Public Finance Management Through Data Analytics

*"Nothing is easier than public money. It does not appear to belong to anybody. The temptation is overwhelming to bestow it on somebody," -- **Calvin Coolidge, 30th President of the USA***

Overview

Public Financial Management (PFM) refers to the effective utilization of public funds for the welfare of society. It is the government's responsibility to ensure the provision of essential services such as healthcare, education, infrastructure, food, and shelter to its citizens.

Efficient distribution of resources and the safeguarding of economic stability are key objectives of any government. Such resource allocation affects the economy and society in both the short term and over the medium to long term.

PFM encompasses the processes of revenue generation, budgeting, expenditure, and the development of related fiscal policies, laws, and rules to support these responsibilities.

PFM is a crucial pillar for a country's growth and long-term sustainability, requiring strong controls and transparency. Without a sustainable approach, the risk of systemic failure becomes significant. However, certain challenges require absolute visibility and focused attention. Let's explore these challenges and examine how data analytics can help mitigate them.

Challenges

1) **Revenue forecasting & collection:** The first challenge is revenue forecasting and collection. The World Bank highlights that many developing countries, including Pakistan, face significant challenges in accurately forecasting and efficiently collecting public revenues. Issues such as tax evasion fueled by the informal economy, unreliable data, and manual processes increase the risk of errors and fraud.

2) **Transparency deficit and corruption in execution:** The second challenge is the transparency deficit and corruption in execution. There is a high risk that public resources may be diverted for political gains, ultimately undermining public trust and discouraging foreign aid and grants. International Monetary Fund (IMF) technical reports emphasize the need for countries like Pakistan to strengthen fiscal control mechanisms, particularly to improve budget credibility and execution *(International Monetary Fund. (2020). (Pakistan: 2020 Article IV Consultation—Press Release).*

Said Faheem Jaffer, FCMA
Manager, Accounts Payable & ERP Financial Transformation, Dubai Government Entity; Chairman, R&P Committee of UAE Branch Council

3) **Unsynchronized or disconnected systems:** The third challenge is unsynchronized or disconnected systems. This is a global public finance issue. A disconnected public financial system poses a major obstacle to effective governance. The World Bank and IMF have consistently identified this issue as a root cause of inefficiency and data inconsistency in PFM (World Bank. (2019). Public Financial Management: Addressing Challenges in Developing Countries; IMF Technical Report 2018). All the components of PFM, including budgeting, procurement, tax, and reporting systems, operate independently; this causes duplication of efforts, delays in decision-making, and reduced transparency. The IMF's Fiscal Transparency Evaluation Reports for various countries, including Pakistan, Ghana, and Kenya, highlight the inefficiency of non-integrated financial platforms and recommend Integrated Financial Management Information Systems (IFMIS) as a reform priority.

4) **Bureaucracy and system challenges:** The fourth is bureaucracy and system challenges. Excessive bureaucracy with outdated systems and unnecessary documentation creates a rigid structure, misallocation of resources, and under-performance in capital investment projects. Weak institutional capacity and outdated public financial systems hinder the effective implementation of policy and undermine accountability. Transparency International also underscores that bureaucratic inefficiency opens opportunities for rent-seeking behavior and undermines citizens' trust in public institutions. Red tape and non-transparent processes are often exploited to delay payments, alter procurement decisions, or manipulate accounting records.

5) **Political interference:** The fifth challenge is political interference, which leads to inconsistent policies, the allocation of funds to low-impact areas, weakened accountability, and the neglect of critical issues. In many developing countries, a primary cause of failure is the use of public funds for political gain. The Organization for Economic Co-operation and Development (OECD), in its 2020 Public Integrity Handbook, recommends establishing integrity standards to prevent conflicts of interest.

Overcoming Hurdles: Data Analytics and Standards

Overcoming these hurdles requires leveraging data analytics tools and globally recognized standards. Institutions such as the IMF, World Bank, and Transparency International have developed key frameworks. These include the Fiscal Transparency Code

(acceptable practice for management of public finance), the Open Contracting Data Standard (internationally recognized standards to ensure government contracting processes are transparent and efficient), PFM Technical Notes, and the Public Integrity Handbook, which guide public sectors in applying data analytics for stronger public finance management.

Crucial datasets such as budget and actual spending records, tax data, procurement tender logs, public works completion reports, funds disbursement records, accounting and asset register data, project master plans, workflow approval logs, and digitization records are essential for developing controls to address weaknesses and achieve desired outcomes.

In today's world, where data visibility is readily accessible and artificial intelligence alongside machine learning enhances analysis, developing forecasts and implementing controls to achieve desired outcomes has become significantly easier.

Datasets, combined with various economic and market factors, can be leveraged for data analytics in public finance management. Predictive analytics can improve revenue forecasting, while deviation detection enhances forecast accuracy. Geospatial mapping helps track economic activities, and real-time budget dashboards along with expenditure tracking promote greater transparency. Data mining and automation streamline bureaucratic processes, and data-driven decision-making can minimize political interference.

To support these efforts, technologies such as blockchain, artificial intelligence, and machine learning should be adopted.

Leveraging data analytics will improve efficiency, effectiveness, and accountability in public finance management. The adoption of advanced technologies will enable governments to ensure accurate record-keeping, increase transparency, and combat corruption. Integrating and connecting diverse datasets will eliminate redundancies, minimize fragmentation, and accelerate decision-making processes.

But at the same time, these benefits are conditional on political will and data quality. Institutional capacity is another prerequisite that needs to be enhanced to achieve targeted goals. A gradual movement towards these reforms will lead to sustainable and trustworthy public finance management.

Questions may arise about what steps should be taken and what actions shall be performed to achieve the objective. This can be understood through some real-world case studies leveraging data analytics that transformed PFM.

The relevant point is what specific steps should be undertaken, and what resources are required to achieve this objective? This can be illustrated through the India GST implementation, where data analytics was leveraged to strengthen GST compliance, as documented by the World Bank in 2023.

Case studies: India, Rwanda, Pakistan

1) **India (GST):** In 2017, India implemented a unified Goods and Services Tax (GST). However, gaps in cross-verifying transactions made tax evasion a significant challenge. To address this and curb fraud, the government adopted artificial intelligence and data analytics. These systems enabled the matching of buyer and seller invoices, integration of data from various authorities, and identification of suspicious transactions. The results were remarkable. In 2022, the Ministry of Finance detected tax evasion since inception amounting to USD 16 billion, while compliance rates improved substantially.

2) **Rwanda:** Rwanda implemented a series of reforms to enhance its PFM and significantly improve the management and performance of government capital projects. Some of these main reforms are highlighted below. In 2013, the World Bank funded Rwanda to implement UMUCYO, an e-procurement system that was the first of its kind in Africa. Built on a web-based portal, UMUCYO offers services such as advertisement, e-bidding, evaluation, contract management, and related functions. The system has significantly reduced processing time, resource costs, and opportunities for corruption. Rwanda also implemented an Integrated Financial Management Information System and expanded the Information and Communication Technology (ICT) platform in the 2018–2024 PFM reforms to enhance skill development programs, compliance with international standards, and boost resource mobilization.

3) **Pakistan (FBR):** In Pakistan, the Federal Board of Revenue (FBR) introduced a data integration and analytics system that connects with NADRA, banks, property registries, and other relevant authorities. The system cross-checks taxpayers' declared returns against lifestyle indicators to identify discrepancies. Between 2022 and 2023, it enabled the detection of thousands of non-filers and cases of under-declared income. In addition to enhancing compliance, the system significantly reduced manual inspection time.

Conclusion

Effective PFM is pivotal for economic growth and sustainable development. However, it encompasses serious challenges that need to be tackled. Modern technologies and data analytics have the potential to transform this critical sector. In the future, these innovations are poised to reshape the social and economic landscape of developing countries like Pakistan. While systemic rigidity and bureaucratic hurdles may delay progress temporarily, ultimately, embracing contemporary tools and techniques is the only viable path forward.

The conclusion of the argument is that our bureaucracy, political leaders, institutions, educational system, human resource developers, donors, and policymakers must come to a clear understanding: all existing obstacles and inefficiencies need to be addressed and transformed. Adopting data analytics and technology is the only viable path forward.

About the Author: The writer is a Fellow Member of ICMA with over 20 years of experience in financial management, ERP transformations, data analytics, and performance analysis. He is currently serving as Manager Accounts Payable and ERP Financial Transformation at a Dubai government entity and as Chairman of the Research and Publications Committee of the UAE Branch Council.