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Integrated Data Governance and Predictive Analytics for Enhancing Public Service Management in Bangladesh: A Framework for Evidence-Based Decision-Making

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Abstract

This research paper explores how Bangladesh can enhance its public service management through a comprehensive framework for integrated data governance and predictive analytics. Despite significant advancements through e-governance initiatives, the public sector suffers from fragmented and disconnected data systems hindering efficient decision-making. This study proposes a holistic framework to integrate data governance across government agencies, enabling predictive analytics to improve policy formulation, resource allocation, and service delivery. By examining the challenges and lessons from global practices, this research provides a practical, scalable framework tailored to Bangladesh's governance needs. The paper highlights how predictive analytics can anticipate issues such as health crises, disaster management, and urban growth, positioning Bangladesh to deliver more efficient, transparent, and citizen-centered governance.

Keywords: Integrated Data Governance, Predictive Analytics, Public Service Management, Evidence-Based Decision-Making, Interoperability and Data Sharing, Capacity Building in Public Administration, Digital Governance, Data Integration

1. Introduction

In the digital era, public administration worldwide is undergoing a profound transformation from traditional, bureaucratic governance to a more data-driven, digital governance model. This shift reflects a growing recognition of the value of data as a strategic resource for making informed decisions,

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improving governance efficiency, and enhancing transparency. In the context of Bangladesh, the government's push toward digitalisation has been epitomised by a few e-governance initiatives, launched in 2008. These initiatives have propelled the country forward, with significant investments in information and communication technology (ICT), resulting in the widespread use of digital services across various public sectors.

By 2022, Bangladesh had made remarkable strides in digitising government services, with nearly all ministries and more than 90% of government departments establishing websites and online service portals. The introduction of e-Government Procurement (e-GP), the online tax portal, and digital land management systems has significantly enhanced access to services for the public. For example, digital public services have saved citizens over 1.5 billion days and approximately 8.5 billion US dollars in transaction costs since 2014 (Jerab, 2024).

However, the rapid adoption of ICT has not been without its challenges. Although various government ministries and departments have embraced digital technologies, the systems they use remain largely disconnected. This lack of interoperability creates data silos, impeding efficient data sharing and analysis across government agencies. As a result, public services suffer from inefficiencies, duplication of efforts, and missed opportunities for evidence-based decision-making. This fragmentation has become a significant barrier to realising the full potential of digital governance in Bangladesh.

Despite the impressive digital advancements, the public sector in Bangladesh continues to face major hurdles in fully realising the potential of its digital systems. The fragmented nature of government data systems, along with a lack of interoperability, limits the ability of ministries and departments to share and analyse data effectively. This results in redundant data collection, wasted resources, and insufficient use of data for informed decision-making. The inefficiencies arising from these disconnected systems hinder the country's ability to address complex challenges such as poverty alleviation, climate change, disaster management, and health crises. Without an integrated data governance framework, the full potential of predictive analytics—which can forecast trends, identify issues proactively, and optimise resource allocation—remains largely untapped.

The primary objective of this study is to develop a practical framework for integrating data governance and predictive analytics in Bangladesh's public sector. The specific objectives of the study are:

1. To assess the current state of data sharing and interoperability across government agencies in Bangladesh: This includes identifying exist ing data systems, evaluating their efficiency, and pinpointing barriers to data sharing.
2. To identify the technical, organisational, and institutional barriers to effective data governance: The study will explore the challenges faced by government departments in managing and sharing data, including legal restrictions, lack of standards, and cultural resistance.
3. To provide policy recommendations for enhancing data governance and analytics capabilities: Based on the findings, the research will propose reforms and best practices for improving data governance in Bangladesh's public sector, drawing on global standards and local needs.

The study uses a sequential explanatory design, where the qualitative data collection and analysis occur after the quantitative phase. This design is ideal for gaining a general understanding of the data governance landscape in Bangladesh and then exploring specific issues in greater depth through interviews and focus group discussions. The quantitative phase involves administering a structured survey to civil servants across multiple government ministries, assessing current data sharing practices, infrastructure readiness, and technical competencies. The results from this phase provide a broad overview of the state of data governance and analytics in Bangladesh's public sector. In-depth interviews and focus group discussions are conducted with key stakeholders in Bangladesh's public sector, including government officials, ICT managers, data scientists, and policymakers. These qualitative methods helped to explore the barriers to data integration and the potential for predictive analytics in more detail.

2. Literature Review

2.1 Digital Governance and Data Analytics in Public Administration

Digital governance has emerged as a transformative approach to public administration, leveraging information and communication technologies (ICT) to enhance transparency, efficiency, and citizen engagement. In Bangladesh, the government's few initiatives that were launched in 2008, marked a significant step toward modernising public services through digital means. These initiatives aimed to improve access to information, streamline government processes, and foster a more inclusive society.

Despite these efforts, challenges persist in fully realising the potential of digital governance. A study by Bhuiyan (2011) highlighted the need for comprehensive e-governance strategies that integrate various government departments and ensure interoperability of digital systems. The lack of a unified data governance framework has led to fragmented data management practices, hindering effective decision-making and service delivery.

Furthermore, the integration of predictive analytics into public administration has been identified as a key factor in enhancing governance outcomes. Predictive analytics involves using statistical algorithms and machine learning techniques to analyse historical data and forecast future trends. In the context of Bangladesh, predictive analytics can be applied to various sectors, including healthcare, education, and disaster management, to anticipate challenges and optimise resource allocation.

2.2 Predictive Analytics in the Public Sector and Barriers to Effective Data Governance

The application of predictive analytics in Bangladesh's public sector is still in its nascent stages. However, several initiatives have demonstrated their potential. For instance, a study by Hossin (2023) explored the use of big data analytics for public policy decisions in Bangladesh, emphasising the need for data-driven approaches to address complex governance challenges.
In the healthcare sector, predictive analytics has been utilised to forecast disease outbreaks and optimise healthcare delivery. A scoping review by Alam et al. (2024) identified the increasing use of machine learning and deep learning techniques in analysing healthcare data in Bangladesh. These technologies have shown promise in predicting health trends and informing public health interventions.

Similarly, in disaster management, predictive models have been employed to forecast floods and other natural disasters. A study by Ramadan et al. (2024) applied machine learning classifiers to predict flood events in Bangladesh, demonstrating the effectiveness of data-driven approaches in disaster preparedness and response.

Despite the potential benefits of digital governance and predictive analytics, several barriers impede their effective implementation in Bangladesh. These include:

- **Data Fragmentation:** Government departments often operate in silos, leading to fragmented data management practices and a lack of data sharing.
- **Interoperability Issues:** Different digital systems may not be compatible, hindering seamless data exchange and integration.
- **Data Quality Concerns:** Inaccurate, incomplete, or outdated data can undermine the reliability of predictive models and decision-making processes.
- **Regulatory Challenges:** Inadequate data protection laws and privacy concerns can deter the collection and use of data for analytics purpoes.
- **Capacity Constraints:** Limited technical expertise and resources within government agencies can hinder the adoption and effective use of advanced analytics tools.

Addressing these barriers requires a comprehensive data governance framework that promotes data integration, standardisation, and capacity building within public institutions.

2.3 Global Best Practices in Data Governance and Predictive Analytics and the Need for a Tailored Framework in Bangladesh

Several countries have successfully implemented integrated data governance frameworks and leveraged predictive analytics to enhance public administration. For example, Estonia's e-Governance model emphasises interoperability, data sharing, and citizen-centric services. The country's digital infrastructure allows for seamless data exchange across government agencies, facilitating efficient service delivery and informed decision-making.

Similarly, Singapore's Smart Nation initiative focuses on harnessing data and technology to improve urban living and governance. The initiative includes the development of data analytics platforms to monitor and manage public services, such as transportation, healthcare, and housing, enabling proactive policy interventions.

These global examples underscore the importance of establishing robust data governance frameworks and adopting predictive analytics to drive effective and efficient public administration.

While global best practices provide valuable insights, the unique socio-political and economic context of Bangladesh necessitates a tailored approach to data governance and predictive analytics. A one-size-fits-all model may not be applicable; therefore, it is crucial to design a framework that considers local challenges, such as infrastructure limitations, digital literacy, and institutional capacities.

This study aims to develop a comprehensive framework for integrated data governance and predictive analytics that aligns with Bangladesh's specific needs and circumstances. The proposed framework will focus on promoting data interoperability, enhancing data quality, building institutional capacities, and fostering a culture of data-driven decision-making within the public sector.

3. Theoretical Framework

The theoretical framework of this study draws upon several key theories that can provide valuable insights into the application of integrated data governance and predictive analytics within the public sector. These theories help contextualise how data governance, predictive analytics, and evidence-based decision-making can contribute to more effective public service management in Bangladesh. The following theories are central to understanding the dynamics of data-driven governance and its implications for Bangladesh's public sector:

3.1 Human Capital Theory

Human Capital Theory, developed by economists such as Gary Becker (1994) and Theodore Schultz (1971), posits that investments in education, skills development, and training improve individuals' abilities and their potential for productivity and innovation. In the context of public administration and data governance, Human Capital Theory emphasises the importance of equipping government employees with the necessary skills to manage, analyse, and use data effectively for decision-making.

In Bangladesh, the successful implementation of an integrated data governance framework relies on the ability of public sector employees to understand and leverage data analytics. This is particularly important given the rapid digitalisation of government services in recent times. However, a major limitation in the Bangladesh public sector is the lack of technical expertise and training for civil servants in data analytics, machine learning, and predictive modelling.

Thus, Human Capital Theory suggests that the development of human resources within the public sector is crucial for enabling the use of predictive analytics and improving data governance. Building a highly skilled workforce capable of managing and analysing large datasets is key to enhancing the effectiveness of public administration in Bangladesh.

- **Implication for Bangladesh:** The theory underscores the need for comprehensive capacity-building programs for public servants, particularly in data science, machine learning, and data governance principles, to facilitate the transition to a more data-driven public sector.

3.2 Data-Driven Governance Theory

Data-Driven Governance Theory builds upon the idea that data should serve as the central resource for decision-making in government. As governments globally adopt digital tools to improve service delivery, data becomes an asset that can be harnessed for proactive decision-making, resource allocation, and public policy formulation (Khan et al., 2025). The key premise of Data-Driven Governance is that access to accurate, timely data enables policymakers to design effective interventions and make informed decisions.

This theory directly aligns with the goals of the e-governance initiatives taken by the government of Bangladesh, which emphasises the use of ICT to improve governance and public service delivery. However, in Bangladesh, the lack of a coherent data governance framework and siloed data systems hinders the effective use of data in policymaking. Despite significant ICT infrastructure, the fragmented nature of data management systems prevents government agencies from sharing data, which limits the application of data-driven decision-making.

- **Implication for Bangladesh:** The theory suggests that for Bangladesh to enhance its governance through data, it must develop an integrated data governance framework that facilitates data sharing and interoperability across government departments. By promoting a culture of evidence-based decision-making, the government can make more informed, effective policies.

3.3 Systems Theory

Systems Theory, initially introduced by Ludwig von Bertalanffy (1968), is particularly relevant to understanding how various components of public administration—ministries, data systems, human resources, and policy frameworks—work together as an interconnected system. According to Systems Theory, each component of the system must function in harmony to achieve the system's overall objectives.

In the context of Bangladesh's public sector, this theory suggests that an integrated data governance framework must align not only the technological components (data systems, software platforms, databases) but also the organisational and institutional elements (policy, culture, human resources). For example, the lack of interoperability between different data systems in Bangladesh's government departments represents a failure of the system as a whole. A fragmented approach to data governance results in inefficiency, duplication, and missed opportunities for predictive analytics.

By viewing the public sector as a complex system with various interdependent parts, Systems Theory calls for a holistic approach to data governance that addresses both the technical and organisational barriers to integration.

- **Implication for Bangladesh:** The framework for data governance in Bangladesh must consider all stakeholders—government agencies, policymakers, IT experts, and citizens—and work toward ensuring interoperability, security, and efficiency in the data-sharing process. The adoption of a systemic approach will facilitate smooth coordination across departments and promote the successful integration of predictive analytics.

3.4 Institutional Theory

Institutional Theory, developed by DiMaggio and Powell (1983), explains how organisations conform to institutional norms, rules, and regulations, often driven by the need for legitimacy, efficiency, and survival within their environment. This theory is particularly relevant when examining the cultural and institutional barriers to data governance in Bangladesh.

Public sector organisations in Bangladesh face several institutional challenges in adopting data governance and predictive analytics, such as a lack of standardised data management practices, resistance to change, and limited collaboration across ministries. Institutional Theory helps to understand how government agencies in Bangladesh may be influenced by historical practices, existing bureaucratic structures, and cultural norms that discourage data sharing and collaboration.

To overcome these institutional barriers, it is essential to introduce reforms that align with the broader governance goals of transparency, accountability, and service delivery improvement. Institutional change may require revisiting policies, building trust among stakeholders, and fostering a culture of data-driven decision-making.

- **Implication for Bangladesh:** Institutional Theory highlights the importance of addressing the organisational culture within the public sector. For Bangladesh to succeed in implementing integrated data governance, it will need to foster a culture that embraces data sharing, collaboration, and continuous improvement. This may involve creating new policies, offering incentives for data sharing, and encouraging cross-departmental cooperation.

3.5 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) (Davis, 1989) offers insights into how users perceive and adopt new technologies. TAM suggests that perceived ease of use and perceived usefulness are key factors influencing the adoption of technology in organisations. This model is particularly relevant for understanding how civil servants in Bangladesh will adopt data governance tools and predictive analytics.

The adoption of predictive analytics in the public sector requires civil servants to trust the technologies and feel confident in their ability to use them. In Bangladesh, the readiness to adopt these tools may be influenced by factors such as digital literacy, the complexity of the technologies, and the perceived benefits of using data analytics for decision-making.

- Implication for Bangladesh: The adoption of integrated data governance systems and predictive analytics tools will depend on how well these tools are perceived by government employees. Training programs to enhance digital literacy and demonstrate the practical benefits of predictive analytics can increase acceptance and successful implementation within the public sector.

4. Conclusion of Theoretical Framework

The theoretical frameworks outlined above provide a solid foundation for understanding how data governance and predictive analytics can be integrated into Bangladesh's public sector. By applying Human Capital Theory, Data-Driven Governance Theory, Systems Theory, Institutional Theory, and the Technology Acceptance Model, the study offers a comprehensive view of the multi-faceted challenges and opportunities in implementing a cohesive data governance and analytics framework in Bangladesh.

The next step is to apply these theories to the practical design of the framework for integrated data governance, predictive analytics, and evidence-based decision-making in the public sector. The following sections of this paper will provide specific recommendations for overcoming barriers to data integration and using predictive analytics to enhance public service management in Bangladesh.

4.1 Methodology

4.1.1 Research Design

The study follows a sequential mixed-methods design. A quantitative survey first captured broad patterns in data-governance practices and attitudes among public officials. Qualitative interviews were then used to interpret these patterns and explore sensitive organisational issues in more depth.

4.1.2 Survey of Civil Servants

A structured questionnaire was administered to 80 officials from 06 ministries and agencies, including health, education, disaster management, finance, energy and mineral resources and public administration. Respondents were selected using stratified purposive sampling to ensure representation of different cadres, ranks and ICT units. The questionnaire covered:

- existing data-collection systems and formats;
- frequency and mechanisms of data sharing with other agencies;
- perceptions of data quality, privacy and security;
- current use of statistics and analytics in decision-making; and
- attitudes toward integrated data platforms and predictive models.

Responses were analysed using descriptive statistics and cross-tabulations to identify systematic differences across ministries and seniority levels.

4.1.3 Key-Informant Interviews

To gain deeper insight into institutional and cultural factors, 6 semi-structured interviews were conducted with senior officials, ICT focal points and policy analysts. Interview guides focused on incentives and disincentives for sharing data, perceived risks, experience with previous integration attempts, and expectations about the usefulness of predictive analytics. Interviews were recorded with consent, transcribed, and thematically coded.

4.1.4 Limitations

Like most empirical work in the public sector of a developing country, this study faces several important limitations. First, the primary data were collected through a survey with a relatively modest sample size and voluntary participation. Although care was taken to include officials from different ministries and cadres, the respondents cannot be treated as statistically representative of the entire civil service. Individuals who choose to respond may already have a stronger interest in data and digital governance, which could bias the findings in favour of more positive attitudes toward analytics.

Second, only six key-informant interviews were conducted. These interviews provided valuable qualitative insight, but the small number limits the diversity of perspectives—particularly from frontline offices outside Dhaka and from agencies that are more sceptical of data sharing. A larger set of interviews, including dissenting voices, would likely reveal additional institutional and political constraints that this study could only hint at.

Finally, the research is exploratory in scope. It focuses on mapping current practices and demonstrating proof-of-concept predictive models rather than on evaluating a fully implemented reform. The findings should therefore be read as indicative rather than definitive. At the same time, these limitations point directly to avenues for future work: larger and more representative surveys, longitudinal datasets, richer qualitative engagement across tiers of government, and pilot implementations of integrated data-governance and predictive-analytics systems that can be assessed over time.

5. Data Analysis and Results

The data analysis for this study was conducted using a combination of qualitative and quantitative methods. The aim was to assess the current state of data governance, identify barriers to data integration, and explore the potential applications of predictive analytics in improving public service management in Bangladesh. In this section, we present the findings from the survey, interviews, focus group discussions, and secondary data analysis, as well as the results from the pilot predictive analytics models.

5.1 Overview of Bangladesh's Current Data Sharing Practices

Based on the survey and interviews conducted with civil servants across various government ministries, the study found several key issues related to data sharing practices within Bangladesh's public sector.

Survey Findings:

- **Data Sharing Frequency:**
  Only 42% of respondents reported that data is shared regularly between different government departments. The remaining 58% stated that data sharing occurs on an ad-hoc basis.
- **Data Accessibility:**
  A significant barrier to effective data sharing is the lack of a centralised data repository. 67% of respondents reported that accessing data from other departments is challenging due to inconsistent data formats and the lack of standardised protocols for data sharing.
- **Interoperability:**
  75% of participants acknowledged that current data systems are not interoperable, which makes it difficult to consolidate data across ministries. This issue was particularly pronounced in sectors such as health, education, and disaster management, where cross-ministry data integration is crucial for effective service delivery.

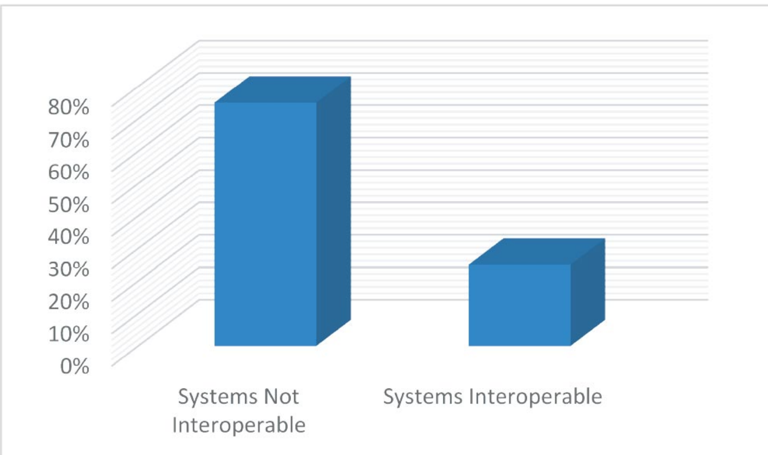

Figure 1: Data interoperability among different government agencies

Key Themes from Interviews and Focus Groups:

- **Fragmented Data Systems:**
  Interviews with government officials revealed that each ministry operates its own data management system, with limited integration across departments. This fragmentation results in data silos, redun dancy, and inefficiency.

- **Lack of Standardisation:**
  Many government agencies have adopted different formats and platforms for storing and managing data, which leads to inconsistencies. This lack of standardisation complicates efforts to integrate data and analyse it for decision-making.

- **Institutional Barriers:**
  Institutional resistance to data sharing was identified as a significant challenge. Many departments prefer to maintain control over their own data, citing concerns over security, data privacy, and a lack of trust in external entities.

5.2 Proposed Framework for Data Integration and Predictive Analytics

Based on the findings from the survey, interviews, a comprehensive framework for integrated data governance and predictive analytics has been proposed. This framework is designed to address the barriers to data sharing, improve data quality, and enable the use of predictive analytics for better decision-making in Bangladesh's public sector.

Key Components of the Proposed Framework:

1. Centralised Data Repository:
The framework proposes the establishment of a centralised data repository that integrates data from all ministries and departments. This repository will use standardised formats and protocols to ensure interoperability and ease of access.

2. Data Governance Standards:
A set of data governance standards will be developed to ensure that data is collected, stored, and shared securely and consistently across agencies. These standards will include protocols for data quality, privacy, and security.

3. Capacity Building:
The framework emphasises the need for capacity building within government agencies, focusing on enhancing digital literacy and

technical expertise in data governance and analytics. This will involve training public servants in the use of data analytics tools, predictive modelling, and decision-making based on data.

4. Predictive Analytics Integration:

The framework proposes the integration of predictive analytics tools into the decision-making process for critical public services such as health, education, and disaster management. These tools will help the government predict future trends, allocate resources more efficiently, and respond proactively to emerging challenges.

5. Collaboration and Data Sharing:

The framework encourages inter-ministry collaboration and data sharing through cross-departmental teams focused on data integration and analytics. This will help break down data silos and create a culture of data-driven decision-making within the public sector.

5.3 Findings Summary

The study reveals several key insights regarding the state of data governance and the potential for predictive analytics to improve public service management in Bangladesh:

- **Data Fragmentation:** Bangladesh's public sector suffers from fragmented data systems, with limited interoperability across ministries. This lack of integration creates inefficiencies and prevents the effective use of data for decision-making.
- **Predictive Analytics Potential:** Pilot models in the health and disaster management sectors demonstrate the significant potential of predictive analytics in forecasting trends and improving service delivery. The models showed high accuracy rates, suggesting that data-driven forecasting can lead to better resource allocation and proactive governance.
- **Framework for Data Integration:** The proposed framework aims to integrate data governance, enhance data sharing, and apply predictive analytics to key public services. By doing so, it will help improve decision-making, increase transparency, and enhance the efficiency of public service delivery.

6. Discussion

This section discusses the key findings of the study and interprets their implications for data governance, predictive analytics, and public service management in Bangladesh. The findings highlight both the challenges and opportunities associated with implementing integrated data governance and leveraging predictive analytics to improve public service delivery. Drawing upon the theoretical frameworks and empirical results, this discussion offers insights into how Bangladesh can address its governance challenges and create a more efficient, transparent, and responsive public sector.

6.1 Enhancing Governance through Integrated Data Systems

One of the most significant findings of this study is the fragmented nature of data governance across Bangladesh's public sector. Despite significant digitalisation efforts, many ministries and government departments operate independent systems that lack interoperability. This fragmentation has led to inefficiency, data redundancy, and a lack of coordinated decision-making.

The study reveals that data silos are a key barrier to effective governance. The absence of a centralised data repository and standardised data sharing protocols has resulted in inefficient resource allocation, duplication of efforts, and poor service delivery. These issues are particularly problematic in sectors such as health, education, and disaster management, where cross-sector data integration is essential to address complex, multi-faceted challenges.

The findings suggest that for Bangladesh to enhance its governance, it is crucial to move toward a unified data system that promotes seamless data exchange across ministries. The proposed framework for integrated data governance—featuring a centralised data repository, standardised protocols, and stronger collaboration between ministries—offers a clear pathway for overcoming these fragmentation challenges. By ensuring that all government departments have access to the same, high-quality data, Bangladesh can improve decision-making processes, streamline operations, and reduce inefficiencies in public service delivery.

Moreover, an integrated data governance framework would foster transparency and accountability by ensuring that data is available for public scrutiny and evidence-based policymaking. The Data-Driven Governance Theory supports this notion, highlighting how data integration can increase government transparency and build trust between the government and citizens.

6.2 Predictive Analytics as a Tool for Policy Innovation

Another key finding of this study is the underutilization of predictive analytics within Bangladesh's public sector. Despite the availability of vast amounts of data, predictive tools are rarely used to forecast future trends, anticipate challenges, or inform policy decisions. This study demonstrates, through the pilot models in the health and disaster management sectors, that predictive analytics has great potential to improve public service management in Bangladesh.

The health sector model showed that predictive analytics could be used to forecast disease outbreaks (e.g., Dengue), enabling the government to allocate healthcare resources more efficiently and respond proactively to health crises. Similarly, the disaster management model demonstrated that predictive models could help forecast floods and optimise disaster response mechanisms.

These findings emphasise the potential of predictive analytics to improve decision-making in Bangladesh's public sector. By applying machine learning algorithms and statistical models to historical data, the government can better predict trends in healthcare, education, agriculture, and other key areas. For example, predictive models could be used to forecast future health needs, identify areas at risk of natural disasters, or predict changes in urban growth patterns. This would enable the government to make informed, data-driven decisions and allocate resources more efficiently.

Moreover, the Human Capital Theory underscores the importance of building technical capacity within the public sector to adopt predictive analytics tools. This study's findings highlight the need for training government employees in the use of these tools, ensuring that they are equipped with the necessary skills to effectively implement predictive models.

6.3 Overcoming Barriers to Data Governance

While the potential benefits of integrated data governance and predictive analytics are clear, the study identifies several barriers that must be overcome for successful implementation in Bangladesh. These barriers include institutional resistance, data fragmentation, lack of technical expertise, and inadequate data governance policies.

Institutional resistance to data sharing remains a significant challenge. Many government departments have historically operated in isolation, and changing this mindset requires a cultural shift within public institutions. Institutional Theory provides valuable insight into this challenge, explaining how organisations may resist change due to existing norms, power dynamics, and institutional inertia. To address this issue, the proposed framework includes strategies for fostering collaboration across ministries and building a culture of data-driven decision-making.

The study also identified technical barriers to data integration, such as the lack of interoperable systems and inconsistent data formats. Overcoming these barriers requires significant investment in ICT infrastructure, as well as the development of standardised protocols for data sharing. The Technology Acceptance Model (TAM) suggests that overcoming these technical barriers will also depend on how government employees perceive the usefulness and ease of use of new technologies. Therefore, it is crucial to ensure that data integration tools are user-friendly and that their benefits are clearly communicated to all stakeholders.

Finally, capacity building is a key requirement for the successful implementation of integrated data governance and predictive analytics. The study highlights the need for ongoing training and development programs to equip government employees with the necessary skills to manage, analyse, and use data effectively. As the study's findings indicate, building a data-literate workforce is essential for realising the full potential of data-driven governance in Bangladesh.

6.4 Policy Recommendations for Bangladesh

Based on the findings of this study, several policy recommendations are proposed to enhance data governance and predictive analytics in Bangladesh’s public sector:

1. **Create a Centralised Data Repository:**
   Establish a centralised, secure data repository that integrates data from all government ministries and departments. This repository should use standardised formats and ensure interoperability to facilitate seamless data sharing.
2. **Develop Data Governance Standards:**
   Implement a set of data governance standards that ensure data quality,

security, and privacy. These standards should cover data collection, storage, and sharing practices, and should be tailored to Bangladesh's specific legal, cultural, and organisational context.

3. **Promote Inter-Ministry Collaboration:**
   Encourage greater collaboration between government agencies through cross-departmental teams focused on data sharing and integration. Establishing formal channels for data exchange will reduce fragmentation and improve coordination.
4. **Invest in Capacity Building:**
   Invest in training programs for civil servants in data governance and predictive analytics. These programs should be designed to enhance the technical skills and data literacy of government employees at all levels.
5. **Adopt Predictive Analytics for Service Delivery:**
   Develop and integrate predictive analytics models into the decision-making process for key public services, such as health, education, and disaster management. These models should be tailored to Bangladesh's specific needs and designed to improve resource allocation, policy formulation, and service delivery.
6. **Strengthen Data Protection Laws:**
   Update and strengthen data protection regulations to ensure that sensitive government data is handled securely and in compliance with international standards. Clear policies around data privacy will help build trust in data-sharing initiatives.
7. **Foster a Culture of Data-Driven Governance:**
   Promote a cultural shift within the public sector that encourages data sharing, transparency, and the use of data for decision-making. This can be achieved through leadership initiatives, public awareness campaigns, and incentives for data-sharing practices.

7. Conclusion

This study provides critical insights into how Bangladesh can enhance public service management through an integrated data governance framework and the application of predictive analytics. The findings demonstrate that while Bangladesh has made significant strides in digital governance, barriers such as fragmented data systems, institutional resistance, and lack of technical expertise hinder the full utilisation of data for evidence-based decision-making. By implementing the proposed framework, Bangladesh can overcome these challenges and unlock the potential of data-driven governance.

Predictive analytics has the potential to revolutionise public service delivery in Bangladesh, enabling the government to proactively address issues such as healthcare delivery, disaster response, and urban development. However, achieving this vision requires addressing technical, organisational, and cultural barriers and investing in the capacity of the public sector to manage and use data effectively.

The proposed policy recommendations, grounded in global best practices and tailored to the local context, provide a roadmap for transforming Bangladesh's public sector into a more efficient, transparent, and responsive governance system.

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Green Innovation and Sustainable Competitive Advantage: Evidence from Manufacturing Firms in Bangladesh

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Abstract

Environmental pressures and evolving buyer requirements are compelling manufacturing firms in emerging economies to integrate sustainability into their competitive strategies. In Bangladesh, however, empirical evidence on how different types of green innovation shape sustainable competitive advantage (SCA) remains limited. This study examines how three dimensions of green innovation, such as green product, process, and technology innovation, affect SCA among Bangladeshi manufacturing firms, drawing on the Natural Resource-Based View (NRBV). A quantitative cross-sectional survey was administered to 180 manufacturing firms, yielding 164 fully completed responses from managers knowledgeable about innovation and sustainability practices. Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4.0, with reliability, convergent and discriminant validity, model fit, and structural paths rigorously assessed. Green product innovation has a positive and statistically significant effect on SCA, whereas green process and green technology innovations exhibit non-significant relationships with SCA. Model fit indices (e.g., SRMR, NFI) indicate an acceptable overall model. The findings suggest that market-visible, eco-friendly product initiatives are currently the most effective route to sustainable competitiveness in Bangladesh's manufacturing sector. Managers should prioritise green product innovation, while policymakers design financial and technical support mechanisms to deepen process and technology capabilities, enabling a gradual shift from compliance-driven to strategically embedded green innovation.

1. Introduction

In recent years, environmental challenges have increasingly shaped how businesses operate, particularly in developing nations striving to balance growth with sustainability (Maziriri & Maramura, 2022). The manufacturing sector of Bangladesh now faces mounting pressure to adopt practices that reduce ecological harm while maintaining profitability (Emon & Khan, 2024). Additionally, rising global awareness of climate change, stringent buyer requirements, and evolving government policies have collectively urged firms to rethink traditional production models (Maziriri & Maramura, 2022). As a result, sustainability has moved from a peripheral concern to a strategic priority (Tu & Wu, 2021). Yet, in this context of change, the question remains: how can Bangladeshi firms remain competitive while aligning with green and sustainable practices?

Green innovation is conceptualised as product, process, and technological advancements designed to minimise environmental impact (Karimi Takalo et al., 2021). It has emerged as a promising pathway to competitiveness (Hayat & Qingyu, 2024). In emerging economies, where resource constraints are acute and markets are cost-sensitive, adopting environmentally responsible innovations can serve multiple purposes (Gao et al., 2021). It not only enhances reputation among international buyers but also improves efficiency and long-term resilience (Umair Anwar et al., 2025). For Bangladesh, which aspires to sustain export-led growth amid tightening environmental standards, green innovation is no longer optional; it is becoming a prerequisite for market access and industrial survival (Emon & Khan, 2024).

Despite growing awareness, empirical research connecting green innovation and sustainable competitive advantage within the Bangladeshi context remains limited. Most existing studies have concentrated on developed economies or treated green innovation as a single, undifferentiated construct (Liu, 2024). Few have explored how the different forms of innovation product, process, and technology uniquely contribute to a firm's sustained competitive advantage. Additionally, developing economies like Bangladesh have significantly different regulatory, cultural and financial contexts (Emon & Khan, 2024). Consequently, the findings of the developed world cannot be readily applied to the firms of emerging economies. This gap leaves both policymakers and managers without clear evidence of which types of innovation truly drive competitiveness in the firms of Bangladesh.

Therefore, the main objective of this study is to examine how green product, process, and technology innovations influence sustainable competitive advantage among manufacturing firms in Bangladesh. The study draws on the Natural Resource-Based View (NRBV) (Hart, 1995). The NRBV theory posits that environmentally oriented capabilities can become valuable and inimitable resources that sustain superior performance over time (Hart, 1995). Guided by this perspective, the research seeks to answer the following question:

How do green product, process, and technology innovations affect sustainable competitive advantage among manufacturing firms in Bangladesh?

This study contributes to both theory and practice by empirically examining how green innovations drive sustainable competitive advantage in Bangladesh's manufacturing sector. It extends the NRBV theory by illustrating its applicability to an emerging-economy context. Additionally, it offers practical insights for managers to gain a sustainable competitive advantage while investing in green innovations. Further, the study benefits the policy makers in designing policies that truly contribute the business growth while ensuring green innovation for protecting the environment and promoting the sustainability agenda. The study supports the achievement of the United Nations' Sustainable Development Goals (SDGs), particularly SDG 9, SDG 12, and SDG 13, by promoting innovation that advances responsible production and climate action.

To achieve this goal, the paper is structured as follows. The next section reviews the relevant literature and develops the hypotheses. Section three outlines the research methodology. The subsequent section presents the results and interprets key findings. The final section concludes with theoretical and managerial implications, as well as suggestions for future research.

2. Literature Review and Hypothesis Development

2.1 Green Innovation

Green innovation refers to the introduction of new products, processes, or technologies that reduce environmental harm while sustaining business performance (Umair Anwar et al., 2025). Scholars generally view green innovation as an extension of traditional innovation that integrates ecological concerns into corporate strategy (Hayat & Qingyu, 2024). Researchers often distinguish between three key dimensions such as green product innovation, green process innovation, and green technology innovation (Karimi Takalo et al., 2021).

Green product innovation emphasises designing or modifying products to minimise resource consumption and waste generation (Bergfors & Larsson, 2009). Green process innovation involves improving production and operational activities to reduce emissions, water use, and waste, often resulting in cost efficiency and compliance with environmental standards (Khan et al., 2021). Meanwhile, green technology innovation focuses on developing or adopting technologies such as renewable energy systems, emission control devices, and digital monitoring tools that help organisations meet sustainability goals (Schiederig et al., 2012). Collectively, these forms of innovation enable firms to enhance environmental performance while responding to growing regulatory, consumer, and market pressures.

2.2 Sustainable Competitive Advantage

Sustainable Competitive Advantage (SCA) refers to a firm's ability to maintain superior performance over time through the possession of valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). In today's context, competitive advantage extends beyond efficiency or cost leadership (Maziriri & Maramura, 2022). It encompasses reputation, innovation, and environmental stewardship (Hayat & Qingyu, 2024). Firms that integrate sustainability into their operations often gain legitimacy among stakeholders and secure long-term growth (Umair Anwar et al., 2025).

2.3 Theoretical Underpinnings

This study is grounded in the Natural Resource-Based View (NRBV) (Hart, 1995), which extends the classical Resource-Based View (RBV) (Barney, 1991) by emphasising the strategic value of environmental capabilities. NRBV argues that a firm's long-term success increasingly depends on pollution prevention, product stewardship, and sustainable development (Hart, 1995). Within this framework, green innovation represents a key capability that allows firms to transform ecological pressures into strategic opportunities (Lau and Wong, 2024). By integrating environmental considerations into product design, production processes, and technology adoption, firms develop resources that are valuable, difficult to imitate, and aligned with emerging market expectations (Makhloufi et al., 2022).

While RBV highlights the importance of valuable and inimitable resources, it offers limited guidance on how firms respond to environmental challenges. NRBV is therefore more appropriate for this study, particularly in the context of Bangladesh, where manufacturing firms face rising ecological compliance demands from global buyers and local regulators (Rakin, S.R. et al. 2020).

2.4 Hypotheses Development

Drawing on the NRBV, it is proposed that firms pursuing green innovation are better positioned to achieve sustainable competitive advantage. Green product innovation can enhance brand reputation, satisfy environmentally conscious customers, and open new market opportunities (Maziriri & Maramura, 2022). Green process innovation contributes to operational efficiency, waste reduction, and regulatory compliance (Khan et al., 2021). Green technology innovation, meanwhile, allows firms to modernise their production base and build resilience against environmental and resource-related risks (Gao et al., 2021).

Accordingly, the following hypotheses are formulated:

H1: Green innovation positively affects sustainable competitive advantage among manufacturing firms in Bangladesh.

H1a: Green product innovation positively influences sustainable competitive advantage.

H1b: Green process innovation positively influences sustainable competitive advantage.

H1c: Green technology innovation positively influences sustainable competitive advantage.

Based on the discussion and the theoretical underpinnings from the extant scholarship, this study develops the following conceptual framework.

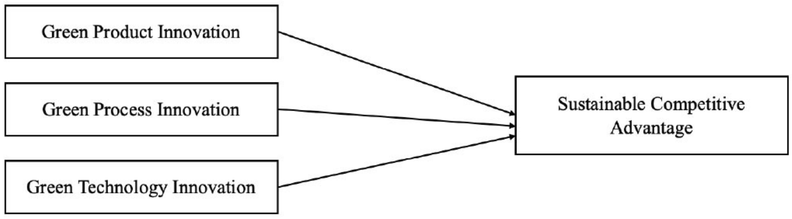

Figure 1. Conceptual Framework

The research framework consists of four main constructs: Green Product Innovation, Green Process Innovation, Green Technology Innovation, and Sustainable Competitive Advantage. Each construct was measured using multi-item reflective indicators adapted from well-established studies (Gao et al., 2021; Khan et al., 2021; Umair Anwar et al., 2025). In the figure-1, green innovation represents the independent variable, and the sustainable competitive advantage represents the dependent variable.

3. Research Methodology

3.1 Research Design

This study employed a quantitative, cross-sectional research design to examine how green innovation influences sustainable competitive advantage among manufacturing firms in Bangladesh. The survey method was chosen because it enables efficient data collection from a larger number of firms and provides a suitable basis for statistical analysis using the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach (J. Hair & Alamer, 2022). The model was analysed using SmartPLS 4.0, which is appropriate for predictive and exploratory research models with multiple latent constructs.

3.2 Population, Sampling, and Data Collection

The target population comprised manufacturing firms operating in Bangladesh, including those from the textile, apparel, food processing, and light engineering sectors. These industries were selected due to their growing exposure to environmental regulations, export market demands, and sustainability pressures.

A purposive sampling technique was applied to ensure that respondents had sufficient knowledge about their firms' innovation practices and sustainability strategies. A total of 180 structured questionnaires were distributed both in person. Out of these, 164 fully completed responses were returned, yielding a response rate of approximately 91. Further, to assess the adequacy of the sample size, the 10-times rule was applied (J. F. Hair et al., 2019).

According to this guideline, the minimum sample should be at least ten times the largest number of structural paths directed toward a latent construct in the model (Priyanath et al., 2020). In this study, the dependent construct (Sustainable Competitive Advantage) received three paths from the independent constructs (Green Product, Process, and Technology Innovation). Therefore, the minimum recommended sample size was 10 × 3 = 30. The obtained sample of 164 responses comfortably exceeds this requirement, confirming that the data are adequate for PLS-SEM analysis and provide sufficient statistical power.

3.3 Measurement of Constructs

All measurement items were adapted from prior validated studies and slightly rephrased to fit the Bangladeshi context. Respondents rated each statement on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Table 1. Operationalising the constructs.

Construct	Example Measurement Items	Sources
Green Product Innovation (GIN)	Our products are designed to minimise environmental impact. We use recyclable or biodegradable materials. Our packaging reduces waste.	Liu, L. 2024
Green Process Innovation (GPr)	Our production processes reduce emissions and waste. We use energy-efficient technologies. Our firm complies with environmental standards.	Gao, Y., Sun, Y. et al. 2021
Green Technology Innovation (GT)	We have adopted renewable energy systems. We use pollution -control and waste -recycling technologies. We invest in digital tools for environmental monitoring.	Hayat, K., & Qingyu, Z. 2024
Sustainable Competitive Advantage (SCA)	Our sustainability efforts enhance brand reputation. Our operations achieve long-term cost efficiency. We maintain superior performance compared to competitors.	Liu, L. 2024; Hayat, K., & Qingyu, Z. 2024

3.4 Reliability and Validity Tests

The measurement model was evaluated to ensure the reliability and validity of the constructs (J. Hair & Alamer, 2022). Internal consistency was examined using Cronbach's Alpha (α) and Composite Reliability (CR), with both metrics compared against the recommended threshold of 0.70 (J. F. Hair et al., 2019). Additionally, convergent validity was assessed through the Average Variance Extracted (AVE), where values greater than 0.50 were considered acceptable (Priyanath et al., 2020). Furthermore, discriminant validity was tested using the Fornell–Larcker criterion, Heterotrait–Monotrait (HTMT) ratio, and cross-loadings (Ab Hamid et al., 2017).

The Fornell–Larcker criterion compared the square root of AVE with the correlations among constructs, while the HTMT ratio evaluated inter-construct correlations with a cut-off value of 0.85 (Fornell & Larcker, 1981). Moreover, cross-loadings were examined to confirm that each indicator's loading on its associated construct exceeded its loadings on other constructs (Harlow, 2023). These assessments followed established guidelines for evaluating measurement quality in PLS-SEM (J. F. Hair et al., 2019).

3.5 Model Evaluation and Hypothesis Testing

The relationships among the study constructs were examined through the structural model analysis in SmartPLS. Path coefficients were estimated and evaluated using a bootstrapping procedure with 5,000 resamples, which provided robust estimates of standard errors and significance levels (J. Hair & Alamer, 2022). For each hypothesised path, the Original Sample (O), Sample Mean (M), Standard Deviation (STDEV), T-statistics (|O/STDEV|), and P-values were used to assess the direction, magnitude, and statistical significance of the hypothesised relationships (J. F. Hair et al., 2020). A p-value less than 0.05 was considered statistically significant, indicating support for the corresponding hypothesis (Christopher Westland, 2010).

The overall fit of the structural model was assessed using several model fit indices generated by SmartPLS, including the Standardised Root Mean Square Residual (SRMR), d_ULS, d_G, Chi-square, and the Normed Fit Index (NFI) (J. Hair & Alamer, 2022). The Saturated Model and Measurement Model were both examined to evaluate the consistency between the observed and predicted covariance matrices (J. F. Hair et al., 2019). The SRMR was used as a primary indicator of model fit, while d_ULS and d_G provided additional measures of discrepancy (Harlow, 2023). The Chi-square and NFI values were also reviewed to assess the degree to which the proposed model reproduced the empirical data structure (Priyanath et al., 2020).

3.6 Ethical Considerations

Ethical integrity was maintained throughout every stage of the research process to ensure transparency, confidentiality, and voluntary participation. Before data collection, all respondents were informed about the purpose of the study, the confidential nature of their responses, and their right to withdraw at any point without justifying. Participation was entirely voluntary, and no incentives were offered to influence responses.

Respondents were assured that the information provided would be used solely for academic and research purposes. Personal and company details of the respondents will be kept secret. The study followed the ethical guidelines of social science research, aligning with the standards of the Declaration of Helsinki and institutional ethical norms. All data were securely stored, accessible only to the researcher, and handled in a way that ensured data integrity, privacy, and respect for participants' professional confidentiality.

4. Results and Discussion

4.1 Measurement Model Evaluation

Before examining the hypothesised relationships among the constructs, a comprehensive evaluation of the measurement model was conducted to ensure the reliability, validity, and overall robustness of the instruments used in the study. Assessing the measurement model is an essential preliminary step in Partial Least Squares Structural Equation Modelling (PLS-SEM) (J. F. Hair et al., 2020). The measurement model determines whether the observed variables adequately represent the latent constructs before proceeding to test the structural relationships (Priyanath et al., 2020).
In Table 2, all constructs demonstrated Cronbach's alpha (α) and Composite Reliability (CR) values well above the recommended threshold of 0.70, thereby confirming the internal consistency of the scales (J. F. Hair et al., 2019).

Table 2. Construct Reliability and Validity of the Measurement Model

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
GIN	0.847	0.882	0.895	0.682
GPr	0.891	0.962	0.932	0.821
GT	0.799	0.906	0.875	0.702
SCA	0.934	0.948	0.953	0.834

The Cronbach's alpha values ranged between 0.799 and 0.934, while the composite reliability (CR) values ranged from 0.882 to 0.962, indicating that the indicators within each construct are highly interrelated and measure the same underlying concept (Harlow, 2023). Furthermore, the Average Variance Extracted (AVE) values for all constructs were above 0.50, with the lowest being 0.682 and the highest reaching 0.834. This demonstrates that more than 50 per cent of the variance in each construct is explained by its respective indicators, thereby establishing convergent validity (Priyanath et al., 2020). These results collectively indicate that the measurement items possess adequate reliability and that each construct captures a substantial proportion of variance from its indicators.

In addition to assessing reliability and convergent validity, the discriminant validity of the constructs was examined to ensure that they are empirically distinct, and measure separate theoretical concepts. Discriminant validity was assessed using both the Fornell–Larcker criterion (Table 3) and the Heterotrait–Monotrait (HTMT) ratio of correlations (Table 4), which are widely recognised in the PLS-SEM literature for evaluating construct distinctiveness (Fornell & Larcker, 1981).

Table 3. Discriminant Validity – Fornell–Larcker Criterion

	GIN	**GPr**	**GT**	**SCA**
GIN	0.826			
GPr	-0.215	0.906		
GT	0.408	-0.177	0.838	
SCA	0.331	-0.083	0.170	0.913

According to Table 3, the square roots of AVE values (displayed along the diagonal) are greater than the inter-construct correlations, fulfilling the Fornell–Larcker criterion (Fornell & Larcker, 1981). This confirms that each construct shares more variance with its indicators than with other constructs in the model. This outcome provides strong evidence that the constructs are theoretically unique and empirically distinguishable from one another.

The HTMT ratios, presented in Table 4, further support this finding. All HTMT values are below the conservative threshold of 0.85, indicating that the constructs do not exhibit multicollinearity or conceptual overlap (Priyanath et al., 2020).

Table 4. Discriminant Validity – Heterotrait–Monotrait (HTMT) Matrix

	GIN	**GPr**	**GT**	**SCA**
GIN				
GPr	0.240			
GT	0.488	0.229		
SCA	0.352	0.095	0.176	

Values below this cut-off point confirm that respondents were able to differentiate among the various dimensions of green innovation—namely product, process, and technology innovation—as well as sustainable competitive advantage. This reinforces the notion that each construct captures a distinct aspect of firms' environmental innovation behaviour and competitiveness.

To further validate the discriminant integrity of the model, the cross-loadings of individual indicators were examined. As shown in Table 5, each indicator loaded more strongly on its corresponding construct than on any other construct, satisfying the requirement of indicator-level discriminant validity (Ab Hamid et al., 2017).

Table 5. Cross-Loadings of Measurement Items

	GIN	**GPr**	**GT**	**SCA**
GIN1	0.739	-0.144	0.346	0.167
GIN2	0.887	-0.187	0.326	0.313
GIN3	0.825	-0.171	0.371	0.247
GIN4	0.845	-0.197	0.330	0.322
GPr1	-0.185	0.827	-0.246	-0.059
GPr2	-0.223	0.956	-0.145	-0.094
GPr3	-0.167	0.931	-0.111	-0.065
GT1	0.305	-0.147	0.763	0.083
GT2	0.283	-0.214	0.841	0.127
GT3	0.412	-0.111	0.903	0.186
SCA1	0.242	0.012	0.092	0.863
SCA2	0.338	-0.097	0.174	0.926
SCA3	0.309	-0.130	0.159	0.929
SCA4	0.307	-0.067	0.182	0.933

Items under Green Product Innovation (GIN1–GIN4) loaded substantially higher on their intended construct than on other latent variables. This indicates that each item is conceptually aligned and statistically appropriate. Similarly, all items measuring Green Process Innovation (GPr1–GPr3), Green Technology Innovation (GT1–GT3), and Sustainable Competitive Advantage (SCA1–SCA4) exhibited strong and clean loadings, demonstrating that none of the indicators displayed problematic cross-loadings.

Collectively, the results from these tests internal consistency reliability, convergent validity, and discriminant validity confirm that the measurement model exhibits satisfactory psychometric properties. The reliability indices confirm the stability and consistency of the indicators. Additionally, the validity assessments verify both the internal coherence and distinctiveness of the constructs. These findings provide confidence that the measurement model is statistically sound and conceptually valid, establishing a solid foundation for evaluating the hypothesised structural relationships in the subsequent analysis.

4.2 Structural Model Evaluation and Hypothesis Testing

After confirming measurement adequacy, the structural model was analysed to examine the causal relationships between the three dimensions of green innovation and sustainable competitive advantage. The results, summarised in Table 6 and visualised in Figure 2, reveal that only one of the hypothesised relationships was statistically significant.

Table 6. Structural Model Results and Hypotheses Testing

	Original sample (O)	**Sample mean (M)**	**(STDEV)**	**T statistics (|O/STDEV|)**	**P values**
GIN -> SCA	0.313	0.310	0.074	4.202	0.000
GPr -> SCA	-0.009	-0.018	0.098	0.092	0.926
GT -> SCA	0.041	0.062	0.070	0.590	0.555

Figure 2. Structural Model

Specifically, Green Product Innovation → Sustainable Competitive Advantage ($\beta = 0.310$, $t = 4.202$, $p < 0.001$) showed a strong and positive relationship, thus supporting H1a. This finding indicates that firms introducing environmentally friendly products such as recyclable packaging, energy-efficient materials, or biodegradable product designs gain tangible competitive benefits. Green product innovation not only enhances firms' reputation and compliance with environmental standards but also helps attract environmentally conscious consumers and export buyers (Karimi Takalo et al., 2021). The finding aligns with previous studies (Umair Anwar et al., 2025), which argue that eco-innovation at the product level contributes directly to brand differentiation and long-term profitability.

In contrast, the relationships between Green Process Innovation ($\beta = -0.018$, $t = 0.092$, $p = 0.926$) and Green Technology Innovation ($\beta = 0.062$, $t = 0.590$, $p = 0.555$) with Sustainable Competitive Advantage were not statistically significant, leading to the rejection of H1b and H1c.

The slight negative but non-significant coefficient for green process innovation suggests that process-level improvements such as cleaner production methods, waste minimisation, and energy-efficient machinery may not yet translate into competitive gains (Liu, 2024). In Bangladesh, many firms pursue process innovations primarily for compliance rather than strategic differentiation (Khan et al., 2021). The high installation and operating costs of effluent treatment plants (ETPs), unreliable electricity infrastructure, and limited technical expertise often make process innovations burdensome rather than value-enhancing (Liu, 2024). These structural constraints may reduce the immediate performance benefits of process innovations, which helps explain the marginal negative coefficient observed.

4.3 Model Fit and Predictive Relevance

The overall quality of the structural model was evaluated through several model fit indices presented in Table 7.

Table 7. Model Fit Indices of the Structural Model

Indicator	Saturated Model	Estimated Model	Interpretation
SRMR	0.059	0.059	Acceptable (< 0.08)
d_ULS	0.36	0.36	Acceptable
d_G	0.221	0.221	Acceptable
Chi-square	226.196	226.196	Acceptable
NFI	0.848	0.848	Marginal but acceptable

The Standardised Root Mean Square Residual (SRMR) value of 0.059 is well below the threshold of 0.08, confirming an acceptable fit between the model and the observed data (J. F. Hair et al., 2020). The Normed Fit Index (NFI) of 0.848, although slightly below the ideal benchmark of 0.90, is considered satisfactory for exploratory studies using PLS-SEM. Both the d_ULS (0.360) and d_G (0.221) values indicate minimal discrepancies between the saturated and estimated models, suggesting consistency in model specification. The Chi-square value (226.196) further supports the adequacy of the model's fit to the empirical data.

4.4 Discussion

The overall findings provide valuable insight into the emerging pattern of green innovation and competitiveness in a developing-country context. The significant impact of green product innovation underscores that firms in Bangladesh's manufacturing sector are increasingly aware of global environmental expectations and are leveraging product-related initiatives to improve market access, particularly in export-oriented industries such as textiles and ready-made garments (Emon & Khan, 2024). These firms appear to focus on "market-visible" sustainability efforts that appeal directly to international buyers and environmentally conscious consumers (Lau & Wong, 2024).

The non-significance of green process and technology innovations points to a critical developmental gap. Process-level innovation requires investment in cleaner production technologies, waste minimisation, and energy efficiency (Bergfors & Larsson, 2009). However, many Bangladeshi firms still face financial and technical barriers (Rakin et al., 2020). Similarly, the slow adoption of green technologies can be attributed to limited access to advanced equipment, insufficient institutional incentives, and a lack of collaboration between industry and research organisations (Schiederig et al., 2012). This suggests that while awareness of sustainability is growing, the capability maturity necessary for deeper environmental transformation remains limited.

In practical terms, the findings imply that Bangladeshi firms tend to prioritise environmental strategies that are visible, low-cost, and externally driven rather than those requiring long-term systemic change. Policymakers and industry associations can play a crucial role by creating enabling environments through fiscal incentives, technical training, and green financing. These initiatives encourage firms to move beyond surface-level greening toward integrated sustainability strategies.

The results also align with previous NRBV-based research emphasising that environmental initiatives become strategic only when embedded within firm capabilities and managerial culture (Hart, 1995). In this sense, green product innovation can be viewed as an entry point for sustainability-driven competitiveness, while process and technology innovation may represent the next stage of evolution toward deeper ecological integration. Future research could further explore mediating or moderating factors—such as firm size, managerial commitment, or regulatory stringency that condition the relationship between green innovation and sustainable performance.

Overall, the empirical evidence from the PLS-SEM analysis supports only one of the three specific hypotheses. The study finds that green product innovation significantly enhances sustainable competitive advantage, while green process and green technology innovations do not show significant effects. The model demonstrates acceptable fit indices and moderate explanatory power, confirming that green innovation, particularly at the product level, is an emerging strategic pathway for competitiveness in Bangladesh's manufacturing sector. These findings contribute to the growing literature on sustainability in emerging economies by emphasizing that the strategic payoffs of environmental innovation depend on contextual readiness, visibility, and capability maturity.

5. Conclusion

The primary objective of this study was to examine the effect of green innovation on sustainable competitive advantage (SCA) within the Bangladeshi manufacturing sector. Drawing on the NRBV, the research aimed to identify which types of environmentally oriented innovations truly contribute to long-term competitiveness in an emerging-economy context.

Using data from 164 valid responses collected from manufacturing firms and analysed through Partial Least Squares Structural Equation Modelling (PLS-SEM), the study confirmed that green product innovation significantly enhances sustainable competitive advantage, while green process and green technology innovations exert statistically insignificant effects. These findings suggest that visible, market-driven eco-product strategies are more effective in generating competitive value than internal process or technology innovations. Overall, the results demonstrate that the relationship between environmental practices and competitiveness is contingent upon the type and maturity of innovation capabilities within firms.

The study makes several meaningful contributions to the literature on sustainability and strategic management. First, it refines the NRBV by demonstrating that environmental resources and capabilities do not exert uniform effects on sustainable advantage. The findings show that only customer-facing, product-level green innovations translate into measurable competitive performance, while internal process and technology innovations do not yet yield similar benefits. This offers a more differentiated interpretation of NRBV, emphasising that the strategic value of environmental capabilities depends on their visibility, maturity, and alignment with market expectations in resource-constrained contexts.

Second, the study provides context-specific evidence from Bangladesh, an emerging manufacturing hub where environmental awareness is rising but organisational capabilities remain uneven. By empirically examining the multidimensional nature of green innovation, the research deepens understanding of how sustainability transitions unfold in developing economies, where firms often prioritise market-visible initiatives over capability-intensive technological or process improvements.

Finally, the study offers a modest methodological contribution by demonstrating that widely used green innovation and competitive advantage scales remain reliable and valid when applied to a resource-constrained emerging-economy context. By confirming the robustness of these measures using PLS-SEM, the study provides a useful reference point for researchers examining sustainability constructs in similar industrial settings.

From a managerial perspective, the findings indicate that green product innovation should be prioritised as an immediate strategic pathway to sustainable competitiveness. Firms can benefit by designing environmentally friendly products, investing in recyclable packaging, and promoting eco-labels that appeal to global buyers and environmentally conscious consumers. These efforts not only enhance brand image but also satisfy growing export compliance requirements, particularly in the textile and apparel sectors. Policymakers, on the other hand, can accelerate this transition by providing fiscal incentives, low-interest green loans, and technical assistance programs. Such policies will encourage firms to go beyond compliance and build systemic innovation capacity.

While the study offers valuable insights, several limitations must be acknowledged. First, the data were collected from manufacturing firms in

Bangladesh, which may limit the generalizability of results to other industries or national contexts. Future studies could extend this model to service sectors or to cross-country comparisons within South Asia to examine contextual variations. Second, the study used cross-sectional data, which captures relationships at a single point in time. Longitudinal studies would be useful to observe how the impact of green innovation evolves as firms mature in their sustainability practices. Finally, the study focused only on the direct effects of green innovation dimensions. Future research could explore mediating or moderating variables such as organisational culture, leadership commitment, stakeholder pressure, or environmental regulation intensity to uncover deeper causal mechanisms.

Overall, this study highlights that the path toward sustainable competitiveness in emerging economies begins with market-visible environmental innovation—particularly at the product level—but long-term resilience will depend on firms' ability to integrate green process and technology capabilities into their strategic core.

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Role of Training on Capacity Development for Land Development Tax Management in Bangladesh

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Abstract

This study investigates the role of training in strengthening the capacity of Union Land Office (ULO) officials in Bangladesh to manage the Land Development (LD) Tax system, especially in the wake of digitisation reforms under the Land Development Tax Act, 2023. Findings reveal that most of the officials receive only a limited amount of training in their careers, let alone refresher courses. Even these limited training programs remain theoretical, fragmented, and inconsistent, with limited attention to hands-on practice, behavioural skills, and continuous professional development. Most officials show moderate legal literacy and weak digital proficiency, often relying on informal learning or outsourced IT support. Though officials perceive themselves as friendly as citizens, service recipients report bureaucratic indifference and poor communication. The study concludes that enhancing ULO capacity through systematic and practical training is indispensable for successful LD Tax administration and digital land governance. By aligning training content with real-world administrative challenges, Bangladesh can foster more efficient, transparent, and citizen-friendly LD Tax management, thereby advancing both revenue collection and public trust in land administration institutions.

Introduction:

Capacity development has long been recognised as a key to effective public sector performance. It is an instrument of shaping attitudes, values, and institutional practices that enable public officials to respond to evolving governance challenges. According to Bolder (2000), capacity is best understood as a composite of abilities, values, relationships, and enabling conditions that collectively empower individuals and systems to achieve their goals. Similarly, the United Nations Development Programme (UNDP) defines capacity building as the ability of individuals and institutions to perform tasks effectively, efficiently, and sustainably (Sadlapur & Kamble,2021)

In Bangladesh, land administration has historically been one of the most complex and sensitive areas of governance, given its direct implications for revenue collection, property rights, and citizen livelihoods. The Union Land Office (ULO) serves as the local authority in this system, responsible for assessing and collecting the Land Development (LD) Tax. This tax, though modest in terms of contribution to GDP, plays a crucial role in formalising land records, ensuring legal transactions, and serving as a prerequisite for access to other land services such as leasing, compensation, and registration. However, despite the importance of LD Tax administration, the system has long been accused of inefficiencies, outdated practices, and citizen dissatisfaction. Traditional manual processes have often resulted in inaccurate tax assessments, procedural delays, and corruption, contributing to both revenue leakage and declining public trust. Recent estimates suggest that 15-20% of rural LD Tax revenues are lost annually due to procedural flaws and corruption (Rahman & Hasan, 2020). These inefficiencies are compounded by inadequate training opportunities for Union Land Office (ULO) officials, who remain ill-equipped to handle the digital reforms introduced under the Land Development Tax Act, 2023.

The 2023 Act represents a major shift in Bangladesh's land governance. By transitioning from manual to digital systems of LD Tax assessment and payment, the government aims to streamline service delivery, minimise corruption, and enhance citizen trust. Reforms include the introduction of e-mutation systems, online tax payment portals, and GIS-based mapping tools. However, the success of these initiatives depends heavily on the capacity of respective officials to operate digital systems, apply updated legal frameworks, and interact with citizens in a service-oriented manner.

The evidence suggests that ULO officials face significant challenges in adapting to these changes. Many officials possess limited digital literacy, often relying on outsourced staff for troubleshooting. Others struggle with interpreting the legal provisions, particularly succession laws, which are critical for determining tax liability. These shortcomings are not merely technical but institutional, reflecting systemic gaps in training inclusion, training design, delivery, and follow-up evaluation.

Training can play an important role in addressing these gaps. Armstrong (2020) argues, training is a systematic process for acquiring the skills and competencies necessary for performance. Within the context of LD Tax administration, training serves not only to build technical capacity in digital systems but also to foster awareness, behavioural transformation, and citizen-oriented service delivery. Without such training, digital reforms risk being undermined by human limitations, resulting in inefficiencies, errors, and continued public distrust.

The present study investigates how structured training programs can enhance the capacity of ULO officials for effective LD Tax management. Specifically, it explores the relationship between training, capacity development, and institutional performance at the grassroots level.

Literature Review:

Training is widely recognised as an essential instrument of capacity development in public administration. Noe (2017) defines training as a planned effort to enhance employees' knowledge, skills, and competencies, which in turn improves organisational effectiveness. Armstrong (2020) argues that training is not merely about imparting knowledge but about transforming employee behaviour and aligning individual abilities with institutional goals. For public sector organisations, where bureaucratic rigidity often hinders innovation, training serves as a catalyst for change by bridging skill gaps, updating professional practices, and fostering citizen-centric approaches.

UNDP (2009) emphasises that capacity development extends beyond technical training to encompass organisational strengthening, behavioural transformation, and institutional alignment. In this sense, training forms only one component of a broader strategy but remains indispensable for building the foundation upon which other reforms rest. Scholars such as Wettasinghe (2023) and Dorcas (2022) confirm that effective capacity development enhances efficiency, reduces corruption, and improves citizen satisfaction in service delivery.

The origins of LD Tax administration can be traced to the State Acquisition and Tenancy Act of 1950, which set the groundwork for modern land governance. However, a more direct framework emerged with the Land

Development Tax Ordinance of 1976, which introduced a formalised system of land taxation. This ordinance remained in effect for decades until it was repealed and replaced by the Land Development Tax Act of 2023. The 2023 Act represents a paradigm shift: it not only updates the legal basis of LD Tax but also mandates the digitisation of assessment, collection, and record management.

Despite these reforms, property taxes, including the LD Tax, remain an underutilised source of revenue. Rahman and Ahmed (2018) estimate that property taxes contribute less than 0.5% of Bangladesh's GDP, far below the OECD average of 2-3%. Alm, Miller, and Wozny (2019) argue that while the LD Tax has the potential to improve resource efficiency and equity, its impact has been minimal due to low collection rates and weak administrative capacity. This highlights the urgent need to strengthen relevant institutions such as ULOs, which are responsible for implementing the tax system.

Existing training programs for ULO officials remain insufficient in scope and design. Ahmed and Khan (2018) found that most training initiatives focus on theoretical instruction rather than practical, hands-on exercises. Ince (2022) similarly observed that training in land administration often fails to address contemporary needs such as Geographic Information Systems (GIS), digital platforms, or citizen-focused service delivery.

Moreover, training opportunities are not evenly distributed. While higher-level officials (grade 9 and above) often have access to specialised courses, field-level ULO staff receive limited exposure. Even some officials working in the Union Land office receive no formal training at all. The absence of an institutionalised framework for training in public administration results in a fragmented curriculum, weak evaluation systems, and poor alignment with real-world challenges.

The digitisation of LD Tax under the 2023 Act demands a new set of competencies from ULO officials. These include technical skills such as operating digital tax portals, managing e-mutation records, and using GIS-based mapping tools; legal knowledge such as interpreting succession laws, property rights, and updated provisions of the 2023 Act ; and behavioural competence such as providing citizen-friendly services, ensuring transparency, and overcoming bureaucratic complexity.

Research by Kano and Tsuda (2023) highlights that digital reforms in the public sector succeed not only through technical training but also by motivating staff and addressing cultural barriers to change. Without adequate preparation, officials may resist innovation or apply digital tools incorrectly, leading to further inefficiency.

Global experiences offer valuable lessons for Bangladesh. In India, for example, capacity-building programs in land revenue administration emphasise continuous professional development through modular courses that blend digital literacy, legal interpretation, and soft skills (Dorcas, 2022). Sri Lanka has introduced competency-based training in land record management, linking training outcomes directly to promotion and performance evaluation (Wettasinghe, 2023). In OECD countries, property tax reforms are often accompanied by intensive training packages that include scenario simulations, refresher workshops, and citizen engagement strategies.

By contrast, Bangladesh's training landscape remains relatively static, with limited integration of practical exercises, weak monitoring of training effectiveness, and minimal citizen-focused content. These shortcomings underscore the urgency of reform.

Several theoretical models inform the design and evaluation of training programs in the public sector. Training Need Assessment (TNA) by Ferreira and Abbad (2013) emphasises identifying the gap between current competencies and desired performance. Applied to ULOs, this requires systematic evaluation of officials' digital, legal, and service skills. Andragogy (Knowles, 1980) highlights adult learning principles, stressing self-directed, problem-based, and experience-driven methods. ULO officials, as adult learners, benefit most from participatory training formats rather than lecture-based delivery. PICRAT Model (Kimmons et al., 2020), originally used in teacher education, this framework stresses moving from passive learning to the transformative application of technology. For LD Tax, training must ensure that digital tools are not just demonstrated but actively integrated into daily operations. Kirkpatrick Evaluation Model (1994) proposes four levels of training evaluation: reaction, learning, behaviour, and results. Current LD Tax training often stops at level 1 (reaction), with little assessment of behaviour change or service outcomes.

The literature consistently identifies several gaps in Bangladesh's LD Tax training system: limited scope of training for the grassroots officials, more theoretical focus with minimal hands-on practice, lack of continuous professional development or refresher courses, post-training evaluation and absence of behavioural and citizen-oriented content, which prolongs bureaucratic attitudes.

These gaps highlight the need for a multidimensional training approach that integrates digital, legal, and behavioural elements while ensuring maximum inclusion in the training, continuous professional development and institutional support.

Objectives:

The Primary objective of this study is to investigate the role of training in enhancing the capacity development of Union Land Office (ULO) officials for effective Land Development (LD) Tax management in Bangladesh. The Specific Objectives include:

I. To assess the current knowledge, skills, and attitudes of ULO officials regarding LD Tax management.
II. To evaluate the effectiveness of existing training programs in improving the capacity of ULO officials to manage the LD Tax
III. To identify specific training needs for ULO officials to address gaps in LD Tax management practices.

Conceptual Framework:

The conceptual framework provides a structured lens to understand how training (Independent variable) leads to improved LD Tax management (dependent variable) through the mediating role of capacity development. It draws from established theories such as Training Need Assessment (Ferreira & Abbad, 2013), Andragogy (Knowles, 1980), and the PICRAT model (Kimmons, 2020), The framework is tailored to the Bangladeshi context of land administration, where ULOs operate at the initial stage of tax collection but are constrained by outdated skills, institutional complexity, and weak coordination with digital systems.

The framework for evaluating the role of training on effective Land Development (LD) tax management is built on three interconnected variables. The independent variable is training programs, which include formal courses organised by institutions such as the Land Administration Training Centre (LATC) and training arranged by the Office of the Deputy Commissioner, alongside informal and on-the-job learning. These programs also extend to refresher courses, simulation exercises, and role-play sessions. The training content typically covers digital tools, legal updates, customer service delivery, and ethics, providing both technical and behavioural inputs to officials.

The dependent variable is effective LD tax management, which is the outcome of improved capacity. This is measured through multiple dimensions: accuracy (fewer data errors and misapplication of legal provisions), transparency (clarity of assessment, visible records, and reduced corruption), timeliness (faster tax processing and mutation handling), citizen satisfaction (positive interactions with fewer complaints), and revenue collection (greater compliance and higher efficiency).

The relationship among the variables operates through a cause-and-effect chain. Training programs function as the key inputs that enhance officials' technical, legal, and behavioural capacities. These enhanced capacities then generate outputs such as accuracy, transparency, and timeliness in tax administration. The outputs lead to outcomes like greater citizen satisfaction, stronger compliance, and improved public trust in institutions. At the highest level, these outcomes contribute to impacts, including sustainable revenue collection and strengthened governance systems.

Methodology:

This study adopts a mixed-methods research design, integrating both quantitative and qualitative approaches to evaluate the complex and multidimensional nature of training effectiveness in LD Tax management. The rationale for using mixed methods is grounded in the recognition that quantitative surveys provide measurable indicators of capacity, while qualitative tools such as interviews, focus group discussions (FGDs), and case studies secure the lived experiences, perceptions, and contextual nuances that cannot be quantified.

Creswell and Plano Clark (2018) argue that combining quantitative and qualitative data allows for a more holistic understanding of governance-related issues. In the present study, quantitative data identify broad patterns in knowledge, skills, and attitudes of ULO officials, while qualitative data explain why these patterns exist and how they influence service delivery.

The research employed a sequential explanatory model. In the first stage, quantitative data were collected through surveys administered to both service providers and service recipients. This was followed by qualitative methods, including Focus Group Discussions (FGDs), Key Informant Interviews

(KIIs), and case studies that elaborated on, validated, or challenged the survey findings. Data from both phases were then integrated during the interpretation stage, allowing for triangulated insights and a robust understanding of the dynamics of training and capacity development in Land Development (LD) management.

Fieldwork was conducted in two Union Land Offices (ULOs) selected to reflect diverse conditions. Aminbazar ULO in Dhaka District represented a sub-urban context with relatively greater access to technology and closer administrative supervision. In contrast, Sultanganj ULO in Bogura District represented a rural area where infrastructure constraints and limited resources shaped service delivery practices. This deliberate selection enabled the study to get both urban-rural contrasts and shared challenges in LD tax administration. A purposive sampling strategy was adopted to ensure that the perspectives of both service providers and service recipients were included. The total sample size was 100 respondents, consisting of 7 officials including Union Land Assistant Officers, surveyors, and Kanungos and 93 citizens who were taxpayers or landowners. Higher-level officials involved in land administration were also consulted to enrich the institutional perspective.

The study included two FGDs, one in each site, involving 8–10 participants, such as ULO staff, citizens, and local stakeholders. These discussions captured collective perceptions of training effectiveness and service delivery challenges. Ten KIIs were also conducted with a range of key stakeholders, including an Assistant Commissioner (Land), an Additional Deputy Commissioner (Revenue), a Upazila Nirbahi Officer (UNO), a senior official from the Ministry of Land engaged in digitization initiatives, a representative from the Land Administration Training Centre (LATC), and five ULO officials with direct training experiences. These interviews provided policy-level and insider perspectives on training design, implementation gaps, and institutional priorities. In addition, two case studies were conducted in the Shahjahanpur AC (Land) office, focusing on practical service delivery failures linked to training deficits. One case highlighted a misinterpretation of succession law that delayed tax assessment, while the other demonstrated how reliance on outsourced IT staff led to data entry errors in digital systems.

The study faced several methodological limitations that must be acknowledged. Its geographic scope was restricted to only two Union Land Offices, which limits the generalizability of findings across Bangladesh. The sample size of service providers was also small, with only seven officials surveyed, reducing the ability to capture the full diversity of officials' perspectives nationwide. Time constraints posed another challenge, as data was collected within a short period during ongoing administrative reforms, raising questions about long-term applicability. Additionally, the reliance on self-reported data introduced potential bias, since officials may have overstated their competencies.

Findings and Discussion:

This section presents the findings derived from surveys, focus group discussions (FGDs), key informant interviews (KIIs), and case studies. Results are organised thematically around the key research objectives: (1) assessing current knowledge, skills, and attitudes of ULO officials; (2) evaluating the effectiveness of existing training; and (3) identifying training needs and gaps. The discussion on institutional barriers and the implied need for governance has been along these lines.

Current Knowledge, Skills, and Attitudes of ULO Officials

Survey data indicate that ULO officials demonstrate moderate levels of legal literacy, with 70% of respondents rating officials' legal knowledge as "moderate," 20% as high, and 10% as low. This pattern suggests that while most officials have a basic working understanding of land-related laws concerning taxation, ownership, and inheritance, significant gaps remain in applying specific provisions of the Land Development Tax Act 2023, particularly in areas such as succession law and property classification. Insights from FGDs and KIIs reinforced these findings, with a Ministry of Land official observing that most ULOs rely on knowledge passed down from predecessors rather than keeping up with updated legal frameworks. Case Study 1 illustrated this challenge in practice, where a misinterpretation of succession law led to an incorrect tax assessment, delaying service delivery and eroding citizen trust. Overall, although legal knowledge is present, it tends to be outdated, informal, and heavily dependent on peer learning rather than being systematically developed through institutionalised training.

Digital literacy emerged as the weakest competency area among ULO officials, with 30% of respondents rating their skills as low, 65% as moderate, and only 5% as high. This indicates that nearly one-third of officials face significant challenges in using digital platforms such as e-mutation systems, online tax portals, and electronic record management tools. Qualitative findings reinforced this weakness, as one ULO officer admitted during a KII that when systems crash, they typically wait for technicians since they often lack the skills to troubleshoot issues themselves. Case Study 2 further illustrated the consequences of this gap, showing that reliance on outsourced IT staff for data entry resulted in widespread errors in digital land records, underscoring the risks posed by inadequate digital training and the urgent need for stronger capacity-building in this area.

Survey results painted a generally positive picture of ULO officials' attitudes toward citizens, with 75% of respondents rating them as high, 16% as moderate, and only 9% as low. This suggests that officials are widely perceived as polite, cooperative, and service-oriented.

However, FGDs provided a more critical account from the citizens' perspective, with service recipients expressing frustration over bureaucratic indifference, frequent delays, and inadequate communication. One participant noted, they don't explain the process; they just ask you to come back later. This divergence highlights a clear perception gap, while officials tend to view themselves as professional and responsive, citizens often experience interactions as equivocal and unhelpful. Such attitude problems appear less from personal courtesy and more from systemic issues such as heavy workloads, entrenched bureaucratic culture, and weak motivational incentives.

Effectiveness of Existing Training Programs:

Two sets of survey findings illustrate the mixed picture of training effective-ness. Before training, officials reported only moderate confidence in using digital systems, with a mean score of 3.14 out of 4, indicating that many still struggled with digital tools. After training, confidence levels rose markedly, with the mean increasing to 3.86 and both the mode and median reaching 4, suggesting that most participants perceived the training as very effective. Primarily, these results point to strong training outcomes. Yet, field-level evidence challenges this narrative, showing that while officials report higher confidence, practical difficulties in applying digital skills persist, limiting the real-world impact of training.

Klls and FGDs consistently underscored critical weaknesses in the design of existing training programs. Participants pointed out that sessions tend to be very theoretical, offering limited opportunities for practical application.

Digital training is often confined to short modules of only two to four hours within larger courses, leaving officials underprepared for real-world challenges. Moreover, the absence of adequate refresher programs means that whatever skills are gained quickly become outdated. Legal training also falls short, as it rarely incorporates recent updates, leaving many officials uncertain about new provisions of the LD Tax Act. As one ULO officer reflected, I attended the Basic Land Management Training, but it hardly helped me when I faced the digital tax portal. The classroom and the field are two different worlds. This highlights the disconnect between training content and the practical realities of service delivery.

Case Study I revealed that officials' lack of legal clarity on succession law resulted in significant service delays, while Case Study 2 demonstrated how inadequate digital training and heavy reliance on outsourced IT staff led to frequent errors in data entry. Together, the cases highlight a critical disconnect between training outcomes and field-level performances. Although training may increase officials' confidence, it often does not translate into the practical competence required for accurate and efficient service delivery.

Training Needs and Gaps:

Survey respondents were asked to rank training priorities, and the results highlighted a clear set of needs. Digital proficiency, particularly in using e-mutation systems and online tax platforms, along with integrated legal-tech training, received the highest priority ratings of 9 out of 10. Regular legal refreshers were also rated highly at 8 out of 10, while soft skills such as client handling and communication scored 7 out of 10. FGDs reinforced these findings, with officials emphasising the importance of real-life problem-solving and scenario-based learning, while citizens stressed the need for clearer communication and greater empathy from land officials. Key informants further criticised the lack of timely updates in training, noting that new rules and circulars often reached the field before being incorporated into training modules, forcing offices to develop informal practices. As one senior land officer remarked, We are often unaware of new rules or circulars. By the time training is arranged, field offices have already developed informal practices. Taken together, these findings underscore the most critical training priorities: strengthening digital literacy, ensuring updated legal knowledge, integrating problem-solving exercises, and improving citizen engagement skills.

Despite ongoing training initiatives, ULO officials continue to face several barriers that hinder the effective application of newly acquired skills. Staffing shortages are a major obstacle, with 85% of survey respondents citing excessive workload as a challenge, particularly in small offices where limited personnel make it difficult to allocate time for adopting new digital practices. The lack of refresher training compounds this issue, as 80% reported that without continuous learning opportunities, their knowledge quickly becomes outdated, especially in rapidly evolving digital contexts. Technical issues also persist, with 70% of respondents pointing to unreliable digital infrastructure and slow troubleshooting, while weak collaboration with IT teams further delays problem resolution. Cultural resistance presents another hurdle, as many old officials remain more comfortable with manual processes and retain bureaucratic, colonial attitudes that undermine service orientation. Finally, motivational deficits—though reported by only 20% in surveys emerged strongly in qualitative data, which revealed low morale due to limited incentives, recognition, and career advancement opportunities. Collectively, these barriers significantly weaken the translation of training into improved service delivery.

The data reveals certain contradictions that underscore the complexity of training effectiveness and service delivery. On one hand, digital literacy remains weak, yet training interventions appear to raise officials' confidence scores. Similarly, surveys rate officials' attitudes towards citizens positively, while citizens themselves continue to report dissatisfaction with bureaucratic indifference and poor communication. These inconsistencies can be explained by the nature of training and perception gaps. Training may temporarily boost self-confidence without securing long-term competence, leaving officials still dependent on IT staff when faced with practical challenges. Likewise, officials may genuinely perceive themselves as courteous and professional, whereas citizens, shaped by experiences of bureaucratic evasion, interpret their behaviour more critically. Such findings highlight the value of triangulation, which not only identifies gaps in skills but also exposes the discrepancies between perceptions and expectations, offering a fuller understanding of institutional effectiveness.

The findings carry significant implications that extend beyond individual performance to the broader governance landscape. Weak training directly undermines revenue efficiency, as persistent errors and delays reduce the effectiveness of revenue collection. At the same time, citizen trust is eroded when misinterpretations of law and unreliable digital services create frustration and weaken confidence in government institutions. The policy effectiveness of the 2023 Act, which emphasises transparency and digitisation, is also compromised by gaps in officials' legal and digital capacity, preventing its objectives from being fully realised. Moreover, issues of equity and access emerge, as rural citizens already facing structural disadvantages are disproportionately affected when responsible officials lack the skills to deliver timely and accurate services. These findings underscore that strengthening training is not merely a technical concern but a critical governance imperative essential for ensuring efficiency, accountability, and inclusive service delivery.

Recommendations:

The study reveals that the respective officials receive very limited training, and even while training opportunities exist, they remain fragmented, overly theoretical, and insufficiently aligned with the practical demands of LD Tax management. To address these shortcomings and ensure that training translates into effective field performance, several recommendations have been proposed from our the service provider and service recipient ends:

a. Structured and Continuous Training Framework for the ULO Officials

Regular and structured training programs should be institutionalised for all ULO officials to keep them updated with ever-changing land laws, digital systems, and service delivery standards. This framework needs to be competency-based and modular, enabling officials to build skills progressively. A basic module should provide introductions to the LD Tax Act 2023, digital tax systems, and citizen service orientation. An intermediate module should incorporate scenario-based legal interpretation, hands-on digital practice, and case analysis. Finally, an advanced module should focus on supervisory skills, policy updates, and integration with broader land administration reforms. All ULO officials should be required to complete these modules at different career stages, ensuring systematic progression rather than sporadic exposure.

b. Integration of Digital Proficiency

Since digital literacy remains the weakest competency, ICT training should form the foundation of LD Tax training programs. Practical sessions must be expanded to cover e-mutation, online payment systems, and GIS applications. Simulations and role-playing exercises should replace lecture-heavy formats to reinforce hands-on learning. Establishing digital labs at LATC and other training places would allow officials to practice in safe environments without the fear of making errors. Partnerships with ICT experts from the Ministry of Land and private sector actors are also necessary to keep training content relevant and updated.

c. Legal Refreshers and Case-Based Learning

Legal training should be dynamic, with regular updates reflecting changes to the LD Tax Act and related laws. Quarterly refresher sessions can be introduced on key areas such as succession law, property classification, and dispute resolution. Case-based learning is critical; officials must analyse real-life examples of tax disputes, legal misapplications, or appeals, followed by structured group discussions. Additionally, quick reference manuals with flowcharts and decision-making steps should be developed to support officials in day-to-day tasks.

d. Behavioural and Service Orientation Training

Technical and legal training must be complemented with behavioural skills that strengthen citizen engagement. Training modules should cover customer service, empathy, conflict resolution, and ethics. Role-playing exercises, simulating citizen-official interactions, can help internalise service orientation. A citizen-first philosophy should be embedded into the curriculum, linked to the Right to Information Act (2009) and service charters, reinforcing accountability and responsiveness in public service delivery.

e. Regular Refresher Courses

Without reinforcement, skills decay quickly, particularly in digital domains. Refresher courses should therefore be mandated every 6-12 months. A blended learning model, combining short online modules with in-person workshops, can increase accessibility and reduce costs. To enhance participation, refresher training should be linked directly to performance evaluations and promotions, ensuring both accountability and incentives.

f. Institutional Support and Monitoring

Sustainable training outcomes depend on institutional backing. Each ULO should assign IT focal points to provide ongoing technical support, while dedicated budget allocations should ensure continuous training and updated ICT infrastructure. Robust monitoring and evaluation mechanisms must also be established, drawing on Kirkpatrick's four-level model: Reaction (satisfaction), Learning (knowledge gained), Behaviour (application in the field), and Results (impact on service quality and revenue). Findings from monitoring should directly inform revisions to training design and delivery.

g. Incentives and Motivation

Finally, cultural resistance and motivational deficits must be tackled through stronger incentive structures. Training completion should be directly tied to career progression, increments, and recognition awards. Best-performing ULOs that demonstrate improved service delivery after training should be publicly acknowledged and rewarded. Performance indicators such as reduced complaint rates, faster service delivery, and increased revenue collection should guide recognition and create a result-driven culture within the land administration system.

Together, these recommendations outline a holistic strategy to transform training into a meaningful driver of institutional capacity, improved citizen trust, and more effective governance in LD Tax administration.

Conclusions:

Training has emerged as a decisive factor in strengthening the capacity of Union Land Office (ULO) officials to manage Land Development (LD) Tax in Bangladesh, particularly in the context of the reforms mandated by the Land Development Tax Act, 2023, which aim to digitise tax assessment, collection, and record management. The study shows that while existing training programs raise short-term confidence, they remain fragmented, theoretical, and misaligned with field realities, limiting their long-term impact. Officials report moderate legal knowledge but significant gaps in succession law, weak digital literacy, and inconsistent service orientation. While quantitative findings indicate that self-reported confidence rises from a mean of 3.14 to 3.86 after training, qualitative evidence demonstrates that competence remains weak, with many officials continuing to depend on outsourced IT staff and informal peer learning. Moreover, citizens often experience bureaucratic delays, rudeness, and poor communication despite officials rating their attitudes positively, highlighting a perception gap between providers and recipients. Institutional barriers, including staff shortages, heavy workloads, unreliable ICT infrastructure, cultural resistance to change, and lack of refresher programs further undermine training outcomes. Considering these challenges, the study proposes a multidimensional reform framework that views training as an indispensable pillar of governance rather than an optional support tool. First, training must be structured and continuous, designed as modular competency-based programs that accompany officials throughout their careers, rather than one-off courses. Digital proficiency should form the core of this framework, with practical exercises, simulations, and digital labs enabling hands-on learning in e-mutation, online portals, and GIS systems. Legal knowledge must be regularly updated through quarterly refresher sessions and case-based learning modules, ensuring that officials can correctly interpret succession laws and tax provisions. Equally important are behavioral and service orientation components, including customer service, ethics, empathy, and accountability training, which can shift entrenched bureaucratic attitudes toward a more citizen-focused culture. All training must be supported by institutional arrangements such as IT focal points in every ULO, dedicated budgets and robust monitoring and evaluation mechanisms using Kirkpatrick's four-level model, linking training outcomes not only to knowledge but also to behavior and service results. Regular refresher courses should be institutionalized every 6-12 months to sustain competence, supported by blended learning options that combine online and in-person modules. Collaboration among Training Centers and the Ministry of Land is critical for policy coherence, while partnerships with development agencies and ICT experts can introduce the best international practices. Finally, Incentives are necessary to overcome motivational deficits and cultural resistance. Training completion should be linked to career progression, increments, and recognition awards, while high-performing ULOs demonstrating improved service delivery should be publicly acknowledged. The implications of these reforms extend beyond technical efficiency. Improved training will enhance revenue mobilization by reducing tax leakage, promote transparency by minimizing errors and opportunities for corruption, and restore citizen trust in land governance by improving service quality and responsiveness. In the long term, it will align frontline practices with the government's agenda, ensuring that reforms under the LD Tax Act, 2023, achieve their intended outcomes. The study therefore concludes that training must be reconceptualized not as a supplementary administrative intervention but as a transformative governance tool, the bridge between digital policy aspirations and effective service delivery.

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Revitalising Municipal Governance: The Impact of Deputing Chief Executive Officers in the Municipalities of Bangladesh

Sumit Saha

Abstract:

This article explores the impact of deputing Chief Executive Officers (CEOs) in the municipalities of Bangladesh and how this strategy has brought about transformational changes in the governance and administration of these local government institutions. Initially, appointing CEOs in municipalities was intended to improve operational efficiency, increase transparency, and ensure accountability within local governance structures. But it was challenging to assign the BCS (Administration) cadre officials in the local representative-led municipalities. Through a comprehensive analysis of the implementation process and its outcomes, this article highlights the significant impacts in service delivery, financial management, and citizen engagement achieved by such deployment. Drawing on empirical evidence and case studies, the article demonstrates the effectiveness of this initiative in revitalizing municipal management and fostering sustainable development at the grassroots level.

Keywords: Municipalities, CEO, Local Governance, Paurashava, Transformation

Introduction:

The local governance landscape in Bangladesh has undergone significant reforms in recent years, focusing on enhancing efficiency, transparency, and accountability. As part of this reform agenda, placing Chief Executive Officers (CEOs) from the BCS (Administration) cadre in first-class municipalities has become a key strategy to revitalize administrative structures and improve service delivery mechanisms.

Municipality staff called a country-wide movement demanding their due salaries in March 2018. According to an editorial published in the daily Prothom Alo on April 19, 2019, eighty-five percent of municipalities were failing to pay salaries to their employees, and only 49 out of 329 municipalities could pay salaries at that time. In July 2019, they gathered again with the same demand. Considering the grievance among municipal staff, the Local Government Division (LGD) the guardian ministry of municipalities issued an order on August 19, 2019, where LGD asked for detailed financial reports from 59 municipalities defaulting on employees' salaries for ten or more months. Besides these, the municipalities were also suffering from irregularities and low quality of development project implementation and public service delivery over the years, ultimately failing to achieve the goal of the local government system.

In response to ongoing financial crises and inefficiencies, LGD decided to designate chief executive officers from the BCS (Administration) cadre to enhance discipline and improve service delivery, financial management, and citizen engagement within municipal institutions. On March 23, 2021, LGD wrote to the Ministry of Public Administration (MoPA)—the ministry mandated for recruitment, posting, and deputation of BCS (Administration) cadre officials—expressing the need for CEO deputation. On September 30, 2021, MoPA issued an order to all the Deputy Commissioners to assign a senior assistant commissioner-level officer of their office as the chief executive officer in the first-class municipalities in their territory as an additional charge.

Legal and Strategic Provision:

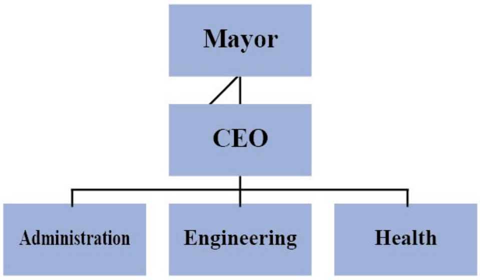
According to the Local Government (Municipality) Act, 2009

Chief Executive Officer

74. (1) Notwithstanding anything contained in Section 72, the government may appoint a Chief Executive Officer for any specified municipality.

(2) The Chief Executive Officer shall be appointed on such terms as may be prescribed by the government.

(3) If an officer is appointed under sub-section (1) for a municipality, he shall be the chief executive officer of that municipality, and other officers and employees of the municipality shall be subordinate to him.



(4) The Chief Executive Officer shall have the right to attend and participate in the deliberations of any committee of the Municipality, and in any such meeting, he shall, with the permission of the President, make any statement or explanation and inform the meeting of any violation of law or rule, and in such meeting, the Chief Executive Officer shall have no right to vote or to raise motions.

According to the National Strategy for Paurashava Governance Improvement 2016-2025,
The organogram consists of the Mayor, a Chief Executive Officer (CEO), and employees of (1) the Engineering Department (the head of the department is an Executive/Assistant Engineer); (2) the Administration Department (Secretary); and (3) the Health, Family Planning, and Conservancy Department (Health Officer). The head of Paurashava officers and employees is a CEO who is an employee of the administrative cadre under the civil service. (p16)
Amongst the key Paurashava officers, the vacancy rates for the CEO and Health Officer are high. Since the CEO is in charge of overall Paurashava management, these vacancies in this post could significantly affect the Paurashavas' administrative performance. (p18)

Relevant Studies on Local Governance in Bangladesh:

Islam (2015) aims to examine the historical progression of local governance, namely the expansion of municipalities and their management in Bangladesh. Local governance in the Indian subcontinent can be traced back to around 1200 BC, while the current structure of the local administration is the result of steady development over several centuries. Notably, the Mughal rulers played a great role in the development of both rural and urban local government institutions. The establishment of local government in its contemporary form began during the British colonial era.

Khan et al. (2018) developed a planning framework grid to assist and direct local government planning under the SDGs. The SDGs prioritise local and regional governments in recognition of the rapid pace of change in rural areas. These governments can fulfill diverse beneficial functions in ensuring the long-term achievement of interconnected objectives. Their study aims to develop a practical framework that establishes a connection between the Sustainable Development Goals (SDGs) and the efforts of local governments, with a particular focus on Bangladesh.

Khan et al. (2021) investigate the trust of citizens in the historically significant local government institution (LGI) of upazila parishads in Bangladesh, despite the absence of adequate study. To evaluate the trust of citizens in LGIs, they implemented indicators. The study found that most respondents were dissatisfied with the performance of the LGI, which suggests a lack of trust among citizens. Dishonest practices like bribery, unfair treatment by service personnel, and prolonged waiting times for service all contributed to a lack of trust among citizens. Service providers identified challenges like insufficient funding, frequent turnover of staff, a lack of training in modern technology, and undue pressure from powerful individuals.

Ferdous et al. (2024) conducted a detailed analysis of the performance and citizen trust in local government institutions (LGIs) in Bangladesh, with a particular emphasis on Union Parishad (UP), the lowest level of LGIs at the grassroots level. This entailed conducting interviews with key informants who were service providers and administering a questionnaire survey to service recipients. The data that was collected was subsequently analysed and triangulated. The study evaluates the performance of the UPs using a set of criteria and demonstrates that citizens' dissatisfaction with the UP’s performance has resulted in a lack of confidence. The citizens attribute the lack of trust to factors such as significant delays in service delivery, discriminatory practices, and disrespectful behaviour toward service recipients. In contrast, the institutional actors attribute the inadequate performance and failure to satisfy local demands to the lack of decision-making power and insufficient funding at the grassroots level.

Municipalities are mandated to provide a wide range of services such as social care, schools, housing and planning, and waste collection for people and businesses in the local community. The municipal councils are envisioned to fulfill the needs for social care, schools, housing and planning, and waste collection in a democratic and accountable manner. They also provide services such as licensing, business support, registrar services, and pest control. Fundamentally, these institutions are supposed to operate sustainably by generating revenue from their internal sources. Despite these expectations, the municipalities in Bangladesh have struggled to cover basic expenses, let alone fund capital investments, and maintain service deliveries for years. The government aimed to address these issues by appointing an experienced executive from the Bangladesh Civil Service to oversee municipal operations. Although the legal provision is present, the decision to appoint an experienced executive from the Bangladesh Civil Service went through mixed reactions from stakeholders and experts. While some are optimistic about the decision and anticipate positive changes, others view the appointment of an executive from the Bangladesh Civil Service as interference by the central government or bureaucrats in the local government system. To address these contrasting views, a study on the impact of CEO deputation in the municipalities of Bangladesh is necessary to understand the implications of this decision.

Objectives:

Main Objective: of the study is to assess the impact of CEO deputation on the effectiveness of municipal governance in Bangladesh. The specific objectives are to (a) identify the specific mechanisms through which CEO deputation influences municipal governance; (b) analyze the factors influencing the success of CEO deputation in Bangladesh; and (c) explore the challenges and limitations associated with deputing CEOs country-wide and propose policy suggestions for scaling up such deputation.

Methodology:

This study employed a qualitative approach to gain insights into CEOs' roles in enhancing citizen participation, fiscal discipline, and service delivery. The methodology was designed to explore both the institutional process and visible changes in governance, fiscal management, and service delivery of selected offices after the deputation.

CEO deputation has been implemented in a limited number of municipalities so far. Thus, a multiple case study approach was adopted as the intervention requires in-depth contextual examination. This design facilitates comparing patterns and identifying mechanisms through which CEOs brought transformation.

There are 194 first-class municipalities in Bangladesh. As of 2023, only 18 of these municipalities had a deputed CEO. From these 18, three municipalities—Laksam (Cumilla), Sreepur (Gazipur), and Manikganj Sadar were purposively selected based on the availability of complete financial and administrative records before and after CEO deputation, accessibility for field investigation, variation in geographic location and demographic size, and evidence of documented reforms implemented by CEOs. Such sampling ensured the inclusion of municipalities where the impact of CEO leadership could be meaningfully traced over time.

This study incorporated both primary and secondary data sources, including in-depth Key Informant Interviews (KIIs), document and administrative data review, and field observations.

For KIIs, semi-structured interviews were conducted with stakeholders directly involved in municipal governance. The respondents include CEOs, mayors and elected council members, administrative officers (secretaries, accountants, engineers), other municipal staff involved in service delivery, and citizen representatives from TLCC and WLCC committees. Interviews focused on changes in governance processes, financial management practices, challenges faced during reform, and perceptions of CEO effectiveness.

A systematic review was conducted of annual financial statements, holding tax records (before and after deputation), meeting minutes of council, TLCC and WLCC, audit reports, citizen charters, and service delivery manuals, web portals, digital service records, and public notices. This enabled a quantitative comparison of key indicators e.g., revenue collection, salary disbursement regularity, municipal bill payments, and development project approvals. Direct field visits were conducted to observe the operational workflow of municipal offices, including service counters, digital centres, and public interaction points. Field drives and community engagement programs were conducted for tax recovery. Besides, public hearings are attended to witness the grievance redressal mechanism. Throughout the study, non-participant observation provided firsthand insights into administrative discipline, staff behaviour, and citizen responsiveness.

A thematic content analysis approach was used for data analysis here. Interview transcripts were inductively coded to identify frequent responses, while documentary data were quantified where appropriate to compare. Data triangulation was applied, where findings are validated by cross-checking with administrative data and field observations. Cases are compared to identify cross-cutting mechanisms of change and context-specific factors. Throughout the study, participation was voluntary and respondents' confidentiality and anonymity were ensured. Furthermore, audit trails were maintained for document reviews, and triangulation minimised bias.

Limitations:

There are other influencing factors, such as changes in national policy or local economic conditions, like trade agreements or tax reforms, which affect the performance of municipalities. Isolating the impact of CEO deputation here presents a significant challenge. Furthermore, municipalities led by a CEO may exhibit unique characteristics that deviate from the norm, such as a focus on innovation or a strong emphasis on community engagement, potentially biasing the results. Consequently, results obtained from restricted case studies may not accurately reflect the entirety of municipalities in Bangladesh.

Furthermore, the study may not be able to capture the long-term impacts of CEO deputation, as this policy may take time to show significant results. Implementing follow-up assessments at regular intervals post-deputation could help track the sustained effects over time. Quantifying the costs and benefits of CEO deputation is also a challenge, as some benefits, such as improved organisational culture or enhanced stakeholder trust, may be intangible. Finally, the limited number of municipalities with CEO deputation limits statistical generalisation, while qualitative methods allow for deep insights.

Data Analysis and Findings:

The analysis derives from documentary evidence, interviews, and field observations conducted across the selected municipalities. Overall, the findings indicate that CEO deputation produced measurable improvements in fiscal discipline, administrative performance, and citizen-centric service delivery. These outcomes emerged through targeted interventions in revenue management, institutional governance, and digital transformation.

For instance, holding tax and own-source revenue collection increased substantially following CEO deputation across the case municipalities.

Municipality	CEO Deputation		Remarks
	Before (FY 2021 - 2022)	After (FY 2022-23)	
Laksam, Cumilla	2,46,02,870/-	3,87,91,759/-	Annual Holding Tax Collection
Sreepur, Gazipur	3,77,68,707/-	6,35,14,778/-	
Manikganj Sadar	4,46,01,352/-	6,00,98,926/-	

Interviews show that CEOs enforced rigorous measures against long-standing defaulters. Strategies included systematic field drives targeting overdue taxpayers, creation of accurate tax databases linked to digital mapping, institution of transparent tax review committees, and strict enforcement of legal provisions, including the cap on tax remission. These efforts increased compliance and created a culture of fiscal responsibility, allowing municipalities to clear outstanding salary arrears, utility bills, and vendor payments.

CEOs introduced procedural uniformity across administrative functions. Key changes included the regularisation of staff salaries after years of delay, monitoring registers for expenditure tracking, standardised project approval processes with technical vetting, stricter procurement oversight aligned with PPR 2008, and internal audit practices even where formal audit units were absent. Field observations confirmed that CEOs' executive magistracy powers enabled them to conduct mobile courts against illegal establishments, unauthorised construction, and sanitation violations. This increased institutional authority and public compliance.

Case studies demonstrate significant improvements in service delivery, particularly through digital tools and participatory mechanisms. Laksam introduced a unified municipal web portal enabling online applications for certificates, tax payments, and grievance submissions. Sreepur operationalised its Citizen Charter (2022), defined service fees for digital centre services, and disallowed arbitrary charges. Manikganj streamlined certification processes and introduced transparent service timelines. These digital reforms reduced the Time-Cost-Visit (TCV) burden for citizens and minimised rent-seeking opportunities.

CEOs revitalised institutions such as Town-Level Coordination Committees (TLCC), Ward-Level Coordination Committees (WLCC), Public Consultations, and Town Hall Meetings. Municipal records confirm that regular TLCC meetings often dormant previously improved accountability for project selection and budget allocation.

Field verification teams were formed, consisting of engineers, ward councillors, and administrative staff, while project progress was tracked through checklists and photographic evidence. This participatory monitoring system reduced irregularities in project execution, increased adherence to budgets, and ensured better alignment with community needs.

Despite positive outcomes, several constraints persisted in implementing such deputation in the local representative-led municipal bodies. In some cases, the absence of formal job descriptions for deputed CEOs led to chaos and confusion among the stakeholders. In addition, resistance from municipal councils, particularly where power dynamics shifted, hindered the implementation process. Sometimes, CEOs are withdrawn despite positive moves due to persistent pressure from the representatives. There was an absence of established office infrastructure, including support staff and logistics for newly deputed executives. As most of the municipal staff are locally recruited, there lies political interference in project selection and staff management. Furthermore, CEOs were not equipped with adequate training on municipal laws, urban planning, and financial systems before being designated to these roles. These challenges reveal gaps in institutional readiness for CEO deputation that must be addressed for long-term sustainability.

Discussion:

The findings demonstrate that the CEO deputation has acted as a catalyst for revitalising municipal governance in Bangladesh. The improvements observed across financial, administrative, and service delivery dimensions indicate that professional bureaucratic leadership can mitigate longstanding weaknesses in municipal operations.

The deputed CEOs experienced in public administration, legal frameworks, and interagency coordination introduced professional management practices typically absent in local bodies dominated by political leadership and understaffed offices. Their understanding of regulatory frameworks, exposure to digital governance, and authority as executive magistrates enabled them to enforce discipline and standardise procedures. This supports institutional theory, which argues that technical capacity and rule-based administration are essential for improving public sector performance.

Interestingly, although some stakeholders perceived CEO deputation as central government intrusion, the resulting improvements strengthened municipal autonomy by increasing internal revenue, reducing dependency on central transfers, professionalising financial documentation, and building public trust and accountability. In this sense, CEO deputation did not weaken local democracy; rather, it helped municipalities perform their statutory responsibilities more effectively.

Restoration of TLCC and WLCC committees and introduction of citizen charters demonstrate that CEOs played a pivotal role in connecting citizens with service providers. Participatory governance improved service uptake, transparency in resource allocation, and responsiveness to public complaints. This corroborates research indicating that citizen participation is critical to improving LGI legitimacy.

Despite individual achievements, the institutional framework still constrains CEOs. Key persistent issues include political contestation for control over municipal resources, insufficient urban planning capacity at the municipal level, and the absence of sustainable financing mechanisms. These systemic issues must be addressed through policy reforms to unlock the full potential of the deputation model.

Policy Recommendations:

Based on the findings and broader governance principles, the following policy reforms are endorsed:

- Establishing clear legal mandates is mandatory for institutionalising the role, for which the existing municipality should be amended.
- CEOs should be trained in relevant laws and skills before the deputation.
- For financial sustainability, municipals should be brought under IFMIS, while GIS-based tax mapping could be introduced to enhance revenue collection.
- The appointing authority should be more vigilant in addressing political pressure cases. To ensure continuity of reforms, fixed tenure could be introduced.
- TLCC and WLCC committees should be activated with competent members. For encouraging citizen feedback, a dashboard can be linked to municipal websites.
- The CEOs should be equipped with a standard working environment

and logistics support so that they can implement the reforms smoothly.

- Achievements should be tracked by the ministry in different criteria, like revenue growth, service delivery efficiency, and participatory governance, so that the officers remain motivated for innovating new techniques for better outcomes.
- Before scaling up the model country-wide, performance outcomes should be compared between municipalities with and without CEOs.

Conclusion:

The deputation of chief executive officers to Bangladesh's municipalities has emerged as a practical and impactful strategy for strengthening local governance. The findings of this study demonstrate that CEOs have contributed significantly to improving fiscal discipline, enhancing administrative efficiency, expanding digital service delivery, and revitalising participatory institutions. These improvements have translated into better revenue mobilisation, more transparent decision-making, and greater citizen engagement—outcomes that many municipalities had struggled to achieve for years. Despite these gains, the effectiveness of CEO-led reforms remains constrained by structural challenges, including political interference, inadequate administrative capacity, and the absence of clear institutional guidelines. Addressing these limitations is essential for ensuring the sustainability of the progress made.

Overall, CEO deputation represents a promising model for professionalising municipal management and advancing the broader agenda of decentralisation in Bangladesh. Continued policy support, institutional strengthening, and systematic evaluation will be crucial to fully realising the potential of this reform and ensuring that municipalities can deliver responsive, accountable, and citizen-centered services.

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Political Influence on the Level of Non-performing Loans in Bangladesh

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Abstract:

The objective of this study is to develop a framework that explains how political influence shapes the level of Non-Performing Loans (NPLs) in the banking sector through a literature review approach. NPLs pose a significant threat to financial stability, and political interference through directed lending and regulatory pressure can exacerbate the problem. The study also examines the political influence on NPLs by including specific moderating factors, i.e., political campaign staff, nepotism, anti-corruption legislation, audit committees, boards of directors, political interference, regulatory quality, corporate governance, bank ownership structure, and political patronage, alongside the independent variable, political influence. The study concludes that political party affiliation, personal guarantees of collateral, borrowers' political and social backgrounds, reliance on politically aligned boards of directors and audit committees, insufficient training and development regarding problematic loans, and misguidance from the central bank play crucial roles in increasing NPLs. The findings suggest that political stability is essential for keeping NPL ratios low, based on theoretical discussions, although no empirical results have been presented.

Keywords: Non-Performing Loan, Corporate Governance, Central Bank, Credit Analysis

1. Introduction

Financial institutions play a vital role in any economy, as they mobilise savings for productive investments and facilitate credit flow to various sectors, thereby stimulating investment and enhancing productivity (Richard, 2011). They are the primary source of finance for millions of households and small, medium, and large organisations, and they play a critical role in developing countries where access to capital markets is limited (Greuning & Bratanovic, 2003). Despite their valuable contributions, banks worldwide have faced significant challenges regarding default loans—also known as Non-Performing Loans (NPLs)—over the past few decades.

According to the International Monetary Fund (IMF, 2011), NPLs refer to loans where payments of interest or principal are overdue by 90 days or more, or where interest payments overdue for 90 days or more have been capitalised, refinanced, or rolled over. A loan can be classified as non-performing when payments of principal and interest are 90 days or more overdue, or when future payments are not expected to be received in full. The ratio between NPLs and total loan portfolios is also called "bad debts" or "bad loans" (World Bank, 2022). Higher levels of NPLs can hinder monetary policy and reduce the effectiveness of the financial system (Pop & Chicu, 2018). Moreover, the proportion of NPLs indicates the overall stability of the banking sector, which aims to achieve long-term profitability while minimising bad loans through effective monitoring (Kuzucu & Kuzucu, 2019).

The topic of NPLs has gained increased attention in recent decades, and numerous researchers have offered varying insights. Some focus on the conceptual nature of NPLs within economic cycles; others examine determinants such as macroeconomic performance, economic growth, unemployment, lending rates, and exchange rates. Behavioural determinants, including social, cultural, psychological, and political factors, have also been explored. Additional research emphasises causes such as poor management, inadequate credit analysis, and fraudulent practices. Moreover, corruption, government failure, economic policy uncertainties, and weak legal systems are commonly cited contributors to high NPL levels. However, despite the global significance of political influence on NPLs, the existing literature has offered limited attention to this issue.

Non-performing loans are a key indicator of financial distress within the banking industry and can significantly undermine economic stability and growth. While many studies have focused on the economic and financial determinants of NPLs, insufficient attention has been given to the political variables influencing bad loans in emerging economies. Political decisions heavily shape regulatory frameworks, banking supervision, and fiscal and monetary policies—which in turn influence lending behaviour, especially in state-owned financial institutions.

The primary research gap identified in prior literature concerns the limited focus on the political influences affecting NPLs in the banking industry. This study aims to establish the relationship between political influence and non-performing loans in the banking sector of Bangladesh. Additionally, the study highlights both internal and external factors that contribute to the growth of bad loans.

This research is qualitative and based on a review of existing literature. Research articles related to NPLs in the banking sector were collected from various academic journals. The study examines political influences on NPLs using selected moderating variables. Trend analysis was used to assess NPL levels in Bangladesh's banking industry between 2014 and 2023. The research also analyses the NPL ratio across different categories of banks using data from Bangladesh Bank's annual reports.

2.Literature Review

The main research gap identified relates to the influence of politics on NPLs in the banking sector. The study arises from the current economic challenges in Bangladesh, an emerging economy. According to a report by H. Ahsan (The Daily Star, 2024), Bangladesh has experienced rising NPLs due to political interference and deficiencies in corporate governance. In recent years, a significant number of businesspeople and corporate personnel, many affiliated with major political parties, have become involved in the banking sector. Following the ninth parliamentary election, 59% of elected members were businesspeople, and 44% had assets exceeding USD 10 million (Chowdhury, 2021). These politically connected businessmen have been linked to bad loans and corruption in the banking industry.

Table: 1: Amount of NPLs by types of banks in BDT in billions & percentage

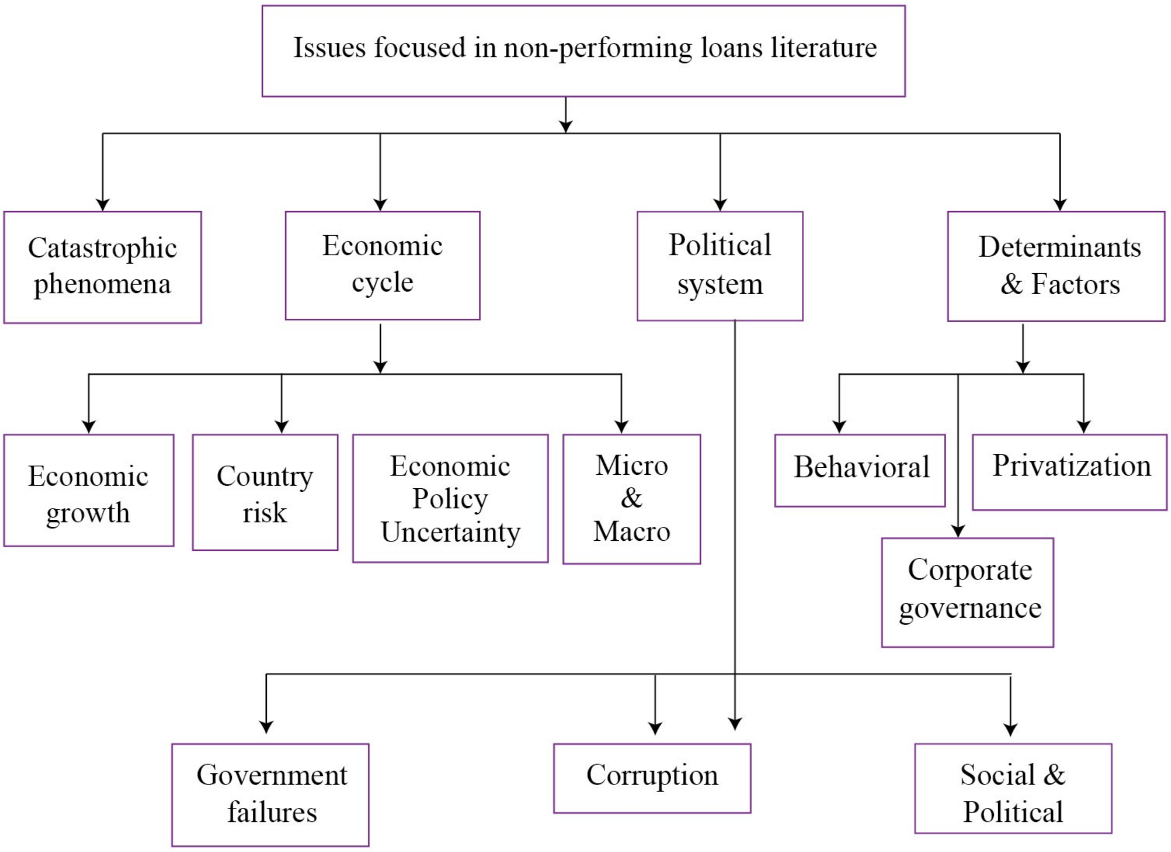
Year	SCBs		DFIs		PCBs		FCBs		Total
	BDT	%	BDT	%	BDT	%	BDT	%	
2014	227.6	45.37%	72.6	14.47%	184.3	36.74%	17.1	3.41%	501.6
2015	237.5	46.23%	49.7	9.67%	207.6	40.41%	18.9	3.68%	513.7
2016	310.3	49.90%	56.8	9.13%	230.6	37.09%	24.1	3.88%	621.8
2017	373.3	50.24%	54.3	7.31%	294	39.56%	21.5	2.89%	743.1
2018	487	51.85%	47.9	5.10%	381.4	40.61%	22.9	2.44%	939.2
2019	439.9	46.63%	40.6	4.30%	441.7	46.82%	21	2.23%	943.3
2020	422.7	47.64%	40.6	4.58%	403.6	45.49%	20.4	2.30%	887.3
2021	449.8	43.56%	39.9	3.86%	515.2	49.89%	27.9	2.70%	1032.7
2022	554.3	44.25%	41.9	3.35%	626.8	50.04%	29.6	2.36%	1252.6
2023	658	45.17%	56.7	3.89%	710	48.74%	32	2.20%	1456.33

Source: Bangladesh Bank Annual report,2023

The World Bank (2022) reported that the total outstanding written-off loans in Bangladesh reached nearly Tk 3.78 lakh crore by the end of 2022 due to political influence.

Several studies have focused on bad loans and examined the impacts of bad loans in banking industries from different perspectives.

Figure 4: Non-performing loans literature



According to the literature, non-performing loans are one of the most cataclysmic phenomena for the banking industry. Additionally, the lack of corporate governance, weak supervision, corruption with country risk, political interference, and professional ineptness of bankers played an important role in causing bad loans. Bristy & Alam (2020) emphasised the challenges of NPLs with the classification of loans, ways to improve debt recovery, and cracking down on bad loans in the banking industry. It also highlights the cause and effect of bad loans on the bank's profitability. This study claimed that information with moral hazard, adverse selection with borrowers, and legal actions default—politicians and influential businessmen—are the main reasons for bad loans, with recommendations that improve the efficiency of legal and judicial systems in both banking sectors and the country.

In the literatures, models linked to credit risk and economic activity are not new things, in which theoretical concepts are developing with the help of economic cycles. Beck et al. (2023) concluded that economic cycles are the primary determinants of bad loan behaviour globally, as well as exchange rates, share price, and interest rates matter depending on a country's financial and structural characteristics.

In general, the research adopted in the development of economics to know the factors that affect NPLs includes macroeconomic and bank-specific variables, in which gross domestic product (GDP), inflation, unemployment rate, and interest rates are consistently mentioned as macroeconomic factors. On the other hand, factors like inefficiency, profitability, return on assets, capital adequacy ratio, and variables of loan losses are the indicators of bank-specific factors. The study of Messai & Jouini (2023) showed that GDP growth, capital adequacy, and return on assets have a negative impact, but the unemployment rate and interest rates affect bad loans positively. They also provided recommendations that banks should give interest to many variables to decrease NPLs when they offer loans to assess the soundness and stability of banking systems.

Most of the studies highlighted that the micro and macro levels impact bad loans. Saliba et al. (2023) addressed the gap in related literature by examining the impact of country-specific risks—political risks, financial risks, as well as economic risks—on bad loans in the banking sector. The study used two types of independent variables for the research: banking sector-specific variables, i.e., profitability, capital regulations, liquidity, inefficiency, and income diversification, while country and global-level variables include the country risk index, financial market development, lending interest risk, and global risks. The findings of the study demonstrate that banking sector-specific variables, without inefficiency, negatively impact NPLs, but inefficiency has a significant positive impact on bad loans. On the contrary, the country's risk harms bad loans with political, financial, and economic risks. The researchers recommend that policymakers pay more attention to some related components of the country's risk, i.e., reducing inflation, increasing GDP, reducing exchange rates, and so on.

Economic policy uncertainty is defined as uncertainty about the economic policies of the private sectors, including inflation uncertainty, negative economic growth, financial crisis, abnormal lending cuts, pandemics, rising unemployment rates, foreign exchange, and unexpected changes in monetary policy rates (Chen et al., 2020). A survey of EPU (Ozili, 2022) finds that EPU affects banks through loan pricing and reduction in credit policy to mitigate the effect of EPU on profitability and investigates the correlation of EPU with NPLs and loan loss provisions. The findings show no significant correlation between EPU and loan loss with bad loans, but EPU is negatively correlated with bad loans, while loan loss provisions are more responsible. The findings imply that regional characteristics drive the correlation between EPU and loan loss provision with bad loans to ensure balanced profitability when lending to borrowers.

In line with Schumpeter (2011), the impact of NPLs on economic growth is mostly unanimous that the resources are stuck in unproductive sectors, detrimental to economic growth and the efficiency of the economy. In the past decades, a lot of studies have been prepared linking finance and economic growth with the four schools of thought—supply-lending, demand-following, bi-directional, and independent. Sengupta (2020) found that investment and economic growth have a close connection with political governance in NPLs, while it concludes that bad loans hamper investment and economic growth; in addition, this can be mitigated by a political governance structure. The study also showed that investment and economic growth hurt bad loans, whereas they are strengthened by political governance. The impact of NPLs can be mitigated by strong political governance in addition to creating safer banking and financial environments.

Accordingly, a study by Keshani & Jayatilake (2021) focused on institutional-related factors, customer-related factors, and remedial mechanisms for dealing with non-performing loans in the banking systems. The study found that institutional-related factors, i.e., size of institutions, credit growth, bad management, credit monitoring and terms, and lack of communications and other skills, have a significant impact on NPLs. However, the researchers pointed out that customer-related factors, i.e., loans to unprofitable investments, delay in project completion, customer dishonesty and awareness, high debtors, and excessive borrowings, also have crucial effects on bad loans. To minimise bad loans, the researchers recommend a reduction of interest and risk assessments, as well as close monitoring of borrowers and so on.

Rehman (2015) stated that corporate governance practices are an important factor in the banking sectors and affect the banking industry more severely than other sectors. Nyor & Mejabi (2013) examined the relationship between bad loans and corporate governance indicators, and they showed that board size and composition are positive; still, the audit committee and power separation have negative associations with NPLs. The study of Khatun & Ghosh (2019) investigated the impact of corporate governance practices on bad loans using independent variables—board size, number of independent directors, audit committee, and chairman of banks—in addition to control variables—the age of the firm and total assets of the firm. The results of the study showed that independent variables without a chairman have a positive impact on bad loans and recommended that efficient governance and the activeness of members ensure integrity, sincerity, and trustworthiness, which may reduce bad loans.

Ikram et al. (2016) identified some behavioural factors, i.e., type and quantity of collateral, credit assessment and repayment, creditors' behaviour, and so on, of NPLs. The study of Ghosh et al. (2020) revealed nepotism, moral hazard, inadequate collateral, credit assessment, lack of monitoring, and business risk with a lending interest rate as the catalysts of increasing bad loans by analysing social, cultural, psychological, as well as political context. The study found that business risk, poor credit assessment, and repayment have no significant impact on bad loans, but all other behavioural factors positively affect bad loans.

Several studies indicated that political pressure is related to banking activity. Ravina & Sapienza (2009) found that social agencies and political factors explained the performance of banking activities at lower rates in poor regions. Moreover, Rosenbluth & Schaap (2003) studied that the electoral rules explain the choice of politicians to regulate and control the banking systems.

Ofria & Mucciardi (2022) proved that government failures have been measured by analysing corruption and public debt as a percentage of GDP. On the other hand, Goel & Hasan (2011) investigated the relationship between bad loans and corruption and concluded that more corrupt countries have higher levels of NPLs in banking sectors. The study by Giammanco et al. (2023) investigates the relationship between government failures and bad loans to consider the factors—debt, GDP growth, price index, and unemployment—and concludes that there is a negative relationship between them, in addition to recommending that strict monitoring of governance is necessary to reduce bad loans.

A politically concentrated economy largely dominates the state-owned banks and private sectors (Beck, 2013). Gupta (2002) found the negative effect of corruption on foreign banks. According to the study by Mohamad & Jenkins (2020), the result shows that the level of corruption is positively and significantly associated with bad loans after considering GDP growth, bank size, corruption (CPI), and return on assets, in addition to providing implications for bad loans with economy-wide reforms and regulations.

Maksimovic & Asli (1998) revealed that there is a significant correlation between the efficiency of legal systems and bad loans, which correlates with the growth of financial sectors. The slow judicial process, legal procedures, and ambiguous judicial penalties system reduce corruption in bad loans (Goel & Hasan, 2011). The study of Farhan & Alam (2018) investigated socio-political and legal variables negative personal intentions, political influence, banker's incompetence, and judicial system which have significant positive relationships with non-performing bank loans.

3. Framework Development

The unique combination of the following frameworks checks the political influence of NPLs on banking sectors by encouraging politically motivated lending that directly contributes to bad loans. This framework shows the relationship between political influences and non-performing loans with the help of some moderating variables like corporate governance, corruption, and board ownership, etc.

- Dependent variable – Non-performing loans
- Independent variable – Political influence
- Moderating variables – Audit Committee, Board of Directors, Corporate Governance and others.

3.1. Political Campaign Staff

Political influence is considered pervasive all around the world, which shows that political interference costs the whole nation economically (Khwaja & Mian, 2005). When the government changed, the successful political party rewarded political campaign staff with board positions in banks, especially state-owned banks, using political influence so that the campaign staff acted as an intermediary between them. As a result, they push banks to make loans in favour of personal and political objectives, thereby creating bad loans.

3.2. Nepotism

The differentials of power and influence, as well as the dynamics of inequity in wealth, power, status, and personal reputation, have influenced white crime (Braithwaite, 1991). In the banking industry, most banking management bodies comprise family members, family friends, and independent directors, resulting in a lack of supervision in sanctioning and collecting related-party loans.

3.3. Audit Committee

The higher authorities of the banks take loans for their own business, or the people with powerful social and political backgrounds refuse to repay loans (Begum & Kamal, 2018). In these cases, most people with a political background commit fraud with the help of an audit committee. As a result, the audit committee commits misconduct in reviewing financial statements, related-party transactions, and risk disclosures in favour of political personnel, leading to an increase in NPLs.

3.4. Board of Directors and NPLs

The board of directors is important in the effective monitoring of management, especially in the banking industry, because they are accountable to shareholders, creditors, clients, and depositors (Macey & O'Hara, 2003). It is argued that the board's independence matters a lot for effective monitoring, but political influence on them leads to an increase in NPLs by approving loans without proper authorisation due to political pressure. Additionally, when loans are approved based on political influence rather than sound credit assessment, it leads to an increase in bad loans.

3.5. Political Interference

The interference of politicians, bureaucrats, and military officials in banking sector lending decisions causes heavy loan loss and banking distress. In Asian countries, the impact of political connections in a transitional economy has a significant impact on both banking sector performance and economic growth (Masood et al., 2010). In the case of democracy, state-owned banks must follow the orders of the higher management, but the management is recruited by the politicians (Fan & Ding, 2011). Therefore, they use them for their political goals and objectives, resulting in a rise in the size of bad loans.

3.6. Regulatory Quality

Regulatory quality captures the government's attitudes toward promoting private-sector development and inward investment, ensuring that projects are up and running properly and protected from incurring loan loss (Sengupta, 2020). In the context of bad loans, financial regulators act in the public interest rather than align with the interests of powerful political personnel. Besides, state-owned banks receive regulatory leniency on bad loan recognition and provisions from political parties.

3.7. Corporate Governance

Corporate governance is the widest control device, which is a combination of internal and external control mechanisms for the proper authorisation of corporate resources (Chowdhury, 2021). In emerging countries, politics heavily influence banking sectors due to weak governance, particularly in state-owned banks. Politicians pressure banks to provide loans to offer an enhanced future with motivating factors politically. Besides, the state-owned banks' governance is appointed and controlled by the political influence of the government for their personal and political objectives, thereby increasing NPLs.

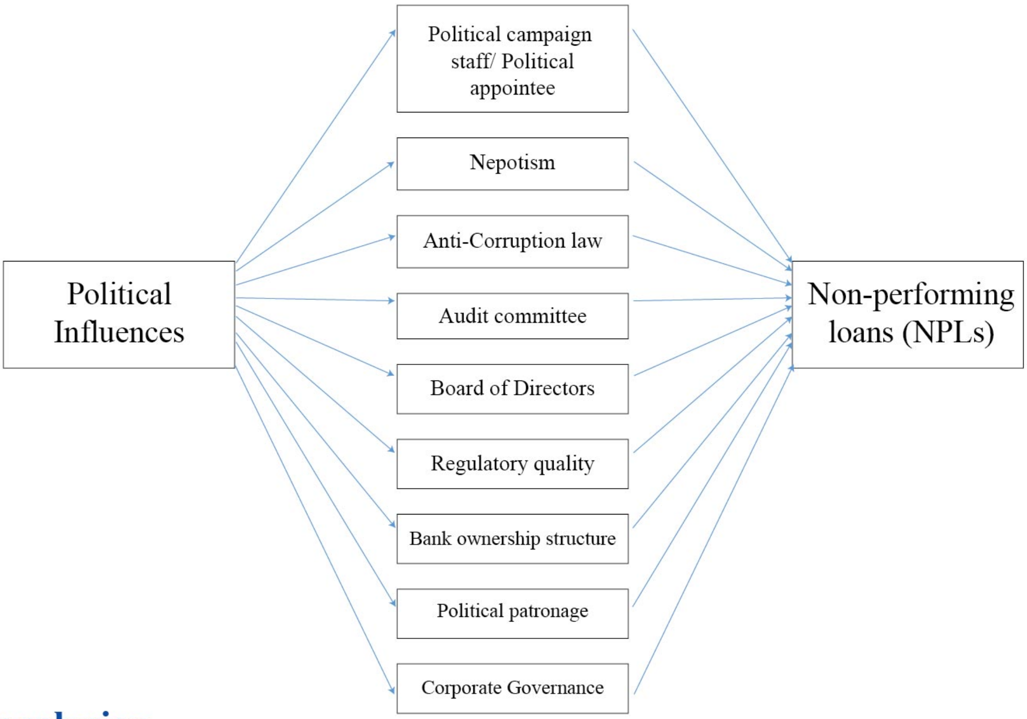
3.8. Bank Ownership Structure

The association between bank ownership and performance is unresolved, with a significant body of literature available on this issue and suggesting that private enterprises perform better than public enterprises (Alessi, 1998). From this point of view, it indicates that the weak ownership structure of public banks, as well as the concentrated ownership that holds a significant portion of shares due to political influences, creates a way for NPLs in the banking industry.

3.9. Political Patronage

The administrators engage in dishonesty when they look for their benefits and political gains, where these benefits are provided to these people at the expense of the national interest (Bhargava, 2005). The practice of political patronage—the politically beneficial personnel giving government jobs, contracts, or rewards to civil sectors as well as public-sector positions for a long time—means that these political persons, linked to corruption in banking industries, contribute to increasing NPLs.

Figure 5: Association of political influence with NPL



4. Conclusion

As a descriptive study, this study summarises prior literature that focused on political influences on NPLs across the banking system. This study develops a framework that explains the nature of political influence on the level of non-performing loans in the context of banking industries, employing specific moderating factors identified through a literature review. The model indicates that political issues play a significant role in the extent of non-performing loans. The framework illuminates that every moderating factor, including political campaigns, patronage, nepotism, anti-corruption regulations, audit committees, boards of directors, political interference, regulatory quality, corporate governance, and the structure of bank ownership, is affected by political interference that contributes to a rise in non-performing loans (NPLs) within the banking sector. This paper also emphasises the current situation of Bangladesh regarding NPLs by analysing trends and the ratio of NPLs from 2014 to 2023, along with evidence indicating that political instability contributes to the country's ongoing economic decline.

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