and theoretical problem that Zambia requires coordinated public service delivery networks to accelerate socio-economic transformation, but decision-makers lack empirical evidence on the relative influence of the main critical success factors. Specifically, the study examines communication and data sharing quality, mutual trust, network governance, digital maturity and resource allocation efficiency as determinants of public sector service delivery network optimisation. These factors were selected because they recur in the literature as central enablers of network effectiveness and because they reflect the practical constraints facing public institutions in Zambia.

The general objective of the study was to examine the determinants for optimisation of public sector service delivery networks towards accelerated socio-economic transformation in Zambia. The specific objectives were to determine the influence of communication and data sharing quality, mutual trust, network governance, digital maturity and resource allocation efficiency on the performance of public sector service delivery networks. The study was guided by the broad proposition that critical success factors positively influence public sector service delivery

network optimisation. The rest of the study is structured as follows: literature review followed by methodology, findings and discussion, conclusions and recommendations and lastly limitations and areas for future study.

Theoretical framework

The research is based on the theoretical lens of the theory of inter-organisational collaboration and network effectiveness (TICNE) first developed by Provan and Milward (1995) and further modified by Akbulut-Gok (2022). This theory was developed based on various theories such as resource dependence theory, stakeholder theory, institutional theory and network theory (Akbulut-Gok, 2020). According to Akbulut-Gok (2022), TICNE attempts to explain how and why institutions collaborate across institutional boundaries and the factors that make such collaborative networks work towards achieving a common goal such as service delivery.

The theory states that organisations from different sectors collaborate to achieve outcomes that may be difficult or inefficient to achieve in silos. From the theory, network effectiveness depends on the structure of the network itself, network governance, communication and trust towards outcomes such as efficiency, stakeholder satisfaction and service quality (Akbulut-Gok, 2022). The theory helped in the deduction of key variables of the study, namely trust, communication and information sharing quality, network governance and resource allocation efficiency.

TICNE is relevant to Zambia because ministries, local authorities, parastatals and statutory bodies depend on information, mandates, expertise and resources held by other organisations. Resource dependence theory explains why agencies form networks; institutional theory explains the influence of rules, norms and legitimacy pressures; stakeholder theory highlights the need to satisfy citizens, public officers, political principals and partners; and network theory explains how relationships, coordination and communication flows affect performance. Together, these perspectives support analysis of how critical success factors affect network optimisation.

The theory also clarifies that public sector network effectiveness is not simply an outcome of having many institutions involved. A network can be large but ineffective where agencies distrust each other, withhold information, lack shared governance rules or fail to allocate resources efficiently. Conversely, a smaller network can be effective where members have clear coordination structures, reliable digital systems, agreed responsibilities and a shared commitment to service outcomes. TICNE therefore supports the empirical expectation that network optimisation is affected by the quality of communication, the level of trust, the strength of governance arrangements, the maturity of digital systems and the efficiency with which resources are jointly used.

However, TICNE does not specify which critical success factor is most important in every context. It may also assume that collaboration is desirable, even though poorly managed collaboration can create transaction costs, authority conflicts and delays. In developing economies, weak institutional capacity and resource constraints may further limit outcomes. The study therefore tests the relative influence of selected factors in the Zambian public sector using regression analysis.

Critical success factors for optimisation of public sector service delivery networks

Existing empirical research identifies several critical success factors for optimisation of public sector service delivery networks. According to Haidar and Bartel-Radic (2017), effectiveness of inter-organisational collaborations largely relies on trust, information sharing and effective communication. Similarly, Nezami et al. (2023) argued that resource and knowledge sharing and

effective communication are key success factors for inter-organisational collaborations, whilst the presence of conflicting interests and poor communication hamper such collaborations. Franco et al. (2024) also recognise open communication and knowledge sharing as key factors contributing to effective inter-organisational collaborations.

Communication and data sharing quality constitute a central determinant because collaboration requires the exchange of accurate, timely and relevant information. In public service delivery networks, institutions must share data on citizens, programmes, resources, plans, service standards and implementation progress. Poor information exchange results in duplication, inconsistent decisions and delayed responses. The collaborative governance literature similarly emphasises that repeated communication, transparent information flows and shared understanding are necessary for collective action (Ansell & Gash, 2008; Emerson et al., 2012). In Zambia, where many institutions historically relied on paper-based or institution-specific systems, the quality of communication and data sharing becomes a practical condition for network performance rather than a peripheral administrative issue.

According to Kożuch and Sienkiewicz-Małyjurek (2016b), trust and open communication are driving factors for effective inter-organisational collaboration in the context of public safety management. Kożuch and Sienkiewicz-Małyjurek (2016a) also reported that factors that effectively drive inter-organisational collaboration in the public sector include trust, knowledge sharing and effective communication. From the empirical study by Sy and Abubakar (2024), critical success factors for effective inter-organisational collaboration towards public service delivery include open communication, mutual trust, information sharing, risk sharing and resource allocation efficiency.

Mutual trust is important because public sector networks often require agencies to depend on one another without complete hierarchical control. Trust reduces the perceived risk of sharing information, pooling resources and coordinating decisions. It also lowers transaction costs because actors do not have to spend excessive time monitoring the behaviour of partners. In collaborative public management, trust is closely associated with commitment, reciprocity and willingness to engage in joint problem-solving (Bryson et al., 2015; O'Leary & Vij, 2012). In Zambia, where public institutions may have different mandates, reporting structures and performance incentives, mutual trust can encourage agencies to treat network objectives as collective objectives rather than as external obligations.

Network governance is also considered a critical factor as noted by Provan and Kenis (2008). Similarly, Klijn and Koppenjan (2015) reported that network governance determines effectiveness of inter-organisational collaborations in the public sector. According to Vangen et al. (2015), network governance is one of the critical success factors for effective inter-organisational collaboration in the public sector. In support, Martinez (2011) argued that network governance facilitates effective collaboration and resource allocation efficiency for effective public service delivery.

Network governance refers to the rules, structures, decision processes and accountability mechanisms that guide how network members interact. It determines who convenes the network, how priorities are set, how decisions are made, how conflicts are resolved and how members are held accountable. In the absence of clear governance arrangements, networks may become informal forums that generate meetings without implementation. Strong network governance is therefore required to balance flexibility with accountability. In public sector service delivery, this

balance is especially important because public agencies must coordinate while remaining accountable to legal mandates, budget rules and citizens.

Digital infrastructure and innovations have also been found as critical factors for inter-organisational collaborations in the public sector. Nõmmik (2024) observed that robust digital infrastructure enhances inter-organisational collaboration as seen in the case of the Estonian public sector. In the same view, Schöggl et al. (2024) found that digital innovations play important roles in enhancing inter-organisational collaboration. Digital maturity is more than the possession of computers or internet access. It includes the degree to which digital platforms, data systems, workflows, skills and management practices are integrated into service delivery processes. Digital maturity improves network performance by reducing information asymmetry, enabling real-time data sharing, supporting monitoring and strengthening transparency (Mergel et al., 2019).

In a nutshell, there are several critical success factors for the optimisation of public sector service delivery networks, yet significant knowledge gaps remain regarding their relative influence in Zambia. The widely cited critical success factors are open communication, digital maturity or transformation, network governance, resource allocation efficiency and trust. Hence, these factors are empirically examined in this research. The study focused on the most frequently cited factors in extant literature such that the influence of other factors was beyond the scope of this research and is recognised as a key limitation of the study.

Resource allocation efficiency is another important critical success factor. Collaboration can fail when resources are duplicated in some institutions while other institutions lack essential capacity. Efficient resource allocation refers to the ability of a network to deploy financial, human, technological and informational resources where they are most needed to achieve service outcomes. This is particularly important in developing economies where fiscal space is constrained and where public sector organisations must do more with limited resources. Resource allocation efficiency also reflects the ability of a network to align budgets, staff, facilities and information systems with shared priorities rather than institutional silos (Guo et al., 2023; Sy & Abubakar, 2024).

The literature therefore suggests that service delivery network optimisation is a multi-dimensional phenomenon. Communication and data sharing quality address the informational dimension of collaboration. Mutual trust addresses the relational dimension. Network governance addresses the institutional and accountability dimension. Digital maturity addresses the technological dimension. Resource allocation efficiency addresses the operational and economic dimension. Considering these dimensions together makes it possible to move beyond a narrow view of collaboration as simply bringing institutions together. Instead, the study treats collaboration as a managed network process requiring mutually reinforcing capabilities.

Hypotheses development

In order to strengthen the link between the literature review and the empirical analysis, the study tested the following sub-hypotheses for each critical success factor. These hypotheses are derived from TICNE and from the empirical literature reviewed above.

H1: Communication and data sharing quality has a positive and statistically significant influence on public sector service delivery network optimisation in Zambia.

H2: Mutual trust has a positive and statistically significant influence on public sector service delivery network optimisation in Zambia.

H3: Network governance has a positive and statistically significant influence on public sector service delivery network optimisation in Zambia.

H4: Digital maturity has a positive and statistically significant influence on public sector service delivery network optimisation in Zambia.

H5: Resource allocation efficiency has a positive and statistically significant influence on public sector service delivery network optimisation in Zambia.

The overall hypothesis is that the five critical success factors jointly have a positive and statistically significant influence on the optimisation of public sector service delivery networks in Zambia.

Conceptual framework

Figure 1 presents the conceptual framework guiding this research. The framework shows that five independent variables, namely communication and data sharing quality, digital maturity, network governance, resource allocation efficiency and mutual trust, are expected to influence public sector service delivery networks. The arrows indicate the hypothesised positive effects of each critical success factor on the dependent variable. The framework is consistent with TICNE because it combines relational, governance, technological and resource-based conditions that shape network effectiveness. It is also consistent with the empirical literature which identifies communication, trust, governance, digital capability and resource efficiency as recurring determinants of inter-organisational collaboration performance.

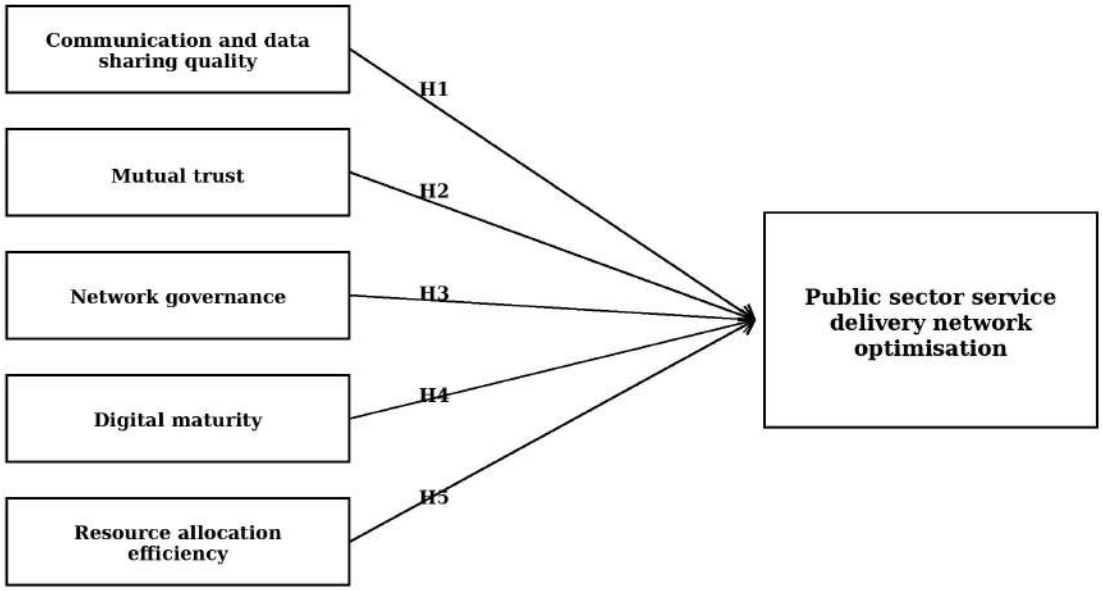


Figure 1: Conceptual framework for the study

Methodology and Approaches

For this research, the quantitative approach was employed utilising the descriptive cross-sectional survey design. The positivist philosophy was adopted. The population for the study included public sector officers or employees from various government agencies including local governments, ministries and parastatals. The quantitative approach was suitable because the

study sought to measure the magnitude and statistical significance of relationships between specified critical success factors and public sector service delivery network optimisation. The cross-sectional design was appropriate because data were collected at one point in time from public sector officers with knowledge of institutional collaboration and service delivery processes.

The sample size was estimated using the conservative proportion formula described by Israel (1992): $n = z^2/(4e^2)$, which is equivalent to assuming a population proportion of .50. In the formula, n is the required sample size, e is the desired margin of sampling error and z is the standard normal value for the selected confidence level. Using a 95% confidence level ($z = 1.96$) and a 5% margin of error, the minimum sample size was estimated at 385 (Hasan & Kumar, 2024).

The stratified random sampling technique was employed. Stratification was necessary because public sector service delivery networks involve different categories of institutions, including ministries, local authorities and state-owned entities. The use of stratification increased the likelihood that the sample captured variation in public sector experience, institutional mandate and exposure to collaborative service delivery. Questionnaires were administered electronically via Google Forms. The research was done upholding all applicable ethical considerations such as informed consent, anonymity, confidentiality and avoidance of harm. Participation was voluntary and respondents were informed that the data would be used for academic purposes only.

The key variables examined in this study were chosen based on theory and empirical literature. They include communication and data sharing quality (CDSQ), network governance (NETGOV), digital maturity (DIGM), mutual trust (TRUST) and resource allocation efficiency (RAE). Public sector service delivery networks (PSSDN) is the dependent variable in this study. Questionnaire items for the variables were developed from the theoretical and empirical literature reviewed in the preceding sections. This approach aligned the indicators with established relational, governance, technological and resource dimensions of inter-organisational collaboration.

All the constructs were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Likert scales were appropriate because the study examined perceptions of public sector officers regarding the extent to which critical success factors are present and influence service delivery networks. Data collected were analysed using descriptive, bivariate correlation and forward stepwise regression analyses. Forward stepwise regression was carried out in order to identify the most significant critical success factors whilst eliminating statistically insignificant ones by observing the t-values, R^2 change and p-values. Normality was assessed using the Shapiro-Wilk test whilst multicollinearity was checked using the variance inflation factor (VIF) method. Overall significance of the regression model was assessed using the ANOVA F-test and goodness-of-fit was checked using R^2. All analyses were conducted using IBM SPSS Statistics, Version 29 (IBM Corp., 2022).

The following regression model was estimated: $PSSDN = \beta0 + \beta1CDSQ + \beta2TRUST + \beta3NETGOV + \beta4DIGM + \beta5RAE + \varepsilon$. In the model, $\beta0$ represents the constant, $\beta1$ to $\beta5$ represent the regression coefficients for the five critical success factors and ε represents the random error term. The model allowed the study to determine both the joint explanatory power of the predictors and the unique contribution of each critical success factor after controlling for the others. The model was therefore suitable for testing the five sub-hypotheses and the overall hypothesis of the study.

Findings and Discussion

Of the 385 questionnaires distributed, 273 were completed and returned, representing a response rate of 70.9%. Table 1 presents the results of the Cronbach's alpha reliability test.

Table 1: Cronbach's alpha reliability results

Construct	N of items	Factor loadings	Cronbach's alpha
PSSDN	5	0.806–0.845	0.883
CDSQ	5	0.869–0.889	0.927
TRUST	4	0.877–0.892	0.909
NETGOV	5	0.862–0.894	0.926
DIGM	4	0.862–0.899	0.908
RAE	4	0.871–0.887	0.904
Overall	27		0.945

Key: PSSDN = Public sector service delivery networks; CDSQ = Communication and data sharing quality; TRUST = Mutual trust; NETGOV = Network governance; DIGM = Digital maturity; RAE = Resource allocation efficiency.

The reliability results show that all construct-level Cronbach's alpha coefficients exceeded .88, while the overall questionnaire achieved an alpha of .945, indicating excellent internal consistency. All reported factor loadings exceeded .80, providing further evidence that the items represented their intended constructs. The strongest reliability coefficient was recorded for communication and data sharing quality ($\alpha = 0.927$), closely followed by network governance ($\alpha = 0.926$), mutual trust ($\alpha = 0.909$), digital maturity ($\alpha = 0.908$), resource allocation efficiency ($\alpha = 0.904$) and public sector service delivery networks ($\alpha = 0.883$). These results indicate that the questionnaire items consistently measured their intended constructs.

Table 2 presents the results of the bivariate correlation analysis. The results showing the descriptive statistics and Pearson correlation coefficients demonstrate significant positive correlations between the CSFs and public sector service delivery networks in Zambia. Communication and data sharing quality showed the strongest correlation with public sector service delivery networks, suggesting its high potential influence on effectiveness of public sector service delivery networks. This was followed by mutual trust, network governance, digital maturity and resource allocation efficiency. The positive correlations provide preliminary support for the hypotheses, although regression analysis was required to determine the unique predictive contribution of each CSF.

Table 2: Descriptive statistics and Pearson correlations

Variable	Mean (SD)	PSSDN	CDSQ	TRUST	NETGOV	DIGM	RAE
PSSDN	3.05 (1.41)	1					
CDSQ	2.99 (1.25)	.730**	1				
TRUST	2.99 (1.26)	.643**	.425**	1			
NETGOV	3.01 (1.26)	.578**	.390**	.348**	1		
DIGM	3.04 (1.28)	.530**	.363**	.292**	.308**	1	
RAE	2.98 (1.24)	.523**	.348**	.401**	.278**	.359**	1

*Note: ** p < .01 (two-tailed). PSSDN = public sector service delivery networks; CDSQ = communication and data sharing quality; TRUST = mutual trust; NETGOV = network governance; DIGM = digital maturity; RAE = resource allocation efficiency.*

Furthermore, VIFs were estimated to check for multicollinearity among the CSFs representing the independent variables. The results shown in Table 3 indicate that all predictors had VIF values below 1.5 and tolerance values above .70, providing no evidence of problematic multicollinearity. This means that the predictors were related but not so highly correlated as to distort the regression estimates. Therefore, the forward stepwise regression analysis could be interpreted with confidence that the coefficients reflected the unique contribution of each predictor rather than multicollinearity problems.

Table 3: Multicollinearity diagnostics

Variable	Tolerance	VIF
CDSQ	0.703	1.42
TRUST	0.719	1.39
NETGOV	0.782	1.28
DIGM	0.784	1.28
RAE	0.754	1.33

Key: CDSQ = Communication and data sharing quality; TRUST = Mutual trust; NETGOV = Network governance; DIGM = Digital maturity; RAE = Resource allocation efficiency.

Furthermore, the test for normality of the regression errors was done using the Shapiro-Wilk test with the results presented in Table 4. The Shapiro-Wilk statistic was .998 (p = .956). Because the result was not statistically significant, there was no evidence that the regression residuals departed from normality. This means that the regression model met an important diagnostic requirement and that the inferential results were suitable for hypothesis testing.

Table 4: Residual normality test results

Test	Kolmogorov-Smirnov Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Unstandardized Residual	.026	273	.200*	.998	273	.956

*Note: * This is a lower bound of the true significance. Lilliefors significance correction applied.*

Table 5 presents the model summary for the forward stepwise regression analysis. The results for the final model of the forward stepwise regression show that five predictors explain about 77.9% of the variance in effectiveness of public sector service delivery networks in Zambia. This indicates strong model fit. In addition, each added CSF significantly improved the model as shown by the steady increase of R^2 from 0.532 to 0.779 and the reduction of the standard errors from 0.965 to 0.669. The Durbin-Watson statistic of 1.940, which is close to 2, suggests absence of serial correlation, further confirming the model's fit and validity.

Table 5: Forward stepwise regression model summary

Model	R	R Square	Adjusted R Square	Std. Error	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.730a	.532	.531	.965	.532	308.533	1	271	< .001	
2	.817b	.668	.665	.815	.135	110.094	1	270	< .001	
3	.853c	.727	.724	.740	.060	58.737	1	269	< .001	

Model	R	R Square	Adjusted R Square	Std. Error	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
4	.874d	.764	.760	.690	.036	41.136	1	268	< .001	
5	.882e	.779	.774	.669	.015	18.045	1	267	< .001	1.940

a. Predictors: (Constant), CDSQ. b. Predictors: (Constant), CDSQ, TRUST. c. Predictors: (Constant), CDSQ, TRUST, NETGOV. d. Predictors: (Constant), CDSQ, TRUST, NETGOV, DIGM. e. Predictors: (Constant), CDSQ, TRUST, NETGOV, DIGM, RAE. Dependent variable: PSSDN.

The stepwise results are substantively meaningful. Communication and data sharing quality alone explained 53.2% of the variance in network optimisation, showing that information exchange is the foundation of network performance. Adding mutual trust increased R^2 to 66.8%, while network governance raised it to 72.7%. Digital maturity increased explanatory power to 76.4%, and resource allocation efficiency raised the final model to 77.9%. The sequence shows that optimisation is cumulative: communication enables connectivity, trust strengthens commitment, governance structures coordination, digital maturity supports integration and resource efficiency improves implementation.

Model 5, which included all five critical success factors, provided the strongest fit, with the highest R^2 and the lowest standard error. Furthermore, the ANOVA F-test results confirmed model fit where the final model reported an F-value of 187.80 ($p < .001$), confirming that the CSFs in combination significantly improve effectiveness and performance of public sector service delivery networks in Zambia. The results of the forward stepwise regression final model are presented in Table 6.

Table 6: Final forward stepwise regression model

Variable	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	-1.113	.146		-7.620	< .001	-1.400	-.825
CDSQ	.460	.039	.407	11.856	< .001	.384	.537
TRUST	.316	.038	.282	8.315	< .001	.242	.391
NETGOV	.254	.036	.226	6.946	< .001	.182	.325
DIGM	.199	.036	.180	5.535	< .001	.128	.270
RAE	.160	.038	.141	4.248	< .001	.086	.235

Note: All coefficients are statistically significant at p < .001. CDSQ = communication and data sharing quality; TRUST = mutual trust; NETGOV = network governance; DIGM = digital maturity; RAE = resource allocation efficiency.

Table 6 shows that all five CSFs have significant positive effects on public sector service delivery network performance. Communication and data sharing quality was the strongest predictor ($B = 0.460$, $\beta = 0.407$, $t = 11.856$, $p < .001$, 95% CI: 0.384–0.537). This confirms TICNE's prediction that network effectiveness depends on communication quality (Akbulut-Gok, 2022), and is consistent with Franco et al. (2024) and Kożuch and Sienkiewicz-Małyjurek (2016b), who identify open communication as a key driver of inter-organisational collaboration. The result also reflects the need to address fragmented information systems in Zambia (Zawe, 2021).

The strong effect of communication and data sharing quality can be explained by the nature of public service delivery. Public institutions cannot coordinate decisions or allocate resources effectively where information is late, inaccurate or inaccessible. In Zambia, public service delivery often involves multiple institutions responsible for planning, finance, implementation, monitoring and citizen engagement. Weak data sharing between these actors may result in slow

responses, duplication of records and limited accountability. Therefore, improving communication and data sharing quality should be viewed as a strategic reform priority. It requires standardised reporting systems, interoperable databases, formal communication protocols and a culture that values information sharing rather than institutional information ownership.

Mutual trust emerged as the second most influential CSF (B = 0.316, β = 0.282, t = 8.315, p < .001, 95% CI: 0.242–0.391). The result indicates that higher trust among agencies strengthens collaboration and service delivery outcomes in Zambia. It supports TICNE's emphasis on trust in network effectiveness (Akbulut-Gok, 2022) and agrees with Kożuch and Sienkiewicz-Małyjurek (2016a) and Sy and Abubakar (2024), who identify mutual trust as a critical success factor for public service collaboration.

The empirical importance of trust implies that technical reforms alone may not optimise service delivery networks. Even when digital systems or formal policies exist, agencies may not share information or resources if they fear blame, loss of authority or misuse of shared data. Trust develops through repeated interaction, fairness, reliability and credible leadership. It can therefore be strengthened through joint planning sessions, shared performance targets, inter-agency learning forums, dispute-resolution mechanisms and recognition of collaborative achievements. In this respect, the study extends the literature by showing that trust is not an abstract relational quality but a measurable predictor of service delivery network performance.

Network governance had a significant positive influence on service delivery network performance (B = 0.254, β = 0.226, t = 6.946, p < .001, 95% CI: 0.182–0.325). This suggests that structured collaboration mechanisms improve accountability, transparency and network performance. The finding aligns with Zambia's decentralisation reforms and supports previous studies identifying network governance as critical for inter-organisational collaboration in public service delivery (Klijn & Koppenjan, 2015; Martinez, 2011; Vangen et al., 2015).

Network governance is particularly important because inter-organisational collaboration can easily become fragmented where roles are not clear. Agencies may attend network meetings but remain uncertain about authority, accountability and responsibility for implementation. The positive coefficient for network governance indicates that service delivery networks improve when governance arrangements provide clarity on objectives, decision rights, reporting lines, performance indicators and conflict management. This finding has practical significance for Zambia’s decentralisation and e-government reforms because policies must be translated into operational governance structures that define how institutions collaborate at national, provincial, district and local levels.

Moreover, digital maturity was found to be a significant CSF with positive significant influence on performance of public sector service delivery networks (B = 0.199, β = 0.180, t = 5.535, p < .001, 95% CI: 0.128–0.270). The results suggest that digital infrastructure and systems can enhance collaboration in public sector service delivery networks in Zambia leading to better public service delivery. These findings reflect the importance of Zambia’s digital transformation and e-government efforts under the Smart Zambia Agenda, which seek to enhance service-delivery efficiency (Liswaniso & Mbale, 2024). The findings are consistent with Nõmmik (2024) and Schöggl et al. (2024), who show that digital innovations can strengthen inter-organisational collaboration.

The effect of digital maturity should be interpreted broadly. Digital maturity includes infrastructure, software systems, data governance, cyber security, digital skills and the organisational willingness to redesign processes around digital tools. The results imply that digital transformation improves public service delivery networks when it enables real-time coordination, reduces manual duplication and creates common platforms for service delivery. However, digital maturity cannot substitute for trust, communication or governance. The stepwise model shows that digital maturity enters after these relational and institutional factors, suggesting that technology works best when it is embedded in a collaborative administrative environment.

Lastly, resource allocation efficiency was found to be a significant CSF for public sector service delivery network performance ($B = 0.160$, $\beta = 0.141$, $t = 4.248$, $p < .001$, 95% CI: 0.086–0.235). According to these results, enhanced resource allocation efficiency can aid in optimising performance of public sector service delivery networks in Zambia. The findings demonstrate the importance of greater efficiency in the allocation and use of limited resources within Zambia's resource-constrained economy. The findings concur with Nezami et al. (2023) and Sy and Abubakar (2024), who argued that resource allocation efficiency and capabilities are key success factors for public sector inter-organisational collaborations.

Although resource allocation efficiency had the smallest standardised coefficient among the five predictors, its effect remained statistically significant. This means that after accounting for communication, trust, governance and digital maturity, the way resources are allocated still matters. The result is important because networks can have strong intentions but weak implementation if budgets, personnel, equipment and information systems are not aligned with shared priorities. In the Zambian context, resource allocation efficiency may require pooled planning, joint budgeting for cross-cutting programmes, shared infrastructure and performance-based allocation of scarce resources. It may also require reducing duplication between agencies and directing resources towards citizen-facing service points.

Taken together, the findings provide support for all five hypotheses. H1 is supported because communication and data sharing quality positively and significantly influenced PSSDN. H2 is supported because mutual trust positively and significantly influenced PSSDN. H3 is supported because network governance positively and significantly influenced PSSDN. H4 is supported because digital maturity positively and significantly influenced PSSDN. H5 is supported because resource allocation efficiency positively and significantly influenced PSSDN. The overall hypothesis is also supported because the final model was statistically significant and explained a high proportion of variance in the dependent variable.

The results also make a broader contribution to the public management literature. First, the study shows that collaborative service delivery in Zambia is empirically measurable and can be explained by identifiable organisational capabilities. Second, the findings confirm that network optimisation is not driven by a single factor. Rather, it depends on the interaction of communication, trust, governance, digital maturity and resource efficiency. Third, the results add African evidence to a literature that has been dominated by studies from developed economies. Fourth, the findings show that digital transformation should be understood as part of a broader network optimisation agenda rather than as a stand-alone reform.

The findings have significant policy implications. The government should strengthen data-sharing rules and institutional communication protocols to reduce fragmentation. It should

promote trust through collaborative leadership, joint training and transparent accountability systems. It should institutionalise network governance structures that clarify roles, decision rights and reporting mechanisms across agencies. It should continue investing in digital infrastructure but ensure that digital systems are interoperable and user-oriented. Finally, resource allocation should be aligned with cross-sector service delivery priorities rather than being confined to isolated institutional budgets.

Conclusions and Recommendations

The research has demonstrated a critical success factor model for enhanced performance of public sector service delivery networks in Zambia. According to the study, communication and data sharing quality, mutual trust, governance structures, digital maturity and resource allocation efficiency capabilities represent foundational CSFs or enablers of public sector service delivery networks in Zambia. These CSFs jointly contribute to optimised performance of public sector service delivery networks which lead to effective and efficient public service delivery and ultimately accelerate the socio-economic transformation agenda.

The study concludes that public sector service delivery network optimisation in Zambia is primarily a communication and coordination challenge, but it is also a relational, governance, technological and resource-management challenge. The final regression model was strong, explaining 77.9% of the variance in public sector service delivery network performance. The F-value of 187.80 ($p < .001$) confirmed that the model was statistically significant. These results demonstrate that the identified CSFs are not merely desirable administrative practices; they are empirically significant determinants of network performance. This makes the study important for evidence-based public sector reform.

The most important conclusion is that communication and data sharing quality is the strongest determinant of PSSDN optimisation. Public sector institutions must therefore prioritise accurate, timely and accessible information exchange. In practical terms, this requires harmonised reporting templates, interoperable digital records, clear information-sharing mandates and regular coordination mechanisms. Ministries, local authorities and state-owned entities should not treat information as an internal organisational asset only. Instead, information should be treated as a public management resource that supports integrated service delivery.

The second conclusion is that mutual trust is critical for network optimisation. Public sector collaboration cannot be sustained where institutions distrust the motives, competence or reliability of partners. Trust must be built deliberately through consistent interaction, transparent decision-making, fair distribution of responsibilities and credible leadership. Trust-building should therefore be incorporated into public sector reform programmes, particularly those involving decentralisation, digital government and inter-agency service delivery platforms.

The third conclusion is that network governance is necessary to translate collaboration into performance. Informal cooperation is insufficient for complex service delivery networks. The government should establish clear governance arrangements for cross-agency networks, including terms of reference, decision-making procedures, reporting mechanisms, accountability indicators and conflict-resolution processes. Network governance should also clarify the relationship between central ministries, local authorities and parastatals so that decentralisation reforms produce coordinated implementation rather than administrative confusion.

The fourth conclusion is that digital maturity enhances service delivery networks by enabling integration, speed, transparency and coordination. However, digital maturity should not be

reduced to technology procurement. It should include digital skills, data governance, system interoperability, cyber security and process redesign. The government should therefore continue investing in digital infrastructure and e-government platforms, but these investments should be aligned with collaborative service delivery objectives. Digital platforms should support cross-agency workflows and citizen-centred service delivery rather than replicate existing silos electronically.

The fifth conclusion is that resource allocation efficiency remains a significant determinant of network performance. Public sector networks require resources to function, but they also require efficient use of those resources. The government should strengthen joint planning and budgeting for cross-cutting service delivery priorities. It should also promote shared use of infrastructure, personnel and information systems where appropriate. Resource allocation decisions should be guided by service delivery outcomes and citizen needs rather than by institutional boundaries alone.

Based on these conclusions, the study recommends that the Government of Zambia invest in digital infrastructure and systems that promote public sector collaboration and service delivery network performance. Policy should prioritise interoperability, data sharing, trust-building, network governance and resource coordination. The study contributes to theory by expanding empirical evidence on public sector inter-organisational collaboration, and to policy by guiding reforms that support Zambia's socio-economic transformation agenda. Implementation should also be aligned with the Zambia Public Service Change Management Framework Toolkit (Government of the Republic of Zambia, Cabinet Office, 2025).

For practice, public managers should establish inter-agency coordination forums linked to measurable service delivery outcomes, shared work plans, timelines, indicators and follow-up mechanisms. They should also promote a collaborative culture through joint problem-solving, cross-agency training and recognition of collective achievements. For policy, government should strengthen data-sharing rules while protecting privacy, prioritise interoperable and user-centred digital platforms, and identify opportunities for shared infrastructure and joint procurement.

For theory, the study confirms the relevance of TICNE in a developing country context. The findings support the theory’s argument that network effectiveness depends on communication, trust, governance and resource arrangements. The study extends the theory by empirically demonstrating the role of digital maturity as a contemporary determinant of network optimisation. This is important because digital transformation has become central to modern public administration. The study therefore suggests that TICNE can be strengthened by explicitly incorporating digital maturity as a core capability in public sector service delivery networks.

For future policy design, the study indicates that Zambia’s socio-economic transformation agenda can be accelerated when public sector reforms are designed as network reforms. Many development challenges, including health, education, local development, revenue administration, land management and social protection, require coordinated action across institutions. A network-based approach can improve service delivery by aligning mandates, data, resources and accountability. The government should therefore treat public sector service delivery networks as strategic infrastructure for national development.

Limitations and Future Research

The major limitation of the study was that it only focused on public service agencies in Lusaka Province, thereby affecting generalisability of the findings. Future research should therefore

include public service agencies across Zambia and may employ mixed-methods or qualitative approaches.

Another limitation is that the study used cross-sectional survey data. This means that the findings identify

statistical associations at one point in time but do not establish long-term causal dynamics. Future research may use longitudinal designs to examine how improvements in communication, trust, governance, digital maturity and resource allocation efficiency affect network performance over time. In addition, future research may compare different sectors such as health, education, local government, revenue administration and social protection to determine whether the relative importance of CSFs varies by service area.

The study also relied on perceptions of public sector officers. Although such perceptions are important because officers are directly involved in service delivery networks, future studies may include objective service delivery indicators such as processing time, cost efficiency, citizen satisfaction, digital transaction volumes and service coverage. Combining perception-based and objective data would provide a more comprehensive assessment of network optimisation. Further research may also investigate moderating factors such as leadership support, organisational culture, political commitment and legal frameworks.

A further implication is that public sector network optimisation should be monitored through performance indicators that combine internal administrative efficiency and citizen-facing outcomes. Internal indicators may include speed of inter-agency responses, number of shared datasets, frequency of joint planning, reduction in duplicated processes and percentage of services delivered through interoperable platforms. Citizen-facing indicators may include processing time, accessibility, satisfaction, complaint resolution and service reliability. Using such indicators would enable government institutions to move from general commitments to collaboration towards measurable network performance. This also strengthens accountability because institutions can be assessed not only on their individual outputs but also on their contribution to collective service delivery results.

References

Akbulut-Gok, I. (2020). Intergovernmental networks in peace operations. *Peace & Change, 45*(4), 569–601.

Akbulut-Gok, I. (2022). Theory of interorganizational collaboration and network effectiveness. In *Security and interorganizational networks in peace operations* (pp. 33–49). Springer.

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory, 18*(4), 543–571. https://doi.org/10.1093/jopart/mum032

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross-sector collaborations: Needed and challenging. *Public Administration Review, 75*(5), 647–663. https://doi.org/10.1111/puar.12432

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory, 22*(1), 1–29. https://doi.org/10.1093/jopart/mur011

Franco, M., Haase, H., & Rodrigues, M. (2024). The role of inter-organisational communication in the performance of strategic alliances: A relational perspective. *EuroMed Journal of Business, 1*(2), 1–10.

Government of the Republic of Zambia, Cabinet Office. (2025). *Zambia public service change management framework toolkit* (Version 1.310124). https://www.cabinet.gov.zm/wp-content/uploads/2025/02/Change-Management-Framework-Toolkit_v1-310124-Tov-edited-002.pdf

Guo, Y. G., Yin, Q., Wang, Y., Xu, J., & Zhu, L. (2023). Efficiency and optimization of government service resource allocation in a cloud computing environment. *Journal of Cloud Computing, 12*, Article 18.

Haidar, H., & Bartel-Radic, A. (2017). *Success factors of inter-organizational collaboration with non-for-profit organizations: The case of the renewable energy sector* [Conference paper]. XXVIe Conférence Internationale de Management Stratégique, AIMS.

Hasan, M. K. H., & Kumar, L. K. (2024). Determining adequate sample size for social survey research. *Journal of the Bangladesh Agricultural University, 22*(2), 146–157.

IBM Corp. (2022). *IBM SPSS Statistics for Windows* (Version 29.0) [Computer software].

Israel, G. D. (1992). *Determining sample size* (Fact Sheet PEOD-6). University of Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences.

Klijn, E. H., & Koppenjan, J. F. M. (2015). *Governance networks in the public sector*. Routledge.

Kożuch, B., & Sienkiewicz-Małyjurek, K. (2016a). Key factors of inter-organisational collaboration in the public sector and their strength. *International Journal of Contemporary Management, 15*(3), 123–144.

Kożuch, B., & Sienkiewicz-Małyjurek, K. (2016b). Factors of effective inter-organizational collaboration: A framework for public management. *Transylvanian Review of Administrative Sciences, 12*(47), 97–115.

Liswaniso, M., & Mbale, J. (2024). Leveraging cloud computing and artificial intelligence to enhance e-government services in developing countries: Insights from Zambia. *Proceedings of the International Conference for ICT (ICICT-Zambia), 6*(1), 39–44.

Martinez, L. (2011). Governance networks as collaborative platforms for innovation in the public sector. In *Network governance: Theories, methods, and practice*. Roskilde University.

Mbaka, R., & Mwange, A. (2024). An exploration of the key success factors of public-private partnerships as alternative social infrastructure financing strategy: The case of the health sector in Lusaka, Zambia. *International Journal of Multidisciplinary Research and Growth Evaluation, 5*(2), 138–146.

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly, 36*(4), Article 101385. https://doi.org/10.1016/j.giq.2019.06.002

Muleya, F., Zulu, S., & Nanchengwa, P. C. (2020). Investigating the role of the Public-Private Partnership Act in private-sector participation in PPP projects: A case of Zambia. *International Journal of Construction Management, 20*(6), 598–612.

Nezami, M. R., de Bruijne, M. L., Hertogh, M. J., & Bakker, H. L. (2023). Inter-organizational collaboration in interconnected infrastructure projects. *Sustainability, 15*(8), Article 6721.

Nõmmik, S. (2024). Cross-organisational collaboration management of digital innovation in the public sector: The case of the Estonian Employment Register. *NISPAcee Journal of Public Administration and Policy, 17*, 142–168. https://doi.org/10.2478/nispa-2024-0007

O'Leary, R., & Vij, N. (2012). Collaborative public management: Where have we been and where are we going? *The American Review of Public Administration, 42*(5), 507–522. https://doi.org/10.1177/0275074012445780

Provan, K. G., & Kenis, P. (2008). Modes of network governance: Structure, management, and effectiveness. *Journal of Public Administration Research and Theory, 18*(2), 229–252.

Provan, K. G., & Milward, H. B. (1995). A preliminary theory of interorganizational network effectiveness: A comparative study of four community mental health systems. *Administrative Science Quarterly, 40*(1), 1–33.

Republic of Zambia. (2009). *Public-Private Partnership Act, 2009 (Act No. 14 of 2009)*. Government Printer.

Republic of Zambia. (2022). *Eighth national development plan, 2022–2026*. Ministry of Finance and National Planning.

Republic of Zambia. (2023). *National decentralisation policy: Realising local development through citizen participation*. https://www.mlgrd.gov.zm/wp-content/uploads/2023/06/National-Decentralisation-Policy-2023.pdf

Schöggl, J. P., Stumpf, L., & Baumgartner, R. J. (2024). The role of interorganizational collaboration and digital technologies in the implementation of circular economy practices: Empirical evidence from manufacturing firms. *Business Strategy and the Environment, 33*(3), 2225–2249.

Smart Zambia Institute. (2023). *Final national e-government plan 2023 (2022–2026)*. https://www.szi.gov.zm/wp-content/uploads/2023/08/Final-National_e-Government_Plan_-2023-Final-17.08.2023.pdf

Sy, A., & Abubakar, M. (2024). Critical factors affecting interorganizational collaboration among MDAs in public housing programme delivery in Kebbi State. *International Journal, 6*(10), 576–584.

Vangen, S., Hayes, J. P., & Cornforth, C. (2015). Governing cross-sector, inter-organizational collaborations. *Public Management Review, 17*(9), 1237–1260.

Zawe, R. (2021). *Exploring corporate communications gaps in public institutions necessitating access to information law in Zambia: The case of Zambia Revenue Authority* [Doctoral dissertation, University of Zambia].