Volume 07 Issue 01

ISSN 2756 – 9233 [Online]
ISSN 2756 – 9225 [Printed]

2025

IJGPPA

International Journal of Governance and Public Policy Analysis

Research Centre for Governance and Public Policy
University of Sri Jayewardenepura
Sri Lanka

International Journal of Governance and Public Policy Analysis

IJGPPA - 2025

Volume 07

Issue 01

Research Centre for Governance and Public Policy

Department of Public Administration

Faculty of Management Studies and Commerce

University of Sri Jayewardenepura

Nugegoda

Sri Lanka

International Journal of Governance and Public Policy Analysis (IJGPPA) – 2025

Editorial Board

Publishing

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Pages: 143

ISSN (Online): 2756-9233
ISSN (Printed): 2756-9225

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Driving Forces for Building Trust among Citizens on e-Government Websites: User Perceptions in the Galle District, Sri Lanka

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Abstract
In the field of e-government, trust is a critical factor in successful online service delivery. It is evident that the transparency is not clearly apparent through some of the government websites of Sri Lanka. The main objectives of this study are to identify the driving forces that are required to build government website-oriented citizen trust and to provide suggestions for policymakers to ameliorate government website-oriented citizen trust. This research is conducted based on quantitative research methods involving deductive approach with hypothesis testing and confirmatory factor analysis. The findings reveal key obstacles such as usability limitations, accessibility barriers, and disparities in user trust and suggests practical improvements, including refining interface design, strengthening cybersecurity protocols, and introducing personalized digital services to enhance user experience. Additionally, integrating AI-driven support tools, expanding digital literacy initiatives, and optimizing multi-channel service delivery are recommended to improve accessibility and foster public confidence. The results of the study can be valuable for policymakers in efficiently executing approaches to enhance citizen confidence in e-government for addressing potential risks and susceptibilities related to the usage of e-government websites.

Keywords: e-Government Website Quality, Government Website-oriented Citizen Trust, Hedonic Motivation, Usability Performance, Website Security

1. Introduction
The Network Readiness Index (NRI) is a significant global measure used to assess the integration and impact of ICT in economies worldwide (Dutta & Lanvin, 2022). Within this framework, trust is defined as the security of individuals and businesses in the networked economy, creating an environment conducive to fostering trust and reliable behaviour among the population (Dutta & Lanvin, 2022). NRI evaluates 131 economies across various dimensions, with trust being one of its sub-pillars. Sri

Lanka, positioned at 96 in the 2022 ranking, underscores the importance of trust in accomplishing e-government objectives.

The advancement of e-government initiatives in Sri Lanka has faced obstacles, as evidenced by the country's descent to the 95th position out of 193 nations in the 2022 E-Government Development Index (EGDI). Notably, this represents a drop from its 2020 ranking of 85 (United Nations, 2023a). The EGDI assesses a country's website development trends, considering factors such as advancements in online services (institutional framework, service provision, content provision, technology, and e-participation), infrastructure, and literacy levels. It measures the utilization of ICT applications for improving access and inclusivity (United Nations, 2023b). There is a noticeable downward trend in Sri Lanka's performance in the Online Services Index (Younus et al., 2023).

The Human Capital Index for Sri Lanka remained stagnant between 2020 and 2022 (Younus et al., 2023). According to Younus et al. (2023), countries in South Asia, including Sri Lanka, faced challenges in advancing their electronic government initiatives in 2022. This hindrance could potentially be attributed to economic uncertainty, heightened inflation related to commodity price trends, rises in fuel costs, and the conflict between Russia and Ukraine. These factors shifted focus away from e-government initiatives towards maintaining economic stability and addressing social unrest (Younus et al., 2023).

Sri Lanka's ranking in the e-participation index fell to 107 out of 193 countries in 2022, a significant drop from its position of 66 in 2020 (United Nations, 2023a). The e-participation index evaluates how governments use e-participation mechanisms compared to other nations, providing insights into how countries utilize online tools to improve communication between the government and citizens for mutual benefits (United Nations, 2023c).

There is no evidence of implementing feedback or survey tools to provide statistical support and boost citizen engagement. In their review of selected e-government websites in Sri Lanka, Sittampalam et al. (2016) discovered that over 90% of these sites may inconvenience or obstruct users with disabilities.

The Sri Lankan police website was hacked on April 18, 2022 (10QBIT, 2022). Amid the unprecedented rise of the 'Aragalaya' conflict in Sri Lanka, anonymous hackers also targeted the websites of the Ceylon Electricity Board and the Department of Immigration and Emigration (10QBIT, 2022). These incidents could negatively affect citizens' long-term trust in adopting Sri Lanka's e-government, thereby jeopardizing the government's overall reputation.

The reluctance of older citizens to embrace e-government, particularly government websites, may hinder progress, pushing the nation backward rather than forward. Similarly, Karunasena and Deng (2009) emphasized that the government's transparency is not clearly apparent through the websites.

E-government platforms have become essential for modern governance, enabling efficient public service delivery, increasing transparency, and fostering citizen participation. Despite continued investments in digital transformation, many governments face persistent challenges such as declining user adoption, economic instability, and growing cybersecurity threats. These issues point to underlying weaknesses in the accessibility, trust, and overall effectiveness of e-government systems. While existing research has explored various aspects of digital governance, there is limited focus on how these broader challenges directly impact user engagement and service delivery.

In this context, this study poses the following research questions:

01. What are the driving forces that are required to build government website-oriented citizen trust?

02. What are the suggestions to improve government website-oriented citizen trust?

This study aims to fill that gap by examining the role of usability, digital literacy, and security concerns in shaping the success of e-government platforms. Most of the studies focused on a generalized approach to digital governance, but this research specifically investigates how these factors contribute to adoption barriers and trust issues. By drawing connections between declining public confidence, security vulnerabilities, and economic pressures, the study seeks to offer practical solutions for strengthening e-government services.

2. Literature Review

2.1. E-government Websites

Digital governance refers to the utilization of ICT, particularly via the World Wide Web, aimed at enhancing the effectiveness, efficiency, and quality of government information and services provided to various stakeholders (Lindgren et al., 2019). Ray (2023) posits that e-government websites set themselves apart from others primarily through their visual presentation. They are specifically crafted to efficiently deliver information, employing a straightforward approach with logically structured sites for easy navigation.

2.1.1. Theoretical Background

This study is supported by the Political Trust Theory. Turper and Aarts (2017) elucidate that political trust encompasses citizens' faith in political norms and regulations, serving as a gauge of political legitimacy. As per the authors, the erosion of political trust is primarily attributed to global shifts brought about by modernization and globalization, which in turn foster increased levels of education among citizens. This educational advancement heightens expectations and discontentment with the inadequacies of the prevailing political system.

Further, this study examines the factors of perceived usefulness and perceived ease of use within the framework of the Technology Acceptance Model (TAM). The TAM has established that perceived usefulness and perceived ease of use are pivotal in determining technology acceptance (Davis, 1989), thereby influencing trust in the technology. Given the importance and widespread applicability of these variables in e-government research, they have been included in this study. The proposed TAM is capable of predicting an individual's acceptance of innovation (Jahangir & Begum, 2008, cited in Chen & Aklikokou, 2019).

The social influence factor from the UTAUT model was also incorporated into the present study. This decision stemmed from the assumption that citizens' trust in e-government is rooted in psychological agreement and is influenced by behavioural intention. When predicting the intention to use technology and its actual usage, four dimensions come into play: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2016, as cited in Chen & Aklikokou, 2019). According to Jackson et al. (2013), performance expectancy and effort expectancy align conceptually with perceived usefulness and perceived ease of use, respectively, in TAM.

The current research incorporates hedonic motivation, supported by the UTAUT2 model, which has expanded the original UTAUT model by introducing three new constructs: hedonic motivation, price value, and habit (Venkatesh et al., 2012). Hedonic motivation is specifically addressed in this study because it is recognized as a robust predictor of behavioral intention by Venkatesh et al. (2012).

The concepts of website security and vulnerability intensity are linked to the Protection Motivation Theory, which stands as one of the early theories focusing on the psychological aspect of individuals' inclination to protect themselves from threats (Marikyan & Papagiannidis, 2023). Key variables outlined in this theory include vulnerability, severity, response efficacy, and perceived self-efficacy (Sutton, 2015). This aspect was integrated into the conceptual framework of the present study by considering both the current economic state of the country and the diverse cyber-attack risks faced by individuals.

2.1.2. The Conceptual Framework

Based on the theoretical background this study identifies seven independent variables namely, Utility Performance, Usability Performance, Social Influence, Vulnerability Intensity, Website Security, Hedonic Motivation, E-government Website Quality and the dependent variable is the Government Website-Oriented Citizen Trust. These variables will be discussed in the proceeding section.

Utility Performance: This variable is the same as the perceived usefulness variable used in TAM. Chen and Aklikokou (2019) emphasized the significant influence of "perceived usefulness" on the "behavioral intention to adopt e-government services." Additionally, Abu Karsh and Hussein (2021) indicated that performance expectancy (also known as perceived usefulness) affects the behavioral intention to utilize e-government public services and is moderated by educational level.

Usability Performance: This variable is the same as the “perceived ease of use” variable used in TAM. Chang and Almaghalsah (2020) conducted research to evaluate the usability of e-government websites in Taiwan, focusing on specific issues identified within targeted websites. The study involved assessing two local e-government websites: national taxation and the ministries of finance and interior. Nielsen's usability heuristic evaluation method was utilized. Findings revealed that dimensions such as user assistance, user control and freedom, efficiency and flexibility of use, and visibility of system status significantly impacted “perceived ease of use” (Chang & Almaghalsah, 2020). The study concluded that improving website design, particularly in terms of navigation, aesthetics, content, accessibility, and customization, is likely to promote users' adoption of e-government (Chang & Almaghalsah, 2020). Perceived ease of use exerts a moderately positive and significant influence on attitudes towards utilizing e-services (Elkheshin & Saleeb 2020).

Social Influence: Abu Karsh and Hussein (2021) confirmed and supported the hypothesis that social influence significantly impacts the behavioral intention to use online government services. Similarly, Susanto and Aljoza (2015) asserted that social influence significantly pressures individuals to adopt e-government services, especially in developing countries. Albesher (2015) asserts that social influence is a significant factor in determining how much citizens embrace e-government services.

Vulnerability Intensity: During the COVID-19 pandemic, people facing financial instability or lacking political influence tend to have lower levels of trust (Organisation for Economic Co-operation and Development [OECD], 2023). Therefore, prompt government actions are crucial to building trust in a crisis situation (OECD, 2023). Increased uncertainty due to the epidemic, disruptions in

transportation processes, and healthcare facilities prioritizing COVID-19 patients, influence individuals' decisions to adopt digital health solutions (Wang et al., 2021).

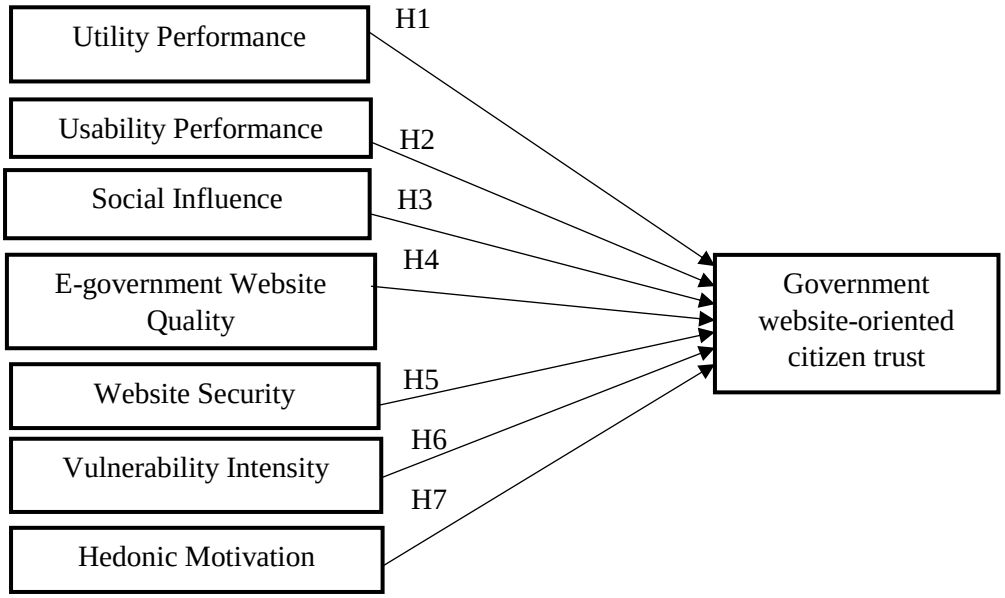
Website Security: Pribadhi et al. (2021) state that security and privacy are crucial for fostering confidence in e-government. Research by Dwivedi et al. (2017) and Munyoka and Maharaj (2019) identifies perceived threat as a key factor influencing trust in digital government.

Hedonic Motivation: Kaczmarek (2017) defines hedonic motivation as the desire to partake in activities that increase positive experiences and decrease negative ones. Khatimah et al. (2019) explored the relationship between hedonic motivation and social persuasion on the intention to use e-cash, with payment habits serving as a mediator. Their study revealed that hedonic motivation significantly influences payment habits and that it substantially affects behavioral intention through the mediation of these payment habits.

E-government Website Quality: Sitokdana (2019) evaluated the information standards of virtual government websites managed by regional administrations in eastern Indonesia. The results highlighted that all these websites in eastern Indonesia were insufficient in providing high-quality information to the public (Sitokdana, 2019). Pribadi et al. (2021) found a significant and positive correlation between the quality of information and trust in e-government. Similarly, Ranaweera (2016) confirmed that information standards play a crucial role in building trust in virtual government services. Lee et al. (2020) found that individuals who perceive higher levels of information literacy are more likely to trust a website.

Government Website-Oriented Citizen Trust: The different categories of trust in e-government include trust in stored data, trust in transactions, trust in service, and trust in information (Papadopoulou et al., 2010). Developing countries have encountered difficulties in implementing e-government systems due to significant disparities between users and platforms, largely caused by users' reluctance to adopt the new technology (Heeks, 2003, cited in Abu Karsh and Hussein, 2021).

Figure 01: The conceptual framework of the research



Source: Based on Literature

3. Methodology

This research is conducted based on quantitative research methods involving deductive approach with hypothesis testing and confirmatory factor analysis. Many previous studies investigating the factors that influence trust in e-government websites have utilized a quantitative research approach.

The implementation of quantitative research begins with identifying primary and secondary research questions. To address these questions, hypotheses are developed and tested within a conceptual framework.

Table 01: Operationalization of the Research Variables

Variable	Description	Survey item	Sources of survey items
Utility Performance	The extent to which a person perceives e-government services as advantageous in comparison to conventional methods of delivering public services (Chen & Aklikokou, 2019)	1.The convenience of existing e-government websites 2.The potential of existing e-government websites to save time 3.The potential of existing e-government websites to save costs	Chen and Aklikokou (2019), Susanto and Aljoza (2015)

Usability Performance	The extent to which a particular system or website user perceives it to be user-friendly (Davis, 1989).	1.Visual appeal of current e-government websites, specifically in terms of navigation 2.The functionality of e-government websites in terms of accessibility from any device, at any time, and from any location 3.Loading Speed	Becker (2005), Chang and Almaghalsah (2020)
Social Influence	The extent to which a person is influenced by the ideas of the external environment for adoption of an e-service application (Chen & Aklikokou, 2019).	1.The influence of any negative comments from friends on e-government websites 2.The influence of any positive comments from friends on government websites 3.The impact of media channels, particularly TV news, on encouraging the use of digital government websites 4.The effect of expert speeches worldwide on emphasizing the significance of utilizing e-services through government websites	Chen and Aklikokou (2019)
E-Government Website Quality	The ability of government websites to meet the standards and expectations of citizens (Pribadhi et al., 2021)	1.Up-to-date information delivery 2.Providing relevant information 3.Adaptation of Simple and understandable format Delivering standard-quality services 4.Providing feedback	Pribadhi et al. (2021)

Website Security	Precautionary measures to strengthen protection of government websites from cyber attacks (Pribadhi et al., 2021)	1.Use of proper security controls 2.Safety of online transactions 3.Privacy of personal data	Pribadhi et al. (2021)
Vulnerability Intensity	The weight of the risk associated with citizens' ability to take care of themselves due to social risks (Sutton, 2015).	1.Difficulties experienced with the COVID-19 pandemic 2.Difficulties with the economic crisis 3.Ability to grab opportunities	Belyi and Chugunov (2021), Ceesay and Bojang (2020)
Hedonic Motivation	The pleasure or satisfaction experienced from utilizing a technology (Venkatesh et al., 2012)	1.Happiness with the use of advanced technology 2.Excitement to use advanced technology	Kaczmarek (2017), Khatimah et al. (2019)
Government Website-Oriented Citizen Trust	The extent to which citizens believe in government websites (Pribadhi et al., 2021)	1.Willingness to conduct online transactions 2.The level of trust in e-government websites regarding the dissemination of reliable information 3.The extent of trust in the transparency of e-government websites 4.The level of confidence in e-government websites regarding safeguarding the best interests	Lee et al. (2020)

Source: Based on Literature

This study used a structured questionnaire to collect the data. The questionnaire is structured into three sections. The first section provides participants with an introduction to the research topic. The second section gathers demographic information, including name, age group, employment status, gender, and educational qualifications. The third section consists of questions formatted on a Likert scale, with responses ranging from '1' for very low to '5' for very high.

The survey method is employed to collect primary data from research participants. Initially, the questionnaire is designed and then translated into Sinhala. Following the

development and refinement of the questionnaire based on feedback from a panel of reviewers, a pilot study is conducted with 10 participants to assess their comfort level with the questionnaire. After refining the questionnaire based on input from the review panel and incorporating feedback gathered from a pilot study involving 10 participants, the survey was randomly distributed to citizens visiting both the Galle Four Gravets Divisional Secretariat area and the Baddegama Divisional Secretariat area. Responses were manually recorded using a Google Form. For individuals unable to participate immediately, the Google Form was shared via WhatsApp, and they were asked to provide their contact numbers for follow-up. Additionally, they were encouraged to share the questionnaire with their friends and relatives in Galle.

For this specific research project, random sampling is employed, which involves the random distribution and dissemination of the questionnaire. The total population within the age range of 25 to 64 in the Galle district is 529,828 (Department of Census and Statistics, 2012), making it the target population for this research. To provide justification for selecting this age category, ages 25–64 can be considered the critical age group that determines a large portion of the trust level. The Galle district is selected considering the convenience of collecting data. Yamane (1973) introduced a formula for determining the sample size, which can be presented as follows:

$$Sample\ size = \frac{N}{1+N\,e^2} \quad \text{---------- (1)}$$

$$Sample\ size = \frac{529{,}828}{1 + 529{,}828(0.05^2)} = 400$$

As seen in (1), 'N' represents the population size, while 'e' signifies the precision level associated with a 95 percent confidence interval and a probability of 0.05. By applying this formula, the optimal sample size for the current research is calculated to be 400. This determination was confirmed by consulting the Krejcie and Morgan (1970) table for sample size determination.

The selection of the Stata software package for this research is based on its user-friendly interface and widespread use among researchers. Its extensive resources provide support with commands, and the 'help' command allows users to access guidance on command usage. Stata is particularly advantageous for analyzing large datasets, making it well-suited for extensive application in research.

The regression output is generated to evaluate the relationship between independent and dependent variables. Additionally, hypothesis testing is conducted using t-values, p-values and a 95% confidence interval. The goodness of fit of the model is assessed by calculating the R-squared and the p-value of the F-statistic. The Shapiro-Wilk test is performed to determine the normality of the distribution. The Variance Inflation

Factor (VIF) test is used to evaluate multicollinearity among independent variables. Cronbach's alpha will be calculated to determine whether the combination of items consistently measures the same characteristic. Furthermore, convergent validity and discriminant validity for each variable are evaluated by examining Average Variance Extracted (AVE) values and Squared Correlation (SC) values. The composite reliability, also known as Raykov's reliability coefficient in Stata, is calculated for the variables. The data analysis will involve confirmatory factor analysis, and based on the findings, recommendations for a new model is be proposed.

4. Analysis and Discussion

According to the conceptual framework, the Ordinary Least Square (OLS) method is considered the suitable model for the research study.

In this research study, 362 responses were collected, resulting in a response rate of 90.5%. Females provided the highest number of responses (Specifically, 64.92% of survey participants are female, while 35.08% are male). The largest proportion of participants (43.37%) are within the 30-34 age group. In contrast, the 50-54 age group has the fewest (1.93%) participants. The highest number of responses (71.82%) were from employed participants, while the fewest (4.97%) were from pensioners. Of the employed participants, 46.69% work in the public sector, while 27.07% are employed in the private sector. Most survey participants (51.66%) are graduates, while the smallest proportion (3.04%) have Ordinary Level (O/L) as their highest level of education.

Table 02: Reliability Analysis and AVE Values of the Initial Model

N=362

Reliability		
	Alpha	AVE
Utility Performance	0.93	0.810
Usability Performance	0.76	0.512
Social Influence	0.74	0.432
Website Quality	0.87	0.595
Website Security	0.84	0.645
Vulnerability Intensity	0.32	0.875
Hedonic Motivation	0.93	0.026
Website Trust	0.88	0.638

Source: Survey Data

As indicated in Table 02, the Cronbach's alpha for all variables exceeds the 0.7 threshold, except for vulnerability intensity. This suggests that the survey items are reliable and internally consistent, and the most items consistently measure the same characteristics, except for those related to vulnerability intensity.

Table 03: The Squared Correlation (SC) Values of the Initial Model

Variable	Utility Performance	Usability Performance	Social Influence	Website Quality	Website Security	Hedonic Motivation	Vulnerability Intensity	Website Trust
Utility Performance	1.000							
Usability Performance	0.598	1.000						
Social Influence	0.481	0.613	1.000					
Website Quality	0.380	0.794	0.496	1.000				
Website Security	0.289	0.694	0.391	0.596	1.000			
Hedonic Motivation	0.309	0.291	0.398	0.186	0.125	1.000		
Vulnerability Intensity	1.493	1.277	1.361	0.643	0.846	2.968	1.000	
Website Trust	0.274	0.521	0.334	0.591	0.546	0.243	1.619	1.000

Source: Survey Data

Convergent validity is established when the Average Variance Extracted (AVE) value exceeds 0.5. According to Table 02, the analysis confirms convergent validity for utility performance, usability performance, e-government website quality, website security, vulnerability intensity and government website-oriented citizen trust. However, the variables social influence and hedonic motivation do not meet this criterion, as their AVE values are below 0.5. Discriminant validity is achieved when AVE values are greater than Squared Correlation (SC) values. When comparing Table 02 and 03, the analysis indicate that Website Quality, Website Security, and Website Trust meet the above criterion, but the other five variables do not have discriminant validity.

The confirmatory factor analysis (CFA) is conducted to assess the validity of the survey items associated with the respective variables, and the results are presented as follows.

Table 04: Results of Confirmatory Factor Analysis

Construct Items	Factor Loading	Composite Reliability	Variance Extracted Estimate
Utility Performance		0.927	0.92
Utility_Performance_1	0.85		
Utility_ Performance_2	0.94		
Utility_Performance_3	0.90		
Usability Performance		0.757	0.39
Usability_Performance_1	0.75		
Usability_Performance_2	0.70		
Usability_Performance_3	0.69		
Social Influence		0.748	0.15
Social_Influence_1	0.44		
Social_Influence_2	0.82		
Social_Influence_3	0.76		
Social_Influence_4	0.55		
Website Quality		0.879	0.43
Website_Quality_1	0.78		
Website_Quality_2	0.87		
Website_Quality_3	0.83		
Website_Quality_4	0.78		
Website_Quality_5	0.57		
Website Security		0.844	0.44
Website_Security_1	0.78		
Website_Security_2	0.82		
Website_Security_3	0.81		
Vulnerability Intensity		0.00	0.04
Vulnerability_Intensity_1	0.19		
Vulnerability_Intensity_2	-0.05		
Vulnerability_Intensity_3	-0.20		
Hedonic Motivation		0.933	1.05
Hedonic_Motivation_1	0.96		
Hedonic_Motivation_2	0.91		
Website Trust		0.875	0.39
Website_Trust_1	0.81		
Website_Trust_2	0.81		
Website_Trust_3	0.81		
Website_Trust_4	0.77		

Source: Survey Data

According to Tavakol and Wetzel (2020), it is more accurate to view the factor loading as indicative of the relationship between a particular survey item and the corresponding factor. Field (2005) agrees with Guadagnoli and Velicer (1988), who propose that a factor loading greater than 0.6 is acceptable regardless of the sample

size. Therefore, as shown in Table 05, all survey items meet this criterion except for Social_Influence_1, Social_Influence_4, Website_Quality_5, 3 items of Vulnerability Intensity. Furthermore, the composite reliability for all variables, except for vulnerability intensity, surpasses the minimum threshold of 0.7.

Table 05: Model Fit Summary

Fit index	Model	Recommendation
chi2	514.68	n/a
df (degree of freedom)	296	n/a
chi2/df	1.7	<2.00
RMSEA [90% CI]	0.045	<0.08
SRMR	0.055	<0.05
NFI	0.887	>0.95
RNI	0.948	>0.9
CFI	0.948	≥ 0.95
IFI	0.949	≥ 0.95
MCI	0.739	>0.9
p-value = 0.000		Non-significant

Source: Survey Data

Researchers assess the Chi-square value by calculating the extent to which the sample's covariance matrices deviate from the model's predictions (Hu and Bentler, 1999, as cited in Hooper et al., 2008). According to Cole (1987), a chi-square to degrees of freedom ratio (chi2/df) below 2.00 signifies an optimal model fit. A lower chi-square value in relation to the degrees of freedom indicates a better fit for the model. Generally, the chi-square statistic is used as a measure of absolute fit (Alavi et al., 2020).

The widely accepted guideline for Root Mean Square Error Approximation (RMSEA) is that it should be less than 0.08 to indicate a best-fit model (Hooper et al., 2008). RMSEA provides an indication of how well a model with optimally selected but unknown parameter estimates align with the population's covariance matrix (Byrne, 1998, as cited in Hooper et al., 2008).

A Standardized Root Mean Square Residual (SRMR) value below 0.05 indicates a good model fit, with the range extending from zero to 1.0 (Diamantopoulos & Siguaw, 2000, as cited in Hooper et al., 2008). However, SRMR values up to 0.08 are still considered acceptable (Hu & Bentler, 1999, as cited in Hooper et al., 2008). Researchers find SRMR easy to interpret because it accounts for the varying scales of survey items (Hooper et al., 2008).

The NFI (Normed Fit Index) statistic evaluates the model by comparing its chi-square value to that of the null model (Hooper et al., 2008). NFI values above 0.95 are

generally preferred according to recent recommendations (Hu & Bentler, 1999, as cited in Hooper et al., 2008). However, researchers may also consider a cut-off value as low as 0.8 to be acceptable (Hooper et al., 2008).

The RNI (Relative Non-centrality Index) value must exceed 0.9 to qualify as a well-fitted model (Bentler & Bonett, 1980, as cited in Gupta & Falk, 2017). This assumption relies on the comparability of sample sizes between the target model and null model (Gerbing & Anderson, 1992).

Scholars consider the Comparative Fit Index (CFI) an improved iteration of the NFI because it provides more precise results due to its responsiveness to the sample size. In current discussions, it is suggested that researchers confirm that the CFI obtained from their confirmatory factor analysis results is at or above 0.95 to signify a strong fit for the model (Hu & Bentler, 1999, as cited in Hooper et al., 2008).

Bollen (1989) introduced the Incremental Fit Index (IFI), presenting it as an updated rendition of the NFI, incorporating adjustments for both sample size and degrees of freedom. The standard deviation for this index is notably reduced compared to earlier versions (Bollen, 1989). Hu and Bentler (1999) indicate that the recent threshold for IFI is around 0.95, marking a shift from the previous cutoff of 0.9.

The threshold for the MCI value stands at 0.9, necessitating it to approach 0.95 or surpass it to qualify as a well-fitted model (Hu and Bentler, 1999). Suhr (2006) proposes that a model with a higher chi-square value and a smaller p-value signifies inadequate fit for the data.

Based on the model fit summary presented in Table 05, the final assessment is that the model demonstrates a satisfactory fit. The model is refined according to the factor loadings derived from each survey item.

The Shapiro-Wilk test operates under the null hypothesis that the data comes from a normally distributed population (Mishra et al., 2019). If the p-value is below the chosen significance level (e.g., 0.01, 0.05, or 0.1), the alternative hypothesis is accepted, providing sufficient evidence to conclude that the variables do not follow a normal distribution (Bobbitt, 2020). The choice to utilize the Shapiro-Wilk test in this research is based on its straightforwardness and effectiveness in evaluating normal distribution properties.

Table 06: Shapiro-Wilk W Test for Assessing Data Distribution Normality

Shapiro-Wilk W test for Normal Data

N=362

Variable	W	V	Z	Prob>Z
Utility Performance	0.99526	1.192	0.417	0.33835
Usability Performance	0.98877	2.827	2.461	0.00692
Social Influence	0.97692	5.812	4.168	0.00002
Website Quality	0.98433	3.946	3.251	0.00058
Website Security	0.99073	2.333	2.007	0.02239
Vulnerability Intensity	0.98701	3.270	2.806	0.00251
Hedonic Motivation	0.99567	1.089	0.203	0.41957
Website Trust	0.97894	5.303	3.951	0.00004

Source: Survey Data

According to the results shown in Table 06, the p-values for utility performance and hedonic motivation are greater than the significance level of 0.05. This suggests that these variables are normally distributed, as the available evidence does not support a significant deviation from normality. Conversely, the p-values for usability performance, social influence, e-government website quality, website security, vulnerability intensity, and government website-oriented citizen trust fall below the 0.05 significance level. This indicates that these variables do not follow a normal distribution, providing substantial evidence to reject the null hypothesis of normality and accept the alternative hypothesis.

According to Kim (2019), multicollinearity refers to a significant degree of linear correlation among explanatory variables in a multiple regression model, which can lead to inaccurate regression analysis results. The variance inflation factor (VIF) measures the extent to which multicollinearity inflates the variance of a regression coefficient (Fox, 2015). The recommended VIF threshold is 10 (Fox, 2015), and a VIF value exceeding 10 indicates a serious multicollinearity problem.

Table 07: VIF Test for Determining Multicollinearity

Variable	VIF	*1*/VIF
Usability Performance	2.98	0.335921
Website Quality	2.67	0.374705
Website Security	2.16	0.462906
Utility Performance	2.03	0.493658
Social Influence	1.91	0.523556
Hedonic Motivation	1.59	0.629266
Vulnerability Intensity	1.00	0.995986

Source: Survey Data

As shown in Table 07, the VIF values for the independent variables, utility performance, usability performance, social influence, e-government website quality, website security, vulnerability intensity, and hedonic motivation are all below 3. This indicates that there is no multicollinearity among the independent variables.

For this research study, the anticipated or forecasted regression model can be detailed as follows given in equation (2):

Government Website-Oriented Citizen Trust = β1 (Utility Performance) + β2 (Usability Performance) + β3 (Social Influence) + β4 (E-government website quality) + β5 (Website Security) – β6 (Vulnerability Intensity) + β7 (Hedonic Motivation) + C---------(2)

A correlation coefficient nearing 1 suggests a robust and meaningful correlation. The outline of hypothesis testing guidelines is presented below:

Table 08: Hypothesis Testing Guideline

T-Value	T > 1.96 (Critical T-Value)	Alternative Hypothesis Accepted Null Hypothesis Rejected
P-Value	p < 0.05 (significance level)	
95% Confidence Interval	Does not include zero	

Source: Survey Data

Below is the output of the model after accounting for heteroskedasticity adjustments:

Table 09: The Regression Analysis (Adjusted Model for Heteroskedasticity)

Linear Regression				**Number Of Observations = 362**	
				F (7,354)	=60.56
				Prob>F	=0.0000
				R-Squared	=0.5534
				Root Mse	=0.44235
Website Trust	**Coef.**	**Std. Err.**	**T**	**P>T**	**95% Confidence Interval**
Utility Performance	0.014	0.037	0.39	0.700	-0.059 0.088
Usability Performance	0.028	0.059	.47	0.639	-0.089 0.144
Social Influence	-0.084	0.049	-1.72	0.086	-0.179 0.012
Website Quality	0.395	0.058	6.76	0.000	0.280 0.510
Website Security	0.267	0.050	5.32	0.000	0.169 0.366
Vulnerability Intensity	0.040	0.038	1.06	0.290	-0.034 0.115
Hedonic Motivation	0.142	0.037	3.81	0.000	0.069 0.215
_Cons	0.470	0.199	2.36	0.019	0.079 0.861

Source: Survey Data

According to Table 09, it can be elaborated that 55.34 percent of the variation in government website-oriented citizen trust can be explained using independent variables.

When evaluating the applicability of the hypothesis testing guidelines outlined in Table 09, the variables 'e-government website quality,' 'website security,' and 'hedonic motivation' meet the necessary criteria to accept the alternative hypotheses. Consequently, alternative hypotheses H4, H5, and H7 are considered valid. On the other hand, the variables 'utility performance,' 'usability performance,' 'social influence,' and 'vulnerability intensity' do not meet the required t-value, p-value, and 95% confidence interval criteria specified in Table 09. Therefore, the null hypotheses for these variables are acceptable, leading to the rejection of alternative hypotheses H1, H2, H3, and H6.

According to the factor loadings presented in Table 04, the survey items Social_ Influence_1, Social_ Influence_2, Website_ Quality _5, Vulnerability_ Intensity_1, Vulnerability_Intensity_2, And Vulnerability_ Intensity _ 3 should be excluded from the model due to their factor loading values being below the acceptable threshold of 0.6. Consequently, the vulnerability intensity variable is entirely removed from the model adjusted for confirmatory factor analysis.

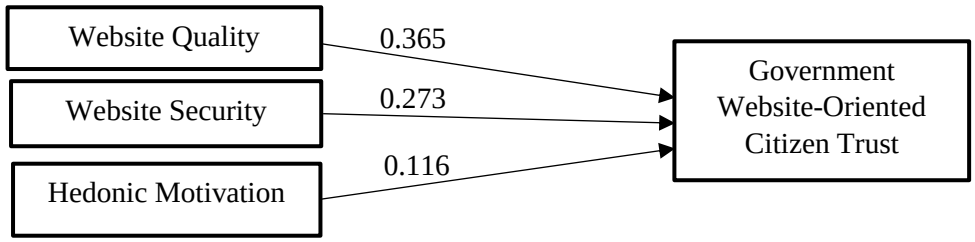
Table 10: The Hypothesis Validation (Model Adjusted for Confirmatory Factor Analysis)

	Coefficients	**t-value**	**p-value**	**Confidence interval**		**Supported**
H1	0.002	0.06	0.956	-0.064	0.068	No
H2	0.008	0.15	0.884	-0.101	0.117	No
H3	-0.003	-0.08	0.932	-0.082	0.075	No
H4	0.365	6.89	0.000	0.261	0.469	Yes
H5	0.273	5.85	0.000	0.182	0.365	Yes
H7	0.116	4.18	0.000	0.061	0.170	Yes

Source: Survey Data

According to the results displayed in the Table 10, the conditions involving the t-value, p-value, and 95% confidence interval required to support the alternative hypothesis, as detailed in Table 08, are met for hypotheses H4, H5, and H7. The regression model summary indicates that 54.39 percent of the variation in government website-oriented citizen trust can be attributed to the independent variables: utility performance, usability performance, social influence, e-government website quality, website security, and hedonic motivation (with the exception of vulnerability intensity).

Figure 02: Regression Coefficient Representation in the Final Recommended Model



Source: Survey Data

With the rejection of hypotheses H1, H2, and H3, as well as the elimination of the vulnerability intensity variable from the confirmatory factor analysis, the final model of the research can be depicted as shown in Figure 02 above.

Table 11: The Reliability Analysis and AVE Values of the Final Model

N= 362

Reliability		
	Alpha	AVE
Website quality	0.88	0.664
Website security	0.84	0.645
Hedonic motivation	0.93	0.879
Website trust	0.88	0.656

Source: Survey Data

Additionally, the Cronbach's alpha for each variable in the approved model exceeds 0.7, indicating the model's strength, as highlighted in Table 11 above.

Table 12: The Squared Correlation Values of the Final Model

Variable	**Website Quality**	**Website Security**	**Hedonic Motivation**	**Website Trust**
Website Quality	1.000			
Website Security	0.575	1.000		
Hedonic Motivation	0.197	0.121	1.000	
Website Trust	0.585	0.539	0.237	1.000

Source: Survey Data

Table 11 demonstrates that convergent validity is established for all variables, with AVE values exceeding 0.5. Moreover, discriminant validity is confirmed for all variables, as the AVE values are greater than the SC values when comparing Table 11 to Table 12.

Table 13: The Summary of the Final Model

Fit index	Model	Recommendation
chi2	94.75	n/a
df (degree of freedom)	59	n/a
chi2/df	1.6	<2.00
RMSEA [90% CI]	0.041	<0.08
SRMR	0.033	<0.05
NFI	0.957	>0.95
RNI	0.983	>0.9
CFI	0.983	≥ 0.95
IFI	0.983	≥ 0.95
MCI	0.952	>0.9
p-value = 0.002		Non-significant

Source: Survey Data

In the final model, the factor loadings of the survey items are all above the acceptable threshold of 0.6. As shown in the model summary in Table 13, all the indices meet the acceptable criteria, further supporting the validity of the final model. Additionally, the composite reliability for all variables is above the 0.7 threshold. With an adjusted R-squared value of 54.77%, it is evident that 54.77% of the variation in citizens' trust in e-government websites can be explained by the independent variables: e-government website quality, website security, and hedonic motivation.

Therefore, the final mathematical regression model can be illustrated as equation (3) below:

Government Website-Oriented Citizen Trust = β4 (E-government website quality) + β5 (Website Security) + β7 (Hedonic Motivation) + C-------(3)

Therefore, it can be recapitulated that e-government website quality, website security, and hedonic motivation are the driving forces that are required to build government website-oriented citizen trust.

Findings in this analysis are consistent with the outcomes of research conducted by Pribadi et al. (2021) and Ranaweera (2016), indicating that “e-government website quality" and “website security” are pivotal determinants affecting “Government Website-Oriented Citizen Trust”. A comparison with the study conducted by Yap et al. (2019) reveals alignment on the significance of “e-government website quality." However, the present study diverges in terms of the “utility performance” variable, where dimensions like cost and convenience do not significantly impact “Government Website-Oriented Citizen Trust.”

While Albesher (2015) suggests that “social influence” affects citizen trust in government websites, the current research contradicts this finding in the Sri Lankan

context. It aligns with the findings of Choudrie et al. (2017). Regarding “hedonic motivation," the results of the current study are consistent with the findings of Khatimah et al. (2019). However, the study diverges from the findings of Ceesay and Bojang (2020) on “vulnerability intensity," suggesting that vulnerability is not a significant determinant of “Government Website-Oriented Citizen Trust”. The results for “usability performance” contradict the findings of Sebetci (2015), Chen and Aklikokou (2019), as well as Abu Karsh and Hussein (2021).

5. Conclusion

This study investigates the driving forces that are required to build government website-oriented citizen trust. Specifically, the observed relationship between website security and government website-oriented citizen trust validates the hypothesis that when government put effort to secure their websites from cyber threats, the citizens are more likely to build trust in these e-government websites. The statistical analysis further substantiates the study's assumptions, enhancing its reliability.

Moreover, this research contributes to a broader understanding of the pragmatic behavior of government website-oriented citizen trust by offering empirical evidence that supports or refines existing theories. The practical implications suggest that understanding the citizens perception on e-government websites can drive up the transformation of government operations, which could have meaningful effects on e-governance and service delivery.

The government can learn from government websites in other countries and identify the modifications required to upgrade the existing websites. They can be transformed to display the availability status of officers, reducing frustration among the public.

The chatbot applications can be introduced into government websites to upgrade service delivery in the public sector by providing information based on requirements. Feedback tools can be incorporated into e-government websites to improve existing services and service delivery processes. Major improvements to the websites of government regional offices, such as divisional secretariats, are required as rural citizens encounter more difficulties.

Public sector organizations must ensure that their websites are fortified with robust cybersecurity measures. Regular monitoring and cybersecurity audits by qualified IT professionals are recommended to ensure the integrity of e-government websites.

The level of understanding of the research context, considering age and literacy levels, poses a contributory limitation for the research. Therefore, to overcome this problem, data are collected from citizens in the Galle district aged between 25 and 64

with a minimum qualification of O/L (Ordinary Level Examination). As we have adapted the quantitative research method, obtaining the realistic perspective of research participants is not possible, as participants are restricted to a specific questionnaire framework. This study specifically focuses on government-owned websites. Gathering a comprehensive list of individuals aged 25-64 in the Galle district, the targeted population for this research, proves challenging. Despite requesting assistance from the Divisional Secretariat, Galle, it was revealed that they lack a database and are currently in the process of developing one. The research is limited to the citizens of the Galle District.

This research provides valuable insights for policymakers and stakeholders looking to enhance the effectiveness and accessibility of digital government initiatives in an evolving technological landscape.

For future research perspectives, researchers can consider employing a mixed-methods approach to explore whether similar findings are obtained. Utilizing a mixed-methods approach may also help identify new variables or elements articulating citizens' trust in virtual government websites. Additionally, researchers can focus on specific e-government applications, such as the online issuance of revenue licenses or passports, to examine the elements influencing public trust in digital government beyond websites. Exploring the moderating and mediating effects of “citizens' trust in e-government” with the development of conceptual models informed by a comprehensive literature review could be a valuable avenue for further investigation.

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Participatory Planning in Primary Health Facilities in Tanzania

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Abstract

Participatory planning plays a significant role in ensuring the delivery of effective healthcare services, particularly in resource-constrained settings. Understanding the dynamics of participatory planning is crucial for fostering community engagement, building local capacities, and fostering collaboration among stakeholders. Tanzania continues to face challenges in participatory planning, including resource constraints, capacity gaps, information gaps, and a lack of autonomy. By exploring demographic, socio-economic, organizational, institutional, cultural, and social factors, the study aims to shed light on how participatory planning can be optimized to enhance healthcare delivery in primary health facilities. The research adopted a quantitative approach with a descriptive design, ensuring rigor and reliability in data collection and analysis. The sample size of the study was 180 respondents, selected using simple random sampling. In order to guarantee clarity, relevance, and reliability, a researcher-developed questionnaire was verified through expert review and pilot testing. The utilization of the Relative Importance Index (RII) enables the ranking of criteria by their significance, thereby providing valuable insights into the factors influencing participatory planning in Moshi municipality. Key findings underscore the importance of clarity by defining roles in planning with strong agreement on its importance. Education and access to information also significantly impact participation. Results inform policymakers to have clear roles and awareness creation to enhance community involvement effectively. The implications of this research extend beyond academic discourse, offering actionable recommendations for policymakers and health administrators. By emphasizing the importance of role clarity, education, and access to information, the study provides practical guidance for improving participatory planning in primary health facilities.

Keywords: Participatory Planning, Primary Health Facilities, Relative Importance Index, Tanzania

1. Introduction

Development of any nation in the world needs people who are healthy and able to participate in economic activities. These can only be achieved through ensuring proper health system management and proper participation in planning for their health. Participatory planning is a crucial aspect of development projects, allowing diverse stakeholders as community members, healthcare workers and local authorities to actively engage in decision-making processes (Kiologwe et al., 2022).

The roots of participatory planning in Tanzania can be traced back to the early 1990s, a turning point in the country's political and economic trajectory. Faced with internal crises such as economic stagnation and rising public dissatisfaction, along with external pressures from international financial institutions and donors, Tanzania began moving away from the post-independence socialist model of Ujamaa. This period saw major reforms including the introduction of multi-party democracy, economic liberalization and privatization, and the adoption of the Decentralization by Devolution (D-by-D) policy. These reforms aimed to devolve power and decision-making to local communities, fostering their active participation in their own development. These reforms collectively laid the foundation for participatory planning by promoting the local governance, citizen engagement, and the community-led development processes. Participatory planning was seen as a means to achieve these goals, allowing communities to voice their needs, priorities, and aspirations (Kilewo & Frumence, 2015; Kamuzora et al., 2013). Not surprisingly, good governance that includes elements such as participation was suggested as the single most important factor in achieving the Sustainable Development Goals (Akbar et al., 2020).

Participatory planning is a major component of health sector reforms in Tanzania, which were heavily influenced by the country's policy of decentralization started in the late 1990s (Kessy, 2023). The government embraced the Decentralization by Devolution (D-by-D) framework as a means of devolving decision-making authority and resources from central government to local authorities. Umbrella health bodies such as Council Health Management Teams (CHMTs), Council Health Service Boards (CHSBs), and Health Facility Governing Committees (HFGCs) instituted in the health sector are mandated to enhance community involvement in the health planning and budgeting lines of the health system (McCoy et al., 2012; Frumence et al., 2014; Kilewo & Frumence, 2015).

Participatory planning is operationalized at the district level through the Comprehensive Council Health Plan (CCHP). The process of CCHP is meant to be

bottom-up health priorities at the community level are consolidated and inform the district health plans through HFGCs (Kesale et al., 2022b).

In Tanzania, participatory planning has gained momentum as a result of various reforms aimed at decentralization and community empowerment. This approach has been particularly significant in the health sector as it ensures community needs are addressed, improves accountability, resource use, and promotes an inclusive, sustainable healthcare delivery, where it allows communities to provide ideas on planning and management of primary health facilities (Kilewo & Frumence, 2015). To ensure quality health and well-being of the society the government of Tanzania through the Ministry of Health and Social Welfare has implemented many strategic plans some of which are short and long-term in nature. The National Health Policy of 2007 succeeded those of 1990 and 2003. The first Health Sector Strategic Plan (HSSP) was implemented from 1999 to 2002. The Health Sector Strategic Plan II started in June 2003 and ended in 2009 and a third one ran for a period of five years starting from July 2009 to June 2015. The Primary Health Care Development Program (PHCDP) which started from 2007 to 2017 aimed at improving service delivery by strengthening the primary health facilities and improving human resources for health in the country (Ministry of Health, 2021).

Objectively, the reforms introduced by the Ministry of Health and Social Welfare aimed at introducing decentralization of power to local government authorities for the delivery of health services and management of resources in order to bring quality health services closer to the people and respond to their demand and health needs (Kesale et al., 2022a). As an outcome of these reforms, Health Boards, Health Facilities Committees, and new allocation formulas have been introduced to ensure good governance and proper participation in the delivery and management of healthcare services within their district (McCoy et al., 2012). Health Boards and Facility Committees create platforms for community members to be directly involved in decision-making, planning, and oversight of local health services, ensuring that services align with local needs (Kesale et al., 2025b; Bossert, 1998). They also hold health workers and administrators accountable for performance and use of resources. Meanwhile, new allocation formulas aim to distribute health funding more equitably, ensuring that resources are allocated based on population needs rather than political or historical biases (Abimbola et al., 2019). Together, these mechanisms help to build a more responsive, fair, and effective health system at the local level. (Kesale et al., 2022a; Kapologwe et al., 2020; Kapologwe et al., 2019).

According to a survey conducted in Tanzania, only 30% of primary health facilities engage in participatory planning processes, indicating a significant gap in the implementation of inclusive decision-making practices (Tanzania Ministry of Health and Social Welfare, 2015). Furthermore, community members' perceptions of their involvement in healthcare planning are low, with only 45% reporting that their opinions and suggestions are considered in the decision-making process (Tanzania Health Information Bulletin, 2019). This data demonstrates the existing problem in the participatory planning of primary health facilities in Tanzania. With such challenges, studies have not given enough attention to factors influencing participatory planning of primary health facilities in Tanzania (Kigume et al., 2018).

Despite its importance, participatory planning in the health sector faces several challenges which covers a broad spectrum of issues ranging from lack of participation, transparency, and ineffective healthcare provision, unfair health financing, and unequal access to health care (Kiologwe et al., 2022; Kilewo & Frumence, 2015)

Participatory planning in primary health facilities in Tanzania is influenced by various factors including leadership and governance, community engagement and ownership, capacity building, communication and information sharing, resource allocation, policy, and legal frameworks (Nabyonga-Orem & Asamani, 2023; Kilewo & Frumence, 2015). While the different literatures acknowledge the existence of factors that influence participatory planning, there is a lack of clarity regarding which factors have the most significant impact. This knowledge gap hinders effective decision-making and implementation of participatory planning initiatives. To bridge this gap, it is important to examine the key factors influencing participatory planning in primary health facilities in Tanzania, and to identify which of these have the greatest impact on effective planning and implementation. This study seeks to address the following research question: What are the key factors influencing participatory planning in primary health facilities in Tanzania, and which of these have the greatest impact on effective planning and implementation?

2. Literature Review

2.1. Definitions

2.1.1. Primary Health Facilities

Universal health coverage employs primary health care that is essential, scientifically grounded, and socially acceptable. Primary health facilities are defined as all immediately accessible, general health care facilities that treat a broad range of possible presenting problems, and which can be accessed by a wide range of patients on demand, and not as the result of a referral for specialist care (World

Health Organisation, 2019). It is the component of the health care system that serves as the entry point to the system for all new needs and problems, continues to provide person-oriented care over a period of time, treats all, but the very rare, unusual conditions, and organizes or integrates care provided in other places. In Tanzania, Primary Health Care Facilities include Dispensaries and Health Centres that provide essential health services close to the community, focusing on disease prevention, maternal and child health, treatment of common conditions, and health promotion (Tanzania Ministry of Health and Social Welfare, 2015).

2.1.2. Participatory Planning

Participatory planning is a way of working together that includes communities, especially those who are often left out, in making decisions about development and planning. It is different from older methods where decisions are made by a few people at the top. It focuses on sharing power, having local people take charge, and learning from each other (Eriksson et al., 2022). Participatory planning can take place in several formats. These include dialogue meetings, opinion surveys, panels, consultations, various forms of diary or report kept by users or citizens, art interventions, open labs, and mental mapping. Participatory Planning emphasizes that having effective laws, systems, and tools in place is crucial to ensure genuine participation, rather than mere lip service (Wilson et al., 2019). Participatory planning helps create a fairer, more just, and sustainable society by seeing citizens as people who contribute, not just as those who receive help (Nyseth et al., 2019).

2.2 Theoretical Literature Review

2.2.1 Participatory Theory

The theoretical basis for this study is grounded in participatory theory to investigate the implications or the influence of participatory planning of primary health facilities. Participatory theory, also known as participatory development or participatory planning, is an approach to decision-making and problem-solving that emphasizes the active involvement of all stakeholders (Draper & Rifkin, 2020; Eriksson et al., 2022). This theory assumes that those affected by a decision or program have the right to be involved in the decision-making process (Avril & Neem, 2016). It advocates for inclusivity, empowerment, and the recognition of local knowledge and expertise (Teal et al., 2023).

One of the key principles of participatory theory is that all individuals and communities should have equal opportunities to influence decisions that affect their lives (Thomas & Van De Fliert, 2014). This means that power dynamics need to be acknowledged and addressed, ensuring that the voices of marginalized and disadvantaged groups are heard and respected. This includes groups such as women,

ethnic and religious minorities, indigenous peoples, and people with disabilities (Williams, 2004).

Participatory theory also recognizes the value of local knowledge and expertise. A study by Howard-Grabman et al. (2017) emphasizes the importance of dialogue, collaboration, and sharing of information between decision-makers and those affected by their decisions. It promotes the idea that individuals and communities have unique insights and experiences that can contribute to better decision-making and more effective policies and programs.

For this study, Participatory theory provides a valuable framework to explore the key factors influencing participatory planning of primary health facilities in Moshi, Tanzania. The theory is directly relevant to the current study as far as the theory's constructs provide a framework for analyzing and addressing these most influencing participatory planning factors. By adopting a participatory approach, the study can ensure that key stakeholders, such as community members, health workers, and local authorities, are actively involved in the decision-making process. This involvement can help to identify and address the specific needs and preferences of the local population, thus contributing to improved health outcomes and increased ownership of primary health facilities.

2.3. Empirical Research

Participatory planning emphasizes the active involvement of community members in decision-making processes related to development and spatial planning. This approach promotes inclusivity, transparency, and empowerment by integrating local knowledge and addressing the needs of diverse stakeholders (Akbar et al., 2020). It fosters social learning, builds trust, and enhances the legitimacy of planning outcomes (Hakiman & Sheely, 2023). Moreover, participatory planning can lead to more sustainable and context-sensitive solutions by reflecting the lived experiences of affected populations (Hassan et al., 2011). Despite its benefits, challenges such as power imbalances and resource constraints can limit its effectiveness, necessitating thoughtful facilitation and equitable engagement strategies (Kilewo & Frumence, 2015).

Notwithstanding these difficulties, participatory planning has produced some encouraging results. Essen et al. (2025) and Ndunguru (2008) also found that a small level of community participation was associated with improved service delivery, better drug availability, and greater local ownership. The participation of citizens in health planning led to increased accountability of health workers and ensured services were matched to community needs.

Despite covering the same topic, the effectiveness of participatory planning differs greatly from district to district. Based on the findings of Aguilera et al. (2024) and Frumence et al. (2014), certain districts seem to demonstrate greater effectiveness in implementing the participatory processes because of the active supervision, leadership, and encouragement of the committee members. In contrast, weaker performance is observed in other districts due to the limited financial resources, low institutional support, and absence of adequate incentive mechanisms (Kiologwe et al., 2022). The varying effectiveness of HFGCs suggests that although there is a space for participatory planning framed by decentralization, the context and the leadership on the ground are key for determining the effectiveness of participatory planning.

Another emerging concern is the inclusiveness of the participatory processes. In most cases, women, youth, and other marginalized groups are found to be less represented in the health planning forums, hence inequity in service delivery (Kamuzora et al., 2013). Even though tools like PlanRep have made coordination possible since it is a system used for budgeting and planning, flexibility has not been realized for the integration of inputs from community-based partners and development actors (Kiologwe et al., 2022). Such inadequacies call for capacity building and communication strategy improvement alongside institutional mechanism reforms to make participatory planning meaningful and inclusive.

3. Methodology

The methodology section was organised into study settings, population and sample, eligibility criteria, data analysis methods.

3.1. Study settings

A quantitative approach with cross-sectional study was conducted across 2 hospitals, 3 health centers, and 28 dispensaries between October 2023 and March 2024. Moshi municipality is among the seven districts of the Kilimanjaro region in northern Tanzania, is the capital of the Kilimanjaro region. The municipality has an estimated population of 184,292, where men aged 15–64 years account for 48.4% of the total population (United Republic of Tanzania, 2022). The municipality is among the municipalities with low community participation in Tanzania (Kapuya et al., 2024).

3.2. Study Population and Sample

The study population comprised a total of 336 respondents, including 288 Health Facility Governing Committee (HFGC) members drawn from various levels of primary health facilities. Specifically, HFGC members were selected from 8 health

centres and 28 dispensaries, with 8 members from each facility, making a total of 288 HFGC respondents. Additionally, 48 Council Health Management Team (CHMT) members were selected from 4 hospitals, with 12 members from each hospital. The breakdown is presented in Table 01 below:

Table 01: Study Population by Facility Type and Respondent Category

Facility Type	Number of Facilities	HFGC Members per Facility	Total HFGC Members	CHMT Members per Facility	Total CHMT Members	Total Respondents
Dispensaries	28	8	224	0	0	224
Health Centres	8	8	64	0	0	64
Hospitals	4	0	0	12	48	48
Total	40	—	288	—	48	336

Source: Moshi Municipal Council (2021)

The sample size for the study was calculated using the Kothari (2004) formula, which is shown below:

$$n = \frac{Z^2 pqN}{e^2(N-1) + Z^2 pq}$$

Whereas n: *the sample size for a finite population*
N: *size of population, which is the number of academic employees (4,863)*
P: *population reliability (or frequency estimated for a sample of size n), where p is 0.5, and p + q= 1*
e: The *margin of error considered is 5% for this study*
Z α/2: *normal reduced variable at 0.05 level of significance Z: is 1.96*

$$n \frac{(1.96)^2 0.05 \times 0.05 \times 336}{(9.04)^2 (336-1) + (1.96)^2 \times 0.05 \times 0.05}$$

n = 180

A sample of 180 respondents was selected from the total study population of 336 respondents. The sample was proportionally distributed across the different facility types based on their population sizes. Specifically, 120 respondents were selected from Health Facility Governing Committees (HFGCs) at dispensaries and health centers, and 60 respondents were selected from the Council Health Management Teams (CHMTs) at hospitals. The proportional allocation ensured representation from all facility types to reflect the composition of the study population accurately. The detailed sample distribution is presented in Table 02 below.

Table 02: Sample Distribution by Facility Type and Respondent Category

Facility Type	Total Population	Proportion (%)	Sample Size (n=180)	Respondent Category
Dispensaries	224	66.7%	80	HFGC Members
Health Centers	64	19.0%	40	HFGC Members
Hospitals	48	14.3%	60	CHMT Members
Total	336	100%	180	

Source: Survey Data

3.3. Eligibility Criteria and Selection of Health Care Facilities

Thirty-three health facilities were purposively selected in the Moshi municipality. Two of the facilities were hospitals, three were health centers, and twenty-eight were dispensaries. The challenges for low community participation within the facilities were an inclusion criterion. The HFGC members and CHMT members were eligible for enrolment. The list of HFGC and CHMT was provided by the respective facility. stratified sampling was employed to select sample of health facilities to be involved in this study whereby the health facilities were divided into dispensaries, health centers and hospitals. Simple random sampling was used to select study respondents. The study employed questionnaire as data collection method. The questionnaire with attitude scale was used with 5-Point-Likert-Scale response format (1= strongly disagree (SD), 2= disagree (D), 3= neutral (N), 4= agree (A), 5= strongly agree (SA). These metrics were chosen because they, more explicitly, participatory planning than other metrics.

3.4. Data Analysis Methods

The study employed Relative Importance Index (RII) to determine the relative importance of different factors identified in the data. The indicators in this study were ranked using the Relative Importance Index (RII). RII was used as one of the most dependable methods for ranking variables in structured questionnaires using Likert scales (Abinaya Ishwarya & Rajkumar, 2021). RII is suitable for allowing easy comparison of factors based on frequency and perceived importance. Calculating the Relative Importance Index (RII) is important in this study since the value of the index specifies the ranked degree of importance. The RII formula was introduced into Microsoft Excel 2016 to determine the index for sets of objects, as seen in Equation 1.

$$\frac{\sum w}{AN} -= \frac{5n5+4n4+3n3+2n2+1n1}{5N} \quad \text{(Equation 1)}$$

Where w is the respondent's weighting of each factor, which can range from 1 to 5, for instance, n1 represents the number of respondents for Not Important, n2 represents the number of respondents for Less Important, n3 represents the number

of respondents for Moderately Important, n4 represents the number of respondents for Important, and n5 represents the number of respondents for Very Important. Thus, the highest weight (in this case, 5) is A, and the total number of people labeled as N. The Relative Importance Index ranges from 0 to 1. According to Tholibon et al. (2021) and Johnson and Lebreton (2004) five significant levels are generated from RI values: high (H) (0.8 RI 1), high-medium (H-M) (0.6 RI 0.8), medium (M) (0.4 RI 0.6), medium-low (M-L) (0.2 RI 0.4), and low (L) (0 RI 0.2).

3.5. Ethical Approval

Mzumbe University granted ethical permission for the study, guaranteeing compliance with norms and ethics for research. Furthermore, Moshi Municipality provided an ethical clearance letter, allowing the study to be carried out within its borders. These approvals attest to the rigorous adherence to institutional procedures and all relevant ethical concerns during the whole study process.

4. Analysis and Discussions

4.1 Demographic Characteristics of Respondents

From the descriptive data analysis provided, the majority of participants are male (59.4%) compared to females (40.6%). Again, the majority of participants have a degree level of education (52.2%), followed by diploma (26.1%). The age distribution of participants is fairly even, with the highest percentage falling within the 37+ age group (28.9%). Overall, these demographic characteristics suggest that the study has a good mix of gender, education, age, and organizational tenure, which is likely to provide a comprehensive view of the factors influencing participatory planning in primary health facilities.

Table 03: Demographic Characteristics of Respondents

Category		**Frequency (%)**	**Mean**	**Std. deviation**
	Male	107 (59.4%)		
Gender	Female	73 (40.6%)	1.41	0.492
	Certificate	8 (4.4%)		
	Diploma	47 (26.1%)		
Level of education	Adv. Diploma	19 (10.6%)	3.31	1.068
	Degree	94 (52.2%)		
	Masters	12 (6.7%)		
	21 – 25	50 (27.8%)		
Age	26 – 30	47 (26.1%)	2.47	1.179
	31 – 36	31 (17.2%)		
	37 +	52 (29.9%)		

Source: Survey Data

4.2. Relative Importance Index Analysis

Using the Microsoft Excel tool, the respondents' feedback was analyzed. Relative Importance Index analysis was created based on the information provided in the questionnaires. In order to rank the criteria according to their relative importance, relative index analysis was chosen. The Relative Importance Index (RII) calculation is significant to this study because its result indicates the ranked degree of relevance. It is particularly beneficial for surveys that employ a Likert scale. The comparison of RII with Five significant levels are derived from RI values, according to Johnson and Lebreton (2004) and Akadiri (2011): high (H) (0.8 RI 1), high-medium (H-M) (0.6 RI 0.8), medium (M) (0.4 RI 0.6), medium-low (M-L) (0.2 RI 0.4), and low (L) (0 RI 0.2).

All participatory planning factors (demographic characteristics and the level of participation, organizational structures/institutional management and socio-cultural factors to participation) were evaluated using Cronbach's Alpha Reliability Coefficients. All variables have internal consistency values of at least 0.7, according to Table 04. This demonstrates that the data have strong internal consistency reliability and that every variable was suited for analysis and none of the variables were discarded. The internal consistency reliability is determined by Cronbach's alpha, which uses the following criteria: Excellent (>0.9), Good (0.70.9), Acceptable (0.60.7), Acceptable (0.60.7), Poor (0.50.6), and Unacceptable (0.5).

Table 04: Cronbach Alpha Reliability Table

Variables	No of items	Cronbach's Alpha
Demographic factors	10	0.605
Organizational/Institutional arrangement	10	0.814
Socio-cultural factors	10	0.833

Source: Survey Data

4.3. Demographic Characteristics and Level of Participation

The Relative Importance Index (RII) analysis of demographic characteristics and participation levels reveals that education is the most influential factor in participatory planning, with the highest RII of 0.844 and a mean score of 4.2. This suggests strong consensus among participants on the importance of education for effective engagement. Sex ranks second (RII 0.837, mean 4.1), also indicating high perceived importance. Other factors like DC_LP8, DC_LP9, and DC_LP10 follow closely with slightly lower RIIs but are still considered highly relevant. Lower-ranked factors such as DC_LP3 to DC_LP7 show medium importance, with RIIs between 0.708 and 0.634. While these are seen as less critical, they still contribute meaningfully to participatory planning.

Table 05: Demographic Characteristics and Level of Participation

Variable	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Weighted total	RII	Rank	Importance level	Item Mean
DC_LP1	90	63	11	9	7	760	0.844	1	H	4.2
DC_LP2	67	91	12	8	2	753	0.837	2	H	4.1
DC_LP8	77	69	17	14	3	743	0.826	3	H	4.1
DC_LP9	72	70	20	15	3	733	0.814	4	H	4.0
DC_LP10	42	92	24	20	2	692	0.769	5	H – M	3.8
DC_LP4	33	70	43	29	5	637	0.708	6	H – M	3.5
DC_LP3	46	47	41	40	6	627	0.697	7	H – M	3.4
DC_LP5	24	61	69	20	6	617	0.686	8	H – M	3.4
DC_LP6	18	55	73	20	14	583	0.648	9	H – M	3.2
DC_LP7	22	47	61	40	10	571	0.634	10	H – M	3.1

Source: Survey Data

DC_LP1=Education, DC_LP2=Sex, DC_LP3=Age, DC_LP4,= Marital Status, DC_LP5=Health and disability, DC_LP6=Occupation, DC_LP7= Social economic status, DC_LP8= Religion, DC_LP9= Employment status, DC_LP10= Location

4.4. Organizational Structures (OS) and Participatory Planning

Table 06 shows the relevance level of organizational structure and institutional arrangements on community involvement in participatory planning (OS). OS10**,** OS2**,** OS7**,** OS6**,** and OS5 have slightly lower RIIs, ranging from 0.790 to 0.767, and are ranked from sixth to tenth. These items are categorized as high to medium importance, with item means ranging from 3.9 to 3.8, indicating a mix of "Agree" and "Strongly Agree" responses, with some "Undecided" or lower.

Overall, the findings suggest that OS4 clear role clarification (see Table 06) within organizational structures is paramount for fostering community involvement in participatory planning. The high importance levels and item mean across the board indicate a general agreement among respondents on the significance of these factors. This information is vital for health facility administrators and policymakers, as it highlights the need to focus on strengthening organizational and institutional frameworks to enhance community participation in the planning processes of primary health facilities. The rankings and RIIs provide a clear hierarchy of priorities that can guide efforts to improve participatory planning outcomes.

Table 06:Organizational Structures and Participatory Planning

Variable	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Weighted total	RII	Rank	Importance level	Item Mean
OS4	77	65	31	3	4	748	0.831	1	H	4.1
OS9	63	80	20	14	3	726	0.807	2	H	4.0
OS8	65	75	26	8	6	725	0.806	3	H	4.0
OS3	64	74	27	12	3	724	0.804	4	H	4.0
OS1	59	78	30	10	3	720	0.800	5	H	4.0
OS10	48	95	23	8	6	711	0.790	6	H – M	3.9
OS2	55	81	22	20	2	707	0.786	7	H – M	3.9
OS7	53	80	29	10	8	700	0.778	8	H – M	3.8
OS6	48	82	33	15	2	699	0.777	9	H – M	3.8
OS5	47	74	46	8	5	690	0.767	10	H – M	3.8

Source: Survey Data

OS1=Bureaucracy, OS2=Rules and regulations, OS3= Supportive leadership, OS4= Role clarification, OS5=Organizational culture, OS6=Decision making process, OS7=Communication channels, OS8=Resources allocation, OS9=Transparent, OS10=Hierarchy

4.5. Cultural and Social Factors and Community Participation in Planning (CBS)

Table 07 shows the relevance level of cultural and social factors on participatory planning. CBS10 (Access to information) with RII of 0.740 was ranked the first, indicating that, it is the most significant cultural factor in community participation. The item mean of 3.7 suggests that respondents generally agree that this factor is the most significant compared to others. CSB5 has an RII of 0.693 and ranks second. The item mean of 3.4 indicates that respondents agree it is the second factor in influencing participatory planning in the health sector.

Table 07: Cultural and Social Factors and Participatory Planning

Variable	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree "1"	Total respondents (N)	Weighted total	RII	Rank	Importance level	Item Mean
CBS10	70	44	25	24	17	180	666	0.740	1	H – M	3.7
CSB5	43	66	19	36	16	180	624	0.693	2	H – M	3.4
CBS9	29	50	57	31	13	180	591	0.657	3	H – M	3.2
CSB4	29	52	50	27	22	180	579	0.643	4	H – M	3.2

CSB2	21	61	45	35	18	180	572	0.636	5	H – M	3.1
CSB1	26	65	24	36	29	180	563	0.626	6	H – M	3.1
CBS8	22	54	41	50	13	180	562	0.624	7	H – M	3.1
CBS7	25	41	50	58	6	180	561	0.623	8	H – M	3.1
CSB6	26	37	46	52	19	180	539	0.599	9	M	2.9
CSB3	14	47	62	35	22	180	537	0.593	10	M	2.9

Source: Survey Data

CBS1= Traditional practices, CBS2=Power dynamics, CBS3=Traditional norms, CBS4=Social capital, CBS5=Social Movement and advocacy, CBS6=Access to resources, CBS7=Language and communication, CBS8 Historical context, CBS10=Access to information

The study's results are consistent with the tenets of participative theory, which prioritizes empowerment, inclusivity, and the active participation of all parties in the decision-making process. According to the theory, in order for participation to be successful, one must have the ability and opportunity to participate in addition to the right to do so. According to this study, meaningful involvement in primary health facility planning is hampered by ambiguous roles, a lack of education, and poor information availability. These obstacles show a disconnect between the principles of participation in theory and the actual situation. The study backs up the assertion made by participatory theory that sincere engagement results in more responsive and efficient planning by filling these gaps through role definition, education, and enhanced information access. Therefore, the results support the notion that for participatory planning to be successful, informational and structural enablers supporting inclusive and equitable stakeholder involvement must be in place.

The findings on demographic and socio-economic factors that impact participatory planning of primary health facilities highlight the significance of education (DC_LP1) in participatory planning, as evidenced by the high RII and item mean scores. This supports the findings of earlier research (Gholipour et al., 2023; Kilewo & Frumence, 2015) that found low community member participation in the development and implementation of various health projects as a result of a lack of education and awareness regarding community participation. According to this study, inadequate understanding of the topic of health plan participation was partly caused by community members' low educational attainment. Due to their poor educational attainment, the majority of committee members find it challenging to fully engage in the planning of health-related activities and assess concerns. According to other research (Nyama & Mukwada, 2023; Eriksson et al., 2022), key factors in health systems with high levels of education had greater confidence and were more likely to participate in decision-making related to health-related

activities and interventions. The gradual decrease in RII and item mean values for other factors suggests a hierarchy of importance among the factors influencing participatory planning. This finding is consistent with the study by Howard-Grabman et al. (2017) who found education as one of the critical factors in influencing community participation in maternal and newborn health program planning.

The findings on organizational and institutional factors that affect the participatory planning of primary health facilities reveal the impact of organizational structures and institutional arrangements on community involvement in participatory planning, resonate with existing literature on the subject. The Relative Importance Index (RII) values and item mean suggest a consensus among participants on the importance of clear role clarification within organizational structures for effective community participation. This finding is supported by previous studies that have emphasized the role of community participation in development planning and project management. For instance, the World Bank has recognized the need to address social aspects of development, highlighting the importance of community participation in planning and governance (Gilmore et al., 2023). Similarly, research has shown that participatory planning in community organizations can lead to better outcomes when there is genuine participation and a clear understanding of roles (Draper & Rifkin, 2020).

The findings align with previous research, for instance, Hakiman and Sheely (2023) that underscores the importance of clear role definition in participatory planning processes. Studies have shown that role clarification can enhance stakeholder engagement and improve the effectiveness of participatory planning interventions (Sethamo et al., 2022). Moreover, issues such as transparency, supportive leadership, and lack of resources have been identified as factors to successful community engagement, which aligns with the findings that emphasize the need for clear organizational structures (Draper & Rifkin, 2020). Effective stakeholder communication has also been recognized as a critical factor in participatory development planning, affecting the quality of planning and programs at the grassroots level (Morales-Garzón et al., 2023).

In the context of health systems, institutionalizing community engagement has been argued to be critical for quality improvement initiatives and improving health outcomes for communities. This involves integrating efforts to engage communities into existing health systems, which is in line with the study's suggestion to strengthen organizational and institutional frameworks. The high Relative Importance Index (RII) and item mean scores for role clarification (DC_LP1) reflect Participatory Theory's stance on the necessity of clear role definition within

participatory processes. The theory posits that when individuals understand their roles and the significance of their contributions, they are more likely to engage meaningfully in the planning process (Thomas & Van De Fliert, 2014). This is crucial for fostering ownership and ensuring that development initiatives are responsive to the needs of the community. The descending order of importance as indicated by the RII values suggests that while all factors are significant, some are more critical than others for participatory planning. This is consistent with the theory's recognition that participation is not a one-size-fits-all approach and that different factors may hold varying degrees of relevance in different contexts (Claridge, 2004).

The findings related to cultural and factors barriers influencing community participation in planning are critical to understanding the nuances of community engagement. The Relative Importance Index (RII) and item mean scores provide a quantitative measure of the perceived barriers, with CSB10 (Access to information) emerging as the most significant factor to community participation. Recent literature highlights mixed outcomes regarding participatory planning in Tanzania's health sector. While earlier studies (Frumence et al., 2014; Kilewo & Frumence, 2015) emphasized the potential of Health Facility Governing Committees (HFGCs) to enhance accountability and local ownership, newer evidence challenges this optimism. Kesale et al. (2025) found that many HFGCs operate with very low functionality due to limited resources, unclear roles, and inadequate incentives. Similarly, Kapuya et al. (2024) reported that over 85% of community members were unaware of HFGCs' existence, and only 14.5% viewed them as accountable. Cultural and informational barriers particularly lack of access to information were identified as major constraints to community engagement. These findings suggest that structural decentralization alone is insufficient. Effective participation requires context-sensitive approaches, capacity building, and stronger communication strategies. Without addressing these systemic and contextual limitations, HFGCs risk remaining symbolic rather than functional mechanisms of participatory health governance.

The ranking of factors as indicated by the RII values in the present study suggests a hierarchy of concerns among the community members. This hierarchy reflects the varying degrees of consensus on what constitutes a barrier to participation. For example, CSB10, with the highest RII, is seen as a significant barrier by most respondents, while CSB3, with the lowest RII, indicates a level of indecision among the community members. The item means further illustrate the degree of agreement or disagreement among respondents regarding each barrier. Higher item means suggest stronger agreement that a particular factor is a barrier, while lower item means indicate less consensus or more uncertainty.

In relation to previous studies, these findings underscore the importance of addressing both cultural and social barriers to enhance community participation in planning. It is essential for planners and policymakers to recognize and actively work to mitigate these barriers through inclusive and transparent planning processes, community education, and empowerment initiatives. This can be achieved by strengthening civic education, increasing public awareness campaigns about the roles and responsibilities of Health Facility Governing Committees (HFGCs), ensuring community involvement in member selection, and institutionalizing regular feedback mechanisms between communities and health governance structures. Previously, such efforts were often overlooked due to assumptions that decentralization alone would automatically foster participation. In reality, limited resources, weak institutional frameworks, and lack of sustained political will prevent the implementation of community-centered strategies. As a result, participatory structures were introduced without the necessary support systems to ensure their functionality and legitimacy at the local level. Participatory theory suggests that for development initiatives to be successful, they must be inclusive and sensitive to local contexts, with decision-making processes that involve all stakeholders (Claridge, 2004). The theory emphasizes the importance of overcoming barriers to participation to ensure that community members can contribute effectively to planning and development processes (Thomas & Van De Fliert, 2014).

4.6. Theoretical Implications

The findings reinforce the core principles of participatory theory, particularly the importance of role clarity, education, and access to information in fostering meaningful community involvement. Participatory theory asserts that all the stakeholders should actively engage in decision-making processes that affect them. However, this study highlights that without clearly defined roles, adequate education, and access to relevant information, participation becomes superficial or symbolic. These results suggest that participatory theory must place greater emphasis on structural enablers such as knowledge sharing and role delineation as prerequisites for genuine inclusion and empowerment in health planning. The study delves into theoretical frameworks and empirical evidence, emphasizing the relevance of participatory theory in guiding the analysis.

4.7. Practical Implications

The study reveals that effective participatory planning in primary health facilities depends on practical factors such as clarity of roles, education, and access to information. When stakeholders, including community members and health staff, clearly understand their roles in the planning process, they are more likely to participate actively and meaningfully. Role confusion can lead to disengagement or

the concentration of decision-making power among a few individuals. Additionally, education and awareness are essential for empowering community members to contribute effectively, as many lack knowledge of their rights or the planning procedures. Access to timely and transparent information also plays a crucial role in enabling participation. Without it, communities are left out of key decisions that impact healthcare delivery. Improving communication channels and providing opportunities for capacity-building can enhance community engagement. These practical measures are vital for creating inclusive and responsive health planning processes that reflect community needs and strengthen service delivery in primary health facilities.

5. Conclusion and Recommendations

The study highlights that education, role clarification, and access to information are vital for effective participatory planning in primary health facilities. High RII values and consistent item means indicate strong agreement among respondents on the importance of these factors. However, variations suggest some factors require more targeted interventions. To enhance participatory planning, local authorities should prioritize clear stakeholder roles through guidelines and training. Additionally, raising community awareness can help overcome cultural and social barriers, fostering broader engagement. The findings emphasize the need for a multifaceted, context-specific approach to ensure meaningful and successful participatory planning.

6. Limitations of the Study

The findings of the study conducted in Moshi, Tanzania, may not directly apply to other regions or countries due to unique contextual factors influencing participatory planning. This limitation restricts the generalizability of the results beyond the specific area studied. Furthermore, the study's findings are susceptible to potential sampling bias as the data collection is confined to a specific geographic location and population. This limitation may result in the sample not fully capturing the diversity of perspectives and experiences within the broader community.

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Effectiveness of Global Partnerships for Climate Change Mitigation in Sub-Saharan Africa's Agricultural Sector: A Sustainable Development Perspective

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Abstract
This study investigates the effectiveness of global partnerships in mitigating climate change impacts within Sub-Saharan Africa's agricultural sector. Anchored in globalization, interdependency, and public policy theories, it evaluates partnership outcomes, identifies best practices, and analyzes challenges related to power asymmetries and African agency. Using a qualitative desk review of literature from 2010–2024, the study focuses on five country cases and highlights the lived experiences of smallholder farmers. Findings reveal that while partnerships have advanced climate resilience and resource mobilization, they often lack contextual sensitivity and equitable governance. The study recommends inclusive, locally adapted strategies to enhance stakeholder ownership and promote sustainable agricultural transformation.

Keywords: Agriculture, Climate Change, Food Security, Global Partnerships, Globalization, Interdependency, Mitigation, Multi-stakeholder Initiatives, Sub-Saharan Africa, Sustainable Development

1. Introduction
Climate change presents a profound threat to global agricultural systems, with Sub-Saharan Africa expected to bear disproportionate impacts due to its reliance on rain-fed agriculture and limited adaptive capacity. Projections suggest up to a 30% decline in agricultural productivity by 2050 (Schlenker & Lobell, 2010), compounded by a rapidly growing population projected to double within the same timeframe (United Nations, 2019). These pressures exacerbated by erratic rainfall, rising temperatures, and institutional vulnerabilities intensify risks to food security, economic stability, and sustainable development across the region (Omweri, 2024).

In response, global partnerships comprising international organizations, national governments, non-governmental organizations (NGOs), and private-sector actors have emerged as critical mechanisms for climate change mitigation and adaptation in agriculture. These collaborative efforts aim to facilitate resource mobilization, knowledge transfer, technology deployment, and capacity building to enhance agricultural resilience (Newell & Touni, 2018).

This study examines the effectiveness of such global partnerships in addressing climate challenges in Sub-Saharan Africa's agricultural sector through the lens of sustainable development. Drawing on globalization and interdependency theories (Mittelman, 2000; Keohane & Nye, 1977), the research explores how these partnerships operate within power-laden global structures and reciprocal relationships, potentially shaping or constraining local agency and climate-smart agricultural strategies.

Employing a qualitative desk review methodology, the study analyzes literature, policy documents, and program reports published between 2010 and 2024. The analysis focuses on cases from Rwanda, Ethiopia, Mali, Zambia, and Malawi. It critically evaluates partnership outcomes, identifies best practices, and interrogates challenges, particularly those affecting smallholder farmers and vulnerable communities.

Ultimately, the research contributes to the evolving discourse on climate mitigation, sustainable agriculture, and the United Nations Sustainable Development Goals (SDGs). Its findings offer actionable insights for improving partnership models, strengthening African stakeholder agency, and promoting equitable, responsive, and context-sensitive agricultural transformation under a changing climate

Objectives of the Study

To guide the analysis, the study pursues the following objectives:

1. To evaluate the outcomes of global partnerships aimed at climate change mitigation in agriculture across Sub-Saharan Africa.
2. To identify best practices that improve the responsiveness, adequacy, and sustainability of climate-smart agriculture interventions.
3. To analyze the challenges and power dynamics that influence the agency of African stakeholders in shaping climate mitigation strategies.
4. To assess the adequacy of climate change responses in Sub-Saharan Africa's agricultural sector, focusing on their relevance, coverage, inclusivity, and effectiveness for smallholder farmers.

2. Literature Review

While globalization theory explains the structural dominance of Global North actors in shaping climate interventions, interdependency theory introduces a counterbalance, highlighting the potential for reciprocal agency and negotiated outcomes. This tension is critical: partnerships may simultaneously empower and constrain African stakeholders. Public policy theory adds evaluative depth, distinguishing between procedural legitimacy (input validity) and tangible results (output validity). Together, these lenses expose the complex interplay between power, participation, and performance in climate-smart agriculture.

Globalization Theory

Globalization, understood as both a process and a form of governance (Wulff, 2021), has significantly shaped climate intervention structures in Sub-Saharan Africa's agricultural sector. It influences resource flows, technological norms, and policy priorities, often reinforcing Global North dominance over local agricultural systems (Parjanadze, 2009; Muna et al., 2020). This dynamic raises concerns about the marginalization of traditional agricultural knowledge and the contextual relevance of imported climate-smart technologies.

Interdependency Theory

Interdependency theory offers a valuable lens for analyzing the relational dynamics between international actors and African stakeholders in climate mitigation partnerships (Keohane & Nye, 1977; Van Lange & Balliet, 2015). Key concepts such as level of dependence and co-variation of interests help explain tensions between dominance and agency in decision-making processes. For instance, the degree to which African nations rely on external partners can influence whether mitigation strategies reflect joint control or external imposition. This tension may manifest as assertiveness versus passivity in policy negotiations (Rusbult & Van Lange, 2008; Balliet et al., 2016).

Public Policy Validity

Drawing on Marsh and McConnell's framework (2010), the success of climate partnerships can be assessed through input validity and output validity. Input validity refers to the extent to which partnerships incorporate the voices, priorities, and lived experiences of local stakeholders, particularly smallholder farmers and cooperatives. Output validity evaluates whether partnerships achieve tangible outcomes such as increased agricultural productivity, enhanced climate resilience, and reduced greenhouse gas emissions. However, as McConnell (2010) cautions, policy success often resides in grey zones. In the context of Sub-Saharan Africa, additional

dimensions such as timing, adequacy, and agency are critical for evaluating the real-world effectiveness of climate mitigation efforts.

2.1. Global Climate Partnerships on Agriculture in Sub-Saharan Africa

Climate change, driven by anthropogenic activity, continues to reshape weather patterns, increase climate extremes, and disrupt agricultural livelihoods in Sub-Saharan Africa (Omweri, 2024; Intergovernmental Panel on Climate Change [IPCC], 2021). In response, global partnerships have emerged as transnational multi-stakeholder platforms (Knutsson & Lindberg, 2019), enabling diverse actors including governments, international organizations, non-governmental organizations (NGOs), civil society groups, and philanthropic foundations to pursue climate-smart agriculture (CSA) and resilient food systems (Lipper et al., 2014). These partnerships reflect evolving governance structures that balance public-private collaboration and align with aid effectiveness principles (Menashy & Dryden-Peterson, 2015; Ogbuoji & Yamey, 2019).

Rwanda: Strategic Plan for Agricultural Transformation (PSTA IV under CAADP)

Under the Comprehensive Africa Agriculture Development Programme (CAADP), Rwanda's Strategic Plan for Agricultural Transformation Phase IV (PSTA IV) was launched for the 2018–2024 period to modernize agriculture and enhance climate resilience. One of its most notable achievements has been the integration of climate-smart agriculture (CSA) practices, particularly among smallholder farmers. The plan prioritized the promotion of drought-resistant crop varieties such as improved maize, beans, and cassava, which have demonstrated higher yields under erratic rainfall conditions. These varieties were developed and disseminated through partnerships with research institutions including the Rwanda Agriculture and Animal Resources Development Board (RAB) and the Consultative Group on International Agricultural Research (CGIAR) centers, contributing to increased food security and reduced vulnerability to climate shocks (RAB, 2023; CGIAR, 2022).

In addition to crop diversification, PSTA IV emphasized sustainable land management techniques. The expansion of radical and progressive terraces, covering over 143,000 hectares by 2024 and helped reduce soil erosion and improve water retention in hilly terrains (Ministry of Agriculture and Animal Resources [MINAGRI], 2023; Abbott & Malunda, 2014). Small-scale irrigation systems were also scaled up, with irrigated land increasing by nearly 50% from 2017 levels, enabling year-round vegetable production and mitigating the effects of seasonal droughts (Alliance for a Green Revolution in Africa [AGRA], 2025; World Bank, 2023). Farmers in districts such as Bugesera and Gatsibo reported yield increases of

up to 60% due to greenhouse farming and irrigation support, as documented in Rwanda's National Agriculture Investment Plan and United Nations Development Programme (UNDP) monitoring reports (UNDP, 2024; Federal Ministry of Agriculture, 2022).

Moreover, the plan supported the development of early warning systems and climate information services, enabled farmers to make informed decisions about planting and harvesting. These systems, backed by the UNDP and other partners, reached over 100,000 farmers and significantly reduced crop losses during extreme weather events (UNDP, 2024; International Fund for Agricultural Development [IFAD], 2024a; World Bank, 2023). The fisheries and poultry sectors also experienced notable growth. Aquaculture production rose from approximately 31,000 tonnes in 2018 to over 46,000 tonnes by 2023 (Commercial Agriculture for Smallholders and Agribusiness [CASA], 2023a; African Union Inter-African Bureau for Animal Resources [AU-IBAR], 2024). During the same period, poultry numbers increased from 5.4 million to over 6 million birds, diversifying protein sources and improving household nutrition (Commercial Agriculture for Smallholders and Agribusiness [CASA], 2023b; Cocchini & ter Steeg, 2019).

Collectively, these outcomes reflect Rwanda's commitment to transforming its agricultural sector into a resilient, market-oriented, and inclusive engine for sustainable development. The Strategic Plan for Agricultural Transformation Phase IV (PSTA IV) not only advanced productivity but also laid the groundwork for long-term adaptation to climate change through institutional reforms, farmer training, and public-private partnerships (Ministry of Agriculture and Animal Resources [MINAGRI], 2018; World Bank, 2023; Network of Excellence on Land Governance in Africa [NELGA], 2017).

Ethiopia: Agricultural Growth and Watershed Management Program

Ethiopia's Agricultural Growth and Watershed Management Program, implemented under the Comprehensive Africa Agriculture Development Programme (CAADP), has significantly advanced climate resilience and sustainable land use across vulnerable regions. Through flagship initiatives such as the Agricultural Growth Program (AGP) and the Sustainable Land Management Program (SLMP), the country rehabilitated degraded landscapes in over 400 woredas, integrating soil conservation, agroforestry, and water harvesting techniques (Federal Ministry of Agriculture, 2022). These interventions have improved soil fertility, reduced erosion, and enhanced moisture retention, enabling farmers to cultivate previously unproductive land. In regions like Amhara and Tigray, agroforestry systems combining fruit trees with staple crops have diversified household incomes and stabilized food supplies

during drought seasons (World Bank, 2011). Water harvesting structures including check dams, percolation ponds, and rooftop rainwater systems have expanded access to irrigation, reducing dependence on erratic rainfall and boosting crop yields. Notably, Ethiopia's irrigated wheat program reduced national wheat import dependency by 35%, with some farmers doubling their yields within two seasons (AGRA, 2025). These outcomes reflect Ethiopia's strategic alignment with CAADP's goals of productivity, resilience, and poverty reduction. However, challenges persist in scaling technologies to remote areas and ensuring equitable access to irrigation and extension services, underscoring the need for inclusive and context-sensitive implementation strategies.

Mali: International Fund for Agricultural Development (IFAD) Fostering Agricultural Productivity Project

Mali's *Fostering Agricultural Productivity Project* (Projet d'Amélioration de la Productivité Agricole au Mali, PAPAM), co-financed by the International Fund for Agricultural Development (IFAD), the World Bank, and other development partners, was designed to enhance the productivity and climate resilience of smallholder farmers through a combination of technology transfer, irrigation infrastructure, and institutional reform. Implemented between 2011 and 2018, the project introduced drought-tolerant millet and sorghum varieties, alongside water-efficient irrigation systems tailored to semi-arid zones. These interventions enabled over 100,000 smallholder farmers to maintain crop yields despite increasingly erratic rainfall patterns and prolonged dry spells (IFAD, 2022). The project also developed over 2,200 hectares of irrigated land, including small-scale village schemes and lowland perimeters, which significantly expanded the area under cultivation and reduced seasonal vulnerability (World Bank, 2015). In partnership with Mali's National Research Institute and technical services, PAPAM facilitated the dissemination of improved agricultural technologies such as the biogas digesters and organic slurry systems that reduced reliance on chemical fertilizers and improved soil health (IFAD, 2024b). These innovations not only boosted productivity but also contributed to environmental sustainability and gender equity by alleviating labor burdens on women and promoting equitable access to farming inputs. Despite implementation delays and political instability, PAPAM's outcomes underscore the potential of integrated climate-smart strategies to transform smallholder agriculture in fragile contexts.

Zambia: UNDP Climate Information and Early Warning Systems

The Climate Information and Early Warning Systems (CIEWS) Project in Zambia, implemented by UNDP in collaboration with the Government of Zambia and funded by the Global Environment Facility (GEF), exemplifies how the localized climate data can enhance adaptive capacity among vulnerable populations. By installing and rehabilitating over 30 meteorological and hydrological stations in flood-prone districts such as Kasaya in Kazungula and Mbeta Island in Western Province, the initiative provided real-time weather forecasts and seasonal climate data to over 100,000 smallholder farmers (UNDP, 2019; UNDP, 2022a). Dissemination through radio, mobile alerts, and community bulletins translated into local languages enabled farmers to adjust planting schedules, select climate-resilient crop varieties, and mitigate exposure to climate-related risks. Notably, in Southern Province, women farmers reported "bumper" harvests after using forecast data to avoid planting during dry spells, thereby improving food security and household income (UNDP, 2022b). The project also strengthened institutional capacity by training forecasters and district officers to interpret and communicate climate data, contributing to long-term agricultural planning and disaster preparedness (UNDP, 2024). Despite logistical challenges in reaching remote communities, the CIEWS initiative demonstrates the transformative potential of climate-informed decision-making in fostering resilience and inclusive development.

2.2. Regional & Alliance-Based Initiatives

Africa Climate-Smart Agriculture Alliance (ACSAA)

Launched in 2014 under the leadership of NEPAD and five international NGOs, ACSAA was designed to accelerate the adoption of climate-smart agriculture (CSA) across Africa. The alliance aimed to reach at least 6 million farming households by 2021**,** contributing to the African Union's Vision 25x25 goal (ACSAA, 2022). ACSAA mobilized funding through CAADP-aligned National Agriculture Investment Plans (NAIPs), promoted CSA innovation through farmer-led approaches, and supported the development of national CSA strategies. It facilitated peer learning, policy engagement, and technical backstopping across 10 core member organizations, including CGIAR, Food and Agriculture Organization of the United Nations (FAO), and Forum for Agricultural Research in Africa (FARA). The alliance emphasized inclusive programming by targeting women, youth, and marginalized groups, and helped build enabling environments for CSA through evidence-based advocacy and institutional capacity strengthening (Steiner et al., 2020).

Global Alliance for Climate-Smart Agriculture (GACSA)

Established in 2014 and hosted by FAO, GACSA is a voluntary, multi-stakeholder platform that fosters global cooperation on CSA. It operates through three action

groups: Knowledge, Investment, and Enabling Environment. GACSA catalyzed transformational partnerships, facilitated policy dialogue, and disseminated CSA knowledge across the African contexts. It supported national CSA strategies, aligned CSA with NDCs and SDGs, and promoted integrated approaches to productivity, adaptation, and mitigation. GACSA's clearinghouse mechanism enabled evidence-based decision-making and cross-sectoral collaboration, while its facilitation unit provided technical support and convened annual forums for knowledge exchange (Lipper et al., 2014; GACSA, 2022).

Consultative Group on International Agricultural Research (CGIAR) & International Crops Research Institute for the Semi-Arid Tropics (ICRISAT): Research-Based Interventions

CGIAR centers, particularly ICRISAT, have led the development of drought-tolerant crop varieties tailored to the semi-arid agroecologies in Africa. These include improved strains of the sorghum, pearl millet, pigeon pea, and green gram. Demonstration farms in Kenya's drylands showed yield increases of up to 55% compared to traditional varieties, even under below-average rainfall (ICRISAT, 2018). The integration of conservation agriculture and climate information services further enhanced adaptive capacity. Over 1,500 farmers participated in scaling trials, with 75% being women, reflecting strong gender inclusion (Neufeldt et al., 2015).

African Risk Capacity (ARC): Insurance-Integrated Early Warning Systems

ARC, a specialized agency of the African Union, provides parametric insurance and early warning systems to help member states respond to climate disasters. It uses Africa RiskView, a satellite-based tool to trigger payouts based on rainfall thresholds. ARC enabled early recovery planning and rapid disbursement of funds within 2–4 weeks of drought events, reducing humanitarian response delays. Countries like Senegal and Malawi received payouts that supported food distribution and livestock protection. ARC Replica and ARC Ltd. expanded coverage through donor-supported premium subsidies and technical assistance. The initiative also strengthened national contingency planning and risk modeling capacities (Greatrex et al., 2015; ARC, 2022; UNDP, 2024).

2.3. Best Practices in Global Climate Partnerships on Agriculture in Sub-Saharan African

Climate-smart agriculture (CSA) has emerged as a best practice in global climate partnerships focusing on Sub-Saharan Africa. CSA aims to simultaneously increase agricultural productivity, enhance resilience to climate change, and reduce greenhouse gas emissions where possible (FAO, 2013). A comprehensive study by Lipper et al. (2014) in Nature Climate Change highlighted the potential of CSA to

transform agricultural systems to support food security under changing climatic conditions. Successful implementations often involve partnerships between international organizations, local governments, and farming communities to tailor CSA practices to specific local contexts.

The development and distribution of climate-resilient crop varieties is another crucial best practice. The Consultative Group on International Agricultural Research (CGIAR) has been at the forefront of this effort. For instance, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has developed drought-tolerant varieties of crops such as sorghum, pearl millet, and groundnut that have shown significant yield improvements in Sub-Saharan Africa (ICRISAT, 2018). These efforts often involve collaboration between international research institutions, national agricultural research systems, and seed companies to ensure improved varieties reach smallholder farmers.

Implementing early warning systems and weather-based insurance schemes have proven to be an effective best practice. The African Risk Capacity (ARC), a specialized agency of the African Union, has pioneered in this area by combining early warning systems with insurance mechanisms to help member states improve their capacities to plan, prepare, and respond to extreme weather events (ARC, 2020). A study by Greatrex et al. (2015) in Agricultural and Food Security reviewed several index insurance initiatives in Africa and found that they can contribute significantly to climate resilience when implemented alongside other risk reduction measures.

Improving water management and irrigation practices is critical, given the increasing water scarcity in many parts of Sub-Saharan Africa. The Comprehensive Africa Agriculture Development Programme (CAADP), an initiative of the African Union, has identified water management as a key priority area (NEPAD, 2015). A review by Xie et al. (2014) in Agricultural Water Management assessed the potential for expanding irrigation in Sub-Saharan Africa and highlighted the need for integrated approaches to water resource management. Successful partnerships in this area often involve coordination between water resource management authorities, agricultural ministries, and international development agencies.

Knowledge sharing and capacity building have proven to be fundamental best practices. The Climate Change, Agriculture and Food Security (CCAFS) program, collaboration between CGIAR and Future Earth, has been instrumental in this regard. CCAFS has supported the establishment of climate-smart villages as learning platforms for various stakeholders (Aggarwal et al., 2018). Additionally, digital platforms like the African Farm Radio Research Initiative have shown promise in disseminating agricultural information to rural communities (Farm Radio

International, 2011). These initiatives often involve partnerships between research institutions, extension services, and media organizations.

While these best practices have shown promising results, their long-term success depends on continued collaboration, adaptation to local contexts, and sustained investment. As Thornton et al. (2018) argue in Agricultural Systems, addressing climate change impacts on agriculture in Africa will require transformative changes and innovative solutions that go beyond incremental adaptations. Global climate partnerships must therefore remain flexible and responsive to emerging needs and opportunities in the agricultural sector, continuously evolving their best practices to meet the challenges of a changing climate in Sub-Saharan Africa.

2.4. Challenges in Global Climate Partnerships on Agriculture in Sub-Saharan Africa

Global climate partnerships aimed at enhancing agricultural resilience in Sub-Saharan Africa have delivered promising results but continue to grapple with deeply rooted structural and operational challenges. These obstacles are particularly acute for smallholder farmers who constitute the backbone of the region's agricultural sector and often determine the effectiveness, scalability, and sustainability of climate-smart interventions.

Contextual Complexity and Limited Scalability of Interventions

One of the most pressing challenges is the difficulty in scaling up successful climate-smart agriculture (CSA) practices across diverse agro-ecological and socio-economic zones. While many pilot projects show high promise, translating these localized successes into broad regional strategies remains problematic. Whitfield et al. (2015) underscore that CSA effectiveness is highly context-specific, making 'one-size-fits-all' solutions impractical. For smallholder farmers, this means that interventions must be carefully adapted to local soils, climates, traditions, and production systems, requiring time, resources, and extensive participatory planning.

Limited Access to Finance and Agricultural Inputs

Smallholder farmers across the region frequently lack access to affordable credit, savings mechanisms, insurance, and essential inputs like drought-tolerant seeds or water-efficient irrigation technologies. The Rural and Agricultural Finance Learning Lab (2016) reports that formal institutions meet only 3% of smallholders' financing needs. This financial exclusion significantly limits their ability to adopt climate-resilient practices promoted by partnerships, resulting in uneven uptake and missed opportunities for building local resilience.

Fragmentation and Poor Coordination across Stakeholders

Climate adaptation efforts in Sub-Saharan Africa frequently suffer from overlapping mandates, fragmented implementation, and weak alignment between national, local, and international actors (African Capacity Building Foundation [ACBF], 2023). This lack of coordination undermines the coherence and scalability of climate-smart interventions. Ampaire, Mabon, et al. (2017) found that adaptation policies in East Africa are inconsistently coordinated, leading to resource duplication and gaps in service delivery. For smallholder farmers, such fragmentation often results in conflicting guidance, uneven support, and reduced access to reliable markets and knowledge services which are critical components for effective climate-smart agriculture (CSA) deployment. Evidence from Zambia's CSA accelerator program confirms that without integrated support systems, farmers face challenges in adopting CSA technologies due to inconsistent extension messaging, limited access to climate information, and weak market linkages (Homann-Kee Tui et al., 2023).

Gaps in Climate and Agricultural Data

High quality, timely data are essential for tailoring interventions, forecasting climate risks, and measuring partnership impact. Yet, many areas in Sub-Saharan Africa suffer from weak data systems and unreliable climate monitoring infrastructure. Ramirez-Villegas et al. (2013) emphasize how data limitations impede accurate modeling and hinder agricultural impact assessments. This directly affects smallholder farmers, who depend on seasonal forecasts, extension services, and risk assessment tools to inform planting decisions and investment choices.

Governance Constraints and Political Instability

Strong institutional capacity and political stability are prerequisites for effective partnership implementation. However, many Sub-Saharan countries face ongoing governance challenges, including weak rule of law and low administrative accountability (Mo Ibrahim Foundation, 2017). For smallholder farmers, this instability can disrupt access to services, impede long-term planning, and deter private investment in CSA initiatives. Partnerships often struggle to operate effectively in fragile contexts, risking discontinuity and reduced impact.

Balancing Short-Term Food Security with Long-Term Climate Resilience

Smallholder farmers in Sub-Saharan Africa often grapple with immediate survival needs including food security, market access, and livelihood protection, which can overshadow the long-term goals of climate resilience (Kapari et al., 2023). Hansen et al. (2019) highlight the trade-offs between short-term productivity gains and enduring sustainability, noting that interventions focused solely on yield improvement may inadvertently undermine ecological resilience. Partnerships must therefore carefully

design interventions that integrate quick wins (e.g., input subsidies or improved crop varieties) with deeper investments in ecological adaptation, institutional strengthening, and capacity building to ensure both immediate impact and long-term sustainability.

2.5. The Adequacy of Responses to Climate Change in Africa's Agricultural Sector

The adequacy of responses to climate change in Africa's agricultural sector remains a subject of critical scrutiny. Despite a proliferation of initiatives and interventions, their overall effectiveness is often questioned given the scale, urgency, and complexity of the challenge. As Kotir (2011) observes, while awareness of climate change impacts has grown significantly, the implementation of adaptation strategies has been slow and frequently inadequate. This gap between awareness and action is particularly concerning given the sector's vulnerability to climate variability and extreme events.

One area where responses have shown promise is the development and adoption of climate-smart agriculture (CSA) practices. CSA aims to sustainably increase productivity, enhance resilience, and reduce greenhouse gas emissions where feasible (Zougmoréet al., 2018). Empirical evidence from several African countries supports the effectiveness of CSA interventions. For instance, case studies from Rwanda, Tanzania, and Zambia demonstrate that CSA practices such as drought-tolerant crop varieties, agroforestry, and integrated soil fertility management have led to improved yields, enhanced soil health, and greater farmer resilience to climate shocks (Msaki, et al., 2015). A systematic review of 164 studies across Algeria, Senegal, Benin, Nigeria, and Zambia further confirms that CSA strategies positively impact smallholder productivity and food security, especially when supported by climate information services and policy incentives (Ariom et al., 2022). Despite this promise, the scale of adoption remains limited relative to the scale of need. Financial constraints, limited access to extension services, and inconsistent policy frameworks continue to hinder widespread uptake (Finizola e Silva et al., 2024). This indicates that while CSA is conceptually sound and empirically validated, its implementation is not yet adequate to meet the full scope of climate challenges facing the continent.

The adequacy of climate information services and early warning systems has yielded mixed results. While advancements in weather forecasting and climate modeling have expanded across the continent, translating this data into actionable advice for smallholder farmers remains a persistent challenge. Vaughan et al., (2019) found that although climate services are increasingly available, their integration into agricultural

decision-making is still limited, undermining their potential impact on adaptive planning.

In terms of policy responses, many African countries have made strides in incorporating climate change considerations into agricultural frameworks. Yet, implementation often falls short due to limited financial resources, weak institutional capacities, and fragmented coordination across sectors. According to Ampaire, Wangari, et al. (2017), despite the proliferation of climate policies in East Africa, significant gaps persist in operationalizing these frameworks effectively.

The financial adequacy of climate responses is particularly troubling. Although global climate finance has grown, only a small fraction reaches small-scale agriculture in Africa. As the Climate Policy Initiative reports (2019), Africa receives less than 15% of the climate finance it requires annually, with agriculture receiving an even smaller share. This financial shortfall severely constrains the ability of farmers to adopt climate-resilient technologies and practices.

Finally, the adequacy of research and technology development shows both progress and limitations. While there have been notable advances in breeding climate-resilient crop varieties and developing adaptive farming techniques, dissemination and uptake remain slow. Challinor et al. (2016) warn that crop-breeding systems are not keeping pace with the rate of climate change, and that without accelerated variety development and delivery, yields may decline within the next decade

3. Methodology

This study employs a qualitative desk review methodology, analyzing peer-reviewed literature, policy documents, and program evaluations published between 2010 and 2024. Five countries Rwanda, Ethiopia, Mali, Zambia, and Malawi were selected based on their active engagement in global agricultural partnerships and geographic diversity. Thematic coding was applied to extract patterns related to partnership structure, stakeholder agency, and climate-smart outcomes. Data triangulation was used to validate findings across sources, and a comparative matrix was developed to assess cross-country variations. Limitations include reliance on secondary data and uneven documentation across cases.

4. Analysis and Discussion

4.1. Evaluating the Outcomes of Global Partnerships in Climate Change Mitigation

Global partnerships have played a pivotal role in advancing climate change mitigation within Sub-Saharan Africa's agricultural sector. These collaborations have facilitated the dissemination of climate-smart technologies, institutional capacity building, and improved agricultural productivity. For instance, Rwanda's Strategic Plan for Agricultural Transformation (PSTA IV) enabled the adoption of drought-resistant crop varieties and expanded irrigation infrastructure, resulting in yield increases of up to 60% in greenhouse farming zones (MINAGRI, 2018; UNDP, 2024). Similarly, Ethiopia's irrigated wheat program reduced import dependency by 35%, demonstrating the tangible benefits of coordinated interventions (AGRA, 2025). Zambia's Climate Information and Early Warning Systems (CIEWS) project reached over 100,000 farmers with localized forecasts, enhancing adaptive decision-making and reducing crop losses (UNDP, 2022a). These outcomes reflect strong output validity, as defined by Marsh and McConnell (2010), yet input validity remains limited. Many partnerships lack inclusive planning and stakeholder co-design, which undermines long-term sustainability and local ownership (McConnell, 2010; CASA, 2023b).

4.2. Identifying Best Practices for Responsive and Sustainable CSA Interventions

Several best practices have emerged from global climate partnerships that enhance the responsiveness and sustainability of climate-smart agriculture (CSA) interventions. Integrated soil management, agroforestry, and climate-resilient crop varieties have proven effective when tailored to local agro-ecological contexts (AU-IBAR, 2024; CGIAR, 2022). Localized climate services such as real-time weather forecasts and community-based dissemination platforms have empowered farmers to make informed planting decisions, as seen in Zambia and Rwanda (UNDP, 2024; CASA, 2023a). Insurance mechanisms like those developed by the African Risk Capacity (ARC) have enabled rapid recovery from climate shocks through parametric payouts triggered by satellite-based rainfall thresholds (ARC, 2022; Greatrex et al., 2015). Inclusive programming, particularly gender-sensitive approaches and farmer-led innovation platforms, has further strengthened equity and community ownership (Cocchini & ter Steeg, 2019; Neufeldt et al., 2015). These practices are most effective when embedded in participatory governance frameworks and supported by coherent institutional coordination.

4.3. Analyzing Challenges and Power Dynamics Affecting African Stakeholder Agency

Despite notable achievements, global climate partnerships continue to face structural challenges that constrain African stakeholder agency. Power asymmetries persist, with donor-driven agendas often overshadowing local priorities and reinforcing dependency (Resnick & Birner, 2010; CASA, 2023b). Fragmented coordination among actors and overlapping mandates reduce implementation fidelity and hinder policy coherence (ACBF, 2023; Ampaire, Wangari, et al., 2017). Weak climate and agricultural data systems further impede adaptive planning and impact assessment, limiting the effectiveness of interventions (Ramirez-Villegas et al., 2013). Financial exclusion remains a critical barrier, as smallholder farmers often lack access to climate finance and agricultural inputs necessary for CSA adoption (Rural and Agricultural Finance Learning Lab, 2016). Interdependency theory, as articulated by Keohane and Nye (2001), suggests that African institutions can negotiate influence by leveraging strategic assets and contextual expertise. Ethiopia's wheat program and Zambia's co-produced climate services exemplify how localized knowledge and institutional leadership can reshape partnership dynamics and enhance agency (Gebreselassie & Bekele, 2021; Mwale et al., 2022).

4.4. Assessing the Adequacy of Climate Change Responses for Smallholder Farmers

The adequacy of climate change responses in Sub-Saharan Africa's agricultural sector remains insufficient relative to the scale of vulnerability faced by smallholder farmers. While CSA practices have demonstrated positive impacts such as improved yields, enhanced soil health, and greater resilience to climate shocks, their adoption remains limited due to financial, infrastructural, and policy constraints (Zougmoré et al., 2018; Msaki et al., 2015). Many policy frameworks lack operational depth and fail to integrate the climate adaptation into mainstream agricultural planning (Ampaire, Mabon, et al., 2017). Climate information services, though increasingly available, are not yet fully embedded in agricultural decision-making, reducing their potential impact (Vaughan et al., 2019). Furthermore, climate finance flows remain inadequate, with less than 15% of required funding reaching African agriculture annually (Climate Policy Initiative, 2019). Research systems also lag behind the pace of climate change, with crop-breeding programs struggling to deliver adaptive varieties quickly enough (Challinor et al., 2016). These gaps highlight the need for a paradigm shift toward equity-centered governance, institutional reform, and epistemic justice elevating smallholders as co-creators of climate strategies rather than passive beneficiaries.

5. Conclusion

Global climate partnerships have emerged as vital instruments in mitigating the impacts of climate change on agriculture across Sub-Saharan Africa. This study finds that while these partnerships have facilitated the dissemination of climate-smart technologies, strengthened institutional capacities, and improved agricultural productivity, their effectiveness remains uneven and context-dependent. Notable gains such as increased yields, expanded early warning systems, and enhanced resilience are evident in countries like Rwanda, Ethiopia, and Zambia. However, these successes are often geographically concentrated and pilot-bound, with limited scalability and sustainability.

The analysis reveals persistent structural challenges, including power asymmetries, fragmented coordination, inadequate data systems, and financial exclusion. These constraints undermine African stakeholder agency and limit the responsiveness of interventions to local needs. Moreover, while output validity is frequently achieved, input validity, particularly the meaningful inclusion of smallholder farmers in planning and implementation remains underdeveloped. The adequacy of climate responses is further compromised by underfunded research systems, weak policy operationalization, and insufficient climate finance reaching small-scale agriculture.

Ultimately, achieving climate resilience in African agriculture requires more than technical innovation. It demands governance reform, equity-centered design, and epistemic justice repositioning smallholders as co-creators of strategy rather than passive recipients. Interdependency theory affirms that African institutions can negotiate influence within global partnerships by leveraging contextual expertise, institutional legitimacy, and strategic assets.

Recommendations

To strengthen the effectiveness, equity, and sustainability of climate-smart agricultural partnerships in Sub-Saharan Africa, this study proposes the following recommendations:

1. Co-Design with Local Stakeholders: Embed participatory planning processes that include smallholder farmers, indigenous knowledge holders, and decentralized governance actors to ensure contextual relevance and foster ownership.
2. Expand Inclusive Climate Finance: Develop and scale blended finance models, weather-indexed insurance schemes, and community-based credit systems to enable smallholders to adopt climate-resilient technologies.

3. Strengthen Multi-Level Coordination: Establish integrated frameworks that align national, local, and international actors to reduce fragmentation and enhance policy coherence and implementation fidelity.
4. Invest in Data Infrastructure: Build interoperable climate and agricultural data systems, including localized early warning platforms and farmer-accessible digital tools, to support adaptive planning and evidence-based decision-making.
5. Balance Short-Term and Long-Term Goals: Design interventions that reconcile immediate food security needs with long-term ecological investments such as agroecology, soil regeneration, and landscape restoration.
6. Enhance Capacity Development: Support peer learning platforms, strengthen extension services, and invest in institutional capacity for researchers and policymakers to drive innovation and policy uptake.
7. Accelerate Adaptive Research: Increase funding for crop breeding, digital agriculture, and climate-smart innovations tailored to African agro-ecologies, ensuring that research systems keep pace with climate variability.

6. Limitations and Further Study

This study is constrained by its reliance on secondary data, which may omit undocumented local innovations or informal stakeholder dynamics. The desk review approach limits direct engagement with farmer perspectives, and country-level comparisons may mask intra-national disparities. Additionally, the theoretical framing, while robust may not fully capture indigenous epistemologies or informal governance mechanisms. Future research should incorporate participatory fieldwork and mixed-methods approaches to deepen contextual understanding.

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The Impact of Corruption on Biodiversity Conservation in Nigeria: A Review of Some Critical Issues

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Abstract

The rate of biodiversity loss and environmental degradation in Nigeria has reached an alarming level. While both natural and human factors contribute to this decline, corruption, encompassing theft, bribery, procurement fraud, nepotism, abuse of power, extortion, political patronage, and widespread impunity have significantly worsened the crisis. This study examines the link between corruption and biodiversity conservation using a structured conceptual framework and secondary data from international organizations, national agencies, academic institutions, peer-reviewed journals, books, legal reports, and governance and biodiversity databases. Through content and descriptive analysis, it explores how corruption intensifies biodiversity loss. Key findings indicate weak enforcement of environmental laws, a dysfunctional justice system, poor rule of law, institutional inefficiencies, negative attitudes among enforcement officials, and public disregard for regulations. These issues have led to overexploitation of resources, habitat destruction, deforestation, wildlife poaching, and air and water pollution. The broader consequences include severe biodiversity loss, ecosystem degradation, rising unemployment, increased poverty, widening income inequality, and higher crime rates. Addressing this crisis demands comprehensive reforms in Nigeria's governance, legal, and institutional systems, along with strict compliance with national and international biodiversity conventions. It also requires eliminating favouritism, discretionary practices, and arbitrary exemptions in natural resource licensing. Empowering local communities, strengthening community-based enforcement, integrating indigenous knowledge, and adopting digital tools for biodiversity monitoring are essential steps toward sustainable conservation.

Keywords*:* Biodiversity, Compliance, Corruption, Law Enforcement, Nigeria

1. Introduction

Corruption represents a pervasive global challenge that significantly compromises effective governance and undermines biodiversity conservation and sustainable development in numerous democratic states. Rather than serving the public interest, corrupt practices frequently confer undue advantages and private benefits to a privileged few, thereby impeding national progress and posing a severe threat to biodiversity. Empirical evidence underscores the nexus between corruption and environmental degradation. For instance, the 2020 International Criminal Police Organization (INTERPOL) report highlights the role of corruption in facilitating illegal logging and illicit timber trafficking (activities that not only result in the destruction of critical ecosystems but also jeopardize the livelihoods of communities dependent on forest resources). Such environmental crimes have triggered cascading socio-ecological consequences, including landslides and the loss of access to vital natural resources such as food, medicine, and fuel. Ranked among the most lucrative forms of transnational environmental crime, these illicit activities generate annual revenues estimated between $50 and $150 billion, resulting in substantial erosion of state tax revenues (INTERPOL, 2020).

The United Nations Office on Drugs and Crime (UNODC) also identifies illegal logging, wildlife trafficking, illegal mining, and waste trafficking as major transnational environmental crimes. Corruption facilitates these crimes through bribery, forged permits, and complicity of officials in customs, forestry, and law enforcement (UNODC, 2022a). In some of the countries of Latin America, such as Colombia, corruption has been identified as a primary enabler of environmental crime, contributing directly to biodiversity loss. Activities such as illegal mining, land encroachment, illicit logging, and wildlife trafficking persist due to corrupt networks involving bribery, forged permits, and the laundering of illegally sourced minerals (particularly gold) into formal markets. These practices subvert regulatory frameworks and allow environmental violations to proceed with impunity (World Wildlife Fund/Transparent Governance of Natural Resources [WWF/TGNR], 2021).

In Africa, illegal logging and wildlife trafficking are estimated to generate $23 billion annually (UNODC, 2022a). A 2023 UNODC report also emphasizes that corruption at border checkpoints and within regulatory agencies enables the laundering of illegal wildlife products into legal markets (UNODC, 2023).

In Africa a salient case in point is the Democratic Republic of the Congo (DRC), recognized as Africa's most biodiverse nation. The country harbours an exceptional array of species, including approximately 1,110 bird species, 227 amphibians, 1,528 fish species, 465 mammal species, 313 reptiles, and around 8,860 vascular plant

species (The Swiftest, 2022). Despite this ecological richness, the DRC is experiencing a marked decline in biodiversity due to a combination of legal and illegal exploitation of natural resources, exacerbated by systemic corruption (UNODC, 2022b; Itchoko & Tsopmo (2024). In 2022, the country ranked 166th out of 180 nations on Transparency International's Corruption Perceptions Index (CPI), with a score of 20 out of 100, significantly below the threshold associated with low levels of corruption (Transparency International, 2022).

Nigeria, another country endowed with rich biodiversity [ranked 11th in Africa and 35th globally in biodiversity conservation (The Swiftest, 2022)] also contends with entrenched corruption that the country's Economic and Financial Crimes Commission agency has estimated that more than US$ 380 billion of public funds have been stolen or wasted by various governments since their independence in 1960 (Itchoko & Tsopmo, 2024). In 2022, Nigeria was ranked 150th out of 180 countries on the CPI, with a score of 24 out of 100, indicating a high level of perceived corruption (Transparency International, 2022). This institutionalized corruption significantly undermines biodiversity conservation efforts. A notable example is the flawed allocation of oil exploration licenses in 2003, where corrupt practices led to the awarding of contracts to unqualified entities. This resulted in substantial revenue losses; for instance, some companies paid signing bonuses as low as $2.5 million for oil blocks valued at up to $25 million (Ezeamalu, 2018). In 2000, only $5 million was collected in signature bonuses, compared to an estimated potential of $248 million (Global Witness, 2006; Environmental Rights Action/ Friends of the Earth [ERA/FoE Nigeria] & Natural Justice, 2011; Extractive Industries Transparency Initiative [EITI] Nigeria, 2020). These irregularities have contributed to the overexploitation of oil resources, leading to environmental hazards such as oil spills and gas flaring, which have severely degraded ecosystems and accelerated biodiversity loss (Ezeamalu, 2018).

Given Nigeria's status as one of Africa's most biodiverse nations, hosting diverse ecosystems such as tropical rainforests, wetlands, savannahs, and coastal habitats, the preservation of its biodiversity is of critical importance. The country is home to several endangered species, including the Cross River gorilla, forest elephants, and rare plant species. Biodiversity plays a vital role in supporting the livelihoods of rural populations who depend on agriculture, fishing, and forest products (International Union for Conservation of Nature [IUCN], 2023)). Nigeria is also a signatory to key international environmental agreements, including the Convention on Biological Diversity (CBD) and the Paris Agreement, which mandate national actions to conserve biodiversity and mitigate environmental degradation. Nevertheless, the country continues to face significant environmental challenges,

including deforestation, poaching, illegal wildlife trade, and pollution, all of which are intensified by corruption (CBD, 2011).

Corruption remains a critical impediment to effective environmental governance in Nigeria. Public officials frequently accept bribes to permit illegal logging, mining, and unauthorized entry into protected areas. Compounded by weak institutional capacity and inadequate accountability mechanisms, such corrupt practices erode enforcement of environmental regulations and hinder the realization of sustainable development objectives.

In light of these challenges, this study examines the interplay between corruption and biodiversity conservation in Nigeria, with a particular focus on how corrupt practices undermine institutional efforts to preserve the country's rich biological heritage.

The study is organized as follows: it begins with an introduction, followed by a conceptual clarification, an examination of theoretical and empirical perspectives. This is followed by the research methodology, an analysis of the nexus between corruption and biodiversity conservation in Nigeria. Finally the development of a framework linking corruption and biodiversity conservation is presented.

2. Literature Review

2.1. Corruption and Biodiversity Conservation

Corruption is a widespread global issue that has prompted international attention and led to the development of international agreements aimed at combating it (UN, 2004). Despite the existence of these frameworks, corruption remains pervasive, particularly in developing countries.

According to scholars such as Rose-Ackerman (1978), Coolidge and Rose-Ackerman (1997), Tanzi (1998), Rose-Ackerman and Palifka (2016), Gupta (2019), Adeoye et al. (2020), Collier (2000), and Transparency International (2023), corruption refers to the misuse of public or institutional power for personal benefit. It erodes public trust, distorts governance, and negatively affects social, economic and environmental systems.

As noted by Rose-Ackerman and Palifka (2016), Pope and Jubb (2022), UNODC (2022c), and Transparency International (2023), corruption typically involves unethical or illegal behaviour by individuals or organizations in positions of authority. It manifests in various forms, including bribery (offering or receiving something of value to influence decisions), embezzlement (misuse of entrusted funds), nepotism or favouritism (favouring relatives or friends in appointments),

extortion (use of threats to obtain benefits), fraud (deception for personal gain), and clientelism (exchanging goods or services for political support).

In contrast, biodiversity refers to the full range of life forms within an ecosystem. It represents the variety of living organisms (ranging from microorganisms and plants to animals and humans), highlighting the richness and complexity of Earth's biological systems. Biodiversity reflects the intricate interdependence of species and ecosystems that sustain the ecological balance (National Geographic Society [NGS], 2019).

Three main types of biodiversity collectively contribute to the complexity of life on Earth. The first is genetic diversity, which refers to the variation in genes within a species, ensuring that no two individuals are identical. The second is species diversity, which reflects the number and distribution of different species within a habitat, with higher diversity typically found in biologically rich areas, such as coastal zones. The third is ecological or ecosystem diversity, which refers to the variety of habitats and ecological communities within a given region. Together, these dimensions form a complex and interdependent web of life that sustains the planet (Kearns, 2010; NGS, 2019).

Biodiversity conservation involves the protection, management, and sustainable use of biological diversity to benefit both present and future generations (Byjus, n.d.; Kearns, 2010; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2024; World Wildlife Fund [WWF], 2024, 2025). This practice serves three key functions: preserving species diversity, promoting sustainable ecosystem use, and maintaining the ecological processes essential to life (Byjus, n.d). Biodiversity conservation is generally divided into two approaches: in situ and ex situ (Byjus, n.d). In situ conservation involves protecting species within their natural environments, such as national parks, wildlife sanctuaries, and biosphere reserves. In contrast, ex-situ conservation involves conserving endangered species in artificial environments such as zoos, botanical gardens, gene banks, and nurseries (Byjus, n.d.).

2.2. Theoretical Foundation

Theoretically, the link between corruption and biodiversity conservation can be effectively examined through the lens of democratic governance. This theory explores how democratic principles, institutions, and processes influence decision-making, resource allocation, and the public administration. It integrates insights from democratic theory, governance studies, and public administration to understand how governance systems can become more transparent, participatory, accountable, and responsive to citizens (Liu, 2018; Haufler, & Sundström, 2020)

The key elements of the theory of democratic governance include participation (citizen involvement in decision-making), accountability (public officials being answerable for their actions), transparency (openness in decision-making and access to information), the rule of law (equal application of laws to all individuals and institutions), responsiveness (timely and appropriate reactions to public needs), and inclusiveness (ensuring that marginalized or vulnerable groups are included in governance processes) (World Bank, 1994; Kaufmann et al., 2009; World Bank, 2012; Kaufmann & Kraay, 2023; World Bank, 2024).

When applied to biodiversity conservation, democratic governance emphasizes embedding democratic values into environmental governance to ensure legitimacy, inclusivity, and effectiveness. It goes beyond administrative efficiency to promote citizen empowerment, equity, active political engagement, and the reduction of corrupt practices (Tungodden, 2001).

2.3. Empirical Research

Governance and institutional frameworks are key to understanding the success or failure of biodiversity conservation programmes (Wells, 1998). The author noted that programme effectiveness depends on incentives involving various organizations ranging from local communities and government agencies to NGOs, businesses, and international bodies. However, conservation efforts are often undermined by institutions that lack biodiversity awareness or commitment to its protection. To improve outcomes, Wells proposed several strategies: (i) decentralizing decision-making to local levels, (ii) aligning government institutions with conservation objectives, (iii) establishing new national and international agencies, and (iv) strengthening collaboration among institutional stakeholders. Active participation by local, national, and global institutions is crucial for designing and enforcing effective biodiversity incentives.

Azwardi et al. (2025) examined the role of green growth in driving economic development, particularly when supported by strong governance and anti-corruption policies. A key finding was that, contrary to expectations, corruption control showed a negative association with green growth (particularly in high-income Asian countries) indicating that current anti-corruption initiatives were largely ineffective between 2019 and 2023. The research shows that corruption hinders green growth by weakening environmental regulations, obstructing the enforcement of policies, and leading to inefficient resource utilization, especially in energy and industrial sectors. Moreover, corrupt practices worsen environmental damage and suppress green innovation by distorting policy incentives and undermining institutional performance. Overall, the study concludes that advancing green growth requires robust governance and strategic investment in environmental protection, while

unchecked corruption and development models reliant on intensive resource use remain major obstacles.

Asif et al. (2024) examines how political instability and corruption affect environmental degradation in selected South Asian countries from 1996 to 2019, using the panel Autoregressive Distributed Lag (ARDL) method to analyze short- and long-term impacts. Findings reveal that both factors significantly increase carbon emissions and ecological footprints in the long run, highlighting how weak governance and political turmoil impede sustainable environmental management. In the short term, political instability worsens environmental outcomes, while corruption shows an unexpected negative link to carbon emissions (possibly due to slowed economic activity or delayed industrial projects during turbulent periods). Overall, the study underscores that poor governance and persistent instability are key drivers of environmental decline in the region.

Itchoko and Tsopmo (2024) investigate how corruption affects the relationship between natural resources and economic growth in Sub-Saharan Africa from 1985 to 2022, using a Panel Smooth Transition Regression (PSTR) model. Key findings show that corruption significantly distorts natural resource management and undermines economic growth, with political corruption having the most detrimental effect compared to other forms. The impact of natural resources on growth varies with corruption levels. In low-corruption environments, mineral, oil, and forest resources have no significant effect on growth. However, in high-corruption settings, oil and forest resources hinder growth, while mineral resources surprisingly contribute positively, likely due to rent-seeking dynamics or selective exploitation.

Iheanachor et al. (2023) examined the interplay between corruption, environmental sustainability, and economic performance in Nigeria from 1981 to 2020, testing the validity of the Environmental Kuznets Curve (EKC) hypothesis using an ARDL model. The study found that corruption significantly undermines both environmental quality and economic performance. It directly and indirectly exacerbates environmental degradation by increasing CO_2 emissions and eroding ecological resilience, supporting the EKC framework. In the long run, rising corruption and higher carbon emissions are linked to deteriorating economic outcomes.

The reviewed literature offers a strong basis for understanding the links between corruption, governance, natural resources, environmental sustainability, and economic performance in developing regions like Sub-Saharan Africa and South Asia. However, key gaps persist. There is little or no examination of how indigenous knowledge, local enforcement and community-based governance can

reduce corruption in biodiversity conservation. Illicit financial flows from resource exploitation that drains revenues and weakening conservation financing are ignored. The role of digital and technological tools in improving transparency is underexplored. Moreover, ties to international environmental agreements and compliance are weak, and gender and social equity aspects are missing.

3. Methodology

This study primarily utilized secondary data and information obtained from publications and databases of international organizations, government agencies, and academic institutions. It also draws on peer-reviewed journal articles, books and legal reports related to corruption and biodiversity.

The gathered information was analyzed using content and descriptive analysis techniques. Content analysis was employed to systematically evaluate and interpret the publications, allowing for the extraction of meaningful insights. From the collected data on corruption, governance, and biodiversity, patterns were descriptively identified on a yearly basis, enabling the interpretation and discussion of trends and relationships relevant to the study.

4. Analysis and Discussion

As previously discussed, the analysis of the relationship between corruption and biodiversity conservation in Nigeria was based on secondary data. Content analysis was employed to assess and interpret the collected information, while descriptive analysis was used to explain the extent of corruption, the status of the biodiversity conservation, and the environmental performance of Nigeria in comparison with the selected African countries.

4.1. The Nexus Between Corruption and Biodiversity Conservation in Nigeria

Biodiversity conservation provides an atmosphere for other species to thrive. Promoting the well-being of existing species by mitigating the impact of human activities, such as environmental overexploitation, destruction, degradation, deforestation, wildlife poaching, and pollution (air and water), and minimizing the effects of natural disasters on biodiversity (Kearns, 2010).

Nigeria is one of the foremost biodiversity hotspots globally, as indicated in Table 01. Unfortunately, the abundance of biodiversity in the country has been threatened significantly over the past few decades. Factors contributing to these threats include a rapidly expanding population, which increased from 161 million in 2010 to 208.3 million in 2020 (UNODC, 2022d). Other challenges include insecurity, leading to the occupation of three out of Nigeria's seven crucial national parks (Kainji Lake National Park, Kamuku National Park, and Chad Basin National Park) by bandits and insurgents, rendering these parks inaccessible (UNODC, 2022d). The situation

is exacerbated by porous borders, limited political will and commitment, difficulties in law enforcement, regional instability, ongoing economic development, poverty, weak governance and institutions, fragile rule of law, deficient criminal justice systems, and corruption (UNODC, 2022d).

Some of the efforts put in place to improve and maintain the nation's level of biodiversity include the signing and ratification by the Nigerian governments of the Environment Related International Conventions and Protocols, such as the African Convention on the Conservation of Nature and Natural Resources, Algiers in 1968, the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) in 1973, the enactment of Environment Related National Legislations, such as the Federal Environmental Protection Agency Decree No. 59 of 1992, the National Parks Decree No. 1979, 1991, and 1999) and the establishment of institutions responsible for biodiversity conservation and research, such as the Federal Ministry of Environment, the State Ministries of Environment/Forestry Department, the Local Governments' Department of Agriculture and Natural Resources, the International Institute of Tropical Agriculture (IITA) Ibadan, and the National Institute for Freshwater Fisheries Research (NIFFR) (Federal Government of Nigeria [FGN], 2001).

The outcomes of these efforts are presented in Table 1. For instance, Nigeria was ranked 11th in Africa in biodiversity conservation and about 35th out of 210 countries in the world, with a biodiversity index of 135.87 (The Swiftest, 2022). These positions were based on the number of birds (864), amphibians (119), fish (776), mammals (294), reptiles (207), and plants (3378) species in the country in 2022 (The Swiftest, 2022). The only exception is its overall environmental performance, which is poor, as indicated by the global environmental performance index of 28.3, which ranked Nigeria 162nd out of 180 countries in the world and 41st out of 46 in Africa in 2022 (Yale Centre for Environmental Law & Policy, Yale University & Centre for International Earth Science Information Network, Columbia University [YCELP/CIESIN], 2022).

Table 01: Global Biodiversity and Environmental Index in Selected African Countries 2022

Country	No. of Bird Species	No. of Amphibian Species	No. of Fish Species	No. of Mammal Species	No. of Reptile Species	No. of Vascular Plants Species	Global Biodiversity Index	Environmental Performance Index*
Congo DR	1110	227	1528	465	313	8860	214.4	36.9
Tanzania	1074	207	1773	412	346	10100	213.1	34.2
South Africa	762	132	2094	331	421	21250	207.9	37.2
Cameroon	888	226	1064	351	288	6883	172.4	30.2
Kenya	1057	115	1060	424	272	6506	179.7	30.8
Madagascar	248	377	1197	257	444	12000	162.2	28.0
Angola	920	106	988	331	310	6735	160.6	30.5
Guinea	635	80	807	241	648	4000	153.4	31.6
Mozambique	675	90	1780	265	225	5692	144.3	31.7
Uganda	998	62	271	362	174	4932	136.6	35.8
Nigeria	864	119	775	294	207	3378	135.8	28.3
Ethiopia	821	78	173	311	244	6603	128.2	36.8
Sudan	917	13	485	255	279	3137	124.2	27.6

Sources: The Swiftest (2022) and YCELP/CIESIN, (2022)

However, public sector corruption in Nigeria is high, and efforts to control it have been a mirage (Transparency International, 2022). The country's anti-corruption agencies, such as the Economic and Financial Crime Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC), have failed to make any progress in the fight against corruption since their inception (Adebayo, 2020; Adeoye & Adeyemi, 2021). The pieces of evidence contained in Transparency International's Corruption Perception Index (CPI) in 2022 ranked Nigeria as 150th out of 180 countries in the world with a CPI score of 24 per cent, which is far below the 100 percent mark for lessor no corrupt nations (Transparency International, 2022) (see Table 02).

When the rate of corruption in Nigeria is linked to the level of biodiversity, the ripple effect provides a hotbed for activities occasioning degradation, destruction, over-exploration of natural resources, and the extinction of wildlife, which in turn has led to biodiversity loss, ecosystem deterioration, unemployment, income loss, poverty, and crime (United Nations Environment Programme [UNEP], 2011, 2019).

Table 02: Nigeria's ranking and score in the Corruption Perceptions Index (2016-2022)

Year	Global Ranking	Score
2016	136	28
2017	148	27
2018	144	27
2019	146	26
2020	149	25
2021	154	24
2022	150	24

Source: Transparency International (TI) (2022)

Note. This is adapted from the Transparency International Corruption Perceptions Index yearly reports. The index ranks about 180 countries from the least corrupt to the most corrupt.

Numerous instances illustrate how corruption severely undermines biodiversity conservation in Nigeria, where environmental laws and policies are often rendered ineffective due to poor enforcement (World Bank, 2012). A key example is the international ban on African elephant ivory trade under the Convention on International Trade in Endangered Species (CITES). Despite this prohibition, Nigeria remains a major source, transit, and destination country for illegal wildlife trade (IWT). Between 2015 and 2017, ivory seizures linked to Nigeria totaled approximately 12,211 kg (UNODC, 2022b, 2022d). In January 2021, a major seizure at Lagos's Apapa Port uncovered 2,772 elephant tusks (4,752 kg), 162 sacks of pangolin scales (5,329 kg), 5 kg of rhino horns, dried and fresh animal bones, 103 kg of suspected big cat skulls, and 76 pieces of semi-processed and processed timber (Trade Records Analysis of Flora and Fauna in Commerce [TRAFFIC], 2021; UNODC, 2022b, 2022c). The government also struggles to curb illegal charcoal and timber trade, as well as illegal, unreported, and unregulated (IUU) fishing in rivers and coastal waters (UNODC, 2022b, 2022d).

These illicit activities thrive due to weak institutional capacities, a dysfunctional criminal justice system, lack of rule of law, inadequate enforcement, widespread impunity, and poor attitudes among agencies responsible for conservation (even in the presence of relevant laws) (Adeola, 2005; ERA/FoE Nigeria & Natural Justice, 2011; World Justice Project [WJP], 2023). For example, the National Environmental Standards and Regulations Enforcement Agency (NESREA) enforce the National Environmental (Control of Charcoal Production and Export) Regulations (NESREA, 2014; IUCN, 2018), which require a valid permit and a reforestation plan for charcoal production. However, compliance is minimal. This is evident in

the discrepancy between official and actual charcoal exports: while Nigeria officially recorded $4.5 million in charcoal exports in 2018, external data suggest the actual value exceeded $91 million, indicating widespread illegal trade and regulatory failure (UNODC, 2022b, 2022d).

The implications are clear. Illegal trade and weak enforcement severely hinder biodiversity conservation. Despite international and national commitments, corruption, institutional failures, and poor coordination allow illegal activities to flourish. Deforestation from illegal logging and charcoal production destroys habitats and reduces carbon sequestration, while IUU fishing depletes fish stocks and damages marine ecosystems such as mangroves and coral reefs. These threats are fueled by corruption, lack of inter-agency cooperation, and weak prosecution, enabling traffickers to operate with impunity which necessitate urgent reforms to prevent further biodiversity loss and ecosystem collapse.

Corruption in Nigeria's extractive sectors (oil, gas, gold, tin, and emerging lithium mining) has become a major driver of biodiversity loss, especially in ecologically sensitive areas like the Niger Delta, Zamfara, and Plateau State. Systemic governance failures, weak regulation, and lack of accountability have enabled unchecked resource exploitation, leading to severe and often irreversible environmental damage (Ibeanu, 2003; Global Witness, 2006; Aliyu, 2024; Associated Press, 2024; Agency Report, 2025; Auta, 2025).

The Niger Delta, one of Africa's most biodiverse regions with extensive mangrove forests and aquatic ecosystems, has been devastated by decades of corrupt oil extraction (Padmore, 2018; Shirbon, 2023). As Global Witness (2006) reported, collusion between government officials, oil companies, and security forces has facilitated the illegal awarding of licenses and fraudulent contracts, weakening environmental oversight. Crude oil theft ("bunkering"), with an estimated 600,000 barrels stolen daily, leads to frequent, unreported spills that pollute rivers, destroy farmland, and harm aquatic and terrestrial species. Mangroves, vital for fish breeding and coastal protection, have suffered massive die-offs due to hydrocarbon contamination (Gillies, 2009).

Moreover, the absence of enforcement allows oil companies to operate with impunity, often bypassing environmental impact assessments (EIAs) and failing to rehabilitate degraded sites. The cumulative effect is a fragmented and degraded landscape that undermines ecosystem resilience and threatens endemic species (Padmore, 2018; Shirbon, 2023).

In Zamfara State, illegal artisanal gold mining continues despite a 2019 federal ban, sustained by bribery of police, military, and local officials. Investigations reveal that

some security personnel receive monthly payments from mining syndicates, highlighting deep institutional corruption (Premium Times, 2021; Aliyu, 2024; Sulaimon, 2025). The environmental impact is severe. Lead and mercury from ore processing have contaminated soil and water, causing widespread lead poisoning, especially in children. These pollutants disrupt ecosystems, enter food chains, and harm birds, mammals, and aquatic life. Unregulated excavation and deforestation also lead to habitat fragmentation, endangering biodiversity in the savanna ecosystem.

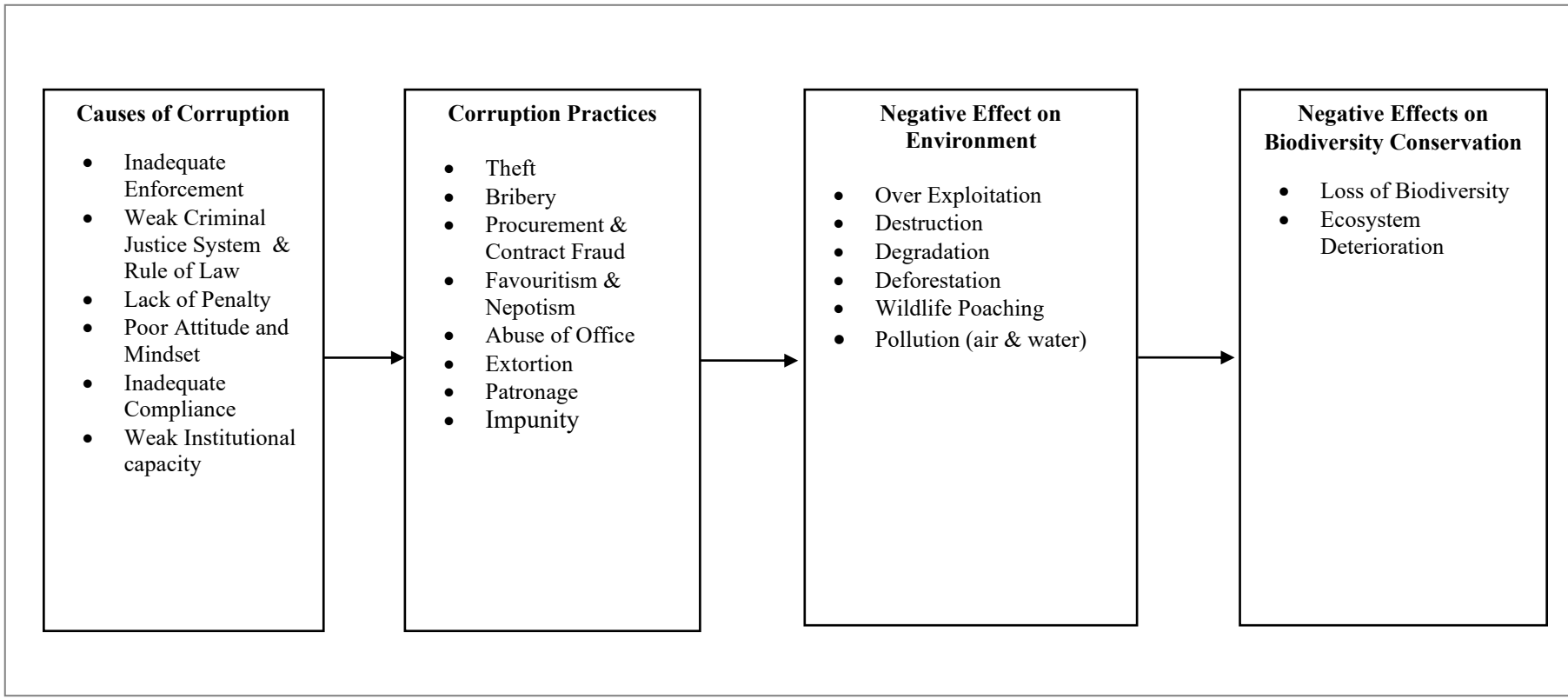
As global demand for lithium rises, Nigeria is exploring deposits in Nasarawa, Kogi, Kwara, and Oyo. However, National Extractive Industries Transparency Initiative (NEITI) (2023) has raised concerns over non-transparent licensing, including the award of exploration rights to inexperienced firms without competitive bidding. Allegations of bribery in the Ministry of Mines and Steel Development (such as fast-tracking permits and suppressing EIAs) are alarming (Akinwunmi, 2024; Akogun, 2024; Associated Press, 2024). This rush risks a "green resource curse," where the pursuit of clean energy materials causes deforestation, soil erosion, and water contamination, threatening fragile ecosystems and biodiversity before formal mining even begins.

On the Jos Plateau (historically rich in tin and columbite) illegal mining has resurged due to weak enforcement and systemic corruption. Regulatory agencies like the Department of Petroleum Resources (DPR) and Ministry of Mines have failed to act despite repeated warnings (Ibeanu, 2003; Suleiman, 2024). Local officials and traditional leaders receive kickbacks, and security forces have been filmed escorting illegal miners, exposing a deep patronage network (Agency Report, 2025; Auta, 2025; EFCC, 2025).

Environmentally, abandoned open pits and excavations have led to landslides during the rainy season, destroying habitats and endangering communities. Contamination of farmlands and water bodies with heavy metals such as arsenic and lead further degrades ecosystems. The montane ecosystem of the Jos Plateau hosts several endemic species, and ongoing habitat fragmentation due to unregulated mining poses a serious threat to their survival (Auta, 2025).

Collectively, these cases demonstrate that corruption in Nigeria's extractive sectors is not only a governance failure but an ecological emergency. It enables environmental crimes, weakens regulatory institutions, and prioritizes private profit over public and ecological well-being. The result is accelerated ecosystem degradation and biodiversity loss across multiple biomes, as illustrated in Figure 01.

Figure 01: A Framework Showing the Link between Corruption and Biodiversity Conservation



Source: Based on Literature (2024)

The framework presented in Figure 01 depicts the interrelationship between corruption and biodiversity conservation. It is grounded in the literature review, encompassing relevant theoretical perspectives and empirical evidence, as well as identified gaps in existing research. The framework identifies key forms of corrupt practices such as theft, bribery, procurement or contract fraud, abuse of office, extortion, political patronage, favoritism, and impunity perpetrated by actors in both the public and private sectors.

These corruption behaviours are caused by a range of weaknesses, including inadequate enforcement of environmental laws, a fragile criminal justice system, lack of legal penalties, poor public attitudes and awareness, low compliance, and weak institutional capacity. Collectively, these factors undermine the effectiveness of biodiversity conservation policies and regulations.

As a result, the environment faces severe threats such as overexploitation of natural resources, habitat destruction, deforestation, wildlife poaching, and air and water pollution. These environmental degradations ultimately lead to biodiversity loss and the decline of ecosystems.

Importantly, the framework also reveals a reinforcing feedback loop between corruption and environmental degradation. Corruption facilitates biodiversity loss and ecosystem decline, while the resulting weakened governance and resource scarcity further create opportunities for corruption to thrive. This self-sustaining cycle continues to worsen the situation unless effective interventions (such as the integration of indigenous knowledge, community-based governance, and local enforcement mechanisms) are implemented to break the cycle and promote sustainable conservation.

5. Conclusion

This study investigated the relationship between corruption and biodiversity conservation, based on a carefully designed conceptual framework. It further explored the impact of corruption on biodiversity conservation in Nigeria, focusing on various forms of corrupt practices, such as theft, bribery, procurement and contract fraud, favouritism, nepotism, abuse of office, extortion, political patronage, and widespread impunity. These corrupt behaviours have been perpetuated by several systemic issues, including weak enforcement of biodiversity laws, an ineffective criminal justice system, poor rule of law, insufficient penalties or sanctions, institutional weaknesses, a negative mind set and lack of commitment among enforcement personnel, and deliberate non-compliance by the public.

Collectively, these factors have led to the overexploitation of natural resources, habitat destruction, deforestation, wildlife poaching, and environmental pollution

(both in the air and water). The broader consequences of these environmental challenges include significant biodiversity loss, ecosystem degradation, rising unemployment, increasing income inequality, deepening poverty, and a rise in criminal activities.

Addressing the issue of corruption that has contributed to biodiversity loss in Nigeria requires a comprehensive reform of the country's governance, legal, and institutional frameworks. This includes strengthening anti-corruption measures, promoting accountability, transparency, and responsiveness among agencies and personnel responsible for biodiversity conservation.

Adherence to national legal frameworks and international conventions on sustainable biodiversity management is essential. Furthermore, it is critical to eliminate discretionary practices, favouritism, and unjust exemptions in the granting of licenses for mining, logging, and other forms of natural resource extraction.

Reforming the weak judicial system and strengthening institutions mandated to address biodiversity loss are equally important. Equally vital is the need for attitude change, ethical behaviour, honesty, and integrity in upholding environmental laws and protecting ecosystems.

There is also a need to increase public awareness, especially in rural communities, about how corruption undermines biodiversity conservation. Empowering local populations, strengthening community-based enforcement, integrating indigenous knowledge into conservation practices, utilizing digital and technological tools for monitoring biodiversity, promoting gender and social equity, providing essential social services, and developing sustainable alternative livelihoods are all critical steps. These measures can help reduce overreliance on natural resources by offering viable and sustainable alternatives.

6. Limitations and Further Research

This study was based entirely on secondary data, which limited the ability to verify the accuracy and completeness of the information. Furthermore, the focus on Nigeria may limit the extent to which the findings can be applied to other developing countries with differing socio-political contexts.

Future research should adopt a multidisciplinary or interdisciplinary approach, integrating governance, legal, environmental, social, economic, and technological perspectives, with a particular focus on biodiversity conservation. Greater emphasis should be placed on generating policy-relevant insights that can guide effective legislation, enforcement mechanisms, and sustainable development strategies in Nigeria and other countries facing similar environmental challenges. This holistic

approach will support the protection of biodiversity while promoting environmentally sound and socially inclusive solutions.

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Enhancing IT-Based Tax Payment Systems in Local Authorities in Colombo District in Sri Lanka

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Abstract

Local Authorities (LAs) in Sri Lanka have a significant responsibility to provide quality public services and are authorized to collect rates and taxes as primary income sources. The efficiency and effectiveness of service delivery determine the level of public satisfaction. However, inefficiencies in manual tax collection and the limited adoption of IT-based systems have posed challenges, highlighting the need to assess the effectiveness of existing digital tax payment systems in LAs. This study addresses the question: How effective and efficient are the existing IT-based tax payment systems in Colombo District LAs, and what strategies can improve their performance? Accordingly, the research analyzes the Strengths, Weaknesses, Opportunities, and Threats (SWOT) of existing IT-based tax and fee payment systems and identifies strategies to enhance their effectiveness and efficiency. The study focuses on twelve (12) LAs in the Colombo District that currently use IT-based tax payment systems. Data were collected through semi-structured interviews and secondary sources such as legal provisions, policies, and project reports. A qualitative analysis was conducted using the Innovation Diffusion Theory (IDT) as the theoretical framework, as it provides a comprehensive basis for understanding how innovations are adopted within organizations. The SWOT analysis was structured around the five (05) attributes of IDT relative advantage, compatibility, complexity, trialability, and observability, and their parameters. Overall, the findings reveal that the strengths of these systems are substantial, demonstrating that IT-based tax payment systems positively influence the functionality and performance of LAs. Finally, strategies to enhance effectiveness and efficiency were proposed under three key areas: structural development, educational development, and attitudinal development.

Keywords: Innovation Diffusion Theory, IT-Based Tax Payment Systems, Local Authorities, SWOT

1. Introduction

Sri Lanka has three types of Local Authorities (LAs): Municipal Councils (MCs), Urban Councils (UCs), and Pradeshiya Sabhas (PSs). MCs govern city areas and townships, UCs manage suburban areas, and PSs serve rural and remote regions. There are 341 LAs, comprising 24 MCs, 41 UCs, and 276 PSs. MCs are established under Sections 2, 3, 5, 7, 8, and 9 of the MCs Ordinance (1947), UCs under Sections 2, 3, 5, 8, and 9 of the UCs Ordinance (1939), and PSs under Sections 2, 4, and 8 of the PSs Act No. 15 of 1987.

LAs are responsible for regulating, controlling, and administering all matters related to community well-being, public utility services, and local development. They are authorized to collect taxes and fees to generate revenue for providing these services. Currently, most LAs rely on manual systems for tax collection, requiring citizens to visit offices, which is inefficient and inconvenient for both staff and the public. Some LAs have introduced IT-based and online systems, but many of them face operational challenges, limited functionality, and incomplete staff satisfaction.

At present, members of the public must visit their respective LAs to pay these taxes and fees, as most LAs still use manual systems for collection. This process is inefficient and inconvenient for both LA staff and the public. Although some LAs have introduced computer-based and online systems for tax and fee collection as part of a modernized approach to service delivery, most of these systems are not functioning effectively, face numerous operational challenges, and have not gained full staff satisfaction. Even the recently implemented IT-based systems have failed to deliver effective and efficient services due to several practical issues and limitations.

Given these issues, it is crucial to assess the effectiveness and efficiency of IT-based tax payment systems and identify opportunities for improvement. The existing literature largely focuses on technical aspects or private-sector adoption, leaving a gap regarding organizational perspectives in LAs, particularly in Sri Lanka, where digital systems are still in development. This study addresses this gap by assessing IT-based tax payment systems in Colombo District LAs using the Innovation Diffusion Theory (IDT) to analyze their Strengths, Weaknesses, Opportunities, and Threats (SWOT) and propose strategies for enhancing system effectiveness and efficiency.

In the context outlined above, the research objectives of this study are to:

01. Analyze the Strengths, Weaknesses, Opportunities, and Threats (SWOT) of existing IT-based tax payment systems used by LAs in Sri Lanka.
02. Identify the strategies that can be adapted to enhance the effectiveness and efficiency of existing IT-based tax payment systems in LAs.

2. Literature Review

The integration of Information Technology (IT) in public sector services has been widely studied, highlighting its potential to improve service delivery, transparency, and citizen engagement, alongside implementation challenges. Despite global advances, many developing countries still face difficulties optimizing IT-based tax systems at the local authority level. This review synthesizes prior research relevant to evaluating IT-based tax payment systems in Sri Lankan LAs through SWOT analysis within the IDT framework. The literature is organized into four sections: IT-based systems in the public sector, IT-based systems in taxation, technology acceptance models/theories, and Innovation Diffusion Theory (IDT).

2.1. IT-based Systems in the Public Sector

E-governance and the digital transformation of the public sector are central themes in contemporary public administration, aiming to provide efficient, accountable, and transparent service delivery to the public. However, the effectiveness of these systems and their adoption vary across the world based on different factors.

In the Sri Lankan context, Deshapriya (2022) evaluates the impact of e-government initiatives on public administration since 2005, emphasizing new policies, rules, and regulations. Key structural changes include the establishment of the Information and Communication Technology Agency (ICTA), the Re-engineering Government (Re-Gov) Programme, and the ICT Service under the Ministry of Public Administration, which expanded IT units in public organizations. The study also highlights gaps in e-government, such as poor communication between top management and IT units, limited citizen adoption, insufficient research, and restricted open data sharing.

Accessibility is a key concern in IT-based systems. Kiambati et al. (2024) examined digital library access for visually impaired users in Kenyan public universities, finding that type of impairment, prior assistive technology training, and usage frequency significantly affect success. The study emphasized that system availability alone does not ensure equitable access; adaptability, navigability, and compatibility with assistive tools are crucial for proper adoption. Insights from Ghana during the COVID-19 pandemic further highlight the benefits of digital systems in the public sector.

Owusu et al. (2023) studied digital surveillance platforms in Ghana, showing how they enhanced paper-based disease monitoring through real-time updates, hotspot identification, and public sentiment analysis. The study noted that effectiveness depends on reliable internet, sufficient resources, and equitable access, challenges common in developing countries, including Sri Lanka. It emphasized that digitalization must also prioritize human resources, local expertise, and community engagement, highlighting that successful public sector digitalization requires technology, planning, capacity building, and inclusive access.

Mekonen et al. (2025) examined Ethiopia's health commodities logistics management system, revealing that poor internet, unreliable electricity, limited computers, and staff shortages hindered performance. The study emphasized that effective digital systems require not only hardware and software but also reliable power, consistent supervision, feedback mechanisms, and trained staff in IT and supply chain management.

Musa et al. (2022) studied Indonesia's SimBaznas digital system, finding that user-friendliness, infrastructure, and availability alone do not ensure effective implementation. The main issue was inadequate IT human resources, especially for data entry and reporting, and the study highlighted that trust, awareness, and usability matter more than system functionality for user engagement.

Overall, these studies show that IT-based systems can enhance public sector service delivery, but their success depends on human resources, infrastructure, accessibility, and institutional support, but mere adoption is insufficient.

2.2. IT-based Systems in Taxation

Digital transformation in taxation is a key aspect of e-government, aiming for efficient public finance management, but its success depends on technological capacity, organizational context, and user engagement.

In Sri Lanka, Indika and Ariyawansa (2024) found that both staff and technology positively influence assessment tax administration in the Colombo Municipal Council (CMC), with staff being the most influential factor.

On the other hand, Withanage et al. (2022) studied the e-Vehicle Revenue License and e-Police Clearance Certificate systems in CMC, finding that usefulness, ease of use, and trust in the internet and government positively influence adoption. Challenges included security, data privacy, and system quality, highlighting that technical adaptation alone is insufficient. The study emphasized simplicity, reliability, accessibility, awareness, and a centralized e-government portal.

Senadeera and Charith (2024) proposed a blockchain-based framework to enhance transparency and trust in tax collection, using digital identities, unique transaction IDs, and expenditure tagging. Although the system is not yet implemented, it reflects growing interest in IT-based tax systems.

Not only in Sri Lanka but also in other countries, tax systems are considered one of the central areas under e-government agendas. Islam et al. (2024) examined digital transformation in Bangladeshi municipalities, identifying key barriers such as limited resources, inadequate infrastructure, server failures, insufficient staff training, low awareness, data privacy issues, weak policies, and financial constraints. Success depends on government support, legal frameworks, and adequate infrastructure.

Hans and Rutenge (2024) assessed e-government adoption in Tanzania's Kinondoni MC, and found that it improved service delivery, accountability, transparency, decision-making, economic development, information flow, and data security. Key barriers included limited IT infrastructure, unskilled personnel, financial constraints, and resistance to adoption. Success requires investment, training, funding, and effective change management.

Belahouaoui and Attak (2024a) reviewed literature from 2016–2023 on digital taxation, AI, and tax administration, finding that artificial intelligence (AI) and blockchain enhance compliance and efficiency, especially for Small and Medium-sized Enterprises (SMEs). Challenges include bureaucratic inefficiencies, resource shortages, low digital trust, and limited regulatory frameworks. Further, the authors (2024b) revealed that digital tax compliance depends on the quality of the relationship and trust between taxpayers and authorities, shaped by clear communication and simplified procedures. Even advanced systems may fail if trust is low or communication is unclear.

Herbart et al. (2025) found a strong link between financial performance and the use of the Integrated Financial Management, Programme-based Budgeting, and Integrated Personnel and Payroll systems in Kabale District Local Government, recommending their promotion for effective financial management.

IT positively influences property tax administration in Zimbabwe, improving timely revenue collection, record-keeping, management integrity, and local government income (Wadesango et al., 2024). Similarly, IT positively impacts tax administration in Nigeria, improving processes, reducing errors, enhancing efficiency and compliance, and curbing corruption, recommending user-friendly, mobile-compatible, and secure e-taxation systems (Ihenyen et al., 2022).

As per Olaoye et al. (2025) IT enhances tax administration in Nigeria by automating processes, reducing delays, improving transparency, monitoring, and compliance,

while challenges include regulatory gaps and informal sector exclusion, recommending IT investment, informal sector inclusion, and staff capacity building.

IT enhances tax administration by improving tax base identification, compliance monitoring, and reducing transaction costs, but its effectiveness is limited in developing countries due to poor infrastructure, adoption resistance, unsophisticated systems, trust deficits, and security concerns (Okunogbe and Santoro, 2023).

Overall, the literature shows that IT-based systems can enhance tax administration by improving efficiency, compliance, transparency, and accountability, but adoption challenges persist, making it essential to assess existing systems for continuous improvement.

2.3. Technology Acceptance Models/Theories

Given the complex human-technology interaction influenced by sociological and psychological factors, researchers have developed various theories and models to explain technology adoption and use, summarized in Table 01.

Table 01: Summary of key factors of technological acceptance models and theories

Theory/Model	Scholar/s and Year	Key Factors/ Perspective
Theory of Reasoned Action (TRA)	M. Fishbein and I. Ajzen (1975)	Attitudes, social norms and intentions
Social Cognitive Theory (SCT)	Albert Bandura (1986)	Social context with a dynamic and reciprocal interaction of the personal factors, environmental factors, and behaviours
Technology Acceptance Model (TAM)	Fred Davis (1989)	Perceived usefulness, perceived ease of use, and attitude toward use
Theory of Planned Behavior (TPB)	I. Ajzen (1991)	Attitude, subjective norms, perceived behavioural control, and intentions on the actual behaviour.
Model of PC Utilization (MPCU)	R. Thompson, C. Higgins and J. Howell (1991)	Job fit, complexity, long-term consequences, affect toward use, the social factor and the facilitating conditions
Motivation Model (MM)	F. Davis, R. Bagozzi and P. Warshaw (1992)	Individual's behaviour based on intrinsic motivation (a person's inner drive to perform the task and relates to perceptions of pleasure and satisfaction) and extrinsic motivation (outside the person or outside the task).

Combined TAM – TPB	S. Taylor and P. A. Todd (1995)	Linking the predictors of TPB with the constructs of perceived usefulness and ease of use from TAM. Attitude - usefulness (relative advantage), perceived ease of use (complexity) and compatibility, Normative belief structure - peer influence and superior influence and control belief structure - self-efficacy and facilitating conditions.
Innovation Diffusion Theory (IDT)	E. Rogers (1995)	Innovation is an idea, process, object, or practice that can be considered to be new, and diffusion is the process by which it gets into the social system. Five determinants are relative advantage, compatibility, complexity, trialability, and observability.
Extension of TAM (TAM2)	V. Venkatesh and F. D. Davis (2000)	Adding two more determinants to the original TAM: social influences (subjective norms and images) and cognitive instrumental Processes (job relevance, output quality, result demonstrability and perceived ease of use).
Unified Theory of Acceptance and Use of Technology (UTAUT)	V. Venkatesh, M. G. Morris, G. B. Davis and F.D. Davis (2003)	Performance expectancy, effort expectancy, social influence and facilitating conditions.
Technology Acceptance Model (TAM3)	V. Venkatesh and H. Bala (2008)	Perceived ease of use – computer self-efficacy, computer playfulness, computer anxiety, perception of external control, perceived enjoyment and objective usability. Perceived usefulness – subjective norms, job relevance, result demonstrability and image.
Extending Unified Theory of Acceptance and Use of Technology (UTAUT2)	V. Venkatesh, J. Thong and X. Xu (2012)	This model included the independent variables of UTAUT but added three more which are hedonic motivation, price value and habit.

Source: Alomary and Woollard (2015)

2.4. Innovation Diffusion Theory

Holland (1997) examined diffusion of innovation theories, highlighting the role of librarians in guiding users and summarizing related concepts and models. The study emphasizes internal staff engagement as key to successful technology diffusion, a point relevant to Sri Lankan LAs, where administrative staff mediate between digital systems and the public, underscoring organizational readiness and staff capability in managing IT-based tax systems.

Okour et al. (2020) examined how technological backgrounds influence decision-makers' use of knowledge management systems in Jordanian banks using IDT. Findings showed that comparative advantage, system structure, and information clarity affected usage, while system suitability did not. Although in banking, these insights apply to Sri Lankan LAs, where managerial perceptions and system design are crucial for successful tax system implementation.

Shaikh et al. (2019) examined household acceptance of "takaful" schemes in Pakistan using IDT. Findings showed that acceptance depends on perceived advantage, compatibility, awareness, and trust, while complexity was not a predictor. Although focused on individuals, the study highlights that cultural and cognitive factors also affect institutions. For Sri Lankan LAs, public awareness and trust in government IT platforms can shape perceived legitimacy and system usability, emphasizing the need for strategic communication and user engagement.

Jamshidi and Kazemi (2019) studied clients' intention to use Islamic credit cards using IDT, finding that relative advantage, compatibility, awareness, satisfaction, and attitudes shaped usage intentions. Though focused on consumers, the findings apply to institutions. For LAs, ensuring process compatibility, improving system performance, and fostering stakeholder satisfaction are key to enhancing the effectiveness and sustainability of IT-based tax payment systems.

Overall, while many studies have evaluated effectiveness and user acceptance mainly in the private sector using various models and quantitative methods research on IT-based systems in the public sector remains limited. Studies on IT-based tax payment systems are rare globally, and virtually nonexistent in Sri Lanka. This research is significant as it focuses on local government tax systems in Sri Lanka, employs qualitative methods, and applies an IDT-based framework from an organizational perspective.

3. Research Methodology

3.1. Study Area

The Colombo District was selected as the study area for this research, and it consists of thirteen (13) LAs. Among these thirteen (13) LAs, there are five (05) MCs, five (05) UCs, and three (03) PSs.

- Colombo Municipal Council (CMC)
- Dehiwala-Mount Lavinia MC
- Sri Jayewardenepura Kotte MC
- Kaduwela MC
- Moratuwa MC
- Maharagama UC
- Boralesamuwa UC
- Kesbewa UC
- Kolonnawa UC
- Seethawakapura UC
- Seethawaka PS
- Homagama PS
- Kotikawatta Mulleriyawa PS

The Colombo District was selected as the study area for several reasons. As the most populated district, with the CMC being the largest LA, it faces significant service delivery challenges, making IT-based systems and e-Governance essential. Additionally, most LAs (92%) in Colombo, except Seethawaka PS, have adopted IT-based tax payment systems. The district also offers high feasibility for future system improvements due to its available resources, technological infrastructure, and status as Sri Lanka's main commercial hub.

3.2. Data Collection

Data were collected from both primary and secondary sources. Secondary sources, including legal provisions, policies, and project reports, were used to examine LA tax and fee collection processes, while semi-structured interviews served as primary sources to identify the SWOT of existing IT-based tax payment systems and strategies to enhance their effectiveness and efficiency.

Semi-structured interviews were conducted with staff from the twelve (12) LAs using IT-based tax payment systems, based on the five (05) IDT attributes—relative advantage, compatibility, complexity, trialability, and observability. These attributes

guided the investigation of parameters related to system satisfaction and adoption to identify the SWOT of existing IT-based tax and fee payment systems (Table 02).

Table 02: Attributes and parameters of IDT used for this study

Attribute	Parameter
Relative advantage	Efficiency
	Low cost
	Reduced corruption/ transparency
	Traceability/ measurement
	Time saving
	Convenience service
Compatibility	Meeting expectations
	Change perception
	Satisfaction of quality
Complexity	Easy to understand
	User-friendly interface
	Functionality
Trialability	Pre-testing and testing
	Access to online public services
Observability	Knowledge and awareness campaigns
	Adequacy of resources

Source: Rogers (1995)

The sample for the semi-structured interviews was purposively selected, targeting key staff directly operating the existing IT-based systems in each LA. This approach allowed participants to openly express their experiences and perspectives on the systems they regularly used.

The semi-structured interview guide was based on the five IDT attributes, and twelve (12) face-to-face interviews were conducted with officers directly using the systems in the relevant LAs. Details of the interviewees are presented in Table 03.

Table 03: Details of interviewees

Local Authority	Service of the Public Sector which belongs to the Interviewee in the LA	Duration of the Interview
CMC	Management Service Officer's Service	1 hr
Dehiwala-Mount Lavinia MC	Management Service Officer's Service	2 hr
Sri Jayewardenepura Kotte MC	Management Service Officer's Service	40 min
Kaduwela MC	Management Service Officer's Service	45 min
Moratuwa MC	Management Service Officer's Service	40 min

Maharagama UC	Management Service Officer's Service	1 hr
Boralesamuwa UC	Management Service Officer's Service	40 min
Kesbewa UC	Management Service Officer's Service	40 min
Kolonnawa UC	Management Service Officer's Service	40 min
Seethawakapura UC	Management Service Officer's Service	1 hr
Homagama PS	Public Officer	1 hr 15 min
Kotikawatta Mulleriyawa PS	Management Service Officer's Service	1 hr 35 min

Source: Survey Data

3.3. Data Analysis

Data from the semi-structured interviews were transcribed verbatim and cross-checked with interview notes for accuracy. Key themes were identified, labelled, and aligned with IDT attributes using thematic analysis, supported by direct quotations to ensure credibility. This process informed the SWOT analysis of IT-based tax payment systems and strategies to enhance their effectiveness and efficiency. The qualitative approach provided an in-depth understanding of LA challenges often overlooked in quantitative studies.

4. Analysis and Discussions

This section explains the SWOT of IT-based tax payment systems in LAs in the Colombo District and discusses strategies to enhance their effectiveness.

4.1. SWOT of IT-based Tax Payment Systems in Local Authorities in Colombo District

Of the thirteen (13) LAs in Colombo District, twelve use IT-based tax payment systems, while Seethawaka PS still relies on a manual system. These twelve LAs employ four systems: Emetsoft (3 LAs), eLG (2 LAs), Nekfa (6 LAs), and the CMC system (used exclusively by CMC), as shown in Table 4. The first IT-based system was introduced by CMC in 2013, and Maharagama UC launched its system on 5 July 2023. Only three LAs allow online payment of all taxes and fees, while the others limit their systems to rate payments.

In this study, the SWOT analysis of IT-based tax payment systems in Colombo District LAs was conducted using the IDT framework. IDT was selected for its comprehensive approach, examining innovation adoption and diffusion at the organizational level. Unlike TAM or UTAUT, which focus on individual behavior, IDT supports an in-depth qualitative assessment through its key attributes, as discussed below.

Table 04: IT-based tax payment systems used in LAs in Colombo District

Name of the Tax Payment System	Software Development Company	Local Authority	Focused Income Source in the System	Commenced Year of the System	Availability of Online Payment Facility	Commenced Year of Online Payments
CMC Payment System	Information and Communication Technology Agency (ICTA)	Colombo MC	All taxes and fees	2013	Rates, Trade Tax, Tax on businesses, Market Rental, House Rental, Shops and Boutiques Rental, Hawkers Rental	2013
Emetsoft	Emetsoft (Pvt) Ltd.	Dehiwala-Mount Lavinia MC	All taxes and fees	2018	Rates, Shop rents, trade tax, Trade licenses	2020
Emetsoft	Emetsoft (Pvt) Ltd.	Moratuwa MC	All taxes and fees	2018	Rates, Shop rents, trade tax, Trade licenses	2020
Emetsoft	Emetsoft (Pvt) Ltd.	Maharagama UC	Only for rates	2023	Only for rates	2023
eLG	Cicra Solutions	Sri Jayewardenepura Kotte MC	Only for rates	2014	Only for rates	2018
eLG	Cicra Solutions	Homagama PS	Only for rates	2014	Only for rates	2018
Nekfa	Nekfa Australia (Pvt) Ltd.	Kaduwela MC	Only for rates	2018	Only for rates	2021
Nekfa	Nekfa Australia (Pvt) Ltd.	Kesbewa UC	Only for rates	2018	Only for rates	2021
Nekfa	Nekfa Australia (Pvt) Ltd.	Kolonnawa UC	Only for rates	2017	Only for rates	2023
Nekfa	Nekfa Australia (Pvt) Ltd.	Boralesgamuwa UC	Only for rates	2020	Only for rates	2021
Nekfa	Nekfa Australia (Pvt) Ltd.	Seethawakapura UC	Only for rates	2021	Only for rates	2021

Nekfa	Nekfa Australia (Pvt) Ltd.	Kotikawatta Mulleriyawa PS	All taxes and fees	2018	Only for rates	2018
No IT-based tax payment system		Seethawaka PS				

Source: Interviews Carried Out by the Author

4.1.1. Relative Advantage of the System

Applying the IDT, relative advantage is one of the main attributes and is explained through the parameters of efficiency, cost-related benefits, transparency, traceability, time-saving, and convenience of the system's services.

4.1.1.1. Efficiency

The efficiency of a system can be defined as the capacity of a system to perform its designated function in a way that optimizes the use of inputs (Wrike Team, 2023). The IT-based tax payment system in CMC, in operation since 2013, has run efficiently for over ten years. A Management Services Officer noted that it handles not only rate payments but also trade tax, business tax, market and house rentals, and hawker fees online. Given CMC's 2023 population of 591,085 (Ministry of Public Administration, Home Affairs, Provincial Councils and Local Government, 2023), manual processing would be impractical, but the system efficiently manages payments and reports within seconds.

Next, Emetsoft, developed by Emetsoft (Pvt) Ltd., is used by Dehiwala-Mount Lavinia MC, Moratuwa MC, and Maharagama UC. An officer from Dehiwala-Mount Lavinia MC noted that it supports multiple online payments, provides payment history, quickly calculates early payment discounts (e.g., 10% before 31st January), and allows customizable report generation. Maharagama UC reported similar efficiency, enhanced by good internet coverage, high-speed fiber, and a tech-savvy, high-income population.

The IT-based system "eLG," developed by Cicra Solutions, is used by Sri Jayewardenepura Kotte MC and Homagama PS. Officers highlighted its efficiency in handling payments and generating reports. An officer at Homagama PS noted that manually managing over 150,000 rate units would need a large staff, but the system allows just six staff to manage payments and generate final account reports anytime.

Other LAs using the Nekfa system, developed by Nekfa Australia (Pvt) Ltd., reported similar efficiency in quick report generation and payment handling with minimal staff. However, an officer from Kesbewa UC noted login issues and incorrect report details:

> *"There are several issues in this system. We cannot log in sometimes, and the Aries reports are often incorrect. Shop rental amounts cannot be seen separately, and calculations are wrong. This system is a mess! How can we work properly with error reports?"* (An officer in Kesbewa UC).

Overall, all systems except Kesbewa UC showed high efficiency, supporting optimal staff use, multiple concurrent payments, fast report generation, and quick access to details, aided by good internet and user IT skills. Kesbewa UC was the only LA reporting inefficiencies.

4.1.1.2. Low Cost

All LAs with IT-based tax systems initially signed five-year agreements, followed by annual maintenance fees. CMC reported the highest satisfaction with both the system and the fee, while Maharagama UC also valued the investment relative to service quality and public benefit.

> *"We did not invest much money in developing this system. We only spent Rs. 850,000/- as a total investment, including software and infrastructure development. For infrastructure, we utilized only Rs. 300,000/-. It is worth it, and we are very satisfied with this investment"* (An officer in Maharagama UC).

The other Emetsoft users were satisfied with their investment. eLG users noted high costs prevented system expansion to mixed-income sources, though minimal-staff payment handling remained a key benefit. Similarly, Kolonnawa UC, Boralesgamuwa UC, and Seethawakapura UC reported high costs for expanding the Nekfa system.

On the other hand, the officer in Kotikawatta-Mulleriyawa PS noted a loss in 2022 when comparing the bank gateway fees for online payments with the revenue received:

> *"We pay Rs. 25,000/- annually to the bank for gateway access related to the online payment system, but last year we only received Rs. 17,000/- through online payments"* (An officer in Kotikawatta-Mulleriyawa PS).

In summary, CMC and Emetsoft users are highly satisfied, while eLG and Nekfa users face high expansion costs; losses stem mainly from low customer awareness and limited online payments, not system failure.

4.1.1.3. Reduced Corruption/ Transparency

All LAs stated that IT-based tax payment systems ensure transparency and prevent corruption, as payments are updated in real time, histories are recorded, and details

can be cross-checked with bank statements. Authorized officers have specific user accounts, data modifications require permission, and all changes are logged for review.

An officer in Maharagama UC explained that previously, some individuals obtained rate numbers for incomplete buildings to reduce rates, but now only authorized officers can modify data, with all changes tracked. Similarly, an officer in Homagama PS noted that manual collections allowed fund misuse, whereas the system now ensures accountability through regular deposits and recorded transactions.

4.1.1.4. Traceability/ Measurement

All four (04) systems have traceability facilities and adopt a similar approach for this purpose. All officers in LAs using these systems are provided with personal user accounts as authorized accounts, specifying accessibility based on their assigned duties, while unnecessary access is restricted. The logging history of each user can be checked, showing what actions were performed, by whom, and at what time. Additionally, the system can trace customers' payment histories and filter details as needed. This procedure ensures the traceability of the system.

4.1.1.5. Time Saving

All LAs reported that IT-based systems save time compared to manual methods in managing customers, calculating remaining payments, checking histories, and generating reports. An officer in Maharagama UC highlighted the ability to convert PDF reports to Excel, avoiding manual entry, while Sri Jayewardenepura Kotte MC noted calculations are completed within seconds. CMC also confirmed efficient report generation.

However, officers in Kesbewa UC, Kolonnawa UC, and Kotikawatta-Mulleriyawa PS were dissatisfied with the Nekfa system, as modifications require company intervention, causing delays. In contrast, Boralesgamuwa UC reported timely updates within 2–3 days. Overall, CMC and LAs using Emetsoft and eLG were satisfied with time-saving benefits, while experiences with Nekfa varied.

4.1.1.6. Convenience Service

All LAs that use IT-based tax payment systems and online payment systems are satisfied with the convenience provided by the systems compared to the manual process, although there are some software issues, as mentioned in the previous sections. The Officer in Kolonnawa UC expressed his views on the convenience of the system as follows:

"We cannot generate timely analytical reports. Except for that, there are no issues in this system. However, it is much more convenient than making reports manually, checking all the ledger books, and issuing handwritten bills to customers one by one" (An officer in Kolonnawa UC).

4.1.2. Compatibility

According to IDT, the compatibility of a system is evaluated using the parameters of meeting expectations, perception of change, and satisfaction with quality. This section explains the compatibility of all four IT-based tax payment systems, focusing on these parameters.

4.1.2.1. Meeting Expectations

CMC, committed to providing efficient, accountable, and technologically friendly public service, implemented its IT-based tax payment system in 2013. An officer noted the system meets expectations by enabling error-free management of all tax and fee payments despite the large population.

Other LAs also adopted IT-based systems to enhance revenue collection and service efficiency. Maharagama UC reported quick fulfillment of expectations due to close attention to client needs during system development. Sri Jayewardenepura Kotte MC and Homagama UC are generally satisfied with eLG, though some reports and local adjustments require manual handling.

For the Nekfa system, most LAs, including Kaduwela MC, Kolonnawa UC, Boralesgamuwa UC, and Seethawakapura UC, reported the system meets expectations. However, Kesbewa UC and Kotikawatta-Mulleriyawa PS faced frequent errors, delayed support, report issues, and limited payment functionalities. Overall, CMC is highly satisfied, while other LAs are generally satisfied with minor concerns.

4.1.2.2. Change Perception

Perceptions of IT-based tax payment systems vary across LAs. The officer in Maharagama UC noted that the online system, launched on 5th July 2023, improved service delivery and influenced customer behavior, collecting over Rs. 1,200,000 within five months. Long queues of 3–4 hours no longer occur, and daily online payments are monitored. Actively collecting customer feedback helps change mindsets, enhance system understanding, and better grasp expectations. Officers also interact randomly with customers in the UC and the field to discuss issues.

In contrast, Kotikawatta-Mulleriyawa PS faces low trust despite introducing the online system five years ago. To address this, an awareness program was initiated.

Field inquiries revealed some residents, especially in estate areas, prefer door-to-door collection.

> *"People are not much aware of the online payment system, though we started it in 2018. Less than 1% of people use this online payment mechanism to pay their rate payments"* (An officer in Kotikawatta-Mulleriyawa PS).

Perceptions depend on population characteristics, particularly education and attitudes.

4.1.2.3. Satisfaction of Quality

Based on the above, CMC is highly satisfied with their system, having used it effectively for over ten years. Maharagama UC is also very satisfied, despite focusing only on rate payments, due to their active involvement in the system's design, considering legal requirements, feasibility, and client needs. Other LAs are generally satisfied with their systems, as reflected by the Officer in Kolonnawa UC:

> *"I feel that this system is good around 90%"* (An officer in Kolonnawa UC).

Kesbewa UC, while somewhat satisfied with the system's quality, expressed minor dissatisfaction with its functionality and the responsiveness of Nekfa Australia (Pvt) Ltd. in resolving issues.

4.1.3. Complexity

Under IDT, the attribute of complexity is measured by ease of understanding, user-friendliness, and functionality. This section explains the complexity levels of the four IT-based tax payment systems used by LAs in the Colombo District based on these parameters.

4.1.3.1. Easy to Understand

The study revealed that all four systems used by LAs in the Colombo District are not very complicated, from both institutional and customer perspectives, as they are primarily used for tax and fee payments. Only four LAs use the systems for all types of taxes and fees, while the other eight LAs use them solely for rate payments.

Furthermore, although the eLG and Nekfa systems are designed to include additional management functions such as store and human resource management, these functions are not activated or currently used by the LAs.

4.1.3.2. User-friendly Interface

Since the systems are generally not complex, most have a user-friendly interface for both institutional staff and customers. However, some staff and customers have reported that certain processes are lengthy. An officer in Kotikawatta-Mulleriyawa PS noted that entering multiple cheques requires several steps, which

slows the process. Similarly, customers in Seethawakapura UC found the online rate payment process long and not fully user-friendly, prompting the LA to provide guidance via Facebook and leaflets.

4.1.3.3. Functionality

At the organizational level, staff are assigned user accounts with access levels based on their duties. For rate payments, each property under an LA is assigned a unique property ID. The officer in Maharagama UC explained that property IDs were created for all 95,520 rate units and printed on rate notices, enabling customers to easily search their property details. This directs users to a page showing total value, quarterly payments, and amounts already paid. All systems allow customized payments. The officer in Dehiwala-Mount Lavinia MC illustrated:

> *"If a person has to pay Rs. 12,000/- of total value as Rs. 3,000/- for one quarter and he/she does have only Rs. 10,000/- on his/her hand, he/she can pay that money by customizing his/her payment"* (An officer in Dehiwala-Mount Lavinia MC).

After payment, customers receive receipts via email or download PDFs. Maharagama UC also sends SMS confirmations. Sri Jayewardenepura Kotte MC and Homagama PS use the eLG system, initiated by the Ministry of Provincial Councils and Local Government with ICTA support to improve efficiency, accountability, inclusiveness, and revenue collection. Developed in two phases—covering tax collection, licenses, permits, and certificates first, then other LA activities, the eLG system was introduced in 2014. Initially, LAs collaborated with ICTA and the contracted company, Hsenid (later Cicra Solutions), for Business Process Reengineering (BPR). After ICTA exited, Homagama PS signed a direct agreement with the company in 2018. Data entry was manual during the first year, and the system's functioning later became similar to Emetsoft. LAs using Nekfa, recommended by the Western Provincial Council, also operate similarly to Emetsoft.

4.1.4. Trialability

In the IDT, the attribute of trialability is measured by parameters such as pre-testing, testing, and access to online public services. This section, therefore, focuses on how pre-testing and testing were conducted in the four systems mentioned above in the LAs, as well as the availability of online access for paying taxes and fees.

4.1.4.1. Pre-testing and Testing

All systems undergo pre-testing before launch. Notably, the system used by Dehiwala-Mount Lavinia MC was checked by the Sri Lanka Computer Emergency Readiness Team (SLCERT), which ultimately awarded a certificate for the security of the payment gateway. As the Officer of Maharagama UC explained, the trialability

of the system is evident from the rigorous pre-testing conducted there. The system was tested by SLCERT through 14 cyber-attacks to evaluate its security. An assessment report identified five risks, two low and three medium, which were addressed through system redevelopment. Currently, the payment system employs three security measures: capture, Windows fire, and a one-way gate system, earning Maharagama UC the distinction of being the only LA with an SLCERT-certified payment gateway.

4.1.4.2. Access to Online Public Services

Although Dehiwala-Mount Lavinia MC and Moratuwa MC have used the system for all tax and fee payments since 2018, the online payment facility was only made available from 2020 for rates, shop rents, trade tax, and trade licenses. From 2018 to 2020, for all other tax payments, customers had to come to the office physically. Even then, bills were issued from the system without using handwritten documents.

Since Maharagama UC introduced the IT-based and online tax payment system recently in 2023, and it is currently limited to rate payments, customers must visit the UC physically for other tax and fee payments. Before 2023, Maharagama UC relied entirely on manual methods, requiring customers to come in even for rate payments. The new system now facilitates online rate payments. However, the lack of an online facility for all taxes and fees, which would allow remote payments, remains a significant disadvantage for customers.

Sri Jayewardenepura Kotte MC, Homagama PS, and Kotikawatta-Mulleriyawa PS initiated online payment systems in 2018, while Kaduwela MC, Kesbewa UC, Boralesgamuwa UC, and Seethawakapura UC started in 2021. Similar to Maharagama UC, Kolonnawa UC launched its online payment system recently in 2023. All these systems are currently limited to rate payments.

4.1.5. Observability

According to the IDT, observability is measured by the parameters of knowledge and awareness campaigns and the adequacy of resources. Therefore, this section elucidates the status of observability of the four (04) systems, focusing on these parameters.

4.1.5.1. Knowledge and Awareness Campaigns

ICTA, Emetsoft (Pvt) Ltd., Cicra Solutions, and Nekfa Australia (Pvt) Ltd. conducted initial training programs to help the LAs start using the systems. Later, office staff were responsible for training newcomers on the tax payment system. The LAs have also guided customers in using these systems. For example, Maharagama UC uploaded a step-by-step instructional video and PDF on its official website and

YouTube channel, enabling anyone to process payments independently, with all necessary guidance and facilities provided.

4.1.5.2. Adequacy of Resources

All LAs emphasized the need for new equipment, such as computers, printers, and routers, to ensure uninterrupted operations. The Officer in Homagama PS noted that old computers and broken printers hinder the process, stating, *"Our computers are old, and some printers are already broken. We need at least two printers next year. If not, we cannot continue the process."* Similarly, the Officer in Maharagama UC explained that infrastructure development is necessary, and after receiving approval from the Western Provincial Council and the administrative council of Maharagama UC, they plan to purchase new computers this year, as the existing machines are insufficient and outdated.

Additionally, the Officer in Kotikawatta-Mulleriyawa PS highlighted a lack of IT knowledge among staff, which forces them to rely on Nekfa Australia (Pvt) Ltd. for system-related work. The officer explained,

> *"There are no officers here who have IT knowledge at a satisfactory level. Therefore, we have to depend on the company always. Also, we have to accept what the company said because we cannot understand the technical part of the system"* (An officer in Kotikawatta-Mulleriyawa PS).

4.2. Summary on Strengths, Weaknesses, Opportunities and Threats (SWOT) of IT-based Tax Payment Systems

Summarizing the analysis, the following SWOT can be identified for IT-based tax payment systems in Local Authorities in the Colombo District.

Strengths	Weaknesses
• Established IT-based tax payment systems with online payment facility (mainly rate payments; some mixed-income sources). • Able to handles multiple customers simultaneously. • Eliminate handwritten bills. • Reduces queues. • Acts as a database with detailed customer/payment history. • Allows customized payment amounts. • Quick, accurate report generation.	• IT-based and online systems are mostly limited to rate payments. • Occasional system errors and calculation anomalies (discounts, etc.). • Limited report formats. • Multi-steps and non-user-friendly processes. • Inadequate IT equipment and infrastructure. • Lack of IT-skilled human resources

- High data accuracy and staff access-level controls.
- Traceable staff activities and improved transparency.
- Automated customer notifications (email/SMS).

Paperless environment and administrative trust in digital systems

Opportunities	Threats
• Institutional commitment to system improvement. • Alignment with national digitalization strategies (Digital Sri Lanka). • Streamlined service delivery and improved public perception. • Standardization across LAs and intergovernmental data sharing. • Upskilling of staff and workforce modernization. • Public–Private Partnerships (PPP) and inter-LA collaboration. • Academic/research collaborations and international assistance. • Multi-stakeholder investment in digital infrastructure.	• Weak/unstable relationships with system developers. • Delays from service providers. • High costs for further enhancements from service providers. • Dependence on external vendors. • Public distrust and negative attitudes toward online payment. • Cybersecurity threats. • Policy instability and lack of central coordination/support.

Overall, the SWOT analysis indicates that the strengths of IT-based tax payment systems in Local Authorities are highly significant. Therefore, implementing these systems positively impacts the functionality and performance of the LAs.

4.3. Strategies for Enhancing Effectiveness and Efficiency in Existing IT-based Tax Payment Systems

According to the research findings presented in Figure 01, strategies to enhance the effectiveness and efficiency of existing IT-based tax payment systems in LAs can be addressed through three aspects: structural development, educational development, and attitudinal development.

4.3.1. Structural Development

Under the structural development, the LAs should consider the following:

- Expanding the system to enable customers to make payments for all mixed-income sources as well.

- Correcting identified errors in the system.
- Ensuring the security of the online payment facility and obtaining the SLCERT certification.
- Developing IT infrastructure

4.3.2. Educational Development

Under educational development, the LAs can take the following steps to improve the knowledge of both organizational staff and the public regarding IT-based tax payment systems:

- Conduct awareness programs for the public on how to make online payments through the system.
- Distribute leaflets to the public explaining the online payment process.
- Conduct social media campaigns through platforms such as Facebook, YouTube, and Instagram.
- Upload clear instructions on the official website and within the online payment system so that customers can easily understand the steps to follow.
- Provide advanced IT training to LA staff and select capable officers who can think critically and propose appropriate development solutions for the system.

4.3.3. Attitudinal Development

Attitudes toward online tax payment systems should be improved among both organizational staff and the public to facilitate further developments. To achieve this, LAs can adopt the following strategies:

- Conduct awareness programs for the public, highlighting the benefits of the system.
- Display the progress of online payments on official websites and digital screens.
- Conduct training programs for organizational staff on how to coordinate effectively with private parties involved in system development.

5. Discussion

According to the MCs and UCs Ordinances and the PSs Act, the LAs have been established to regulate, control, and administer all matters related to community well-being, public utility services, and community access, as well as to safeguard and promote the welfare, facilities, and prosperity of the people. Each LA is responsible for generating the necessary funds to provide these services to the public. In this process, LAs are authorized to collect taxes and fees from the public to generate income. However, most LAs have traditionally relied on manual methods for tax collection, which are inefficient both institutionally and for the public.

In the Colombo District, there are 12 LAs that have implemented some form of IT-based system to manage the tax collection process. This study evaluated the efficiency and effectiveness of those systems using a SWOT analysis based on the attributes of IDT. The discussion below integrates the findings of this research with the broader academic literature presented in the literature review section.

This research revealed that IT-based tax payment systems in the LAs of the Colombo District have brought several benefits, particularly in improving service delivery, enhancing efficiency, ensuring accurate record-keeping and report generation, saving time, and streamlining processes. These findings are consistent with those of Ihenyen et al. (2022), Wadesango et al. (2024), Olaoye et al. (2025), and Okunogbe and Santoro (2023), which confirm that digital systems facilitate timely revenue collection, improve internal record-keeping, and enhance organizational transparency. According to the present study, none of the LAs issue handwritten receipts for rate payments, indicating a positive sign of digital progress in Sri Lanka's tax management process.

Despite these strengths, the study also identified several weaknesses in IT-based tax payment systems. Most of these systems and their corresponding online payment facilities are limited to rate payments, while manual processes continue for other types of taxes. This reflects partial fragmentation in the digital transformation of tax payments in the Colombo District. Weaknesses such as system errors, limited reporting functions, and inadequate IT literacy among staff mirror trends seen in other developing countries. Owusu et al. (2023) and Islam et al. (2024) identified similar issues related to limited IT capacity, while Hans and Rutenge (2024) and Mekonen et al. (2025) pointed to infrastructural limitations as barriers to effective e-governance. Okunogbe and Santoro (2023) also observed fragmented digital transformation, consistent with the situation in Colombo District LAs.

Encouragingly, the research found that there are substantial opportunities for improvement in IT-based tax payment systems within Colombo District LAs, particularly through enhanced policy coherence, institutional alignment, and stakeholder engagement. These findings align with those of Hans and Rutenge (2024), who emphasized that IT-based processes must be supported by investments in infrastructure, comprehensive training programs, adequate funding, and effective change management strategies to achieve long-term success. Similarly, Islam et al. (2024) stressed that the success of e-government projects depends on government support, a sound legal framework, and adequate infrastructure.

However, the findings also revealed several notable threats, including weak coordination between LAs and system developers, continuous dependence on external vendors, and public distrust in online payment systems. These challenges

correspond with the findings of Okunogbe and Santoro (2023), who identified lack of trust and security concerns as major obstacles. Attitudinal resistance among both staff and the public further complicates the adoption of IT-based systems. As Shaikh et al. (2019) and Jamshidi and Kazemi (2019) argue, drawing on IDT, cognitive and emotional factors such as trust, awareness, and satisfaction play a critical role in technology acceptance, particularly in service-oriented platforms.

Based on the SWOT results, this study proposes a three-dimensional improvement strategy, Structural Development, Educational Development, and Attitudinal Development to enhance the effectiveness and efficiency of IT-based tax payment systems. Structural development focuses on system expansion, infrastructure upgrades, and achieving certification standards such as SLCERT to strengthen security, aligning with the recommendations of Olaoye et al. (2025) and Okunogbe and Santoro (2023). Educational development focuses on both citizens and staff, aiming to enhance system awareness, confidence, and IT competence. This aligns with findings from the Kenyan case (Kiambati et al., 2024), where accessibility to digital systems was strongly influenced by prior training and user understanding. Attitudinal development addresses deeper behavioural aspects of adoption, emphasizing the importance of transparency, communication, and staff engagement, in line with the findings of Holland (1997) and broader IDT literature.

6. Conclusions and Recommendations

According to the SWOT analysis based on the five (05) attributes of IDT relative advantage, compatibility, complexity, trialability, and observability the IT-based tax payment systems in LAs demonstrate notable strengths, including a systematic structure, user-friendly interface, efficiency, and data accuracy. However, weaknesses such as limitations on rate payments, system errors, lack of user-friendliness, and restricted report generation persist. Opportunities lie in future system expansion and supportive government e-governance policies, while threats include dependence on developers, inadequate IT infrastructure, and limited staff IT literacy. Overall, the systems have a significant positive impact on LA functionality and performance. To further enhance effectiveness and efficiency, this study proposes strategies under three key areas: structural, educational, and attitudinal development.

6.1. Limitations of the Study

Despite its practical and theoretical contributions, this study has a few limitations. First, it focuses only on the Colombo District, which may not represent conditions in other, especially rural, areas. Second, it considers only the organizational perspective, excluding citizen viewpoints. Third, its reliance on a single theoretical framework the IDT may narrow the analytical scope.

6.2. Directions for Future Research

Based on the findings of the study, several future research directions emerge. Future studies could extend the analysis to include both rural and urban LAs, incorporate citizen perspectives, and assess the feasibility of adopting standard protocols and APIs. They could also examine the potential for implementing IT-based systems in areas with limited digital infrastructure and apply alternative theoretical frameworks beyond the IDT to gain deeper insights into technology adoption and organizational change in LA digitalization.

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Mahabharata's Shanti Parva and its Learnings on Good Governance

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Abstract

Mahabharata, this rich epic of Hindus is an intricately woven tableau comprising wisdom and insights for the inheritors of this legacy. Mahabharata is not just about kingdom and regalia; rather, it enunciates the nuanced understanding of governance and serves as an impeccable guide to stewardship. The main objective of this paper is to critically examine key dimensions of governance, specifically Raj dharma, justice, the dire need for a strong ruler and the safety and security of subjects, as delineated in the Shanti Parva. This conceptual paper is based on qualitative research methods. To do so, the existing literature on this topic has been dealt with and this paper is based on theoretical interpretation of books, articles and relevant websites. Despite not having civic democracies back in those days, this research has eventually come up with some ingenious parallels between the administrative practices of those days and contemporary precepts of effective governance.

Keywords: Ancient Indian Political Thought, Justice, Mahabharata, Raj Dharma, Shanti Parva

1. Introduction

As an ancient Indian epic, Mahabharata broadens our perspective and disseminates arcane knowledge regarding a plethora of subjects, ranging from kingship governance to gender justice and equity. Mahabharata is not just about kingdom and regalia; rather, it enunciates the nuanced understanding of governance and serves as an impeccable guide to stewardship. This paper seeks to analyse the very doctrine of good governance as enunciated in the 12th Parva of Mahabharata i.e., the Shanti Parva, the most prolonged Parva of Mahabharata out of its 18 Parvas. After the fierce and ghastly combat between the Kauravas and Pandavas, finally, the vanquishing potentate, Yudhisthira sought the prudent counsel of his grand uncle Bhisma. Filled with befuddlement and mental turmoil Yudhisthira in the quest for truth sought the insightful wisdom of Bhishma who was lying on a bed of arrows waiting for his final redemption. This conversation between the perspicacious Bhisma and King Yudhisthira forms the core of Shanti Parva. This paper firstly seeks to probe into the very meaning of good governance and its next objective is to locate the interface between good governance and Shanti Parva as chronicled in this magnanimous epic.

Mahabharata is replete with instances depicting the very notion of good governance. This paper seeks to unearth those facets of efficacious governance from the Shanti Parva of Mahabharata. The task is to navigate through this timeless classic to find any equivalence between the administrative practices of those days and current paradigms of sound governance. Classical Indian statecraft is a treasure trove in itself for being the mosaic of insights. Similarly, the construct of 'good governance' is all the buzz now. So, a point of synergy would be a fascinating thing to unravel, and this paper precisely aims to do the same.

In this context, this paper seeks to analyse the very meaning of good governance and endeavours to excavate a nuanced understanding of various dimensions of good governance as contextualised within the Shanti Parva.

1. Literature Review

The following survey of existing literature first extensively deals with the timeless epic Mahabharata and then focuses on the dimensions of governance.

1.1. Mahabharata and Shanti Parva

As its name suggests, Shanti Parva chronicled the post-war scenario (Dutt, 1903). Following cessation of the blood-soaked conflict at Kurukshetra, Yudhisthira wracked with guilt condemning himself for the destruction (Dutt, 1903). His soul was pierced with the death of his sons and filled with remorse, he longed for the ultimate relinquishment. His brothers along with his wife tried to pursue him with fervor (Dutt, 1903). The venerable sage, Vyasa also offered him words of solace by expounding that everything was pre-destined (Dutt, 1903). In the throes of emotional turmoil and cognitive dissonance, Yudhisthira sought answers to his questions from astute Bhisma (Dutt, 1903). Lying in a bed of arrows, Bhisma dispensed his wisdom on a plethora of issues (Dutt, 1903). The focus of this paper has predominantly remained on the various facets of governance.

Garg (2004) in her ingenious piece of work expounded on various facets of political ideas that are embedded in Shanti Parva. For instance, the author has skilfully brought out the origin of state theory embedded in Shanti Parva (Garg, 2004). Similarly be it on kinship, inter-state relations, government or dandaniti, the author has effectively conveyed the theoretical grounding of these aforementioned facets (Garg, 2004). This paper focused on those aspects that have a governance undertone. Khangarot (2017) has ingeniously come up with an in-depth explication of ancient scriptures like the Vedas and Upanishads and classical texts like Arthashastra, Ramayana and Mahabharata and thus it provided a significant cue for this research. However, a scholarly work single-mindedly focused on the point of convergence between Shanti Parva and governance is yet to be discerned. It is quite a daunting task to encompass

every aspect of sound administration in a single research paper. Hence, it leaves room for further scholarly discovery.

1.2. Good Governance

The covenant that bears mentioning in this context is the United Nations Development Programme (UNDP) document titled, "Governance for Sustainable Human Development" (1997). This aforementioned document tersely provides an overview of 'sustainable development' and 'good governance'. Governance is not the sole preserve of the state; rather it houses the civil society and private sector as well (UNDP, 1997). The eight central tenets of governance namely rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness, efficiency and accountability are the linchpins of contemporary governance (UNDP, 1997).

An in-depth exploration of Weiss' work provided nuanced governance acumen to comprehend this research paper (Weiss, 2000). Nandigama (2024) masterfully demonstrated the profundity of effective administration by outlining its various facets coupled with the primary constituents integral to it. A comprehensive set of measures has been introduced by the authority to facilitate the robust institutional framework (Nandigama, 2024). But the issue of sound management is a hard row to hoe and just like every silver lining has a cloud, there's a downside to governance as well before it becomes potentially realizable (Nandigama, 2024). This paper helps to enhance the concision of the construct of effective governance.

2. Methodology

This paper seeks to locate the interface between governance and Shanti Parva of Mahabharata through the theoretical interpretation of texts. This is mainly a qualitative research-based paper and to do so, an in-depth content analysis of books, articles and relevant websites has been conducted. First the existing literature on this topic has been dealt with and then the theoretical interpretation has been conducted.

Concept of Good Governance

Before delving into the intricacies of this topic, first, it is pertinent to embark upon understanding the very concept of good governance at the very outset. Governance, the term which has become the latest craze denotes the art of governing or "the state of being governed" or the method of government or regulation" (Weiss, 2000, p. 795). To put it in simple words, governance is the process through which common affairs are managed and steered by public and private institutions (Weiss, 2000, p. 796). This concept of governance rose to prominence during the 1950s and 60s when the disillusionment with the state-controlled models of socio-economic development began to pervade all around (Weiss, 2000, p. 796). There is a plethora of definitions of good governance enunciated by the esteemed institutions across the globe.

Governance is a decision making procedure coupled with the mechanisms through which such decisions are executed (United Nations Social and Economic Commission for the Asia and the Pacific, n.d.). Kofi Annan, the former UN Secretary-General expounded that good governance stands for garnering admiration for human rights, the rule of law, democracy and candor in administration (Weiss, 2000, p. 796).

A document titled "What is Good Governance" published by United Nations Social and Economic Commission for the Asia and the Pacific (n.d.) discussed eight canonical and archetypal characteristic traits of good governance. As per the document the first characteristic is participation, which denotes that every stakeholder of the government even the most vulnerable ones should have a voice in the decision-making algorithm. The second one is the rule of law or the impartial or unbiased execution of statutes and the other two significant elements are transparency and accountability, which means information, ought to be readily retrievable and disseminated amongst all the stakeholders. Further, this document noted that good governance stands for responsiveness and consensus-oriented and lastly it stands for equity and inclusiveness, which means even the most fragile and marginalized, should be provided with level playing field.

Elements of Good Governance

Following an in-depth understanding of the very fundamentals of good governance, it's time to devote oneself fully into the nuanced analysis of its intersection with the Mahabharata's Shanti Parva in greater depth. This paper seeks to feature and accentuate those segments of Shanti Parva that deal with exquisitely detailed facets of governance. Shanti Parva comprises 365 chapters and is further divided into three sub-Parvas, namely: i. Rajadharmanushasana Parva, ii. Apaddharmaanushasana Parva, iii. Mokshadharma Parva (Pareek, 2015, p. 95). This paper preponderantly seeks to explore this Rajadharmanushasana Parva to locate its symbiosis with the contemporary notion of good governance.

Rajdharma

Shanti Parva is a testament to the concept of 'raj dharma' which is considered to be one of the cornerstones of ancient kinship. At the very outset of this tranche of this magnanimous epic, Bhisma tendered his counsel of 'raj dharma' to Yudhisthira. The very first drop of the nectar of wisdom that trickled down his mouth happened to be,

> *Protection of the subject, O Yudhisthira, is the quintessence of duties* (Dutt, 1903, p. 81).

Bhisma elucidated the significance of dharma which was revered by the Elysian and transcendent sages like Bharadvaja, Gourashira and Manu. Therefore, preservation

and defense of the subjects are considered to be of utmost importance. Then Bhisma went on to explain the prolific ways of bestowing security to the adored subjects of the king. From the deployment of spies, charitable bestowing, looking after collective well-being, acknowledging virtue to executing responsibilities promptly, watching over and tending to dilapidated houses and paramountly in pursuant to 'dharma', a king was supposed to execute all his aforementioned duties (Dutt, 1903, p. 82). The primary function of the king was to sustain "dharma" and contribute towards the welfare of his subjects (Pareek, 2015, p. 96). Much like the Hobbesian Leviathan, Bhisma also vested the king with unwavering jurisdiction so much, so that he deserved complete obedience from his subjects (Pareek, 2015, p. 96). But before exercising unchallenged supremacy over his subjects, the king was expected to master the art of transcending his own emotions; in other words, self – mastery was considered to be a pre-requisite for unbridled power (Pareek, 2015, p. 96). Quite akin to the contemporary policy of using gentle persuasion to facilitate comprehension, Bhisma also emphasized winning the 'hearts' of his subjects rather than using coercion (Dutt, 1903, p. 81).

'Raj Dharma' in Shanti Parva is a laconic term comprising both the political and administrative functions; quite akin to the modern notion of government (Garg, 2004, p. 82). The king being designated as the head of the government was entrusted with the task of maintaining law and order coupled with the disposition of justice which is the strategic endeavour of any government (Garg, 2004, p. 82). Ensuring the well-being of his adored subjects is of utmost importance and the king should ensure that his subjects slumber in a cocoon of security. Although the entire machinery of government is composed of three pivotal organs namely, legislature, executive and judiciary, in Shanti Parva greater importance is accorded to the executive branch of the government (Garg, 2004, p. 82). For better governance, an efficacious and adroit executive is the need of the hour (Garg, 2004, p. 82). So in Shanti Parva, it is enumerated that the ministers must be incisive and meticulous enough to actualize the goals (Garg, 2004, p. 82).

Justice and Dandaniti

In another section, Bhisma orchestrated the king to fend for the poor and deliver justice just as the "Regent of death" (Dutt, 1903, p. 80). The concept of punishment or 'dandaniti' is elaborated at a stretch to guide the king for his future course of action. In this context, Dandaniti or "the science of coercion" can also be depicted as the "science of governance" (Garg, 2004, p. 82). Just as the saying goes, rule with an iron fist or keep a tight rein, similarly in order to toe the line, the king needs to enforce dandaniti to keep things under control (Garg, 2004, p. 82). The concept of punishment is enumerated in Shanti Parva as it is one of the linchpins of good governance to

expedite justice by administering sanctions on the malefactor (Dutt, 1903, p. 84). Even Bhisma vocalized the nuanced understanding of conferring sanctions upon individuals (Dutt, 1903, p. 84). For instance, Bhisma opined that Brahmanas should be exempted from punishment, penalties must be commensurate with the crime committed and emoluments should be given to those who were in dire need and those bestowed with unparalleled excellence (Dutt, 1903, p. 85), and most importantly what he propagated by saying "punish with your own hands the man whoever he may be, who doesn't satisfy his duty" is nothing short of the contemporary concept of the rule of law (Dutt, 1903, p. 85). This insinuates the fact that the law applies equally to everyone bereft of any kind of discrimination and regardless of one's status. Bhisma exposited that if the "science of coercion" was not administered properly, it would lead to the obliteration of the three Vedas and utter muddling of duties of belonging to different vernas (Garg, 2004, p. 82). It is only through the execution of the 'science of punishment' or 'dandaniti' that king could uphold 'dharma' and disseminate the same amongst his subjects (Pareek, 2015, p. 96). Shanti Parva enlightens us regarding the ultimate desiderata of life namely, "dharma, artha, kama, moksha" (Garg, 2004, p. 83). Dharma one of the fundamentals of Sanatan tradition stands for justice and optimal execution of one's duties (Garg, 2004, p. 83). It is the apical source of everything, be it law, morality or religion (Garg, 2004, p. 83). Artha on the other hand refers to the means for garnering mundane wealth and the "purusharthas" that gratify human coveting (Garg, 2004, p. 83). Kama refers to the longings and proclivities of individuals including one's carnal impulse (Garg, 2004, p. 83). Moksha is the denouement of one's life and it stands for the ultimate liberation of the soul. Bhisma chronicled that the ultimate function of the king was to administer justice and dandaniti so that the people could live under the canopy of law (Garg, 2004, p. 83).

Need for a Strong Ruler

Bhisma chronicled a bedlamite condition without the overarching rule of a strong monarch very akin to the state of nature enunciated by the social contractualists like Hobbes, Locke and Rousseau (Dutt, 1903, p. 100). Highly analogous to the Hobbesian state of nature of war of all against all, a completely anarchical situation would be pervading all around where the strong ones under duress would plunder and despoil "the properties of the weak", and on their denial to do so, would endanger the lives of the debilitated ones (Dutt, 1903, p.100). Only a strong sovereign ruler capable of handling such an acephalous condition would be able to restore law and order and provide protection to his subjects (Dutt, 1903). Strikingly analogous to the state of nature, in the condition prevailing before the institution of kingship, people had no idea about the notion of private property (Garg, 2004, p. 79). But with the phylogenesis of agriculture, people started establishing individual properties and developed the sense of thine and mine. Not only that then began the concept of

wresting wealth from others and the condition of utter mayhem prevailed (Garg, 2004, p. 79). Shanti Parva delineates that this propelled the necessity to establish kingship to protect the property and family of the people (Garg, 2004, p. 79). So with the establishment of monarchy, as it is chronicled in the Shanti Parva, the king became the sentinel of their "property, family and varna system" (Garg, 2004, p. 79). Varna was much kin to functional division of labour according to one's position in this hierarchy. For instance the performance of rites rested upon the shoulders of Brahmanas where as the Kshatriyas were endowed with the task of protection (Dutt, 1903, p. 111).

Safety and Security of the Subjects

The safety of the women was dealt with utmost importance (Dutt, 1903). Bhisma stated that the security would be such that the women could fearlessly stroll around the streets bereft of trepidation. To maintain law and order in his kingdom, Bhisma also championed complete abstention from intoxication (Dutt, 1903, p. 114). According to Bhisma contrite individuals and flagellants warrant special concern and they must be honoured with wholesome fare (Dutt, 1903, p. 114). This is essentially equivalent to the modern concept of the welfare state where the state fends on those who cannot provide for themselves. Bhisma compiled an exhaustive catalog of thirty-six virtues that a king should cultivate to function according to the principles of dharma (Pareek, 2015, p. 96). Such virtues include meticulously discharging one's duty, not gaining wealth by resorting to malicious means, being pristine and immaculate, should not act in benightedness and so on (Pareek, 2015, p. 96).

As already stated, the protection of his subjects coupled with their safety and security should be given cardinal consideration (Pareek, 2015, p. 96). Especially during the hours of travail, the king must work with a sensible approach and figure out discreet ways to help people in despondency (Pareek, 2015, p. 96) .Even a detailed matrix of taxation is given by Bhisma specially to raise extra revenue at times of emergency (Pareek, 2015, p. 96). Similarly, for the welfare of his subjects, the king should go that extra mile, even if it means signing a treaty with the enemy (Pareek, 2015, p. 96).

Very adeptly, Bhisma chronicled the genesis of prosperity of a king in the 56th chapter of Shanti Parva. He expounded that a self-controlled and austere king, who happened to be unostentatious, ethical, equanimous, handsome and not much enquiring remained unrelentingly thriving (Roy, 1890, p. 169). He further added, that by adjudicating justice coupled with occultation of one's weakness, identification of vulnerability of one's enemy, by maintaining one's "counsel close" and through decorous demeanour, a king could maintain his opulence (Pareek, 2015, p. 96). Shanti Parva lists out five different domains over which an efficacious king enjoyed complete custodianship namely, fortification, belligerence, maintenance of dharma

during administrate affairs, policy formulation and ensuring holistic care and prosperity of the subjects. Besides Mahabharata, classical Indian statecraft is replete with instances depicting the very notion of fiduciary excellence. For instance, venerable texts like Rig Veda and Yajurveda have given utmost primacy to theoretical paradigm of the welfare of the subjects (Khangarot, 2017, p. 16). Brihadaranya Upanishad underscored the duty of the ruler to uphold dharma i.e., moral rectitude, ensure the optimal well-being of his subjects and foster an equitable environment to ensure everyone has a level playing field, free from deprivation and exploitation (Khangarot, 2017, p. 16). Manusmriti articulates the principles of the rule of law and strong leadership, while Kaultilya's Arthashastra stands as a seminal and masterful work on statecraft (Khangarot, 2017, p. 16). Arthashastra has delineated the seven cardinal elements of the state known as the Saptanga theory of state constitutive of the ruler, ministers, territory, capital, treasury, army and ally (Khangarot, 2017, p. 19). Kaultilya's philosophy emphasizes the paramount importance of civic prosperity and sound judicial discretion, anchored in the principles of rule of law (Khangarot, 2017, p. 19). Be it Mahabharata or any of the aforementioned canonical texts of Vedic antiquarian they provide a very fascinating insight into the notion of governance and that was way ahead of its time, especially taking into consideration the paucity of representative government back then. Notwithstanding the lack of participatory governance, the ruler was accountable for the contentment of their subjects, denoting the fundamental building blocks of accountability and transparency. Even though the concept of 'inclusive administrative theory' is of recent origin, the philosophical underpinnings demonstrated applicability during the time of Mahabharata. A fastidious review of the Shanti Parva epitomizes axioms of administrative excellence that elicit a strong affinity with contemporary practices. The concept of Rajdharma is dispossessed of religious connotations; rather it details a schema for prudential management by focusing on the tasks and deliverables of the rulers. By the same token, the salience on women's safety, protection of the populace, and justice dispensation reflects effective governance. Thus the concept of human rights and protection of susceptible demographic has been reinstated in Mahabharata.

Shanti Parva Mirrors the Modern Aspects of Governance

The eight central planks of governance, namely rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness, efficiency and accountability, are the linchpins of contemporary governance (UNDP, 1997). Similarly, if one flips through the pages of the Shanti Parva of the Mahabharat, clearly, such principles of modern governance can be noticeably urbane. For instance, in Shanti Parva, the weal and woe of subjects have been entrusted to the king and ensuring their protection is considered as his primary function. The public who are being treated as the bigwigs in governance are bestowed with primacy, hence the very

schema of consensus orientation of modern governance goes hand in hand with this. Again, administration of justice and amassing of wealth adeptly among the subjects tantamount to the modern notion of the rule of law and optimal use of resources. Likewise, in Shanti Parva, Bhisma underscored the importance of accountability of kings because if the king is not venerated "by his own people" then he would be greeted with derision by his enemies as well (Dutt, 1903, p. 99). By the same token, the issue of responsiveness has also been inscribed implicitly as in one instance, the king has been reminded to ensure the security of his subjects with patrilineal affection.

3. Conclusion

Mahabharata is not just a grandiose epic furnishing sanctuary to a range of human emotions, but also teaches us about a plethora of issues that are of contemporary relevance. The issue of governance has become the talk of the town in recent times. But our ancestors were the chosen ones and indeed were way ahead of their times to comprehend such an issue back then. Shanti Parva is a testament to good governance and chronicled issues ranging from taxation, safety and security of subjects, emergency times, and deployment of spies to utmost maintenance of 'dharma'. This paper has attempted to highlight this intersection between governance and Shanti Parva and thereby flung ajar a revised understanding of this epic altogether.

4. Limitations and Further Research

Although a lot of rendered adaptations of Mahabharata is seamlessly navigable across the globe, since the original one was written in Sanskrit, the original scripture becomes impenetrable to many owing to the language constraint. Many times, these translated renditions compromise with the semantic fidelity of the foundational writings. This can be considered as one of the biggest limitations of working with the aforementioned epic. Yet, there are a plethora of opportunities for further research and reconnaissance of Mahabharata. Each of its segments and Mahabharata in general remains a fertile ground for scholarly discovery. So far as this intersection between governance and Shanti Parva is concerned two articles cater partially to this topic. "Political Ideas of Shanti Parva*"* (2004) by Garg offers an insightful analysis of the political ideologies embedded in Shanti Parva but does not focus predominantly on the governance issue. Similarly, another written by Dr. Meenakshi Khangarot titled "Good Governance in Ancient India: An Analysis" (2017) provides an in-depth explication of ancient scriptures like the Vedas, Upanishads and classical texts like Arthashastra, Ramayana and Mahabharata. However, a scholarly work single-mindedly focused on the point of convergence between Shanti Parva and governance is yet to be discerned. It is quite a daunting task to encompass every aspect of sound

administration in a single research paper. Hence, it leaves room for further scholarly discovery.

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A Book Review
Disaster Law: Principles and Practice by Amita Singh

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Few books possess the ability to fundamentally reshape one's understanding of a subject, but Dr. Amita Singh's *Disaster Law: Principles and Practice*, achieves precisely that. It is an exploration of current public policy on disaster management. What began as an intellectual curiosity swiftly evolved into an enlightening journey through a meticulously researched and compellingly argued treatise on disaster law, one that refuses to treat disasters as mere "natural" calamities, but rather as manifestations of systemic failures, legal inadequacies, and administrative negligence. Spanning 205 pages of incisive analysis, this work transcends conventional academic discourse, offering instead a bold, intersectional, and deeply humane examination of how disasters unfold, who they impact most severely, and how legal frameworks can and must evolve to address them.

Dr. Singh's book distinguishes itself from the outset by adopting an interdisciplinary lens, weaving together insights from administrative law, policy studies, social sciences, and geopolitics. The early chapters lay a robust foundation, defining key concepts and principles with clarity, ensuring that readers, whether scholars, practitioners, or policymakers are well-equipped to engage with the more complex discussions that follow. Yet, what truly sets this book apart is its unwavering commitment to amplifying marginalized voices. Disasters, as Dr. Singh compellingly argues, do not affect all equally; they disproportionately ravage vulnerable communities, women, LGBTQ+ individuals, indigenous populations whose suffering is often rendered invisible in mainstream disaster narratives. By zeroing down on these deficits of disaster policies, the book not only fills a critical gap in legal scholarship but also challenges readers to confront the ethical dimensions of disaster response.

The legal discourse in disaster policy transcends human suffering as over planet earth, there are many other denizens who share this only habitat for life. Therefore, the book stands out in thoughtfully addressing the often-overlooked plight of animals and ecosystems, which bear the brunt of environmental degradation and reckless human activity. This inclusion underscores a central thesis of the work: disasters are rarely "Acts of God", but rather the consequences of anthropogenic recklessness, institutional apathy, and governance failures. This reframing is not merely academic, it carries profound implications for legal accountability, urging a paradigm shift in

how liability is assigned in the wake of catastrophes which is also a dark area of public policy analysis.

One of the book's most striking strengths is its impeccable organization. Each chapter builds upon the last, guiding the reader through a logical progression from theoretical foundations to practical applications. Chapter one, for instance, establishes a critical framework by interrogating governance failures, social exclusion, and legal doctrines such as public trust and vicarious liability. It seamlessly integrates international instruments like the Hague Convention and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) while remaining firmly anchored in India's unique socio-legal context, referencing crisis-prone regions like Manipur and Kerala.

Subsequent chapters delve into even more innovative terrain. Chapter two and Chapter seven, for example, expand the boundaries of disaster law by incorporating zoonotic pandemics like COVID-19 not merely as public health emergencies, but as legal and environmental failures. This timely analysis underscores the necessity of redefining disaster law to encompass biological threats, a perspective sorely lacking in existing literature. Perhaps the book's most groundbreaking contribution emerges in Chapter four, which introduces an intersectional lens to disaster law, scrutinizing how gender and LGBTQ+ identities shape vulnerability and recovery. By asking, 'who will live when not everyone can live', Dr. Singh exposes the biases embedded in disaster response mechanisms, challenging legal scholars and policymakers to design more inclusive frameworks. This focus on intersectionality is rare in traditional legal texts, making the book a pioneering force in the field.

While the book excels in its critical analysis, it does not merely dwell on problems, it offers solutions. Chapter five presents a compelling longitudinal study comparing Odisha's catastrophic 1999 super cyclone, which claimed over 10,000 lives due to inadequate preparedness, with the state's remarkably effective response to Cyclone Fani in 2019. The latter disaster saw dramatically reduced casualties thanks to early warning systems, mass evacuations, and inter-agency coordination. This contrast serves as a powerful testament to how legal and policy reforms can convert vulnerability into resilience.

Equally innovative is Chapter six, which links disasters to global supply chains and foreign trade, a dimension frequently neglected in legal academia. In an era of economic interdependence, Dr. Singh argues, disasters in one region can trigger worldwide disruptions, necessitating international agreements that facilitate swift recovery and equitable resource distribution.

The book concludes on a visionary note in Chapter eight, reframing disasters as opportunities for resilience and diplomacy. India's vaccine diplomacy during COVID-19 exemplifies how proactive disaster response can foster international solidarity, reinforcing the book's overarching argument: disaster law, when wielded effectively, can be a transformative tool for justice and sustainability.

Disaster Law: Principles and Practice is nothing short of a landmark work. It is among the first to treat disaster diplomacy as a serious legal domain, blending rigorous scholarship with urgent advocacy. By interrogating institutional shortcomings, proposing innovative frameworks, and centering marginalized voices, Dr. Singh has crafted a text that is as intellectually rigorous as it is morally compelling.

This book is indispensable for law students, researchers, policymakers, and judges, but its relevance extends far beyond academia. It is a clarion call to reimagine disaster law as an instrument of equity, dignity, and ecological preservation. In a world increasingly besieged by climate crises and systemic inequities, Dr. Singh's work is not just timely, it is essential. A masterful, thought-provoking, and indispensable contribution to legal scholarship, which is highly recommended.

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