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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.

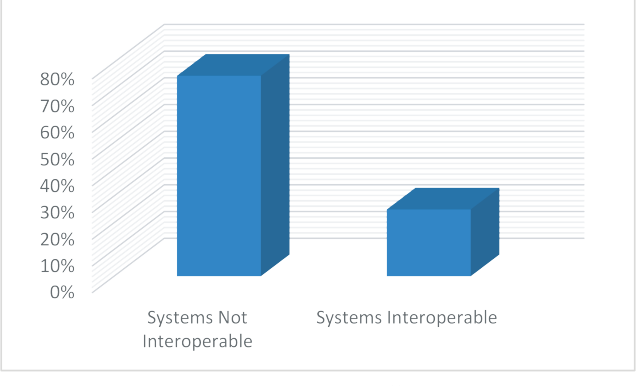

Figure 1: Data interoperability among different government agencies

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-mak-

ing. 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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