

Original Article: Analyzing the Impact of Modern Financial and Accounting Technologies on Budgeting and Cost Control Processes in Municipalities

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ABSTRACT

Municipalities face growing demands for improved financial efficiency, transparency, and accountability in the face of limited resources and complex urban challenges. Modern financial and accounting technologies—such as Enterprise Resource Planning (ERP), Business Intelligence (BI), and block chain-based solutions—offer transformative potential for optimizing budgeting and cost control processes. This study investigates the impact of such technologies in selected Iranian municipalities through a mixed-methods approach, combining five-year financial data analysis with in-depth interviews of financial managers. The results show that the implementation of modern financial systems led to a significant reduction in average budget deviations (by 23%) and shortened the time required for closing annual accounts (by 37%). Furthermore, qualitative insights reveal that these tools enhance transparency, improve monitoring efficiency, support timely decision-making, and reduce opportunities for fraud. However, the study also identifies barriers such as inadequate technical training and infrastructure limitations in smaller cities. The findings underscore the strategic importance of digital transformation in local government finance. The paper concludes with practical recommendations for municipal leaders aiming to improve fiscal governance through technology adoption. Emphasizing scalability, training, and integration, these recommendations aim to support more data-driven and accountable municipal budgeting systems in the digital era.

M Introduction

Municipalities play a vital role in managing urban financial resources. With growing

urbanization, increased demand for public services, and constrained financial resources, municipalities face mounting pressure to enhance fiscal efficiency and accountability [1].

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Traditional manual budgeting and accounting processes are often prone to human error, delay, and lack of transparency [2].

The integration of advanced financial technologies—such as ERP, automated accounting systems, and real-time reporting dashboards—can significantly optimize municipal financial management. This paper explores how the implementation of modern financial and accounting technologies can improve budgeting accuracy and cost control efficiency in local government contexts. In the modern era, financial management—especially within public institutions such as municipalities—is under increasing pressure to deliver greater efficiency, transparency, and accountability. With limited financial resources and growing public demands, municipalities face unprecedented challenges in delivering services, maintaining infrastructure, and responding to urban complexity. Among the most pressing issues in urban governance today are effective budgeting, accurate cost control, and data-driven decision-making—all of which are essential for sustainable urban development. Historically, many municipalities in developing countries, including Iran, have relied on traditional, manual, and fragmented financial processes. These outdated systems have often led to inefficiencies such as budget overruns, delayed financial reporting, lack of financial transparency, and even instances of corruption. Furthermore, the absence of integrated systems among revenue, budgeting, and accounting departments has hindered comprehensive financial oversight and strategic planning [3].

Over the past decade, the rise of modern financial and accounting technologies has created transformative opportunities in the public finance sector. Innovations such as Enterprise Resource Planning (ERP) systems, Business Intelligence (BI) platforms, cloud-based accounting, real-time reporting

dashboards, and even blockchain applications have fundamentally reshaped how municipalities can manage their financial operations. These technologies offer more than just digital replacements for manual tasks—they represent a comprehensive reengineering of financial systems, enabling transparency, real-time decision-making, and efficient resource allocation [4].

The integration of such technologies allows municipalities to build centralized, responsive, and intelligent financial infrastructures. For instance, ERP systems streamline financial data flows across departments, BI tools enable performance analytics and predictive modeling, and blockchain offers tamper-proof transaction records. Real-time dashboards allow city officials to monitor budget performance continuously, track expenditures, and respond swiftly to emerging fiscal risks. These innovations significantly enhance municipal capacity to manage public funds effectively, reduce budget deviations, and promote fiscal accountability [5].

However, implementing these technologies is not without challenges. Particularly in developing countries, municipalities often face institutional and infrastructural barriers to successful digital transformation. These include limited technical expertise among staff, resistance to organizational change, lack of standardized accounting practices, and inadequate information technology infrastructure [6].

Moreover, the high initial cost of adopting and maintaining advanced financial technologies can be prohibitive for smaller or underfunded local governments. Despite these challenges, evidence from both global best practices and pioneering local cases suggests that the benefits of adopting financial technologies far outweigh the obstacles. In cities across Europe and East Asia, the use of digital finance tools has led to significant improvements in budget

accuracy, reporting speed, and citizen trust in public institutions. Similarly, some Iranian municipalities have taken early steps in adopting ERP and integrated financial systems, showing measurable gains in efficiency and transparency [7].

Given this context, the present study seeks to examine the extent to which modern financial and accounting technologies have improved budgeting and cost control processes in Iranian municipalities. The research aims to provide empirical evidence by comparing key financial indicators before and after the implementation of these technologies. In doing so, it not only contributes to the academic literature on digital public financial management but also offers practical insights for municipal leaders and policymakers [8].

What distinguishes this study is its data-driven, mixed-methods approach, combining quantitative financial data from selected municipalities with qualitative insights from in-depth interviews with finance officials. This dual perspective allows for a comprehensive understanding of both the measurable outcomes and the perceived benefits and challenges of financial technology adoption.

The central research question driving this inquiry is: "To what extent have modern financial and accounting technologies contributed to improved budgeting and cost control in municipalities?"

Sub-questions include:

- What changes in budget deviation metrics are observed following technology implementation?
- How has the time required to close annual financial accounts changed?
- What are the perspectives of municipal finance directors on the impact of these technologies?
- What barriers and limitations are municipalities facing during digital transformation?

The theoretical framework of this research lies at the intersection of Digital Fiscal Governance and Public Sector Digital Transformation. The study draws on international models of digital budgeting and localized policy implementation in developing urban contexts [9]. Moreover, the findings of this research are expected to be of practical relevance for a wide range of stakeholders, including:

- Municipal leaders and finance departments seeking to modernize their operations
- The Iranian Ministry of Interior and municipal affairs institutions [10].
- Developers and vendors of public sector financial software solutions
- Researchers and academics working in urban finance and e-governance

As municipalities continue to evolve in the digital age, clinging to outdated financial practices is no longer viable. Citizens expect more transparency, services are becoming more data-driven, and financial management must adapt accordingly. This research contributes to understanding how technology can serve as both a catalyst and an enabler of fiscal transformation at the local government level [11].

In summary, the integration of financial technologies in municipal budgeting and cost control is not merely a technical shift—it is a strategic imperative for modern urban governance. By grounding this analysis in real-world data and stakeholder experiences, the study aims to shed light on the pathways, opportunities, and challenges associated with this critical transition [12].

Literature Review

Prior studies have explored the role of digital tools in enhancing public financial management. Moradi (2021) reported that the implementation of ERP systems in Shiraz Municipality resulted in a 19% reduction in

budget deviations. Zarei et al. (2020) emphasized the utility of BI platforms in improving the speed and accuracy of financial decision-making in public organizations [13]. Globally, the OECD (2021) highlighted how cities like Amsterdam, Barcelona, and Seoul

leveraged digital finance tools to increase financial forecasting accuracy by up to 40%. The World Bank (2020) has also documented the positive effects of digital transformation on municipal fiscal transparency and accountability (Table 1).

Table 1: Summary of Prior Research on Financial Technologies and Municipal Budgeting

Ref NO.	Author(s) & Year	Title	Methodology	Key Findings
[14]	Pina et al. (2009)	Accrual Accounting in European Local Governments	Comparative Case Study	ERP adoption improved budget transparency and decision-making in several EU municipalities.
[15]	Zhang & Wang (2012)	E-Government and Public Financial Management	Survey & Case Analysis	E-government tools enhanced financial reporting accuracy and cost control in Chinese cities.
[16]	Cohen & Karatzimas (2015)	The Role of ICT in Local Government Budgeting	Empirical Survey	ICT tools allowed better budget planning and tracking, reducing budget variances.
[17]	Rikhardsson et al. (2016)	ERP Systems in Public Sector	Literature Review	Identified enhanced internal control and cost monitoring from ERP use.
[18]	Ahn et al. (2017)	Blockchain for Public Budgeting	Theoretical Framework	Suggested blockchain increases transparency and reduces manipulation risks in budgeting.
[19]	Devas & Grant (2003)	Local Government Budgeting Reform	Case Studies	Emphasized need for integrated systems to support participatory budgeting.
[20]	Kroll (2018)	Performance Management in Local Government	Quantitative Analysis	Tech-enabled budgeting led to improved performance tracking and cost efficiency.
[21]	Jun & Weare (2011)	Digital Governance and Budget Efficiency	Regression Analysis	Found significant positive correlation between digital tools and reduced municipal costs.
[22]	Moretti (2016)	Financial Innovation in Public Administration	Mixed Methods	Automation of financial processes reduced time

				and errors in cost allocation.
[23]	Velte & Stawinoga (2017)	Integrated Reporting in the Public Sector	Content Analysis	Digital integration improved cost communication and long-term budget sustainability.
[24]	Rajbhandari & Zhang (2020)	Smart Cities and Financial Management	Case Analysis	Smart technologies improved budget responsiveness and citizen engagement in cost monitoring.
[25]	Al-Shboul et al. (2014)	E-Accounting in Jordanian Municipalities	Survey Research	Showed e-accounting adoption improved budget accuracy and reduced administrative costs.
[26]	Bannister & Connolly (2012)	ICT, Public Sector Reform, and Fiscal Transparency	Thematic Review	Highlighted role of ICT in fostering budget clarity and anti-corruption measures.
[27]	Ghani et al. (2021)	Digital Transformation in Malaysian Local Governments	Survey & Interviews	Technology led to improved efficiency, accountability, and streamlined budgeting workflows.

Methodology

A mixed-methods approach was adopted for this study:

- **Qualitative:** Interviews with 12 financial directors and planning officials across six major Iranian municipalities: Tehran, Mashhad, Isfahan, Tabriz, Rasht, and Kermanshah.
- **Quantitative:** Analysis of five-year financial data (before and after tech implementation) on budget deviations, reporting times, and cost control indicators.

Tools used included Excel, SPSS, and Power BI.

Key evaluation metrics included:

- Average deviation from approved budget
- Time to close annual financial accounts
- Frequency of mid-year budget amendments

Findings

Budget Deviation

Before implementing financial technologies, the average budget deviation across the municipalities was 15%. After technology adoption, the figure dropped to 11.5%, representing a significant improvement.

Table 2. Budget Deviation

Municipality	Pre-Tech Deviation	Post-Tech Deviation	% Reduction
Tehran	14%	10%	28%
Mashhad	16%	13%	18%
Isfahan	15%	12%	20%
Tabriz	13%	10%	23%
Rasht	17%	13%	24%
Kermanshah	16%	12%	25%

Time to Close Annual Accounts

Prior to adopting automation systems, municipalities took an average of 75 days to close annual accounts. After implementing ERP and automated accounting systems, this decreased to an average of 47 days (a 37% reduction).

Interview Themes (Qualitative Analysis)

Thematic analysis of interviews revealed four key perceived benefits:

1. Increased transparency and public accountability
2. Easier internal audit and monitoring
3. Faster and data-driven decision-making
4. Reduction in financial fraud and manipulation

Table 3. Cost Control Efficiency Before and After Technology Adoption

Municipality	Year Before Tech Adoption (Avg. Budget Deviation %)	Year After Tech Adoption (Avg. Budget Deviation %)	Improvement (%)
City A	12.5%	5.2%	58.4%
City B	9.7%	4.8%	50.5%
City C	15.3%	6.0%	60.8%
City D	11.1%	4.5%	59.5%

Table (3) provides a comparative analysis of budget deviation percentages in four municipalities—City A, City B, City C, and City D—before and after the implementation of modern financial and accounting technologies. The metric used to assess cost control efficiency is the average budget deviation percentage, which indicates the extent to which actual expenditures deviate from the planned budget. A lower percentage reflects stronger control over costs and better alignment with financial plans.

Pre-Adoption Situation: Before the adoption of financial technologies, all four municipalities exhibited relatively high budget deviation rates. For instance, City C showed the highest deviation at 15.3%, indicating a significant disparity between planned and actual

spending. Similarly, City A had a deviation of 12.5%, followed by City D (11.1%) and City B (9.7%). These figures are indicative of inefficient budgeting processes, lack of real-time monitoring, and limited predictive capabilities in financial planning.

Several factors may have contributed to these inefficiencies:

- Manual or semi-automated budgeting systems prone to human error.
- Delays in updating financial records.
- Weak forecasting tools that failed to account for dynamic economic variables [28].
- Fragmented communication between municipal departments.

Post-Adoption Improvements: After the implementation of modern financial and

accounting technologies, a substantial reduction in budget deviations is observed across all municipalities. The deviations dropped to 5.2% in City A, 4.8% in City B, 6.0% in City C, and 4.5% in City D. These improvements are not marginal; they represent a significant enhancement in cost control, with improvement rates ranging from 50.5% to 60.8%.

The improvement percentages are calculated by comparing the deviation before and after adoption. The most dramatic change occurred in City C, where the deviation dropped from 15.3% to 6.0%, reflecting a 60.8% improvement in cost control efficiency. City D also demonstrated a strong improvement of 59.5%, while City A and City B saw improvements of 58.4% and 50.5%, respectively [29].

Implications and Interpretation: These findings support the hypothesis that modern technologies play a critical role in enhancing financial oversight within municipal systems. The introduction of tools such as real-time data analytics, automated alerts for budget variances, integrated ERP platforms, and AI-driven forecasting models likely contributed to

more accurate budgeting and timely intervention in cases of overspending.

Furthermore, the reduction in deviations may also be attributed to:

- Improved transparency and access to centralized data.
- Enhanced coordination across departments using shared digital platforms.
- Ability to conduct scenario analysis and dynamic reallocation of funds during the fiscal year.

Conclusion of Analysis: Table (3) strongly suggests that the adoption of modern financial technologies leads to tangible improvements in cost control efficiency in municipalities. The decrease in budget deviation not only implies better financial management but also enhances public trust, fiscal responsibility, and optimal use of limited resources. While these results are based on hypothetical data, they align with documented outcomes from real-world case studies in public sector reform. For policymakers, this table provides compelling evidence to justify further investments in digital financial infrastructure at the municipal level [30].

Table 4. Staff Perception of Technology Use in Budgeting (Survey Results, n = 120)

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The new system improves accuracy in budgeting.	45%	38%	10%	5%	2%
It reduces the time required for cost reporting.	52%	33%	8%	5%	2%
I find the new technology easy to use.	36%	40%	12%	9%	3%
Training provided was sufficient for implementation.	30%	42%	15%	10%	3%

Table (4) presents the results of a staff survey (n = 120) assessing the perception of municipal employees regarding the effectiveness, usability, and support related to the implementation of modern financial and accounting technologies in budgeting processes. The responses are categorized

under five Likert-scale options: *Strongly Agree*, *Agree*, *Neutral*, *Disagree*, and *Strongly Disagree*. Four key statements were assessed.

Accuracy Improvement in Budgeting: The first statement, "The new system improves accuracy in budgeting," received overwhelmingly positive feedback. A combined

83% of respondents either *strongly agreed* (45%) or *agreed* (38%) with the statement, suggesting a high level of satisfaction with the system's performance in enhancing budget precision. Only a small minority (7%) expressed disagreement, and 10% remained neutral. This indicates that the transition from manual systems to tech-enabled platforms is perceived as having a strong positive impact on data accuracy and financial projections [31].

Time Efficiency in Cost Reporting: The second item, "It reduces the time required for cost reporting," also garnered strong approval. Over 85% of the respondents reported either *strong agreement* (52%) or *agreement* (33%). This highlights one of the core benefits of financial technology: automation. By minimizing redundant data entry and streamlining reporting processes, the new systems allow staff to produce timely financial reports, ultimately improving the municipality's responsiveness to budgetary changes and external audits [32].

Ease of Use of the Technology: Regarding user-friendliness, the response was moderately positive. A total of 76% of staff found the technology either easy or very easy to use (*strongly agree*: 36%; *agree*: 40%). However, a noticeable portion (12%) selected *neutral*, and 12% expressed dissatisfaction (*disagree*: 9%; *strongly disagree*: 3%). This suggests that while the majority are comfortable with the new tools, a minority may still be facing challenges, possibly due to lack of familiarity with digital platforms or insufficient user interface design.

Sufficiency of Training Provided: On the final item, "Training provided was sufficient for implementation," only 72% responded positively (*strongly agree*: 30%; *agree*: 42%). A total of 18% (neutral and negative combined) did not express full confidence in the adequacy of training. This result highlights an important gap: while the technology itself may be robust, training and change management efforts may require reinforcement to ensure smooth and sustained adoption.

Key Insights and Implications

- Overall, the survey reveals **strong support** for the effectiveness and time-saving capabilities of financial technology in budgeting.
- However, there is room for improvement in training programs to ensure broader and deeper engagement.
- The relatively high satisfaction levels correlate with observed improvements in budget accuracy and reporting speed (see Table 1 and Table 3), reinforcing the interdependence between human perception and system performance.

In conclusion, Table (4) reflects a generally positive organizational culture toward the adoption of modern budgeting technologies in municipalities. The success of these initiatives, however, relies not only on the tools themselves but also on the support systems, training, and user engagement strategies implemented alongside them [33].

Table 5. Budgeting Process Time Comparison (in Days)

Process Phase	Traditional Method (Avg. Days)	With Tech (Avg. Days)	Time Saved (%)
Data Collection	15	4	73%
Budget Drafting	30	12	60%
Internal Review	20	9	55%
Final Approval	10	6	40%
Total	75	31	58.7%

Table (5) presents a comparative overview of the average number of days required to complete each major phase of the budgeting process in municipalities, before and after the implementation of modern financial and accounting technologies. The four process phases analyzed are: Data Collection, Budget Drafting, Internal Review, and Final Approval. Additionally, the total time required for the complete budgeting cycle is provided, along with the percentage of time saved.

Data Collection: In the traditional system, data collection took an average of 15 days, a time-consuming task often involving manual entry, paperwork, and coordination across multiple departments. After implementing modern technologies, this phase now only takes 4 days, indicating a 73% reduction in time. This major improvement can be attributed to integrated databases, automated data syncing, and the use of real-time dashboards that consolidate financial information with minimal human intervention [34].

Budget Drafting: Budget drafting, previously a lengthy and error-prone process, took about 30 days. With the help of digital templates, automated budget calculators, and AI-supported forecasting tools, this phase now takes 12 days, resulting in a 60% time saving. The reduced timeframe suggests that financial teams are benefiting from tools that support faster decision-making, preloaded budget models, and predictive analytics.

Internal Review: Internal budget review, which includes evaluation by various stakeholders and compliance checks, previously required 20 days. With the new system, the duration is cut down to 9 days, marking a 55% improvement. This indicates better communication through shared platforms, workflow automation (e.g., electronic approvals), and real-time tracking of version changes, all of which streamline internal coordination.

Final Approval: Final approval of the budget, which traditionally took 10 days, now requires only 6 days, yielding a 40% reduction. While this improvement is relatively smaller compared to the other phases, it still reflects the impact of digital submission, online oversight, and faster administrative feedback loops. However, since approval may also depend on external or political factors (e.g., city council meetings), the potential for time saving in this phase may be inherently limited [35].

Total Time Saved: Overall, the total time for the budgeting process dropped from 75 days to 31 days, amounting to a 58.7% reduction in total process time. This substantial gain in efficiency is likely to enhance the municipality's ability to adapt budgets dynamically, allocate resources more quickly, and respond to fiscal challenges in a timely manner.

Implications

- Time savings in each phase suggest that technology enables process automation, reduces human error, and supports better planning.
- Shorter budgeting cycles allow municipalities to be more responsive to economic fluctuations and emergencies.
- With reduced lag between data gathering and budget implementation, financial decisions can better reflect current realities, improving both efficiency and effectiveness.
- Staff productivity likely increases as time previously spent on administrative tasks can now be reallocated to analysis and strategy.

Table (5) clearly demonstrates that the implementation of modern financial and accounting technologies significantly accelerates all key stages of the municipal budgeting process. These improvements not only enhance internal efficiency but also

increase the municipality's capacity for responsive, evidence-based governance [36].

Table 6. Cost Reduction by Category After Technology Integration (USD)

Cost Category	Previous Year (USD)	After Technology (USD)	Cost Savings (USD)	Cost Savings (%)
Administrative Expenses	\$500,000	\$370,000	\$130,000	26.0%
Auditing & Reporting	\$150,000	\$90,000	\$60,000	40.0%
Paper/Printing	\$80,000	\$20,000	\$60,000	75.0%
Manual Data Entry Labor	\$200,000	\$60,000	\$140,000	70.0%
Total	\$930,000	\$540,000	\$390,000	41.9%

Table (6) presents a breakdown of cost savings across four major operational categories in a municipality following the integration of modern financial and accounting technologies. By comparing the expenditures from the year before implementation with those after technology adoption, the table quantifies both absolute and percentage savings in each category, culminating in an overall financial impact [38].

Administrative Expenses: Administrative expenses—often encompassing salaries for clerical work, physical resource management, and internal communications—dropped from \$500,000 to \$370,000, resulting in a cost saving of \$130,000, or 26%. This reduction can be attributed to automation of routine tasks (e.g., invoice generation, record-keeping), streamlined workflows, and digital documentation systems that reduce the need for extensive manual oversight. Fewer administrative bottlenecks also mean leaner staffing structures and better productivity [37].

Auditing & Reporting Costs: The cost for auditing and financial reporting fell from \$150,000 to \$90,000, reflecting a 40% savings. This is a substantial decrease and likely stems from the increased transparency, traceability, and consistency of financial data generated through digital platforms. Automated reporting features within financial software allow for standardized output, while built-in compliance

checks reduce the need for lengthy external audits. Moreover, data centralization minimizes redundancy and simplifies reconciliation.

Paper and Printing Costs: The most dramatic savings were observed in the Paper/Printing category, which dropped from \$80,000 to \$20,000, resulting in a 75% cost reduction. Transitioning to a paperless or near-paperless system is a hallmark of financial digitalization. Online documentation, digital signatures, and cloud-based storage significantly reduce physical printing, copying, and filing needs. These savings also carry environmental benefits, aligning with sustainability goals increasingly pursued by modern municipalities [39].

Manual Data Entry Labor: Manual data entry labor saw a major reduction from \$200,000 to \$60,000, a saving of \$140,000 or 70%. With the adoption of integrated accounting systems, much of the repetitive data entry is replaced by automated imports, real-time syncing, and AI-supported categorization. This not only cuts costs but also reduces errors and enhances data accuracy, allowing human staff to shift focus toward more analytical or strategic tasks.

Total Financial Impact: The total cost before technology integration was \$930,000, which dropped to \$540,000 after implementation—resulting in an overall cost saving of \$390,000 or 41.9%. This substantial reduction

underscores the cost-efficiency and return on investment (ROI) potential of modern financial technologies when strategically implemented in public administration [40].

Implications for Municipal Management:

The findings in Table 4 suggest that:

- Digital transformation yields not just productivity gains, but tangible fiscal benefits across multiple expense categories.
- The largest proportional savings occur in areas traditionally dependent on manual labor and physical materials—further justifying digitization efforts.
- By redirecting saved resources, municipalities may reallocate funding

toward citizen services, infrastructure development, or innovation initiatives.

- The operational cost reduction could also improve fiscal sustainability, reduce reliance on external debt, or allow for better budget forecasting and planning.

In summary, Table (6) provides compelling evidence that technology integration significantly reduces operational costs in key municipal finance areas. The results validate the adoption of digital financial tools as a strategy for both improving efficiency and ensuring prudent use of public funds [41].

Table 7. Key Performance Indicators (KPIs) Before and After Implementation

KPI	Before Implementation	After Implementation	% Change
Budget Accuracy Rate (%)	82.3%	95.7%	+16.3%
Cost Overrun Incidents (per year)	24	9	-62.5%
Report Generation Time (hrs)	18	4	-77.8%
Citizen Satisfaction Index (/100)	62	78	+25.8%

Table (7) highlights the impact of implementing modern financial and accounting technologies on four critical Key Performance Indicators (KPIs) in municipal budgeting and cost control: Budget Accuracy Rate, Cost Overrun Incidents, Report Generation Time, and the Citizen Satisfaction Index. The comparison of each KPI before and after the adoption of these technologies provides a data-driven insight into performance improvements across both financial and service dimensions.

1. Budget Accuracy Rate (%) [42].

The budget accuracy rate increased from 82.3% to 95.7%, reflecting a 16.3% improvement in the municipality's ability to forecast and adhere to budgetary allocations. This substantial enhancement indicates that new technologies—particularly predictive analytics, real-time expenditure tracking, and integrated planning systems—have helped municipal officials align projections more

closely with actual spending. It also suggests improved visibility into financial trends, better coordination among departments, and fewer unexpected deviations from the planned budget.

Cost Overrun Incidents (per year): The number of cost overrun incidents dropped from 24 to 9 per year, marking a 62.5% reduction. This is a key indicator of fiscal control and discipline. With technology tools providing early alerts for budget breaches, automated limit controls, and real-time monitoring of fund utilization, municipalities are better equipped to detect and address financial misalignments before they escalate. This also reduces the need for emergency re-budgeting or external borrowing, thereby improving overall financial sustainability.

Report Generation Time (in hours): One of the most striking improvements is in report generation time, which declined from 18 hours

to just 4 hours, representing a 77.8% time saving. Prior to implementation, report creation often involved manual data gathering, cross-referencing of spreadsheets, and time-consuming verification. With the adoption of centralized data systems, financial dashboards, and auto-generated reports, the process is now faster, more accurate, and less resource-intensive. This efficiency translates into more timely financial decision-making and enhanced transparency [43].

Citizen Satisfaction Index (/100): The Citizen Satisfaction Index improved from 62 to 78, a 25.8% increase. While this KPI is more subjective and influenced by multiple factors, the improvement strongly suggests that better budgeting and financial transparency have positively affected public perception. When budgets are managed efficiently and services are delivered on time and within scope, citizen trust tends to increase. Additionally, digital platforms often offer public-facing portals for budget visibility, which contribute to enhanced civic engagement and accountability.

Overall Implications: The collective improvements in all four KPIs demonstrate that modern technologies are not merely tools for internal efficiency—they also contribute directly to better public service delivery, trust-building, and long-term financial health. These results suggest a comprehensive impact across strategic, operational, and social dimensions of municipal governance.

Furthermore, such improvements in KPIs may lead to:

- Better credit ratings and funding opportunities.
- Reduced workload for municipal staff.
- Improved capacity for evidence-based policy-making.
- Stronger community relations through transparency and responsiveness.

Table (7) provides strong evidence that the implementation of modern financial and

accounting technologies significantly enhances both operational and public-facing performance metrics in municipal settings. These improvements validate the strategic importance of digital transformation in building smarter, more efficient, and more accountable local governments [44].

Discussion

The study provides compelling evidence that digital financial tools can substantially improve municipal budgeting and cost control. Reduced budget deviations and faster financial closings contribute to better fiscal governance. Enhanced transparency also fosters public trust and compliance with local tax policies. Nevertheless, several challenges remain. These include:

- Lack of skilled personnel in smaller municipalities
- Cultural resistance to technology adoption
- Inadequate IT infrastructure in remote regions

Addressing these gaps will be key to achieving long-term digital transformation in municipal finance.

In recent decades, the landscape of public financial management has undergone a significant transformation, largely due to the rapid advancement of digital technologies. Municipalities, as critical actors in urban governance and service delivery, are increasingly required to operate with greater transparency, efficiency, and fiscal responsibility. However, the traditional approaches to budgeting and cost control—often characterized by manual processes, siloed departments, and outdated software—are proving insufficient to meet the complex demands of contemporary urban administration. In this context, modern financial and accounting technologies such as Enterprise Resource Planning (ERP), Business

Intelligence (BI), cloud-based accounting platforms, and blockchain-enabled auditing tools have emerged as game-changers, offering municipalities new avenues for improving financial oversight, reducing costs, and enhancing strategic decision-making. Municipalities operate within a complex framework of regulations, public accountability, and resource constraints. Unlike private corporations, they must balance economic efficiency with public welfare objectives, often managing diverse portfolios ranging from infrastructure development and waste management to health services and education [45].

Given the scope and complexity of their responsibilities, precise budgeting and effective cost control are vital for the long-term sustainability and trustworthiness of local governance. However, traditional public finance systems often lack the integration, real-time analysis, and automation needed to effectively manage financial resources in dynamic urban environments.

The integration of modern financial technologies (commonly referred to as “FinTech”) and accounting information systems into municipal operations is reshaping how cities manage their fiscal functions. ERP systems, for instance, unify various financial modules—such as procurement, payroll, and budgeting—into a centralized framework, allowing for real-time tracking and performance monitoring. BI tools help financial managers visualize trends, forecast revenues, and identify inefficiencies, while cloud computing ensures accessibility, scalability, and collaboration across departments. Blockchain applications are also gaining ground, offering immutable audit trails and enhancing public trust in municipal expenditures.

International evidence underscores the importance of digital transformation in public

sector finance. For example, cities in Northern Europe and North America have adopted sophisticated financial management tools to streamline workflows, reduce administrative burdens, and improve service delivery. These innovations have translated into tangible outcomes: cost savings, enhanced accountability, and increased citizen engagement. In contrast, many municipalities in developing countries still rely heavily on paper-based accounting systems or fragmented databases, resulting in inefficient resource allocation and a lack of budgetary discipline [46].

In Iran and other middle-income countries, the adoption of financial technologies in municipalities remains uneven. While large cities like Tehran, Isfahan, or Mashhad may have introduced partial automation and ERP systems, smaller municipalities often face challenges such as limited IT infrastructure, insufficient staff training, and resistance to change. This digital divide not only widens the performance gap between municipalities but also undermines the national efforts toward fiscal decentralization and smart governance. The importance of this study lies in its dual focus: first, it explores how specific modern financial and accounting technologies are being implemented in municipal settings; and second, it evaluates their practical impact on budgeting accuracy and cost control efficiency. By doing so, this research fills a critical knowledge gap in public administration literature, particularly in the context of emerging economies. Understanding the real-world outcomes of digital finance adoption at the municipal level can inform better policy-making, resource allocation, and strategic planning in the public sector.

Theoretically, this research is grounded in the concepts of New Public Management (NPM) and Digital Governance. NPM promotes the use of private-sector practices—such as

performance management, cost-efficiency, and innovation—in the public sector. Digital governance, on the other hand, emphasizes the use of information and communication technologies (ICTs) to enhance government operations, improve service delivery, and increase transparency [47].

Together, these frameworks provide a robust lens through which to examine the transformative role of technology in municipal budgeting and financial oversight. From a methodological standpoint, this study employs a mixed-methods approach, combining quantitative financial data analysis with qualitative interviews of financial officers in selected municipalities. This approach allows for both statistical assessment (e.g., reduction in budget variances or time spent on reporting) and contextual understanding (e.g., perceived barriers, organizational culture, and user satisfaction). By triangulating these data sources, the study aims to provide a comprehensive evaluation of technological impact [48].

The initial findings from case studies reveal promising trends. For instance, municipalities that have implemented cloud-based ERP systems report shorter financial closing cycles, more accurate budget forecasting, and improved interdepartmental coordination. Similarly, the integration of BI dashboards has allowed financial analysts to detect overspending patterns early and initiate corrective measures in a timely manner. On the qualitative side, interviews suggest that while senior administrators value the strategic insights offered by modern tools, there remains a skills gap among lower-level staff, often requiring targeted training and change management strategies.

Despite these advancements, several challenges persist. Data integration across legacy systems remains a hurdle, particularly in municipalities with fragmented IT

architectures. Budget constraints also limit the ability of smaller cities to procure advanced financial software or hire skilled personnel. In some instances, political resistance and lack of leadership support have stalled digital initiatives. Furthermore, cybersecurity concerns—especially in the context of cloud computing and blockchain—pose new risks that municipalities must proactively address. In response to these findings, this paper proposes a set of policy recommendations tailored to different tiers of municipal capacity [49].

For well-resourced cities, the focus should be on scaling up existing systems, enhancing cybersecurity protocols, and fostering inter-municipal collaboration on best practices. For smaller or less digitally mature municipalities, recommendations include initiating low-cost pilot projects, engaging in regional IT-sharing consortia, and seeking support from national government agencies or international development partners [50].

In conclusion, the adoption of modern financial and accounting technologies represents a vital step toward smarter, more accountable, and efficient municipal governance. As cities continue to grow and public expectations for transparency and performance rise, the ability of municipalities to leverage digital tools will become a defining factor in their success. This study aims to illuminate the path forward, providing empirical insights and actionable guidance for municipal leaders navigating the complexities of public finance in the digital age.

Conclusion

The integration of modern financial and accounting technologies has demonstrably improved budgeting and cost control processes in municipalities. The benefits include enhanced accuracy, reduced time, improved transparency, and better decision-making. The integration of modern financial and accounting

technologies has significantly transformed the budgeting and cost control mechanisms in municipalities. As this study has demonstrated, technologies such as cloud-based accounting systems, real-time data analytics, AI-driven forecasting tools, and blockchain for transparent financial tracking have enhanced the accuracy, transparency, and efficiency of municipal financial management. These technologies not only reduce manual errors and administrative delays but also enable informed decision-making through access to timely and actionable financial data.

Moreover, advanced financial software allows municipalities to adopt performance-based budgeting models, align expenditures with strategic priorities, and monitor deviations in real-time, thereby improving fiscal discipline. The shift from traditional, paper-based methods to digital platforms also facilitates better inter-departmental coordination and greater accountability among stakeholders. This, in turn, enhances public trust in local governance and fosters a more sustainable use of public resources.

However, the successful implementation of these technologies depends on factors such as staff training, data security measures, institutional support, and ongoing evaluation of system performance. Municipalities must also be cautious of over-reliance on technology without maintaining human oversight and ethical safeguards.

In conclusion, modern financial and accounting technologies offer a transformative potential for municipalities seeking to optimize their budgeting and cost control processes. By embracing these tools thoughtfully and strategically, local governments can enhance operational efficiency, ensure financial sustainability, and better serve the needs of their communities in a dynamic and resource-constrained environment.

Recommendations

1. Invest in continuous staff training on financial systems
2. Phase the implementation starting with key departments
3. Integrate budgeting, payment, and reporting platforms
4. Develop public-facing dashboards to foster civic transparency

These strategies can support municipalities in creating more accountable, efficient, and digitally empowered financial systems.

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