Factors Measuring the Effectiveness of Accounting and Reporting Systems in General Government Entities of Bangladesh

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Abstract

Measuring the effectiveness of accounting and reporting systems in general government entities in Bangladesh involves assessing various factors to ensure accuracy, transparency, and compliance with relevant standards. This paper aims to identify key factors to measure the effectiveness of accounting and reporting systems in general government entities in Bangladesh. For conducting the study, 120 structured questionnaire responses were collected from the Comptroller and Auditor General (C&AG) officials, Comptroller General of Accounts (CGA) officials, National Board of Revenue (NBR), as well as the Sonali Bank and the Bangladesh Bank officials. The Exploratory Factors Analysis (EFA) was conducted using SPSS to identify the factors that measure the effectiveness of accounting and reporting systems. From the 27 factors chosen for analysis by critically reviewing the literature, it is found that 14 factors adequately represent all the characteristics of Bangladesh's government accounting and reporting system. By considering these factors, the Ministry of Finance, C&AG, and other administrative authorities can develop a comprehensive framework for measuring the effectiveness of accounting and reporting systems in general government entities in Bangladesh. However, In the future, prospective researchers can investigate emerging technologies such as Artificial Intelligence (AI), Machine Learning, and Blockchain to enhance the efficiency and accuracy of accounting and reporting systems in general government entities in Bangladesh.

Keywords: Annual Finance and Appropriation Accounts, Government Accounting, General Government, Public Financial Management, iBAS++.

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1.0 Introduction

Government accounting and reporting systems help safeguard public funds and attain accountability. It has three broad aims: protecting public resources from improper use, ensuring sound government financial management, and establishing public accountability (Chan, 2003). Nonetheless, Bangladesh obtained a grade of D+ (On a scale of A to D, with A being the highest) for Performance Indicator-29 (PI-29), called Timeliness and Annual Financial Reporting. The most recent Public Expenditure and Financial Accountability-2019 (PEFA-2019) assessment report illustrates reasons for obtaining this low grade. The PEFA report indicates that the current accounting and reporting system cannot compare revenue to the budget. In addition, the reports are submitted for external audit more than two years after the end of the fiscal year, and they are based on something other than a combination of national and international accounting standards. Hence, the Public Financial Management (PFM) action plan's Component 10 (Financial Reporting) focuses on enhancing the Accuracy and Timeliness of all government-wide in-year and year-end reporting and establishing a cutting-edge internal audit function (Ministry of Finance, 2020). Accounting is identifying, recording, classifying, summarizing, analyzing, and interpreting all governmental transactions relating to the receipts and payments of public funds and resources (Hussain, 1994).

On the other hand, financial reporting is the process whereby governments communicate their financial position and activities to the public. The citizenry, oversight bodies, and other stakeholders use these reports to judge their government's efficiency, effectiveness, and overall financial condition (Chaney et al., 2002). Accounting and reporting practices in government entities help the government set services providing and revenue generation agenda, policy formulation, and financial decision analysis.

Efficient management of government resources is one of the essential responsibilities of government entities. However, the Budget and Accounting Classification System (BACS) allocates public resources according to government priorities and national plans (Ministry of Finance, 2020). As far as the government accounting system is concerned, all financial activities of the government are facilitated by timely releasing funds and keeping records through an account maintained by the Bangladesh Bank (BB) called the Treasury Single Account (TSA) (Rahman, 2014). However, in the absence of a branch of the BB in any geographical area of the country, Sonali Bank - a state-owned commercial bank - plays the role of BB as the representative for accounting records (This system is becoming non-functional as the iBAS++ has occupied the digital receipts and payments process). Transactions recorded in the TSA are duly monitored and reconciled from time to time by the Comptroller General of Accounts (CGA) office. After reconciling all transactions sent from the general government entities (General government entities include Ministries/Departments, Commissions, Public Statutory Authorities/Autonomous Bodies, and Local Government), the CGA office prepares the Annual Appropriation Account (AAA) and Annual Finance Accounts (AFA).

Before introducing the present computerized accounting system (With iBAS++) in governmental entities, monitoring and reconciliation functions of these transactions were done manually. Since 2014, government financial and accounting functions have been executed with an online and software-based accounting system called the integrated Budget

and Accounting System (iBAS++). It is a fact that financial management is an essential indicator of good governance for government offices. A well-functioning and credible accounting system helps to establish transparent and accountable government offices and officers in attaining economy, efficiency, and effectiveness in raising and spending public money (Meijer & Bovens, 2003).

2.0 Review of Literature

This section discusses the Constitutional and Legal mandate, theories, and experimental studies for the governmental Accounting and Reporting (A&R) systems for transparency and accountability perspectives. Various theories relating to A&R system adoption, internal organizational efficiency, and external accountability are decisively reviewed to construct all-inclusive methods that apply in preparing Annual Appropriation Accounts (AAA) and Annual Finance Accounts (AFA). These two core financial statements of the general government help to communicate financial events to the public/citizenry. However, legal frameworks and empirical literature regarding government accounting and reporting systems have been critically reviewed in the following passages.

Framework of Government Accounting and Reporting Systems

Bangladesh's fundamental government accounting and reporting systems framework includes the Constitution, Relevant Laws and Rules/ Ordinances, General Financial Rules, Delegation of Financial Power, Treasury and Subsidiary Rules, and Account Code. These documents have been discussed in the following sections.

2.1 The Constitution

Part V and Chapter II of the People's Republic of Bangladesh Constitution spelt out the state's financial processes. Furthermore, tax income is widely acknowledged as the government's primary funding source. Nevertheless, no tax may be imposed or gathered unless authorized by a parliamentary act, according to Article 83 of the Republic's Constitution (Ministry of Law, 2017). The Constitution contains a provision for fund accounting concerning receipts and payments in Article 84, subsections 1 and 2. According to Article 84(1), all government revenues, all government-issued loans, and all sums received in return for government loans will be combined into a single fund referred to as the Consolidated Fund. According to Article 84(2), all additional public funds received by the government or acting on its behalf must be credited to the Republic's public account. If so, a system or procedure for accounting and reporting has yet to be established for handling such financial transactions (Ministry of Law, 2017). The preparation of annual financial statements is specified in Article 87, sub-sections 1 (a) and 2 (b) of the Constitution, although no basis for accounting is mentioned about its preparation. Article 87 (1) states that a statement of the government's estimated receipts and expenditures for each fiscal year must be laid before Parliament, a crucial component of creating a financial statement by the Constitution. This statement is known as the annual financial statement. The annual financial statement must separately display (a) the amounts needed to cover expenses imposed by or under this Constitution upon the Consolidated Fund and (b) the amount needed to cover additional expenses that must come out of the Consolidated Fund (Ministry of Law, 2017). Article 89(1) and (2) of the Constitution specify the procedure for annual financial accounts regarding charged and non-charged expenses. According to Article 89 (1), Parliament may debate and not vote on any portion of the yearly financial accounts that relate to expenses charged against the Consolidated Fund. The Constitution's Article 89(2) established the requirement for government financial reporting, stating that the portion of the annual financial statements related to other expenditures must be presented to Parliament as demands for grants. Parliament can approve, reject, or assent to any demand, subject to a reduction in the specified amount (Ministry of Law, 2017).

Despite having much direction from the Constitutions of the People's Republic of Bangladesh for accounting and reporting government financial events, there needs to be direction about the basis for the accounting and reporting system and directions for treating unearned and deferred tax and other revenues. In the Constitutional directions, the international best practice approach of accounting and reporting system of governmental financial transactions has yet to be found.

2.2 General Financial Rules (GFR)

General Financial Rules (GFR) delineate the financial capacity of various authorities and subordinates of

the Government to procure and allocate resources to carry out the tasks assigned to them. The following clauses are mentioned in this agreement about government money accounting and reporting:

a) Without interruption, all transactions involving a government representative in his official duties must be brought to account.

b) Funds received as government dues or as deposits under government custody must be credited into public accounts by treasury regulations.

For accounting and reporting purposes, general principles and methods are prescribed by the C&AG in Account Code volume I–IV with due approval by the President. As per clause 287 of the GFR, the structure of the accounts has been designed to reflect the organizational structure of the government and its requirements for financial reporting. This structure consists of coding all transactions in 56 digits broken down into many distinct components, enabling data analysis in different ways and levels. Clause 289 of the GFR emphasizes that the accounting officers should strictly follow the classification chart in budgeting, accounting, and expenditure control (Ministry of Finance, 1998).

According to clause 291 of GFR, all officers are accountable for collecting government dues or expenditure of government funds and maintaining the appropriate accounts approved by the competent authority for all government financial transactions. It is indispensable that all financial records should be kept in detail so that the initial records of payments, measurements, and transactions, in general, are very comprehensible, unambiguous, and self-contained, as well as be presentable where required as suitable and credible verification of details (Ministry of Finance, 1998a).

2.3 Delegation of Financial Power (DFP)

Delegation of Financial Power (For a single budget, revenue, and development program) is essential for governmental accounting and reporting systems. This document was prepared by the Ministry of Finance and the Government of Bangladesh. It is predominantly a budget management tool. Methods of accounting for governmental budgeted expenditure can be efficiently and effectively done by using the document's instructions. In this document, duties, power, authority, and responsibility have been elaborated for different levels of government financial managers, e.g., from the secretariat to the Upazilla level. In other programs under the single budget management method, responsibility for accounting and reporting of government funds has been given to the Principal Accounting Officer (PAO), also termed as secretary of the respective ministries or head of the respective divisions and departments. Section 3 (a-f) articulates the methods of accounting and reporting for government-budgeted expenditure. Provisions of those accounting methods are described as under (Ministry of Finance, 2020):

- 3 (a) the PAO of respective ministries, divisions, and attached departments must ensure that the expenditure should be expended to the purposes for which it was allocated;
- 3(b) for government funds, the PAO should be careful and behave as prudently as individuals when spending their funds.
- 3(c) actual expenditure must be limited against the budgeted allocation made in different code(s)
- 3 (d) funds can only be expended with prior permission from the Finance Division, expecting that the grant may be received.
- 3(e) all receives and payments must be accounted for the valid code(s) as per the Budget and Accounting Classification System (BACS).
- 3 (f) reconciliation must be made by the PAO of the respective Ministry, Divisions, and attached Departments at the end of every month.
- Besides the methods mentioned above under section 4 (a-h) of the DFR (Single budget management program), there are specific rules for the government financial managers concerning the accounting and reporting system (Ministry of Finance, 2020). The rules are:
- 4(c) If 85% of adjustments to the previously taken advances were not made with bills and vouchers, the subsequent advances will not be given to the respective ministries, divisions, and departments.
- 4(d) Advances must be adjusted within two (2) months or before 30 June of the fiscal year.
- 4(h) for spending Development Partners Fund accounting and reporting rules prescribed by the

DFR and the respective development partners' must be uniformly followed. However, the development partners' rules will be valid and applied if any incongruence arises.

From the above discussion, DFR is an essential tool for government expenditure management, not revenue receipts management. This document must be more helpful for futuristic decision-making for governmental revenue generation and service-provider agendas due to the need for an accounting and reporting system.

2.4 The Treasury Rules (TR) and the Subsidiary Rules (SR) made Thereunder

Directions of Treasury Rules (TR) and Subsidiary Rules (SR) made thereunder have strong bases for accounting and reporting governmental funds. These regulations require the District Accounts and Finance Officer (DAFO) and Upazilla Accounts and Finance Officer (UAFO) to keep a cash book in which each receipt and payment must be recorded together with the date and order in which they occurred. When stamps and opium are sold, the whole amount sold must be entered in the Treasury's cash book, and a message should be produced and sent to the accountant so that the accountant may make the necessary entries in the treasury's accounts (Ministry of Finance, 1998b). TR and SR have elaborated on the required forms for reporting and recording systems. However, something needs to be mentioned about the basis for classifying, accounting, and reporting economic events (Ministry of Finance, 1998b).

2.5 Account Code

The account code is divided into four volumes, namely:

1. **General Principles and Methods of Accounts.**
2. **Treasury Accounts.**
3. **Departmental Accounts.**
4. **Accounts Kept in Accounts Offices.**

Government accounts are divided into four categories: revenue, capital, debt, and remittance, according to the General Principles and Methods of Accounting. The revenue accounts handled the proceeds of taxes and receipts categorized as revenue and expenditure. Investments in capital accounts are typically financed by borrowing money and are generally made to reduce ongoing liabilities or increase tangible assets of a significant kind. A government's debt is the result of receipts and payments for which it is legally obligated to reimburse the recipient or to collect the sums paid, along with the former's repayments and the latter's recoveries. Adjusting currency between treasuries, central banks, and goods in transit between various accounts department branches is done using remittance accounts.

This text covers the foundation of accounting for documenting and reporting financial transactions involving the government. Except for any book adjustments that may be permitted by regulations included in this code or by general or special guidelines issued by the Government following consultation with the C&AG, as stated in clause 22 of the General Principles and Methods of Accounts, the transactions in government accounts shall act for the actual cash receipts and disbursements for a financial year as distinguished from amounts due to or by the Government during the same period (Comptroller and Auditor General of Bangladesh, 1983).

2.6 Empirical View

Financial administration specialists have noted the six pillars of the financial administrative structure in Bangladesh. These are the Parliament, the Ministry of Finance, the Ministry of Planning, the Principal Accounting Officers of Ministries/Departments, the Audit and Accounts Departments, and the Standing Committee of the Parliament (Patwary, 1989).

According to the Budget and Accounting Classification System Manual-2017, the government accounting system followed in Bangladesh is based on coding. It uses a modified cash-basis approach and double-entry accounting (Ministry of Finance, 2017). This system has 1, 12,934 organizational, 37,032 operational, 1,902 funds, and 1,853 economic codes.

A government accounting and reporting scholar has described that the GOB has maintained 100 different accounts with BB for executing accounting activities. Of those, 70 accounts are maintained for Ministries, Departments, and other Constitutional bodies and 29 for other functional activities according to the nature of transactions. There is an account code number 0001 specific for CF (Rahman, 2014). Additionally, there is a Sundry Account with BB for accounting and reporting any amount received if it is found unrecorded.

Accounting for international donor-aided development projects is executed by preparing and maintaining Special Accounts for Foreign Exchange (SAFE),

Convertible Taka Special Accounts (CONTASA), Dollar Special Accounts (DOSA), IMPREST accounts, and Reimbursable Project Aid (RPA) accounts with the help of office order circulated by the Ministry of Finance, GoB (Hussain, 1994).

Warren Ruppel has shown that the government and government entities are legally separate. This difference raises the question: Do governments need to comply with Generally Accepted Accounting Principles (GAAP)? This question is reasonable because government entities can sell their securities to the public. Most of the government capital expenditure is incurred for generating tax, not for profit. He also mentioned that disclosure is necessary for accounting and reporting government financial transactions (Ruppel, 2005).

Research has been done by several academics who contend that a stronger case for accountability in a democracy and market economy is being made by those who study government accounting. Social, political, and economic contract terms can be observed and enforced using accounting data. Economic responsibility applies to government transactions in the market, including purchasing or selling goods and services and loans and borrowings. It faces political accountability when it imposes taxes to pay for public services. GAAP makes accountability, transparency, targeted funding, and resource efficiency possible (Mozumder & Siddique, 2016).

Arslan (2017) suggested that government accounting is a better way to measure and record revenues, expenses, and net assets. It also serves as a protection for government assets and a tool for financial decision-making. Government accounting is used to track expenditures and income. It also aids in figuring out the government's assets, receivables, and payables (Arslan, 2017).

Waldauer et al. (1996) noted that a state's armed forces are sometimes used to secure the state. In the corporate arena, owners invest in the business and assume the going concern principle that uses a period for reporting and analyzing their performance or determining the profit or loss of the organization at a given period. Are those systems needed in governmental entities? If so, what basis of accounting should be used for the recognition and recording of governmental funds? Is the financial administration of Bangladesh using the proper accounting method as prescribed by the laws and regulations? These are the central questions of the proposed research. The current literature needs to clearly understand the government accounting system followed in Bangladesh (Waldauer et al., 1996).

From the different financial management reform reports of the Ministry of Finance, GoB, it is found that the Government of Bangladesh has been using software named iBAS since 2009 and iBAS++ since 2014 to manage the country's overall financial matters. It is the internet-based software by which the government's budget preparation and budget execution, such as allotment of funds, discharge of funds, budget review, online bill submission, and reverses payment by check or Electronic Fund Transfer (EFT), accounting for revenue collection, financial services automation like bank account synchronization, etc. can be done (Ministry of Finance, 2017). The general government entities prepare and publish two types of financial reports, particular purpose financial reports, which are used to satisfy specific users' needs. On the other hand, general-purpose financial reporting provides information to meet the everyday needs of various users. The main objectives of Government Financial Reporting (GFR) are assessing government accountability, making economic, social, and political decisions, policy formulation, and evaluating operating efficiency and service efforts and accomplishments by government entities.

3.0 Theoretical Orientation of the Study

The researcher has considered the following orientations for building the theoretical framework as leading concepts related to the overall work and scope of the government accounting and reporting systems followed by the governmental entities for internal efficiency and external legitimacy.

3.1 Relevant Theories of Government Accounting and Reporting System

During the search for pertinent theories that can match the relationship between producers (OCGA and OC&AG) and users (Citizenry, Parliament/ Government, and oversight bodies) of government accounting and information systems, it was discovered that two such stewardship relationships have been taken into consideration as the theoretical basis to conduct the analysis and draw conclusions about the

Government Accounting and Reporting System (GARS) in Bangladesh (Hussain, 2011). These theories are:

1. Principal-agent relationships/Agency Theory (AT) (Mitnick, 1973)

2. Cognitive Fit Theory (CFT) ((Vessey, 1991)

Comparing these theories, it was determined that the Agency Theory (AT) and Cognitive Fit Theory (CFT) are more similar to the issue. According to Cognitive Fit Theory (CFT), the implications of decisions made by accounting information producers working under the offices of the CGA and OC&AG are based on predetermined rules and regulations that are difficult to put into practice without the assistance of information users (The government), i.e., parliamentary approval. Therefore, the use of the Principal-Agent relationship and information matching (Cognitive fit) in this context indirectly aids in establishing internal effectiveness and external accountability (Ultimately judging the matter by the Citizenry, Parliament, etc.) in ensuring appropriate standards for government accounting and reporting system (the OCGA and OC&AG working as agent). However, the following analytical framework of the research was shaped by the Principal-Agent Theory and Cognitive Fit Theories (Hussain, 2011).

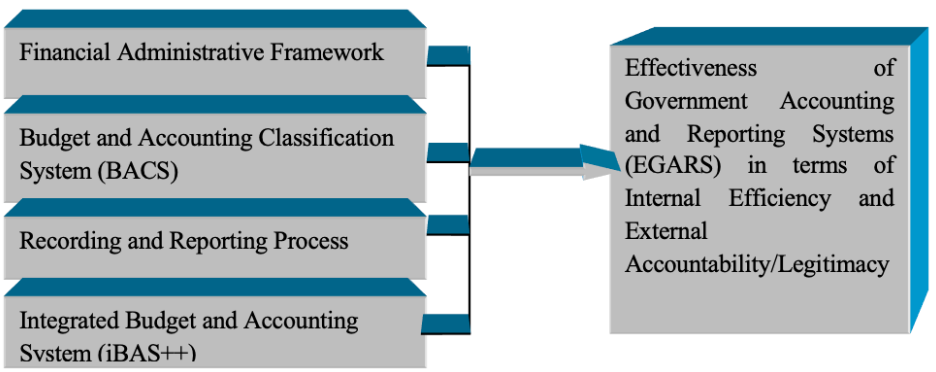


Figure: Analytical Framework for the Effectiveness of Government Accounting and Reporting Systems.
[Source: Authors' own creation]

The study aspires to explore the dimensions of different factors that have (in)direct roles in Bangladesh's Government Accounting And Reporting System (GARS). The Comptroller and Auditor General (C&AG) of Bangladesh is the Constitutional apex body for certifying GARS. With the necessary co-ordination and legal requirements of C&AG, Upazilla Accounts and Finance Officer (UAFO), District Accounts and Finance Officer (DAFO), Divisional Comptroller of Accounts (DCA), and centrally Comptroller General of Accounts (CGA) on behalf of the Government/state (Principal) and the Parliament are responsible for ensuring the efficient government accounting and reporting system as an agent of the principal. Based on the CFT and AT, there are two major things involved in the whole study:

a) OCAG has the constitutional mandate to prescribe forms, methods, and manners with the approval of the President for an accounting and reporting system to communicate government financial events to the government, citizenry and oversight bodies that fulfil the paradigm of CFT.

b) The key responsibility of the agents (CGA and C&AG) on behalf of the Government is to conduct its duties to ensure a true and fair view of the general Government accounting and reporting system. They are also bound to follow laws and regulations. Following the necessary laws and regulations, CGA and C&AG play the agent's role in recording and reporting governmental financial events that fulfil the paradigm of agency theory.

3.1 Justification for Selecting the Theories

The theoretical framework is the underpinning of all knowledge for a research study. It also helps to find the building block of the research question, statement of the problem aims, and objectives of the research, and justify the study's rationale (Colorado-Denver et al., 2014). From a qualitative perspective, Merriam said it would be easier to imagine a study with a theoretical and a clearly defined conceptual framework (Merriam & Merriam, 2009). She opined that the researcher's preference of framework is not unpredictable but considers significant viewpoints and interpretations regarding the nature of knowledge, how it remains in the metaphysical logic corresponding to the viewer, and the probable contribution to be endorsed, and tools to be applied accordingly by the investigator in their effort (Lysaght, 2011).

The justification for selecting the theories as the basis for the analytical, conceptual framework is to explore the relationships between the principal (Govt.) and agent (CGA and C&AG) and the relationship between producers (CGA and C&AG) and users (Govt. parliament, citizenry, etc.) of government accounting information. The dependent variable represents the external legitimacy of the Government (Principal), and the quality of cooperation of government financial administrative bodies (Agent) is represented by one of the independent variables. The dependent variable, Government accounting and reporting system for internal efficiency and external legitimacy, reflects the possession of the Government as principal. Two independent variables, i.e., Budget and Accounting Classification System (BACS) and recording and reporting process, have a reflection on their legal basis to ensure such efficiency and legitimacy of the agent (Accounting offices; e.g., the CGA and C&AG). However, the other independent variable, the integrated budget and accounting system (iBAS++), reflects the agent's role in digitally supporting the accountability process. These four variables and their relationship have been described in the analytical conceptual framework.

To ensure internal efficiency and external legitimacy, the agent Comptroller and Auditor General (C&AG) has the constitutional and legal mandate for the accounting and reporting system based on articles 127-131 of the Constitution of the People's Republic of Bangladesh, C&AG Additional Functional Act 1974, Treasury Rules (TR), General Financial Rules (GFR), Delegation Of Financial Power (DFP), Budget and Accounting Classification System (BACS) rules, etc.

4.0 Research Gap

From the above critical analysis of literature regarding government accounting and reporting systems, the researcher has identified apparent methodological gaps, empirical gaps, theoretical gaps, and, in some cases, population gaps of the previous research. In addition, preceding studies have inscribed several features of laws and evidence. The previous study did not deal with the subject matter and knowledge of Bangladesh's government accounting and reporting system. This incorporates several unexplored scopes that have recently concerned research awareness in new disciplines. Based on the current study, we expect to improve the research design. In this study, we look to launch a novel inquiry on research designs with blended variables, indicators, and methodology. There is an experimental gap in the earlier research. There is a need for meticulous research in the anterior literature. Some of these unexplored variables and indicators are significant and worthy of exploration in the context of Bangladesh's government accounting and reporting system.

Additionally, preceding studies have paid attention primarily to qualitative studies relating to recording and reporting. Until now, no research has, in a straight line, attempted to empirically assess the general government's financial events. The researcher has also recognized an evident theoretical gap in the previous research relating to using a theoretical foundation to conclude on study variables and research outcomes correctly. However, an inquiry in terms of theoretical relevance and theoretical improvement was reasonable. The previous theory didn't focus on new paradigms of thinking about Bangladesh's government accounting and reporting system. Depending on the analysis of the antecedent study, there is a population gap. A number of these sub-populations had been uncharted and under-researched.

5.0 Research Methods

This is a quantitative study. Data have been collected from both primary and secondary sources (Mesly, 2015). Primary data were collected through semi-structured questionnaires and documentary analysis techniques from audit and accounts officials, bank officials, and NBR officials.

Secondary data have been collected from published and unpublished documents from different sources such as books, journals, the internet, some government publications, reports, theses, and conference reports. The conceptual framework and standards of the Government Accounting Standards Board (GASB), International Public Sector Accounting Standards Board (IPSASB), Financial Reporting Act 2015, the constitutional directions, and other relevant laws and regulations relating to Public Financial Management have also been used as secondary sources. The sample was chosen as a purposive sampling method. A total of 120 respondents were selected for analysis as supported by an appropriate sample size of 100-150 by Lin Ding et al. (Ding et al., 1995). The sample unit contains different types of 5 governmental officials such as audit, accounts, and treasury bank offices. The judgmental choice was applied to ensure the actual range among the sample units. After collecting data from the field, an Exploratory Factor Analysis (EFA) was conducted through SPSS. The demographic profile of the respondents for the semi-structured questionnaire has been given on the following:

Table 3.1: Distribution of Semi-Structured Questionnaire Survey Respondents

SL.	Participant Types	Attachment Office(s)	Accounting Offices	Frequency
1.	Audit and Accounts officers	Ministry of Science and Technology	C&AG office, CGA office, Dhaka, and field offices	7 × 2 = 14
		Ministry of Power, Energy, and Mineral Resources		
		Bangladesh Supreme Court		
		Bangladesh National Parliament		
		DCA, Rajshahi		
		DAFO, Chapainwabgonj,		
		UAFO, Mohanpur, Rajshahi		
2.	Auditors	Ministry of Science and Technology	C&AG office, CGA office, Dhaka, and field offices	7 × 10 = 70
		Ministry of Power, Energy and Mineral Resources		
		Bangladesh Supreme Court		
		Bangladesh National Parliament		
		DCA, Rjashahi		
		DAFO, Chapainwabgonj,		
		UAFO, Mohanpur, Rajshahi		
3.	Inspector of Taxes	National Board of Revenue	---	6
4.	Bank Officials	Bangladesh Bank	---	14
		Sonali Bank	---	14
5.	Ministry of Planning	Statistics and Information Division	---	2
		Number of Respondents		120

[Source: Field Survey, 2021 and 2022]

6.0 Results and Discussions

Factor Analysis (FA) recognizes fewer factors essential for many experimental variables. Variables with a high relationship between them and those primarily self-regulating of new subsets of variables are pooled into factors. A frequent practice of FA is in budding objective tools for estimating constructs that are not in a straight line, evident in actual life (Gaur & Gaur, 2009).

Examining the scope of the data curtails the procedure in progress, with the analysis of the mean, standard deviation of the sample, and the number of respondents (N = 120) participating in the study. According to

Frank J. Floyd and Keith F. Widaman, the proportion of subjects matter-to-variables, 4:1 or 5:1, was adequate for exploratory factor analysis (Floyd & Widaman, 1995). Streiner (1994) suggested that sufficient solutions will be achieved with five respondents for each variable, allowing 100 respondents in the sample and ten respondents for each variable when there are fewer than 100 samples (Streiner, 1994). From the specialist's idea, it can be summarized that the sample range for the present study is adequate. The entire analysis has used appropriate sources and documents to validate the result. The output of the descriptive statistics is furnished in the following table:

Table 1: Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Constitutional Mandate for Accounting basis	4.52	.580	120
Constitutional mandates for recording and reporting economic events	4.46	.500	120
BB follows the rules for SAFE, CONTASA, DOSA, RPA and IMPREST accounts	4.53	.549	120
GFR has narrated the rules of IBAS++ recording and reporting	4.38	.537	120
C&AG Additional Functional Act 1974 gives a picture of the financial administrative structure	4.58	.529	120
Relevant Laws and Regulations describe the forms and contents of financial statements	4.44	.499	120
DFP delineated the official duties for govt. accounting and reporting	4.47	.501	120
Govt. accountants are trained enough to adopt technologies	4.46	.548	120
Govt. accountants are performing duties as per the rules of DFP	4.51	.518	120
Timeliness of Reporting with iBAS++	4.46	.593	120
Account Code is internationally comparable	4.45	.548	120
iBAS++ has the opportunity to prepare AFA and AAA	4.43	.589	120
Forward estimation is needed in iBAS++	4.44	.499	120
iBAS++ software has reduced the workload of govt. accountants	4.30	.528	120

[Source: Field data 2021]

The result from Table 1 suggested that mean scores were between 4.58 and 4.30, and standard deviation scores were between .500 and .593. The data trend was found to be entirely satisfactory. The study examined the validity and reliability of the measurement items and their construct using SPSS. The mean value explains the distinctiveness of most ordinary replies among the declared dataset. Thus, there is no lowest value requisite. From the mean values presented in Table 1 above, it can be concluded that the C&AG Additional Functional Act 1974, given the picture of the financial and administrative structure, is the most significant variable that affects the governmental accounting and reporting system process in Bangladesh. The lowest value of 4.30 for 'iBAS++ indicates that the software has reduced the workload of government accountants. All variables with direct/ indirect roles in governmental accounting and reporting systems for internal integrity and external accountability can be interpreted similarly.

Table 2: Correlation Matrix

Table 2: Correlation Matrix

Correlation		Constitutional Mandates for Accounting basis	Constitutional mandate for recording and reporting economic events	BB follows the rules for SAFE, CONTASA, DOSA, RPA, and IMPREST accounts	GFR has narrated the rules of IBAS++ recording and reporting	C&AG Adi. Funct. Act 1974 gives a picture of financial admin. structure	Relevant Laws and Regulations describe the forms and contents of financial statements	DFP delineated the official duties for govt. accounting and reporting	Govt. accountants are trained enough to adopt technologies	Govt. accountants are performing duties as per the rules of DFP	Timeliness of Reporting with iBAS++	Account Code is internationally comparable	iBAS++ has the opportunity to prepare AFA and AAA	Forward estimation is needed in iBAS++	iBAS++ software has reduced the workload of govt. accountants
	Constitutional Mandates for Accounting basis	1.000													
	Constitutional mandate for recording and reporting economic events	.539	1.000												
	BB follows the rules for SAFE, CONTASA, DOSA, RPA, and IMPREST accounts	-.187	-.500	1.000											
	GFR has narrated the rules of IBAS++ recording and reporting	.249	.497	-.471	1.000										
	C&AG Adi. Funct. Act 1974 gives a picture of financial admin. structure	-.182	-.337	.584	-.545	1.000									
	Relevant Laws and Regulations describe the forms and contents of financial statements	.280	.495	-.438	.492	-.493	1.000								
	DFP delineated the official duties for govt. accounting and reporting	.291	.413	-.363	.298	-.387	.614	1.000							
	Govt. accountants are trained enough to adopt technologies	.201	.300	-.344	.311	-.395	.483	.744	1.000						
	Govt. accountants are performing duties as per the rules of DFP	-.126	-.193	.220	-.283	.396	-.356	-.565	-.531	1.000					
	Timeliness of Reporting with iBAS++	.088	.249	-.293	.288	-.365	.333	.519	.512	-.464	1.000				
	Account Code is internationally comparable	.029	.130	-.078	.123	.028	.158	.300	.259	-.368	.343	1.000			
	iBAS++ has the opportunity to prepare AFA and AAA	-.058	-.153	.332	-.094	.153	-.215	-.364	-.426	.442	-.370	-.415	1.000		
	Forward estimation is needed in iBAS++	-.011	.091	-.223	.210	-.143	.155	.312	.360	-.323	.333	.651	-.616	1.000	
	iBAS++ software has reduced the workload of govt. accountants	.038	.048	-.006	-.053	.129	.003	.070	.015	.052	.121	.430	-.359	.546	1.000

a. Determinant = .001

[Source: Authors' own creation]

From Table 2, named correlation matrix, a good number of items have moderately correlated and shown values greater than .30. From the case of determinant value, it is known to us that the value should be greater than (>) .00001. Our calculated result found that the determinant result is .001, more significant than the suggested result. This determinant value explains that the co-linearity is absent among the different variables. So, the data set is sufficient as it is an Exploratory Factor Analysis method (Tavakol & Wetzel, 2020).

Table 3: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.795
Bartlett's Test of Sphericity	Approx. Chi-Square	766.019
	df	91
	Sig.	.000

[Source: Field data 2021]

The KMO estimates sample sufficiency, which determines whether or not the feedback provided by the sample is sufficient, based on the above Table 3, Kaiser Meyer Olkin (KMO), and Bartlett's Test (which measures the power of association among the variables). This estimate must be close to 0.50 for the factor analysis to continue acceptably. Values for KMO above 0.90 are outstanding, values between 0.70 and 0.80 are satisfactory, while Kaiser proposed 0.50 as the minimum level (Hardly accepted). According to the preceding data, the KMO estimate of 0.795 is sufficient.

Another indication of the strength of the correlation between the variables is Bartllet's test. The hypothesis that the relationship matrix is an identity matrix is tested in doing so. A matrix is called an identity matrix if all of its diagonal components (see Table 2) are 1 and all of its off-diagonal components (refer to the term mentioned above) are almost equal to 0. As we can see from the table, the notable result of Bartlett's Test of Sphericity is 000. That is the .05 significant level. Because it is .000, it is sufficient enough to be significant. Thus, the relationship matrix is not the identity matrix (Kaiser, 1970).

Table 4: Communalities

Communalities

	Initial	**Extraction**
Constitutional Mandates for Accounting basis	.327	.338
Constitutional mandate for recording and reporting economic events	.551	.846
BB follows the rules for SAFE, CONTASA, DOSA, RPA and IMPREST accounts	.527	.520
GFR has narrated the rules of IBAS++ recording and reporting	.489	.487
C&AG Additional Functional Act 1974 gives a picture of financial admin. structure	.567	.751
Relevant Laws and Regulations describe the forms and contents of financial statements	.533	.513
DFP delineated the official duties for govt. accounting and reporting	.702	.819
Govt. accountants are trained enough to adopt technologies	.623	.661
Govt. accountants are performing duties as per the rules of DFP	.537	.511
Timeliness of Reporting with iBAS++	.399	.410
Account Code is internationally comparable	.535	.515
iBAS++ has the opportunity to prepare AFA and AAA	.545	.486
Forward estimation is needed in iBAS++	.670	.872
iBAS++ software has reduced the workload of govt. accountants	.437	.473

Extraction Method: Principal Axis Factoring.

[Source: Field data 2021]

The subsequent item from the solution table is of commonalities, which shows how much of the difference in the variables had been considered by the extracted factors. The commonality value, which should be more than 0.30, should be considered for further analysis. If the item's value is less than 0.30, these items/variables should be detached from additional steps of factor analysis. For instance, over 67.00 percent of the Variance in forward estimation needed in iBAS++ is accounted for, while 32.70 percent in Constitutional mandates for accounting basis is accounted for.

Table 5: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadingsa
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.077	36.262	36.262	4.696	33.540	33.540	4.005
2	2.319	16.567	52.829	1.936	13.827	47.367	2.641
3	1.305	9.319	62.148	.906	6.469	53.835	3.377
4	1.045	7.461	69.609	.665	4.748	58.584	2.293
5	.718	5.131	74.740				
6	.644	4.603	79.343				
7	.584	4.169	83.512				
8	.508	3.626	87.138				
9	.435	3.107	90.244				
10	.398	2.844	93.088				
11	.329	2.347	95.435				
12	.251	1.796	97.231				
13	.212	1.516	98.747				
14	.175	1.253	100.000				

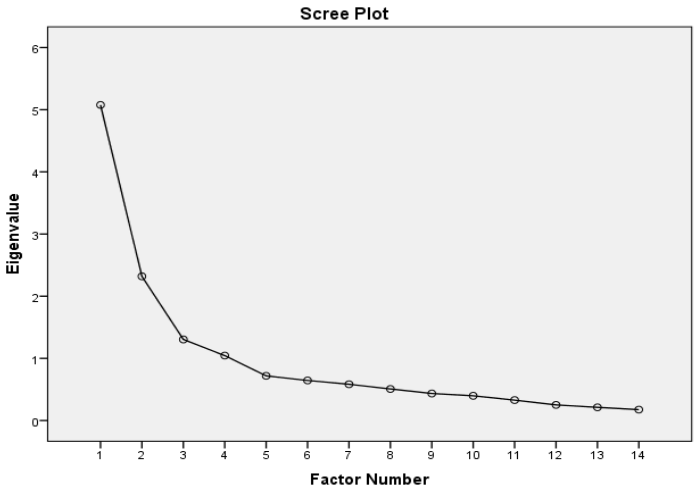
Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: Field data 2021

The study has reviewed Initial Eigenvalues and Extracted Sums of Squared Loadings for inquiry and explanation. Eigenvalues more significant than 1 indicate that the number of elements or factors indicated by the selected variables must be identified. Table 5 above shows that for the 1st factor, the value is 5.077 > 1, the 2nd factor is 2.319 > 1, the 3rd factor is 1.305 > 1, and the 4th factor is 1.045 < 1. Therefore, the declared set of 14 variables with 27 remarks acts for four factors. Moreover, the bring-out summation of squared loading percent of Variance shows that the first factor (as shown in Table 5) accounts for 33.540 percent of the variance features from the declared remarks, followed by the second factor (13.827 percent), the third factor 6.469 percent, and the fourth factor 4.748 percent. Consequently, 4 factors are sufficient to capture all the traits or elements that the 14 variables that were announced cover.

Figure 1: Scree Plot



[Source: Field data 2021]

The Eigenvalues plotted against all components is known as a Scree Plot. To determine how many elements to retain, utilize the diagram. The logic of attention is the point at which the curve starts to squash. Between factors 4 and 5, here is where the curve begins to squish. Additionally, remember that four factors have been retained for the study since factors 5 and higher have Eigenvalues smaller than 1.

Table 6: Pattern Matrix

Pattern Matrix

	Factor			
	1	2	3	4
Constitutional Mandates for Accounting basis				.586
Constitutional mandate for recording and reporting economic events				.840
BB follows the rules for SAFE, CONTASA, DOSA, RPA and IMPREST accounts			-.674	
GFR has narrated the rules of iBAS++ recording and reporting			.617	
C&AG Additional Functional Act 1974 give a picture of financial admin. structure			-.886	
Relevant Laws and Regulations describe the forms and contents of financial statements	.362			
DFP delineated the official duties for govt. accounting and reporting	.918			
Govt. accountants are trained enough to adopt technologies	.817			
Govt. accountants are performing duties as per the rules of DFP	-.702			
Timeliness of Reporting with iBAS++	.513			
Account Code is internationally comparable		.638		
iBAS++ has the opportunity to prepare AFA and AAA		-.519		
Forward estimation is needed in iBAS++		.890		
iBAS++ software has reduced the workload of govt. accountants		.736		

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.a

a. Rotation converged in 6 iterations.

[Source: Field data 2021]

The loadings (extracted values of each item under four variables) of the 14 variables on the four extracted factors are displayed in Table 6 above. The more fully the factor subscribes to the variable, the higher the loading's unqualified value. The 14 objects have been extracted into four variables, each corresponding to the most significant items. These are comparable replies in factor 1 and concurrently in factors 2, 3, and 4. Understanding the table is made more accessible by the gap (empty spaces) on it, which acts for loading that is less than .30. Table 6 illustrates the presence of cross-loading, which is the process of one factor estimating more than one element. We withheld all loadings smaller than .30 due to the requirement of precisely calculating each component. We hide any cross-loaded objects from inspection to achieve better results. The factor pattern matrix is examined to identify factors, and the clarification is achieved by reallocating the factor loadings through rotation.

Table 7: Internal Reliability for Factors

Reliability Statistics		
	Cronbach's Alpha	**No of Items**
Factor 1	.433	5
Factor 2	.420	4
Factor 3	.599	3
Factor 4	.695	2

Item-Total Statistics for Factors

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Constitutional Mandates for Accounting basis	4.46	.250	.539	.231
Constitutional mandate for recording and reporting economic events	4.52	.336	.539	.452
Relevant Laws and Regulations describe the forms and contents of financial statements	17.89	1.341	.506	.168
DFP delineated the official duties for govt. accounting and reporting	17.87	1.192	.668	.025
Govt. accountants are trained enough to adopt technologies	17.88	1.169	.593	.056
Timeliness of Reporting with iBAS++	17.88	1.270	.414	.211
Govt. accountants are performing duties as per the rules of DFP	17.83	2.969	.596	.816
Account Code is internationally comparable	13.17	.577	.404	-.774a
iBAS++ has the opportunity to prepare AFA and AAA	13.19	1.719	.552	.778
Forward estimation is needed in iBAS++	13.18	.683	.341	-.533a
iBAS++ software has reduced the workload of govt. accountants	13.32	.622	.375	-.662a
BB follows the rules for SAFE, CONTASA, DOSA, RPA and IMPREST accounts	8.92	.312	.500	-1.779a
GFR has narrated the rules of IBAS++ recording and reporting	8.96	.259	.410	-2.397a
C&AG Additional Functional Act 1974 gives a picture of financial admin. structure	9.11	.921	.570	.737

[Sources: Field data 2021]

The reliability data in Table 7 above indicate that factor 4 items are required for internal reliability because their Cronbach's Alpha values of .695, .599, .420, and .433 are within the acceptable range. The item-total data show that the corrected item-total correlation, or .539 and .539, respectively, for two items, is more significant than 30. Similar reliability tests were conducted on other factors and associated items, yielding satisfactory Cronbach's Alpha values of .599, .420, and .433, respectively. These values indicate the factors' moderate internal reliability (Cronbach, 1949).

6.0 Conclusion

This study explored the latent variable of the Government Accounting and Reporting System (GARS) through Principal Axis Factoring (PAF) with Promax Rotation. The preliminary examination of the R-matrix recommended a significant quantity of the coefficients were above .30. The Kaiser-Meyer-Olkin (KMO) index was .795, more significant than the suggested score of .60 and Bartellet's Test of Sphericity attained statistically significant ($\chi 2$ = 766.019, p = .000 that is < .05), representing our data were appropriate for factor analysis (Kaiser, 1970; Bartlett, 1954). The outcome of the preliminary examination exposed four factors/dimensions with Eigenvalues over 1, explaining 33.540 percent, 13.827 percent, 6.469 percent, and 4.748 percent variances, respectively. However, the Scree plot suggests a clear break after the four factors (Figure 1), suggesting a potential two-factor solution for the GARS with four latent factors.

- Factor 1 (Categorized as the accounting and recording process of government financial events) has loaded five items: Relevant Laws and Regulations describing the forms and contents of financial statements, DFP delineates the official duties for government accounting and reporting, Govt. accountants are trained enough to adopt technologies, Govt. accountants are performing duties as per the rules of DFP and Timeliness of Reporting with iBAS++.
- Factor 2 (Categorized as the government budgetary and accounting classification system) has loaded four items: Account Code is internationally comparable, iBAS++ has the opportunity to prepare AFA and AAA, Forward estimation is needed in iBAS++, Forward estimation is needed in iBAS++, iBAS++ software has reduced the workload of govt. accountants,
- Factor 3 (Categorized as the government financial administration) has loaded three items: BB follows the rules for SAFE, CONTASA, DOSA, RPA, and IMPREST accounts, GFR has narrated the rules of iBAS++ recording and reporting, and the C&AG Additional Functional Act 1974 given the picture of financial administrative structure, and
- Factor 4 (Categorized as the digitalization accounting and reporting with iBAS++) has loaded two items: The Constitutional mandates for accounting basis and the Constitutional mandates for recording and reporting economic events.

The study's primary limitation is that it has been conducted on the mid-level government financial managers of Bangladesh. Another significant limitation of the study is that it has considered six accounting and reporting frameworks, namely, The Constitution, C&AG Additional Functional Act, 1974, GFR, TR&SR, DFP, and Account Code, for identifying factors to measure the effectiveness of accounting and reporting systems. Rules of Procedures, Public Procurement Act 2006, Allocation of Business, Public Money and Budget Management Act 2009 have yet to be considered for the study. In the future, prospective researchers can investigate emerging technologies such as artificial intelligence (AI), Machine Learning, and Blockchain to enhance the efficiency and accuracy of accounting and reporting systems in the general government entities in Bangladesh.

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