

# Digital Transformation in Treasury Reform in Indonesia: A Mixed Methods Approach

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## Abstract

What happens when a state treasury institution attempts to modernise its operations through digital technology while simultaneously restructuring its organisation? This study explores that question within the context of Indonesia's Treasury. The study's originality lies in analysing digital transformation and organisational reform together within a developing-country treasury, which prior studies have rarely done. Employing a mixed-methods approach that combines in-depth interviews, policy document analysis coded in NVivo, and regression modelling using RStudio, the research examines how technology adoption and institutional reform interact in shaping fiscal efficiency and transparency. The findings show that big data and artificial intelligence have noticeably accelerated decision-making and improved accuracy, yet transparency turned out to be the strongest driver of reform outcomes, surpassing efficiency gains, structural changes, and digital initiatives. Fragmented system integration, slow capital expenditure cycles, and the limited reach of the treasury information system remain serious constraints. The study puts forward a dual-pathway reform framework connecting technological change with organisational restructuring along three dimensions: institutional structure, workforce capability, and business processes. Other developing countries facing comparable fiscal and institutional pressures may find this experience useful as a practical reference.

**Keywords:** Artificial Intelligence; Digital Transformation; Indonesia Treasury; Organisational Reform; Transparency; Treasury Management.

## INTRODUCTION

The last ten years have not been kind to government finances anywhere. Crises overlap now; there is no breathing room between them. After 2008 came geopolitical trouble and trade fights that dragged on for years. Russia's move into Ukraine added another layer. Just as when fiscal planners thought they had seen enough, COVID-19 arrived and blew budgets wide open. How bad was it? Global GDP fell 3.4% in a single year, 2020, something the world had not experienced since the 1930s (Zaki, 2023). All of this has forced a hard question about treasury management. It used to be treated as back-office work. If a government cannot track its cash in real time, cannot execute its budget without delays, cannot produce reliable fiscal reports when they are needed, that government has a macroeconomic problem, not just an accounting one (Abdelkawy, 2024; Limoa, 2024; Marin-Rodriguez, 2024).

Scholars who have looked at this closely keep arriving at the same conclusion: fiscal discipline pays off when trouble hits, and weak management makes bad situations worse Chornovol et al., 2020; Ubi et al., 2021; Ugwu, 2024; Voskanyan, 2022. Developing countries sit in an especially difficult position. Money is already tight. The financial plumbing is still being built. A shock that a wealthy country can absorb will knock a poorer one sideways (Jungo et al., 2022). Indonesia is an example. Its debt-

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to-GDP ratio rose from 30% in 2019 to 36% in 2021 (Zaki, 2023), although not an alarming figure by global standards, but a warning to countries that have long maintained fiscal prudence. For Indonesia, the question is not whether to reform treasury management, but how to do it in a technologically effective and institutionally supported way (Krzyszowski, 2022; Dumičić, 2019; Limoa, 2024).

In many countries, governments have turned to technologies such as big data analytics, artificial intelligence, blockchain, and integrated financial platforms to overhaul treasury functions ranging from the way budgets are planned to how financial reports reach the public (Algazo, 2024; Ma, 2023; Lytvyn, 2024; Maharani et al., 2022; Wang, 2024). Innovation Technology Theory provides a lens that shows that the adoption of new technologies can fundamentally change the speed and quality of organizational decision-making (Sikder, 2024; Tashtamirov, 2023).

Indonesia has done this. The implementation of the State Treasury and Budget System, known as SPAN, which integrates treasury processes from budget planning to financial reporting, is proof of this. Big data and AI applications complement it, among other things, to support fiscal forecasts and improve the evidence base for policy decisions (Marion, 2023). At the same time, interoperability across all government financial information systems has been sought to expand stakeholder access to fiscal data to increase the transparency of state financial management (Barker, 2024; Salehi et al., 2022).

Organizational Design Theory emphasizes that adaptive structures, well-defined processes, and the right mix of skills are prerequisites for any technological shift in an organization (Alblooshi et al., 2020; Mosurović-Ružičić, 2023). Although Opoku et al. (2021) discuss the principles of the relevant organization, their analysis does not specifically address Indonesia. More discussion is on aspects of staff training, role reorientation, and the development of regional offices as centers of analytical excellence that reflect institutional capacity building strategies (Lartey, 2024; Trang et al., 2022).

Concretely, although Big data and AI tools already exist, their use in fiscal analysis is still in its early stages (Soylu et al., 2022; Wanigasekara, 2024). Capital budget execution continues to experience delays, multi-year contract planning is very troublesome, and regulatory requirements around budget shifts add further friction (Ermasova, 2020). The process of filing electronic invoices needs to be improved (Qi & Azmi, 2021), and the application of advanced technologies such as computer vision, natural language processing, and robotic process automation for end-to-end service delivery, including planned Budget Execution and Accounting as a Service (BEAaaS), remains an aspiration rather than a reality (Singh, 2024; Vajgel et al., 2021). In accounting and reporting, updating the Chart of Accounts, harmonizing central and local government systems, and building a consolidated public sector balance sheet database are unfinished homework (Amalia, 2023; Jorge et al., 2022; Juanda et al., 2023).

Discussions on treasury reform and public financial management cover many (Okore et al., 2022; Solms, 2020; Tshabalala & Marnewick, 2021), but there are still gaps. Empirical studies examining the *combined* effects of digital transformation and organizational restructuring in the treasury systems of developing countries are rarely discussed. Systematic evidence on how AI is being used in Indonesia's budget planning and fiscal reporting, or how international best practices are actually adapted on the ground is still limited.

The study aims to fill in some of that gap. The question is simple: how do digital transformation and organizational reforms really shape efficiency and transparency in Indonesia's treasury management, and what stands in the way? This analysis refers to qualitative interpretation and quantitative evidence.

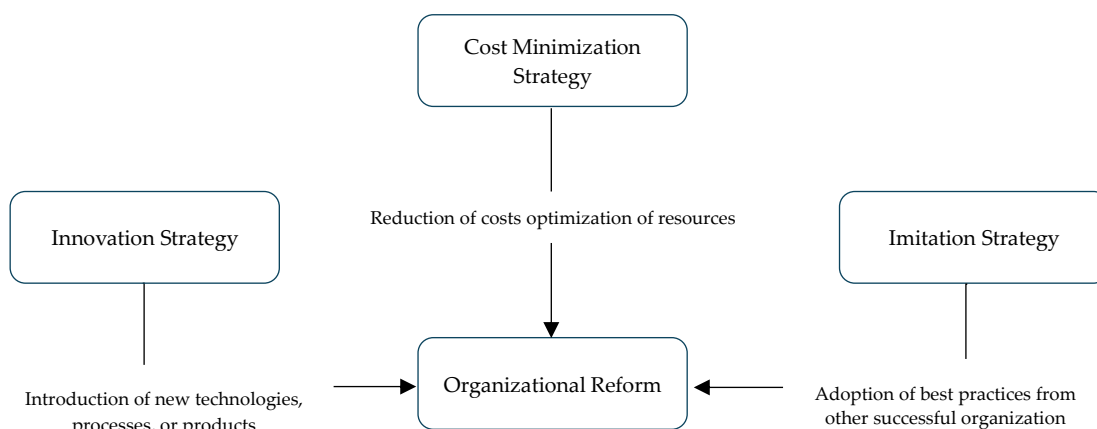
## LITERATURE REVIEW

The analytical framework of the research is based on three strategic orientations: Innovation, Cost Minimization, and Imitation, drawn from organizational and institutional theories, respectively (Figure 1). Treasury reform often blends elements of the three. Treating it as a different lens helps clarify the various mechanisms by which reform can reshape public financial management. The broader conceptual underpinnings come from the theory of innovation diffusion and competitive strategies, adapted as a public sector context using the lens of the framework established by Robbins & Judge (2017).

The Innovation Strategy is centered on the introduction of new technologies, specifically big data and artificial intelligence, into treasury operations. The basic logic is that better data, processed more intelligently, should lead to better decisions (Alrais, 2024). The Cost Minimization Strategy takes a different angle, focusing on improving efficiency through automation. Robotic Process Automation (RPA), for example, can handle routine back-office tasks with more cost and time efficient than manual processing (Singh, 2024). Imitation Strategy, learning what has worked elsewhere and adapting the practice. The adoption of integrated treasury

systems such as SPAN, which is partly modeled on systems operating in developed countries, is a clear example. Together, this strategy is expected to strengthen efficiency and transparency in public financial management (Antwi, 2024; Oyeniya, 2024; Younis, 2020).

**Figure 1** Theoretical Framework of Study



Source: Processed by the author

Organizational structure is an area that tends to receive less attention in discussions of digital reform. How does an institution divide responsibilities, delegate authority, standardize procedures, and manage the range of control between supervisors and subordinates, and how quickly decisions are made, to the extent that new technologies are actually adopted in the field? These patterns are consistent with the principles of organizational design discussed in the broader literature, although few previous studies have examined them specifically in the Indonesian context (Chioma, 2023). Formalization and standardization find concrete expression in the update of the Chart of Accounts (CoA), which aligns Indonesia's financial reporting with the International Public Sector Accounting Standards (IPSAS). This signifies an institutional commitment to accountability and positions MOF within a globally recognized reporting framework (Robbins & Judge 2017).

To give these concepts operational form, Table 1 maps widely recognised structural components from organisational theory to their practical expression within the Indonesian Treasury. The table is intended as an analytical guide, a way of seeing how established organisational principles show up in actual reform practice rather than a prescriptive model.

**Table 1** Key Elements of Organisational Structure Design

Element	Definition	Implementation Example
Formalisation	Establishing rules, procedures, and responsibilities	Updating CoA, aligning with international standards
Centralisation/ Décentralisation	Decision-making concentration or delegation	Autonomy for regional offices in budget management
Work Specialisation	Dividing tasks into distinct activities	Departments for cash management, budget execution, etc.
Departmentalisation	Grouping related jobs into organisational units	Functional grouping (e.g., cash management, accounting)
Chain of Command	Defining authority lines within the organisation	Clear reporting hierarchy
Span of Control	Number of subordinates managed by a single manager	Adjusting control spans across organisational levels

Source: Robbins & Judge (2017)

Looking at how other countries organize their treasury functions provides a useful, if not perfect, point of comparison. The variation is striking (Bezerra et al., 2024). The UK decentralised payment authorisations to individual ministries and agencies, combining them with strong central policies on accounting, cash management, and risk. France uses a payment authorization approach that is within the Ministry of Finance, but the operational arrangements are decentralized. This allows reporting to be done simultaneously. Sweden uses a decentralized payment system approach, but prioritizes flexibility. Australia uses a hybrid central coordination model with local discretion, balancing accountability and responsiveness.

Indonesia's regulation itself is different. Payment authorization is not in the hands of the Ministry of Finance centrally, but in individual expenditure units. This decentralized authority operates within a national framework that includes the Treasury Single Account (TSA), the MPN G3 revenue collection system, and SPAN as an integrated platform for budget execution. The Directorate General of Treasury at the Ministry of Finance oversees this mechanism and ensures consistency across national and regional operations. Table 2 summarises and compares these arrangements across the five countries.

**Table 2** Comparison of Best Practices in Treasury Management

Country	Best Practices	Key Benefits	Structure
United Kingdom	Integration of digital technology in financial management; Payment authorisation decentralised to M/As; Formulating accounting, cash management, and risk management policies	Enhanced transparency and efficiency	Agencies: HM Treasury and Debt Mgmt Office
France	Advanced information systems for tracking state expenditure and revenue; Payment authorisation in MoF; Decentralised system; Formulating accounting and cash management policies	Transparent and real-time financial reporting	Directorate General, Under MoF
Sweden	Decentralised budget management; Payment system within M/As; Adopting a highly decentralised system	Efficiency and Flexibility in Policy Adaptation	Agency: Swedish National Financial Mgmt Authority
Australia	A combination of centralisation and decentralisation in public financial management	Effective coordination between central and local governments	Directorate General, Under MoF
Indonesia	Payment authorisation in other MoF units; Formulating accounting, cash management, and risk management policies	Enhanced efficiency and accountability in financial management	Directorate General, Under MoF

Source: Processed by the author

This is not to suggest that Indonesia should try to graft whatever best practices are held by country A's treasury into its own institutional environment. That would be foolish. Rather, this comparison provides landmarks and guideposts, alternate solutions to broadly comparable challenges, that Indonesia can use to orient itself.

Bearing this comparison in mind, the author proceeds to formulate a set of working hypotheses. Theory sketch The institutional theories used in this analysis are derived from two domains: Technology Innovation Theory, which explains how organisations adapt to and capitalise on technological innovations (Marion, 2023; Tashtamirov, 2023), and Organisation Design Theory, which explains how institutional designs facilitate or impede performance (Robbins & Judge, 2017). Five hypotheses are derived from these theories, each corresponding to a specific aspect of treasury transformation.

The first and most obvious place to start is digital transformation. Everything else being equal, we should expect improvements to decision making, budgeting cycles, and transparency if big data, AI, and automated decision systems live up to their promise. The majority of research on this front bears this out (Lytvyn, 2024; Marion, 2023; Wang, 2024).

**H1:** Digital Transformation has a positive effect on Treasury Transformation.

But technology does not exist in a vacuum. Institutional design is important, and reforms to organisational structure, delegation, and workforce capacity are not orthogonal to technology in many cases. They may actually determine whether a treasury uses technology at all (Nasiri et al., 2022; Robbins & Judge, 2017).

**H2:** Organisational Reform has a positive effect on Treasury Transformation.

Transparency is somewhat unique in this model. While it is also a goal of reforms, it is also a precondition for reform. Clean reporting, interoperable IT infrastructure, and real-time visibility into government finances do not just build trust; they actually facilitate better decision-making (Barker, 2024; Salehi et al., 2022).

**H3:** Transparency positively influences Treasury Transformation.

Efficiency, understood here as the gains from automation, tighter system integration, and lower operational costs, is expected to reinforce reform outcomes through a more straightforward mechanism: doing more with less (Shashyna et al., 2023).

**H4:** Efficiency positively influences Treasury Transformation.

Working against all of these is a fifth factor. Fragmented systems, chronically delayed capital budgets, and the sheer difficulty of deploying advanced technologies in a large bureaucracy do not merely slow reform down, they can actively erode gains made elsewhere (Soylu et al., 2022; Wanigasekara, 2024).

**H5:** Implementation Challenges negatively influence Treasury Transformation.

## RESEARCH METHOD

This study follows an exploratory sequential mixed-methods design, qualitative first, then quantitative, in the tradition outlined by Creswell (2013). The choice was deliberate. Treasury reform is not the kind of subject that lends itself to a single methodological lens. Numbers alone cannot capture why a particular system integration stalled or what made one regional office adopt a new platform while another resisted. But interviews alone cannot tell you whether transparency or efficiency drives reform outcomes more strongly. Both are needed, and the sequential structure lets the qualitative phase do what it does best surface patterns, generate variables, reveal what matters to the people involved before handing those insights over to statistical testing.

The documentary core consisted of official publications from the Ministry of Finance and the Directorate General of Treasury: annual reports, policy papers, performance assessments. But the study also looked at social media content, which proved useful for gauging how external stakeholders actually perceived reform initiatives, as opposed to how those initiatives were described in official documents. Internal records business process documentation, minutes from organisational meetings added another layer, one that is often difficult to access but revealing when available. These internal materials offered a window into how decisions were made behind closed doors, not just what was announced publicly.

**Table 3** Operationalisation of Research Variables

Variable	Code	Definition	Indicator	Code
Treasury Transformation	TR	Improvement in Treasury management	Implementation of new systems	TR_01
			Organisational changes	TR_02
			Policy and regulation adjustments	TR_03
Digital Transformation	DT	Adoption of digital technologies	Use of Big Data and AI	DT_01
			Information System Implementation	DT_02
			AI implementation	DT_03
Organisational Reform	OR	Changes in organisational structure	Restructuring the hierarchy	OR_01
			Competence improvement	OR_02
			Adopting best practices	OR_03
Transparency	TP	Clarity and openness in financial reporting	Accurate and real-time reporting	TP_01
			Ease of data access	TP_02
			System interoperability	TP_03
Efficiency	EF	Optimal use of resources	Cost operational reduction	EF_01
			System Integration	EF_02
			Process automation	EF_03
Implementation Challenges	IC	Obstacles in implementing reforms	Use of Big Data and AI	IC_01
			SPAN data integration	IC_02
			Operational obstacles	IC_03

Source: Processed by the author

Coding and thematic analysis using the help of NVivo 12 statistical tools. Five themes were analyzed, namely digital transformation, transparency, efficiency, organizational reform, and implementation challenges. Word clouds and thematic maps are generated to help identify dominant patterns, although their interpretation rests solely on the researchers' judgment. The quantitative stage uses RStudio for descriptive statistical analysis and regression modeling. Table 3 documents the operationalization of variables in a transparent and replicable manner.

The regression specification is:

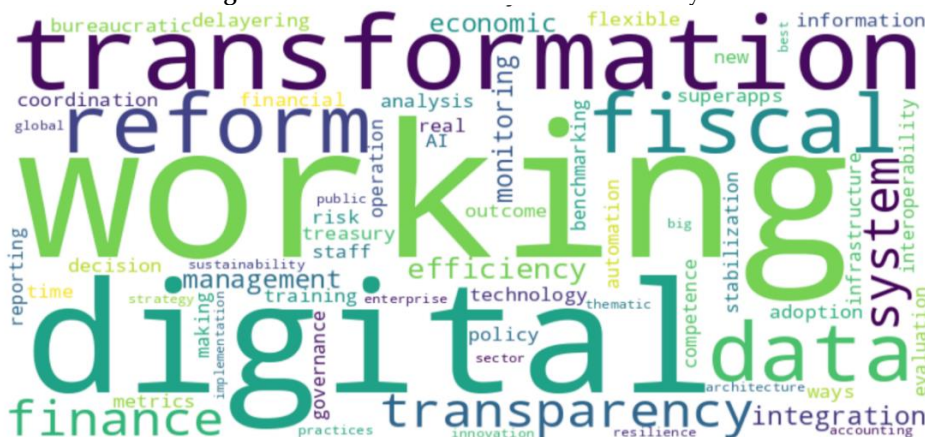
$$TR = \beta_0 + \beta_1DT + \beta_2OR + \beta_3TP + \beta_4EF - \beta_5IC + \varepsilon \dots (1)$$

Each coefficient estimates the marginal contribution of its respective variable to Treasury Transformation. The error term absorbs whatever the model cannot explain.

## RESULTS AND DISCUSSION

The NVivo word cloud offers a useful first impression of where the reform conversation is concentrated (Figure 2). Words like *data*, *fiscal*, *transparency*, *finance*, and *information* dominate, hardly surprising for a treasury reform study, but their prominence does confirm that data-driven fiscal management and openness are at the heart of the discourse.

Figure 2 Results of Cloud Word Content Analysis



Source: Processed by the author

What stands out is the frequency of transparency, which reinforces findings from other research on public financial governance (Barker, 2024; Salehi et al., 2022). What is interesting is what shows up next to it. Words like technology, efficiency, and integration cluster around these governance terms, which tells you something. People are not talking about digitalisation as a standalone project. They see it as tied to bigger institutional questions. AI and super apps appear less often, but the fact that they appear at all hints at where the conversation is heading (Marion, 2023). A word cloud can only tell you so much, of course. Think of it as a first impression, useful, but not the whole story. The interviews go deeper.

When we sat down with treasury officials, digital transformation came up in virtually every conversation. Not as a buzzword, as something they deal with daily. Big data and AI, in particular, kept surfacing in discussions about fiscal forecasting. One official was blunt about it: *"The application of technologies such as big data and AI in treasury management helps predict fiscal outcomes and improve data-driven decision-making"* (Informant 1, DT001). Several informants pointed to the next-generation SPAN as the thing holding it all together, one platform for planning, execution, and reporting (Maharani et al., 2022).

Transparency came through as equally important, though interviewees linked it less to technology per se and more to what technology enables: interoperability between systems and real-time access to fiscal data. Several informants pointed to Regional Economic Surveillance tools and the MPN G3 system's capacity for real-time revenue monitoring as concrete examples of how transparency has been strengthened in practice (Lartey, 2024).

When discussing efficiency, informants gravitated toward specific operational improvements. The use of Robotic Process Automation for back-office tasks was a recurring example. As one interviewee noted, *"The implementation of RPA for back-office tasks aims to reduce operational costs and increase efficiency"* (Informant 2, EF003). The emphasis was less on efficiency as an abstract goal and more on the tangible reduction of repetitive, time-consuming work.

Organisational reform, for its part, was discussed in terms of structure, people, and learning. Informants described hierarchical restructuring, training programmes, and efforts to strengthen advisory services for local government financial management. One interviewee summarised the scope of change: *"Organisational reform includes restructuring the organisational hierarchy, enhancing staff competence, and adopting best practices from global treasury systems"* (Informant 3, OR002). These reforms, while specific to Indonesia's institutional context, echo broader patterns of capacity building documented in the literature (Tagem & Morrissey, 2023; Trang et al., 2022).

Implementation challenges, however, were discussed with frankness worth noting. Informants did not downplay the difficulties. System integration between SPAN and procurement platforms was identified as a persistent problem, and the constraints on using big data and AI for predictive analysis were acknowledged

openly. As one senior official observed, “Indonesia Treasury faces challenges in integrating SPAN data with procurement applications and utilising big data and AI for future outcome predictions” (Informant 4, IC003). Digitalisation has reduced some manual burdens, yes, but these structural constraints continue to shape what reform can realistically achieve (Soylu et al., 2022; Wanigasekara, 2024).

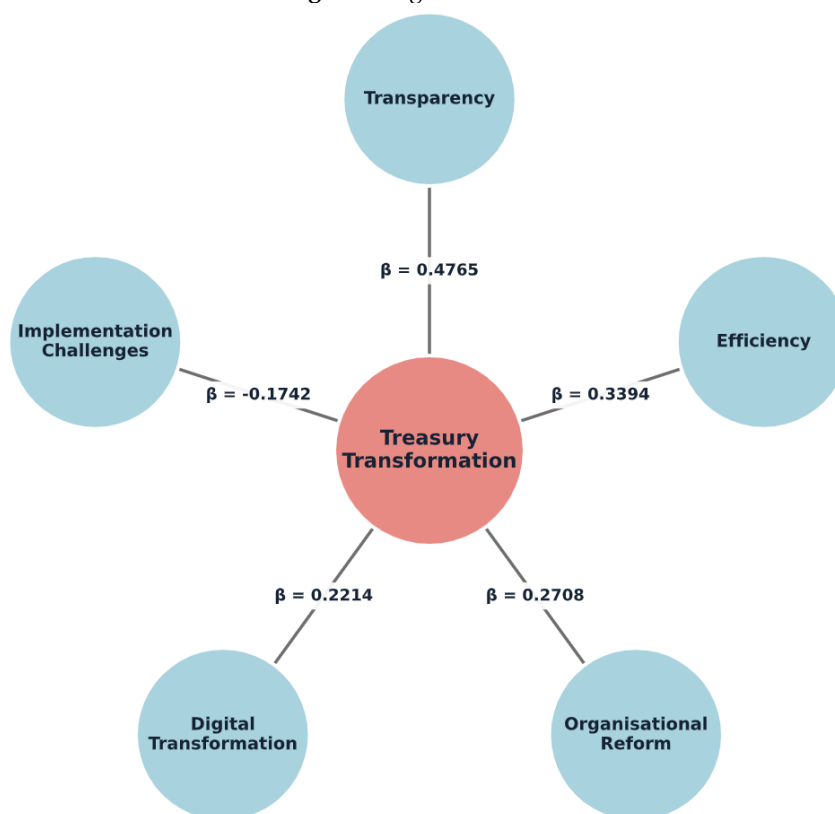
So what does the qualitative evidence add up to? Progress is real; nobody disputes that. But it is incomplete, and the obstacles are not trivial. The technology works when it is properly wired into the institution. When it is not, it just sits there (Alrais, 2024).

Table 4 Regression Test Results

Variable	Coefficient	Std. Error	t-value	p-value	Significance
Intercept ( $\beta_0$ )	0.2538	0.0342	7.417	0.0000000218	High
Transparency ( $\beta_1$ )	0.4765	0.0662	7.198	0.000000312	High
Efficiency ( $\beta_2$ )	0.3394	0.0658	5.157	0.0000149	High
Organizational_Reform ( $\beta_3$ )	0.2708	0.0521	5.198	0.0000143	High
Digital_Transformation ( $\beta_4$ )	0.2214	0.0496	4.463	0.0000645	High
Implementation_Challenges ( $\beta_5$ )	-0.1742	0.0428	-4.071	0.000103	High

Source: Processed by the author

Figure 3 Regression Result



Source: Processed by the author

The regression results deserve a closer look (Table 4 and Figure 3). All five hypotheses held up under testing, and every relationship was statistically significant. Transparency topped the list at  $\beta = 0.4765$ ,  $p < 0.001$ , which frankly was not a surprise after hearing how much the interviewees emphasised openness and reporting quality (Barker, 2024; Salehi et al., 2022). After that came efficiency at 0.3394, organisational reform at 0.2708, and digital transformation at 0.2214, all with  $p < 0.001$ . Anyone familiar with recent public financial management research will recognise this pattern (Marion, 2023; Nasiri et al., 2022).

Now here is the other side. Implementation challenges pulled in the opposite direction  $\beta = -0.1742$ ,  $p < 0.001$ . That negative sign matters. When SPAN cannot talk to the procurement system, when capital projects run two years behind schedule, when an AI tool gets purchased but nobody knows how to use it properly each of those failures chips away at whatever gains the other reforms have produced (Soylu et al., 2022; Wanigasekara, 2024).

What gives these results additional weight is their consistency with the qualitative findings. Go back to what the informants actually said. They kept coming back to transparency, efficiency, and organisational change. The regression landed on exactly the same factors, in exactly that order of importance. Digital transformation showed up as significant too, but more as a supporting player than a lead which, if you think about it, matches the interview tone as well. Nobody dismissed technology. They just did not treat it as the main event. And the implementation problems? The regression flagged those too pulling reform outcomes down, just as the people we interviewed had been telling us all along. Do the two strands of evidence line up perfectly? No. They never do in mixed-methods work, and expecting them to would be naive. But the overlap is strong enough to give confidence that the framework is capturing something real.

The most striking finding from this study is not that digital transformation matters, that much is widely accepted, but that transparency matters more. With the highest regression coefficient among the five variables, transparency emerges as the single most powerful driver of treasury reform outcomes. Stop and think about what that means. You can pour money into the best AI tools and the most advanced platforms none of it will deliver if people cannot see what is happening with public funds, if reports are unreliable, if data stays locked inside one department. What has SPAN actually changed on the ground? Quite a lot, it turns out. Before SPAN brought budget planning, execution, and reporting onto one platform, staff spent hours on manual processing that nobody misses now. Errors that used to creep into financial records because someone retyped a number have dropped. Processing times got shorter. Costs came down (Lartey, 2024; Marion, 2023). For the people working inside the treasury, this was not some incremental tweak. It changed what their workday looks like.

The transparency gains are equally concrete. Consider the MPN G3 revenue monitoring system. Before its implementation, revenue tracking was constrained by manual procedures and limited to banking hours. That world is gone. Revenue data now flows in real time. Payments come through banks, e-commerce, and fintech; it does not matter which channel, the system picks it all up. What changed is not just speed. It is who gets to see the numbers. Fiscal data that used to sit in one office is now accessible to people who actually need it (Barker, 2024; Salehi et al., 2022). Other countries that digitised their fiscal reporting saw similar things happen (Algazo, 2024; Ma, 2023). Why did Indonesia's Treasury go down this road in the first place? Not because digitalisation was fashionable. Because it had to. Global economic disruption, the pandemic chief among them, created fiscal pressures that the old systems could not handle. Scholars have noted before that technology adoption works as a kind of survival mechanism for public finance under stress (Robbins & Judge, 2017). Indonesia's experience puts a face on that observation. This is what it actually looks like when a specific institution, in a specific country, tries to modernise under pressure.

But there is a less encouraging side to this story, and it would be dishonest to gloss over it. Ask anyone working in treasury operations about SPAN and LKPP's procurement system, and you will hear the same complaint: the two do not connect well. This is not a minor technical inconvenience. People notice it every day. Procurement data that should feed straight into treasury platforms gets stuck, arrives late, or arrives messy. And once that happens, all the talk about big data and AI-powered fiscal planning rings a bit empty. What good are smart tools if they are chewing on bad data? Capital budget execution has its own set of headaches. Multi-year projects pile up delays that nobody seems able to fix. Budget carryover rules, which are supposed to bring order, often just add confusion. And electronic invoicing? It should have been one of the easier wins. Instead, progress has been painfully slow (Soylu et al., 2022; Wanigasekara, 2024).

To anyone who has worked inside a government institution, these difficulties will sound familiar. Buying technology is the easy part. Changing how three hundred people in an office actually do their jobs, that takes something else entirely. Staff need training, yes, but they also need proof, not promises, that the new system beats the old one. Leadership cannot just show up for the ribbon cutting and disappear. Money for implementation has to keep coming even when the project is no longer new or interesting. Take away any one of these, and even the best-designed system ends up sitting there unused (Alrais, 2024; Sikder, 2024). Restructuring treasury functions is a case in point. Separating analytical work from transactional work sounds clean on paper, but in practice, it means people's roles change, reporting lines shift, and institutional habits built over years have to be unlearned. That kind of change is as much cultural as procedural, and it does not happen on a timetable set by project managers.

Then there is the accounting infrastructure, which rarely makes headlines but quietly determines whether everything else works. The Chart of Accounts needs updating. Central and local government reporting standards need to converge. These are the kinds of reforms that do not generate much enthusiasm at planning meetings, yet without them, the entire reporting system sits on shaky ground. As of mid-2025, neither task is

finished (Tagem & Morrissey, 2023; Trang et al., 2022). And perhaps the thorniest issue of all is people. The stated goal is to turn regional treasury offices into centres of analytical excellence, a phrase that sounds impressive in a strategy document but looks very different in, say, a KPPN office in eastern Indonesia, where half the staff have never used a data visualisation tool. Skill levels across regions are wildly uneven. Some offices have people who can run sophisticated data tools; others are still working through basic procedural transitions. Training programmes do exist, and they matter, but they have not yet closed the gap. In some regions, the gap may actually be widening, as the systems grow more complex faster than the workforce grows more capable (Nasiri et al., 2022; Solms, 2020).

So, where does all of this leave us? Here is what the evidence points to: you cannot fix the technology and ignore the organisation, or train the people but leave the systems disconnected. Everything in treasury reform is wired to everything else. Fix one piece and neglect the rest, and the piece you fixed will underperform anyway. Indonesia's Treasury needs a reform strategy that treats these dimensions as parts of a single programme, not as parallel tracks that happen to run at the same time. If it gets this right, the payoff extends beyond Jakarta. Other developing countries watching Indonesia's experiment will find something to learn from, whether in terms of what worked or, equally valuable, what did not.

The international evidence reinforces this reading. The UK, France, Sweden, and Australia each built its treasury differently, shaped by its own history and politics. But look at what the successful ones have in common: they spent real money on information systems, and they made deliberate choices about who gets to authorise payments and at what level (Algazo, 2024; Ma, 2023). What this means for Indonesia is fairly clear, even if the execution is not easy: regional offices need the autonomy to manage budgets responsively, but that autonomy only works if SPAN or a comparable platform provides the oversight glue. The people operating these systems need ongoing development, not one-off workshops. And accounting harmonisation, updating the CoA, aligning standards across government levels, is the unglamorous but indispensable foundation that holds the rest together (Tagem & Morrissey, 2023; Trang et al., 2022). Getting these pieces to fit together is the real challenge ahead; the technology, at this point, is arguably the easier part (Jungo et al., 2022).

## CONCLUSION

This study asked what happens when a developing country's treasury tries to modernise its technology and restructure its organisation at the same time. The Indonesian experience suggests that both can work, but not equally, and not without friction. Big data, AI, and automated systems have made operations faster and reporting more reliable. That much is clear. What is equally clear is that the reform is unfinished.

Theoretically, this research brings Technology Innovation Theory and Organisational Design Theory into the same analytical space for a developing-country treasury, something the public financial management literature has not done often enough. The framework combining innovation, cost minimisation, and imitation strategies reflects the messy reality that treasury reform does not follow a single logic. It follows several at once, and sometimes they pull in different directions.

Three practical points stand out. First, the emphasis needs to shift from adopting technology to integrating it. Computer vision, NLP, and RPA can do impressive things, but only when systems actually connect with each other and the people running them know what they are doing. Too often, the conversation stops at procurement. It should not. Second, organisational reform is not a supporting act. Without decentralisation, staff development, and process harmonisation, technology investments risk becoming expensive furniture. Third, no country's treasury model is directly exportable, but the underlying principle holds: central oversight and local discretion need to coexist, supported by consistent accounting standards and dependable information systems.

This study has limitations that only focus on one country, thus limiting generalization. Interviews and secondary data cannot capture operational realities at every level of the bureaucracy. The sequential mixing method design can simplify the back-and-forth between qualitative insights and quantitative testing. And translating the interview theme into numerical indicators involves judgments that other researchers might have made differently. Future research could attempt cross-border studies, it is proposed to test whether these patterns are specific to Indonesia or more general. The longitudinal study will answer a question that this study cannot: do the advantages of digitalization persist over time, or do they erode as the system ages?

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