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TURINYS

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CLIMATE RESEARCH IN LITHUANIA AS A LENS FOR SCIENCE COMMUNICATION: A BIBLIOMETRIC ANALYSIS AND IMPLICATIONS FOR PUBLIC TRUST

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Abstract

Climate change poses urgent challenges globally, yet public understanding and trust in climate science are undermined by widespread misinformation. Small countries, such as Lithuania, contribute to climate research and face unique challenges in engaging their citizens with scientific knowledge. In this study, we present a bibliometric analysis of climate-related research outputs from Lithuania (2005–2024) as a basis to inform a more extensive investigation into public attitudes toward science. The growth and orientation of Lithuania's climate research are contextualized against European and global trends, revealing a rapid expansion in output and increasing integration into international collaboration. We analyze publication trends, topical clusters, co-authorship networks, influential authors, institutions, and journal prominence. Additionally, we conducted a quantitative analysis of projects funded by the Research Council of Lithuania, the main funding body of R&I institutions in Lithuania. Results from both studies indicate that while Lithuania's climate research strengths lie in technical and environmental domains, there is a gap in

social science perspectives. We discuss how this gap can be addressed through targeted communication strategies and public engagement interventions.

Keywords: *climate science, science communication, climate change, bibliometric analysis*

1. Introduction

Climate change is not only an environmental and scientific issue but also a pressing social challenge. Effective climate action depends on an informed public, yet misinformation continues to hinder progress (United Nations 2021). While European surveys indicate high levels of concern (93% of respondents in the 2019 Eurobarometer consider climate change a serious problem), this concern does not consistently translate into understanding or action. In Lithuania, recent data show similar trends: 94% of citizens support climate adaptation, but gaps in knowledge and trust remain (EIB 2024; Lewandowsky et al. 2017). Trust in science is especially critical in countries such as Lithuania, where rapid socioeconomic transition and rising exposure to online misinformation complicate public engagement with climate issues (Skaržauskienė et al. 2020; OECD 2023). As national climate impacts become more visible, building public understanding of scientific findings is increasingly important for democratic legitimacy and support of climate policy (Stoknes 2014; van der Linden et al. 2017).

Prior research has linked scientific literacy to climate risk perception and policy acceptance (Echavarren et al. 2019; Giden et al. 2017), yet relatively little is known about how national scientific communities shape public-facing climate knowledge. Global bibliometric studies on climate research are extensive. Studies such as Haunschild et al. (2016) and Wang et al. (2018) document a growing interdisciplinarity and strong international collaboration, while Chen et al. (2023) highlight the increasingly networked nature of global climate science. Fu and Waltman (2022) argue that bibliometrics can illuminate how national research systems align with international policy goals. However, few studies have focused on smaller countries, such as Lithuania, where the dynamics of climate production, funding, and public communication may differ significantly. This study addresses that gap by analyzing Lithuania's climate research output over the past two decades, using bibliometric and project funding data. We examine the evolution of national research contributions, identify thematic clusters, and consider how these patterns can inform science communication and public trust when it comes to climate change.

2. Methods

2.1. Bibliometric analysis

Data collection. We conducted a bibliometric study using the Scopus (Elsevier) database to identify climate-related publications involving at least one author affiliated with a Lithuanian institution (using the AFFILCOUNTRY [Lithuania] filter). An advanced search query (Figure 1) filtered documents by climate-related keywords in titles, abstracts, and author keywords (e.g., "climate change," "global warming," "climate adaptation," "greenhouse gas," and "sustainability"). The search covered the years 2005–2024, was limited to peer-reviewed journal articles in English, and was restricted to relevant subject areas (e.g., Environmental Science, Energy, Earth and Planetary Sciences, Social Sciences, and Economics) to exclude unrelated uses of the word "climate." After removing duplicates and irrelevant records, we retained 662 publications for analysis. For comparison, we also retrieved global (N=34,667) and European (N=9,222) climate-related publication sets using the same search terms. These were used to contextualize Lithuania's output over time.
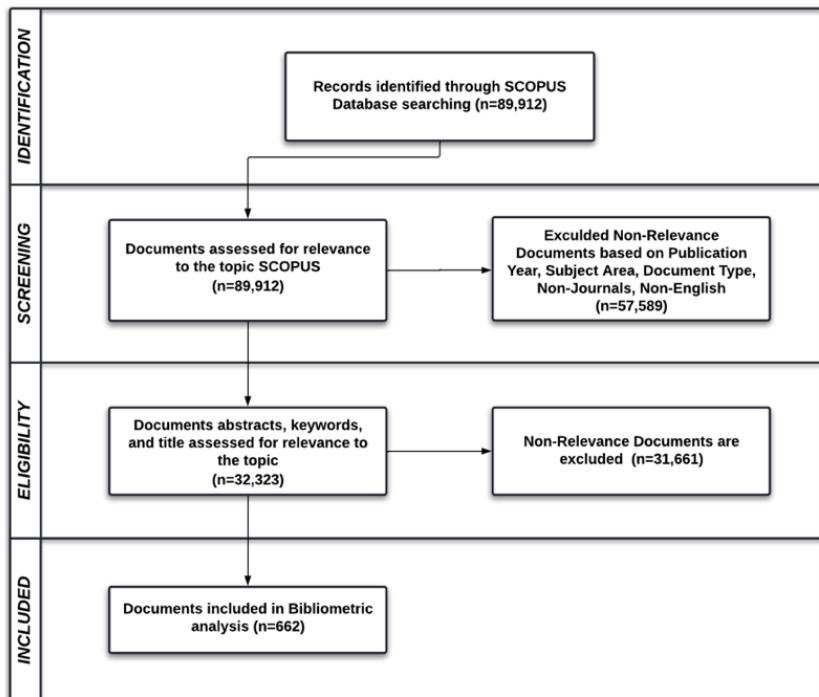
Figure 1: Research strategy for bibliometric analysis

Data analysis. Using Excel, Python, and VOSviewer, we analyzed publication trends, collaboration networks, and research themes. We calculated Lithuania's share of global and EU climate publications annually and identified co-authorship networks at both country and author levels (threshold: ≥5 publications) to map core collaborations. Keyword co-occurrence analysis (threshold: ≥5 mentions) revealed major research clusters. For impact assessment, we identified the 20 most cited Lithuanian climate publications and analyzed journal distribution, including output volume, citations, and impact factors. All analyses were conducted with careful attention to data accuracy, cross-checking the Scopus data with other sources where relevant.

2.2. Quantitative analysis of funded projects

We assembled a complete dataset of all Lithuanian Research Council projects from the public database (spektras.lmt.lt), including titles, abstracts, categories, funding, duration, institutions, disciplines, and status. Then we applied a keyword-based filtering strategy to flag projects explicitly addressing climate change. We scanned Lithuanian and English titles/abstracts for terms related to climate mechanisms and policy. We also tagged any project funded under climate-targeted subcategories, e.g., the national program LEK (*Lietuvos ekosistemos: klimato kaita ir žmogaus poveikis*). Finally, we manually removed false positives, e.g., projects where terms like "transition" or "resilience" appear in unrelated social or medical contexts. For each identified project, we extracted the funding scheme, start year, status (completed vs. ongoing), scientific field, institution, and funding amount.

3. Results

3.1. Bibliometric results analysis and visualization

Climate-related publications in Lithuania have grown sharply since 2005, increasing 144-fold by 2024, outpacing global growth in relative terms (Figure 2). While global and European output surged from the late 2000s, Lithuania's growth accelerated later, especially after 2015, reflecting expanded participation in EU-funded projects and a broader national climate agenda (Puukka et al. 2018).
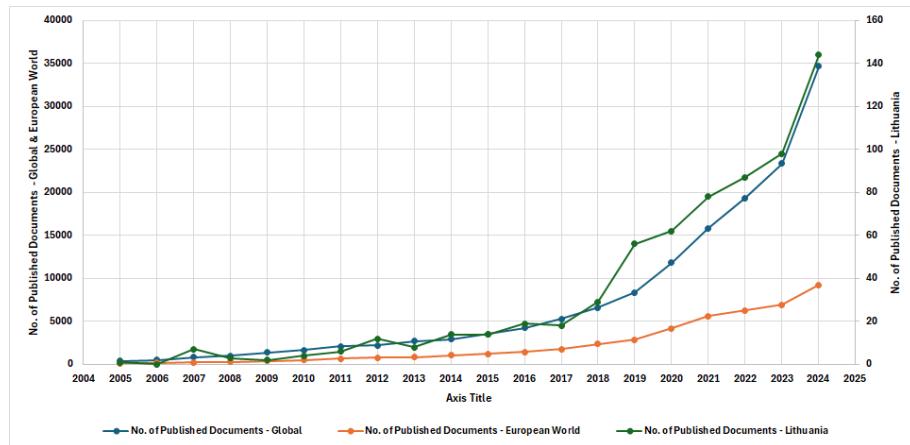
Figure 2: Baseline publication trends in Lithuania, Europe, and on a global scale

Most publications in the dataset involve co-authors from multiple countries, under-lining international collaboration as a symbol of Lithuania's climate research output. The results show that Lithuanian researchers have partnered with a wide range of countries (89 in total), but a smaller subset accounts for most collaborations. The leading partner is Poland, which appears in 72 of the 662 publications. Following Poland, the next country that collaborates most frequently is China (53 publications). Other major partner countries include large Western European nations and neighbors: Italy (47 publications), the United Kingdom (42), Germany (41), and Spain (38). The collaboration network (Figure 3) identified 48 countries with ≥5 publications, and within this set, there were 41 distinct links (co-authorship connections) detected among them (with a total link strength of 1,482, which is the sum of co-authored paper counts across all pairs). This indicates that many collaborations are centered on Lithuania (one-to-one partnerships) rather than large, fully interconnected consortia. In practical terms, a lot of the international collaboration appears to occur via bilateral or small-group partnerships as opposed to substantial multi-national teams on each paper.
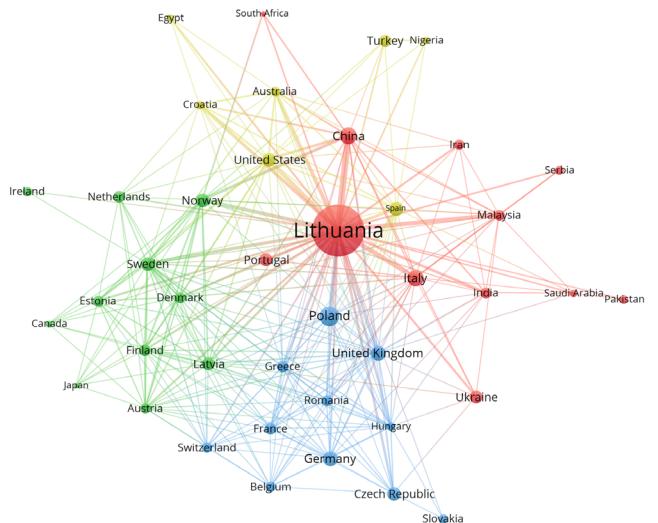
Figure 3: Country collaboration network

Shifting the focus to the institutional and individual level, the bibliometric analysis allowed for the identification of key players in Lithuania's climate research. The dataset includes 160 institutions across the globe, led by Vytautas Magnus University (114 publications), Vilnius Gediminas Technical University (110), and Kaunas University of Technology (107), among others. A long list of other institutions, both domestic and foreign, contributed between 10 and 14 publications each.

The publication output among Lithuanian climate researchers is highly uneven, with a few individuals accounting for a substantial share. *Dalia Štreimikienė* leads with 122 publications (18% of the total), focusing on energy economics and sustainability, and is a key node in international collaborations. *Tadas Baležentis* (48 publications) works on sustainable agriculture and efficiency modelling, with strong ties to China, Poland, and Ukraine. *Paulo Pereira* (32 publications) brings an international dimension to the field, specializing in land use and ecosystems. The dominance of economists and engineers among top authors points to a strong techno-economic focus in Lithuania's climate research, with limited representation of social or ethical perspectives. With the top 10 authors producing around 45% of all publications, the research landscape is highly concentrated, offering both cohesion and a potential risk if key individuals exit the field.

Keyword analysis of Lithuanian climate publications reveals six main thematic clusters: (1) sustainability and resource management, focusing on ecosystem services, circular economy, and carbon footprints; (2) renewable energy and climate economics, with strong attention to policy, CO_2 emissions, and economic growth; (3) energy security and

decision-making, using methods such as multicriteria analysis for evaluating energy options; (4) sustainable development and innovation, linking climate goals with digitalization and Industry 4.0; (5) agriculture and land use, addressing emissions, bioenergy, and rural development; and (6) energy efficiency and environmental impacts, particularly in the Baltic context, using performance benchmarking tools. These clusters emphasize techno-economic and policy-oriented approaches, with strong ties to EU climate priorities. Again, less apparent in these clusters are purely social or behavioral themes.

Finally, Lithuanian climate-related research is published across a wide array of journals, though a substantial portion appears in a few open-access outlets. The most dominant is *Sustainability* (MDPI), which accounts for 122 publications (about 18% of the total corpus). While the journal's broad scope and accessibility contribute to its popularity, its high volume has raised concerns about quality control in the scientific community. Still, the articles published there are widely cited, with over 3,000 citations collectively. Other key journals include *Energies* (40 publications), *Renewable and Sustainable Energy Reviews* (31), and the *Journal of Cleaner Production* (20), all of which reflect the strong emphasis on energy and sustainability topics in Lithuania's research landscape. The broader set of journals includes high-impact outlets such as *Science of the Total Environment* and *Sustainable Development*, as well as more regional or niche publications such as *Contemporary Economics*, *Zemdirbyste-Agriculture,* and *Journal of Security and Sustainability Issues*. This distribution supports findings from the keyword analysis: the research is concentrated in applied sustainability, energy systems, and policy, rather than in core climate science or social science for climate change.

3.2. Results of quantitative analysis of projects funded

Project-level data from the Research Council of Lithuania (LMT) were also examined to understand how climate-related research has been supported over time. Using a keyword-based identification strategy, 773 projects were classified as climate-related between 2009 and 2023. The vast majority (i.e., approx. 87% of 569 projects) originated from investigator-initiated competitive schemes. Government-commissioned initiatives accounted for 77 projects, and internationally funded programs made up another 127 projects, reflecting the country's participation in broader European research frameworks. Three targeted national programs, i.e., LEK (Climate Change Program), ATE (Energy Transition Program), and SIT (Smart Technologies and Innovation), account for most of the state-commissioned climate projects, with 38, 17, and 17 projects, respectively.

The number of funded projects shows peaks in 2012, 2017, and 2023, which coincide with key EU and national climate initiatives and calls (i.e., Horizon 2020 and Green Deal-aligned programs). Annual climate research funding (estimated as project budget × duration) reflects these cycles, with notable surges in 2017 and 2021. Cumulatively, investigator-led projects account for ~77% of climate research funding, with state-commissioned

projects contributing 12%, and international sources 11%. Although climate-related projects make up only 5–10% of all LMT-funded projects per year, their relative share has grown significantly from nascent levels in the late 2000s to more than 10% in 2023, signaling increased alignment with national and EU climate priorities.

Finally, disciplinary patterns show a strong tilt toward the natural and technical sciences, especially in fields such as physics (~27 projects), materials engineering (~24 projects), biology and ecology (~19 projects), chemistry (~15 projects), and environmental engineering. Some projects in the social sciences are present, particularly in the areas of public adaptation and environmental sociology, though they remain comparatively few. This disciplinary distribution mirrors the bibliometric findings, where technical and policy-oriented research dominate.

4. Discussion

The surge in climate-related publications in Lithuania corresponds with the overall boom in climate science worldwide since the mid-2000s. International studies have similarly documented a substantial increase in climate publications and a shift of focus toward applied solutions in recent years (e.g., Fu and Waltman 2022; Bartlett et al. 2024). Lithuania's strong orientation toward renewable energy, sustainability, and climate economics echoes this pivot to "climate solutions" research (Lu 2024). It also reflects regional priorities; as an EU member, Lithuania has been influenced by European research agendas such as the European Green Deal. Moreover, the high degree of international co-authorship we observed is typical for smaller research communities (Kamalski 2009; Poirier et al. 2015). Across scientific fields, smaller or emerging research countries often pursue collaborations abroad to access resources and expertise, resulting in a large share of their publications being internationally co-authored (Aksnes and Sivertsen 2023). The intense collaboration can be seen as a strength, leveraging global knowledge networks, and is consistent with findings that small countries benefit from international partnerships to enhance research impact (Aksnes and Sivertsen 2023).

In contrast, the lack of social science and communication research on climate in Lithuania stands out when contextualized. International assessments have increasingly stressed that climate change is not just a technical problem but also a profoundly social one (Hiltner 2024). Recent studies from rural, coastal, indigenous, and developing contexts show that collaborative approaches to knowledge production (e.g., co-production, participatory monitoring, and boundary work) enhance the legitimacy and usability of climate information (Levesque et al. 2021; Hill et al. 2020; Figus et al. 2022). In many cases, factors such as preexisting trust, source credibility, and media environment are more decisive than scientific content alone (Bogert et al. 2023; Diehl et al. 2019; Buys et al. 2014). However, social sciences where the participatory approaches are elaborated and contextualized, remain

underrepresented in climate change research globally (Overland and Sovacool 2020; Maxwell et al. 2022). Our findings confirm that this imbalance is pronounced in Lithuania's case. Whereas countries with larger research systems may have at least some dedicated climate communication or social impact studies, Lithuania's output appears almost entirely in the natural and applied sciences. This lack of social science engagement is noteworthy. It suggests that the academic discourse in Lithuania has, so far, been disconnected from questions of how the public understands or trusts climate science.

While the study offers a robust analysis of climate-related publication trends in Lithuania, several methodological limitations should be acknowledged. First, our reliance on keyword-based retrieval from the Scopus database introduces a risk of omission bias; relevant publications that do not explicitly use climate-related terms in titles or abstracts may have been inadvertently excluded. Second, the dataset is restricted to English-language, peer-reviewed journal articles, thereby omitting grey literature, reports, or articles published in Lithuanian, which could contain valuable insights, especially on localized or policy-relevant topics. Third, bibliometric approaches inherently focus on formal scientific outputs, meaning that non-published or practice-oriented knowledge (e.g., public engagement initiatives or ongoing projects) falls outside the scope of this analysis. Lastly, thematic clustering requires interpretive decisions during keyword normalization and labelling, which, while methodologically transparent, may influence how topics are categorized.

5. Conclusion

1. Lithuania's climate research output has grown significantly over the past two decades, with an especially sharp increase in recent years. This trend reflects not only the responsiveness of the academic community to global climate agendas but also the country's increasing integration into European and international research frameworks. The thematic concentration on sustainability, energy, and economic modelling shows that Lithuanian researchers are contributing valuable technical knowledge to the global climate discourse.

2. Despite the technical robustness of Lithuania's climate research, there is a persistent gap in the exploration of social, behavioral, and communication dimensions. Few studies address how the public understands, interprets, or engages with climate-related information. This imbalance may limit the broader societal impact of scientific findings, particularly at a time when misinformation, skepticism, and political resistance complicate the translation of science into policy and action.

3. Bridging the gap between climate science and public engagement should be a strategic priority. This requires not only increasing funding and institutional support for interdisciplinary research that includes social science perspectives but also developing targeted science communication strategies.

4. Strengthening public trust in climate science in Lithuania will depend on fostering two-way communication, rather than one-directional dissemination of facts. Engaging citizens as participants in knowledge production (e.g., through citizen science, participatory policy processes, and inclusive dialogue) can enhance the legitimacy and relevance of climate research. Aligning scientific efforts with public values and concerns is essential for building a climate-literate society capable of supporting ambitious mitigation and adaptation strategies.

Acknowledgements

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REGIONAL AUTONOMY ISSUES IN INDONESIA:
A SYSTEMATIC LITERATURE REVIEW

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Abstract

Although regional autonomy has been implemented for more than two decades in Indonesia, this topic is still interesting to discuss. This research aims to discuss some issues around regional autonomy in Indonesia, particularly viewed from an academic perspective. This study used a literature review approach. Data were obtained from the Scopus and Taylor and Francis Group databases, with "regional autonomy" and "Indonesia" being the keywords. The publication period is from 2000 to 2021. The results of the research show that there are interesting issues regarding agroforestry management and economic disintegration related to regional autonomy in Indonesia during that period. Firstly, good agroforestry management can be an attraction to the improved regional economy. Secondly, economic disintegration is one of the factors leading to regional separatism or a movement performed by a region to release itself from a state, due to one region's envy of other, more advanced and richer regions. A solution to the first issue is to have multi-level governance that will ensure high-quality oversight of agroforestry management. Meanwhile, a solution to the second issue is to secure foreign investment to prevent economic disintegration in each region, which would harm the region and the state in the future.

Keywords: economic disintegration, Indonesia, regional autonomy

Reikšminiai žodžiai: ekonomikos dezintegracija; Indonezija; regioninė autonomija.

Introduction

Regional autonomy is one of the agendas that has been in place in Indonesia since the reformation era in 1998–1999. The term "regional autonomy" refers to an autonomous region with the ability to organize its own regional governmental affairs, whereas "decentralization" is a practice that is abstract in nature (Christia and Ispriyarso 2019). Many parties recommend reverting to a decentralization system, particularly following the reformation in 1998–1999 in Indonesia, as this started to become effective in 2001 with the issuance of Law No. 32 of 2004 on regional government as the official legal foundation, with an expectation that the regional autonomy will allow the regions to manage their own potencies and to develop and become more prosperous (Surkati 2012).

However, decentralization is not always considered an ideal system; various cases have revealed that a decentralized system can harm both regional and central governments. Some cases that have occurred and led to the ineffective implementation of regional autonomy in Indonesia are, among others, the conflict in Sambas Regency, West Kalimantan Province, in 1999–2000; the interethnic conflict case that occurred in Sampit, East Kotawaringin Regency, Central Kalimantan Province, in 1999–2001; and the conflict in Poso, Central Sulawesi Province (Sambanis and Milanovic 2014). Research on the organizational conflict model in Jayapura, Papua (Anggraini et al. 2019), shows that conflicts between indigenous Papuans and migrants are caused by economic, power, social, and political disparities.

The gap between communities in the region seen so far could lead to prolonged conflict and harm in the region and require a lot of resources to overcome this; therefore, the focus of this research is on strengthening regional autonomy for Indonesian regions that have not run optimally. In addition, some internal conflicts occurred in Indonesian regions that have felt discontented with the profit-sharing fund given to their regions, the unsolved conflict of land between the central and regional governments and the private sector, and some cases indicating deviation related to natural resource management by the regional government without the central government's hierarchy (Surtikanti 2004; Nurkin 2005).

Other research from Nishimura (2022) shows that local governments play a big role in handling various problems in their regions. For example, the research took place in the Philippines, where there are many urban areas, which means that the environment becomes dirty and polluted, resulting in health problems. However, with financial input from the private sector and contact with neighboring governments that have a positive correlation to these problems, environmental problems in urban areas can be overcome. This also applies to Thailand, where regions are used for political power to ensure regional autonomy lasts, and autonomy is more about combining administrative, political, and traditional power systems, which are synergized to handle conflict (Kulachai 2023).

Considering the explanation above, in this study, the author wants to discuss in-depth some issues faced in regional autonomy in Indonesia, thereby not yet revealing the optimum output as expected. This article is limited to two research questions:

1. What are the regional autonomy issues developing in Indonesia, based on the findings of selected articles in the period of 2000–2021?
2. What solutions are recommended by the selected articles to address the issues?

This article discusses the issues encountered recently in regional autonomy implementation, particularly in Indonesia, and seeks to provide a solution based on the selected articles found through the literature review method. It is also expected to be a new reference on the matter.

Method

To provide an in-depth analysis, this research uses qualitative research methods. This qualitative research uses a literature review approach in the form of a systematic literature review. There are several steps in this research, namely identification, screening, eligibility, and inclusion (Mongeon and Paul-Hus 2016; Bates et al. 2017). For the first step—identification—the researcher uses the keywords "regional autonomy" and "Indonesia" and the publication year 2000–2021, and then the researcher presents the issues that are relevant to writing this article (Cooper et al. 2018). This study used the Scopus and Taylor and Francis Group databases, both of which are reputable and recommended indexers in their fields. Article filtering is done with year and keyword limitations to avoid biased article search results (Denyer and Tranfield 2009).

At the screening stage (inclusion criteria), the article search is carried out by a separation process, and articles that have similarities are immediately eliminated. During the eligibility stage, it is necessary to determine the eligibility of an article, taking into account the suitability of the keywords, year of publication, research design, topics raised in the research, and others, and then a procedure must be followed in accordance with the instructions and guidelines for writing research (Snyder 2019).

The elimination technique used involves disregarding (1) journal articles using the literature review method; (2) non-English journal articles; (3) non-open-access and paid papers; (4) articles in the form of book papers; (5) articles that do not discuss local languages and autonomy in Indonesia; and (6) both national and international journal proceedings. At this stage, journal articles relevant to the discussion that have been collected are then analyzed and linked to the specified problem formulation, and the sub-discussions will be adapted to the contents of each journal article. Thus, an in-depth analysis will be generated based on a systematic literature review.

The first discussion will explain the first research question and its mechanisms, and it will include an explanation of the content of individual journal articles to be classified into several groups/sub-discussions; while articles with different content, topics, and issues will be approached in a way that will form a bridge that connects them to the sub-discussion of the article content (Hall et al. 2012). The final stage is included. This selection is carried

out to provide relevant journal articles in accordance with the guidelines for literature reviews, which can answer the research question raised earlier (Page et al. 2021). In addition, sub-discussions can use additional relevant articles if needed, and data loss can be prevented by the author by entering data into the Mendeley Data database to keep data safe and usable for writing the next article.

Research

For the results of the search for more detailed information on articles, see Table 1 below.

Table 1. Article search results

Database	Step 1	Step 2	Step 3	Result
Scopus	209	51	14	10
Taylor and Francis Group	634	150	40	10
Total				20

The results of the search show that 20 journal articles were obtained using certain limitations as specified in the previous explanation and sub-discussion. Using Scopus, there were at least 209 articles found using keywords, and after the adjustment and elimination stages, 10 relevant journal articles were found. In the Taylor and Francis Group database, 634 articles were found. Following some elimination stages, 10 relevant journal articles were also obtained. The selected articles were then analyzed in this literature review.

Discussion

Regional autonomy issues in Indonesia
The first problem statement discusses development issues related to regional autonomy in Indonesia in the publication period of 2000–2021. Based on the existing data, two prominent issues were found: agroforestry management and economic disintegration.

Agroforestry management
Discussions about regional autonomy in Indonesia are, in fact, associated with agroforestry. Simply, agroforestry is defined as a concept of land use through forestry plant cultivation combined with agricultural plant cultivation to get economic and environmental benefits. As well as providing other positive impacts, especially related to forest sustainability, it means using forests wisely for the sake of posterity (Damayatanti 2011). Local communities can also indirectly participate in forest management without having to abandon

their customs or local wisdom that has been passed down from generation to generation.

The implementation of regional autonomy in Indonesia has had strong legal foundations with Law No. 23 of 2014, indirectly authorizing the regional government to manage its land with the combined concept of consumption plant and forestry or agroforestry (Hitchner et al. 2009; Kuswanto et al. 2017; Nurrochmat et al. 2021; van der Muur 2018). The agroforestry issue is, of course, interesting and reminds us that Indonesia has always faced land conversion problems, with the conversion of land and forest use leading to damaged forests or deforestation (Mulyani and Jepson 2013; Seymour and Harris 2019). Agroforestry management could be an interesting solution to the forest problem in Indonesia. Regional autonomy could also be of potential value to the region, as forests can benefit the people not only from the wood aspect but also from their soil content, which has never been explored effectively (Nurrochmat et al. 2021; Shair-Rosenfield 2021). Regional autonomy would provide a great opportunity for regions to create a sustainable economy without destroying forests, and it would also generate strategic regional economic income for regional development, which so far still relies on income from the mineral sector, which cannot be renewed and will run out at certain times.

According to Nurrochmat et al. (2021), several Indonesian regions have implemented agroforestry well, one of which is Jambi Province. Although the law states that forest management is the central government's right and authority under the Ministry of Environment and Forestry, the region is also entitled to manage its forests well. Some Indonesian regions have also combined it with land management tidily and in a structured manner in accordance with customary law that has existed for a long time. An example of this is in Sumba, East Nusa Tenggara Province, where the customary community plays a very important role in implementing farming activities well and is highly supported by the Sumba Regional Government (Vel and Makambombu 2019). But according to van der Muur (2018), the implementation of agroforestry activities does not always go well, and from the results of scientific analysis, the author found some constraints, one of which is the conflict problem. It can be seen that many communities still have a traditional mindset when it comes to land cultivation, thereby will indirectly damage the original habitat of forest dweller endemic. Additionally, conflict also leads to people's ignorance of the borders of land not belonging to their right domain and dissension with some parties. The discussion section (van der Muur 2018) talks about one of the well-established regions in Indonesia in terms of conflict resolution implementation, which is resolving conflict through mediating the tribes. They achieve this by involving some parties in South Sulawesi Province, as the people there have special rights when a conflict of land management arises.

People are able to get involved and are allowed to express their complaints to the regional government. People's bargaining position, according to van der Muur (2018), is their basic power in South Sulawesi Province. The regional government of South Sulawesi Province recognizes the value of informal interaction beyond official forums in order to know and understand the issues at hand. Through this bargaining power, the community

is considered as participating in contributing to forestry management, especially for those who generally live or reside in the forest area (Setiajiati et al. 2019; Jalilova and Vacik 2012).

Regional autonomy allows the people and the regional government to take their own course of action, so that the central government no longer makes people and the regional government the object only, as has been the case historically (Muhyidin 2019; Tolo 2014; Muluk and Nugroho 2019). However, it places more emphasis on knowing, exploring, and utilizing the regional potency of its own residents to make its people prosperous and improve their economic standing. Additionally, through regional autonomy, regional governments in Indonesia are expected to manage their regions more equally, based on the potency they have (Asmorowati et al. 2020; Shair-Rosenfield 2021; Aluko 2005). This includes the potential for forestry, which is one of the pillars of sustainable economic elements. If it can be managed by prioritizing the concept of regional autonomy, the region would have an interest in the results of forest management, and the community would get a part of the work. If the results lead to the involvement of the regional government itself, not only would the local government benefit but so would the local community in the forest area, who would experience an increase in welfare in a sustainable manner if the local government can allow for this.

Economic disintegration

Regional autonomy implemented in Indonesia can bring prosperity to the regions through the local potencies existing. Local potency contributes to the region's income and, of course, the state's revenue. The region receives profit sharing and a general allocation fund, as mentioned in Law No. 23 of 2014 on Regional Government. The law states that there should be a substantial fund given to the regions in an attempt to support decentralization implementation—the more potency and income the regions have, the more funding they will receive (Wahyuningsih et al. 2019; Maharani and Tampubolon 2014). Indonesia can learn from the experience in the reformation era (2000s) when Timor Timur (East Timor) separated itself from Indonesia and became an independent state named Timor-Leste, which is an example of an economic disintegration case that had surfaced many years before. A previous study by Burchill (2000) revealed that social envy and economic differences between western and eastern regions of Indonesia had been present for a long time in the region of East Timor. Until then, opponents of the New Order's decentralization (1966–1999) had not been able to do anything to change their regional fate, and they would be suppressed and taken as political prisoners. Finally, Timor-Leste detached from Indonesia with the fall of the New Order rule in 1998–1999, and Timor-Leste has been a sovereign state since then. Therefore, regional development, especially in areas that have natural resources in the form of forests, needs to receive more attention from the central government. The involvement of local governments, academics, and even local communities needs to be fully supported in this regard, so that incidents similar to what occurred in Timor-Leste do not happen again (Desmiwati and Christian 2019; Roengtam and Agustiyara 2022).

According to Sutiyono et al. (2018), the events that happened a long time ago will never be repeated. Thus, the government, through decentralization, should be able to maximize regional autonomy on a broad scale, and all regions should be allowed to participate without the wish to be detached from Indonesia. Regional administration and public services would run more smoothly were regional autonomy to be implemented broadly, as the central government's direct approval would no longer be needed. However, the state would still need supervision over local leaders, as it oversees the state budget managed by each region (Iek and Blesia 2019; Sahabuddin et al. 2019; Said et al. 2020). The supervision of local governments would continue to be carried out, and it would be necessary to determine which would be the affairs of the regional government and which would be the affairs of the central government, so that the responsibilities and the flow of coordination are clear and function properly.

Up to 2021, many regions in Indonesia explored their local potency because they have more natural resources that can promote their regions. For example, from the journal articles reviewed, the author found an article (Marlina et al. 2021) studying Wakatobi National Park, which, according to regulation, belongs to the list of National Parks in Indonesia under the Ministry of Living and Environment and Forestry, but from a tourism management aspect, the taxes collected from the businesses in the national area, such as visitor centers, tour guides, and recreational device owners, belong to regional income. According to Bakker and Moniaga (2010), socialization should be given to the people living around the national park, which could be done by involving the tribal leaders and community groups in managing this national park, in order to give the people an indirect income. This kind of involvement from the community could have a significant economic impact on the existence of forests that are indirectly managed. The provision of transport to support all needs in a tourism park is certainly more interesting when it prioritizes elements of completeness and is also user-friendly and accessible to all visiting tourists.

Research from Semiarty and Fanany (2017) talks about the utilization of regional potency, viewed from the local leaders' perspective, in utilizing opportunities in West Sumatra in the context of the health sector. Local government, particularly local leaders, can utilize human resources to improve and maintain the health of all people, both in urban and rural areas. Better and more modern hospitals can attract people to come to health facilities in order to get treatment and increase regional income. However, if people do not get good service and the prices are high, it may deter them from prioritizing their health, or they may even go to health facilities in another region that may be considered to have better facilities (Milanovic 2005; Erbaugh 2019).

Wardhana (2019) notes that, essentially, regional autonomy is like two sides of the same coin that could contribute either positively or negatively to a government and a society. The negative side could mean an impact on the sustainability of people's lives, while the positive side could mean the provision of many benefits for the sustainability of life. The optimization of integrated land use and even economic distribution is desirable to maintain the

unity of Indonesia, particularly in the regions that have never been touched by the central government's development so far. The central government must immediately provide maximum regional autonomy to the regions, and of course, be supported by strict supervision and assistance to regions that have forest reserves, so that they can be utilized to the maximum without destroying them.

The expectation from all circles is that the existence of regional autonomy could certainly have a broad impact on the sustainability of the community, and the local government will assess whether forests can be one of the sectors that could drive the regional economy and be a source of regional income that will not run out. Optimizing forest management must prioritize the interests of the community, especially local communities in the forest area, lest those in the forest area become victims of the existence of regional autonomy, which only emphasizes regional income and regional income without the active involvement of the community around the forest area.

Solution to the regions

The solution to regional autonomy issues is interesting to study through the selected journal articles found in response to the issues. There are at least two solutions that can be elaborated: multi-level governance and foreign direct investment (FDI).

Multi-level governance

From an in-depth analysis of each of the journal articles selected, it can be concluded that multi-level governance could be an alternative solution to the issues discussed in the previous problem. Research in Papua (Anggraini et al. 2019) provides an understanding that the involvement of city and district governments is very important to bridge communication with indigenous system governance to advance a policy. Regional regulations (*Perda*) can bridge the gap between national regulations and customary norms. According to Sutiyono et al. (2018), has applied this multi-level governance; this can be seen from the distribution of tasks, roles, and responsibilities between central, provincial, and regency governments in governmental affairs. The study undertaken by Sutiyono et al. (2018) also found that multi-level governance in Indonesia is still overshadowed strongly by the central government's centralization. The Indonesian government has not indirectly let go of the existence of broad regional autonomy to the regions. Other research from Hooghe and Marks (2003) argues that cooperation through coordination between governments is desirable. It should be emphasized that the coordination conducted is limited to work visits and agenda discussions that have been specified by the central government, so that the regional government only receives direction and serves as a field technical executor. An effective decentralization not only implements the policy specified by the central government but also has no domination in its government implementation, because all governments have a shared vision and mission to provide the best service to the public (Shair-Rosenfield 2021).

In relation to the agroforestry issue, one point needing all stakeholders' attention is

coordination. Coordination should be established between the central government, regional government, and society (people). Thus, through direct coordination and interaction with the people, any problems occurring within society can be identified. According to Hitchner et al. (2009), this has been implemented in the Sarawak region, or to be more exact, in the Kelabit Highlands—the Indonesian region known to be a tourist destination and referred to as the "Heart of Borneo." The concept used is not only able to preserve nature in the forests of the Sarawak area, Malaysia, but it also makes it easier for local governments to monitor the use of forest functions and indigenous peoples while maintaining their ancestral traditions without being disturbed by modernization.

Considering the review from the articles selected, it can be seen that customary communities living around the national park area, which may become an area for agroforestry, need serious attention, particularly from the central government, because it has the utmost authority. Indonesian politics, according to (Kuswanto et al. 2017), affects the decentralization system. Both practical politics and domination politics have led to the gap between the regions belonging to a legislator's constituency and other regions not belonging to it. Election winners tend to only focus on development in their areas, the majority of which are their areas of residence and voting areas, and the areas that should be their responsibility are left behind in terms of infrastructure, economy, social services, health, and education. Communities whose areas are left behind will certainly be powerless when faced with the concept of involvement in forest management and won't benefit from the results of the forest wealth.

In China, for example, the Chinese central government does not influence Shanghai Province significantly administratively. The Chinese government in Beijing serves as the supervisor of national interest only, and if the Shanghai government wants to cooperate with other state governments to invest abroad, it should discuss its plan first with the central government, as long as the cooperation or agreement is in line with China's national interest and does not harm China or the Shanghai government (Yeung and Li 1999). Thus, the implementation of real regional autonomy in China has been very good and has given broad freedom to the government in Shanghai. We can see that the Shanghai region is currently advancing rapidly in terms of economic and population growth, meaning that it becomes a special attraction when someone is going to invest in the region, especially in the development of economic areas.

Research from Egunyu et al. (2016) and Nurrochmat et al. (2021) observes that agroforestry management is easy as long as the central and regional governments want to seriously reform the management system, which still has some shortcomings that can be solved well by elites at each level. In reality, there is an egocentric weakness in the field that still seems to be unsolvable even today. Therefore, fundamental reform is required in agroforestry management in order to elicit a great deal of benefits to central and regional governments. Rather than generating conflict between governmental levels, there should be an understanding that forest management should remain sustainable and well-maintained, and the

communities should feel comfortable in their environment without any disturbance in preserving their local wisdom in managing forests.

Foreign direct investment (FDI)

Research from Dehoop (2016) notes that foreign capital is an indicator of a state's financial management when it comes to developing its regions. Foreign capital investments give states a large foreign exchange profit indirectly, so that the regions with foreign companies are the richer ones because their land and resources have been used for corporate interest. In addition to the optimization of local potencies, foreign capital investment also contributes to activating the people's economy and local economic growth. Indonesia is highly open to foreign investment, particularly in the issuance of Law No. 25 of 2007 on Foreign Investment, and the regional autonomy policy facilitates the regions to receive foreign capital to build their regions without relying on the central government's funds, which are frequently given very slowly. Based on research on investment management in the development of renewable energy in Indonesia (Yulianto et al. 2019), it was found that it is very important to involve the private sector in developing renewable energy because of its flexible access to capital, advanced technology, and innovation in this field.

Also, according to Asmorowati et al. (2020) and Rodiyah et al. (2020), the central government should be cautious when identifying the regions in each of the Indonesian provinces with potencies such as mineral, industrial, human resource, health, and infrastructure, and prepare them earlier to avoid the domination of regions receiving this foreign capital, because it will result in envy among regions if there is an uneven distribution of investment.

Considering this, each of the regions can benefit from the investment and promote their regions without envy toward one another. One Central European state—Slovakia—bordering on Western Europe, having an advanced economy, receives great investment in the state's economy. It can be seen from the successful development of nearly all infrastructures, including an electric train network, telecommunication, and water reserve from 2000 to 2012, compared with those in previous years. Slovakia has implemented decentralization, and this state has similar characteristics to Indonesia. Slovakia's territory is fairly broad for a Central European state, and it has a dense population with a lower-middle economic class on average. However, within just a few years, everything was turned around; the investment they received had made Slovakia a superior state in many sectors, particularly in the automotive and cement industries (Kucharčíková et al. 2015; Fabuš and Csabay 2018).

According to Lindblad (2013), broadly, the appearance of disintegration is understandable, as it is triggered by a region's envy of other richer regions. This will gradually lead to discordance, detrimental to the state entirely. Not all stakeholders will agree with foreign investment. Some reasons are expressed, one of which is that foreign investment means the state has failed to bring its wishes into reality. Another reason is that there is no strong

control over this investment, so it is difficult to investigate the investors' track record. And yet another reason is that there is tight competition, and if it occurs and the state is not ready for it, it will merely be a spectator in its economically colonized region. Many other critiques and reasons are expressed against the acceptance of foreign investment (Asri 2015).

Foreign investment will indirectly have a huge impact on the sustainability of a country and even a region. Of course, details related to policies and the core values of every action taken by the government are needed, so that it can be ensured that no party is harmed as a result of foreign investment, and that regions and their communities benefit significantly from it (Marks 2010). Giving freedom to other countries in terms of investment must, of course, be accompanied by concrete actions and laws that are strict against all violations that may occur during the implementation of the investment. The existence of this investment can certainly provide prosperity if it is managed properly, yielding benefits involving equity, job creation, and even technology transfer that can be utilized properly by internal parties. But if managed inadequately, it could certainly result in a big loss that must be paid by the government.

The solution to the second research question in this sub-discussion is related to the government's readiness to receive foreign investment with the aforementioned preparation and structuring measures. Mapping investment areas to realize synergy between regions and national synergy to benefit both Indonesia and its regions must be done carefully and precisely by the Indonesian government, considering that foreign investment is entering Indonesia fast, and the ease of investment could be an obstacle to maintaining control over it if the government cannot keep up. By doing the mapping and synergies, strong intergovernmental relations in the regions and national synergy must, of course, be realized immediately by prioritizing the concept of sustainable development and strong law enforcement, fostering a high sense of trust in the government.

Conclusions

1. Considering the results of research and discussion related to regional autonomy issues developing during 2000–2021 in Indonesia, at least two very interesting issues are found: agroforestry management and economic disintegration.

2. The result from the literature review is that agroforestry in regional autonomy will impact the regions and the people broadly. Meanwhile, the Indonesian government should be alerted to the economic disintegration issue. The second is that economic disintegration is the implication of economic envy between regions, thereby requiring the central government to anticipate negative risks in the implementation of regional autonomy. Integration will be in danger if a misunderstanding occurs and

the central government has inadequate informal and formal approaches in terms of access to regional development, particularly in the eastern part of Indonesia.

3. The solution offered to respond to the issues found in the articles' review is multi-level governance to deal with the agroforestry management issue, in which the central government serves as supervisor only, rather than as executor. This solution is offered, emphasizing that the forest areas "belong" to the regions. Although the policy is controlled by the central government, it would be more effective for regions and their people to have full control over agroforestry management, so that the national interest can be achieved.

4. Another solution is to use foreign capital investment to prevent economic disintegration in Indonesia. Foreign capital investment could be accepted by Indonesia to eliminate economic disintegration and optimize local potencies. But it is worth noting that foreign capital investment policy should be organized to create synergy between regions, rather than to exacerbate the conflict between regions or between regional and central governments.

5. One limitation of the study is that it still emphasizes literature review research. It is hoped that future research can prioritize comprehensive research methods with the same theme as this research.

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COERCIVE PRESSURE FOR THE IMPLEMENTATION OF THE INDONESIAN VILLAGE E-GOVERNMENT FOR PUBLIC ACCOUNTABILITY

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Abstract

In Indonesia, digital financial management has reached the village level through applications such as the digital financial management system titled "Sistem Keuangan Desa," also known as SISKEUDES, which is mandated by the central government to manage village funds. While e-government programs have generally been associated with improved public accountability, the mechanisms through which these systems are adopted and implemented, especially under institutional pressure, remain underexplored in the context of village governance. This study responds to this gap by examining how coercive institutional pressures shape the implementation of SISKEUDES. In the context of SISKEUDES, coercive pressure manifests through central government mandates, local government supervision, and strict monitoring of fund management and reporting practices. Despite its intention to promote digital governance and financial accountability, the application's implementation

faces multiple challenges at the village level. Specifically, this study investigates the motivations behind the central government's requirement for SISKEUDES and explores how various institutional actors—including regulators (the Ministry of Home Affairs [MoHA]), supervisors (local governments), and executors (village officials)—interpret and respond to these coercive forces. It also highlights barriers such as limited technical capacity, infrastructural gaps, and misalignment with regulatory updates, which complicate effective implementation. By focusing on the institutional dynamics behind SISKEUDES, this research contributes to a deeper understanding of how coercive pressures operate in decentralized governance systems and offers insights into the uneven trajectories of digital transformation in rural settings.

1. Introduction

Nowadays, the evolution of e-government systems globally is already increasing. E-government is a tool for enhancing transparency, accountability, and efficiency in governance. Syaefullah and Marzuki (2024) mentioned that digital governance, in the last two decades, has offered many benefits to governments and communities, such as reducing costs and improving government operational efficiency. Research on digital governance shows there is great potential and expectations, and that the research results can change the fundamental ways in which public organizations operate, provide services, develop policies, implement performance and evaluation, and lead citizens to government intervention to implement a good democratic process.

Later, a study presented by Lindquist and Huse (2017) stated that the remote region of Quebec, Canada, was where Goldberg's colleague conducted research and found that only 36 managers (civil public officials) showed concern for the development of online services. A digital government is built on the need to create efficiency, productivity, effectiveness, transparency, and public participation (Allahverdi 2011). Some instances of digital government involve the utilization of technology and computers for the purpose of managing financial government affairs, particularly for government accounting information systems.

An accounting information system collects finance-related transaction data by analyzing variations in a company's business entity, including both capital and debt, which are the resources of the entity, then processing information from the data collected and reporting the information available (Zou et al. 2023). O'Dwyer et al. (2024) researched the use of accounting information systems in the state of Croatia and concluded that information technology in the ISO/IEC 2510:2011 procedure has a significant impact on the quality of financial reporting and accountability in the provincial government work unit.

Enhancing government transparency and accountability is a key benefit of e-government. It enables citizens to access government information at any time and from any

location, thereby promoting greater transparency and accountability (Chathurangani and Madhusanka 2019). Elements of public accountability, such as transparency, interaction, and openness in website data trends, were on the rise from 1997 to 2000. The results of research indicate that the successful implementation of e-government in improving public accountability uses a framework of transparency, responsiveness, control, and responsibility. Powell and DiMaggio (1983) note that e-government has become a widely recognized term in public administration, encompassing areas such as service delivery, interactivity, decentralization, transparency, and accountability.

In Indonesia, e-government implementation has spread at several levels of government, including the central, provincial, city/district, and village governments. In village governments, the types of e-government for the purpose of civil administration, assets inventory, financial reporting, sustainability development goals achievement, and so forth vary (Rosnidah et al. 2022). The Indonesian central government is trying to create a computer-based accounting information system that is integrated from one place to another, namely the village financial system, i.e., SISKEUDES. SISKEUDES was created as a village e-government system for improving the reporting process of village budgeting and financial management.

As there is still limited research regarding the connection between e-government implementation and its purposes, this research focuses on e-government implementation in village financial management. This study aims to examine the underlying reasons for the government's mandate for village governments to utilize this financial application and discover the institutional forces that are pushing for its adoption. Thus, this research seeks to answer the question of how and why Indonesian village governments implement the SISKEUDES as a financial application, and what institutional forces are behind its implementation. The research also reveals the challenges, complexities, and obstacles behind the implementation of the village financial system from the perspective of the regulator (the Ministry of Home [MoHA]), the supervisor (local government), and the executive (village government). Furthermore, this study examines the question of how e-government promotes public accountability through the implementation of SISKEUDES.

2. Theoretical Framework

2.1. New Public Governance and New Institutional Sociology Theory

This section examines New Institutional Sociology (NIS) and New Public Governance (NPG) as frameworks for comprehending e-government reform, specifically regarding the implementation of village e-government for public accountability. NIS highlights institutional pressures and isomorphism as catalysts for organizational change, whereas NPG provides a supplementary viewpoint by emphasizing collaborative governance, citizen engagement, and network-oriented strategies in public administration.

NPG transitions from hierarchical, bureaucratic frameworks to participatory and decentralized governance models. It underscores the involvement of various stakeholders, such as citizens, private organizations, and non-governmental entities, in influencing public policies and services(Osborne 2016). This method corresponds with the tenets of e-government, which seek to improve transparency, accountability, and responsiveness via digital instruments and platforms.

Within the framework of village e-government, NPG emphasizes the significance of co-production, wherein citizens engage actively in the design and provision of public services. This cooperative framework cultivates trust, enhances service quality, and guarantees that technological solutions effectively meet local requirements (McMullin 2021). In contrast to NIS, which frequently depicts organizations as passive responders to external influences, NPG promotes proactive involvement and innovation, empowering organizations to navigate through intricate environments and effectuate substantial reform (Waheduzzaman 2019).

NPG provides significant insights into governance dynamics; however, its dependence on stakeholder collaboration may lead to challenges, including conflicting interests, power imbalances, and resource limitations (McMullin 2021). The integration of NPG with NIS offers a comprehensive perspective on e-government reform, reconciling the necessity for legitimacy and compliance with the opportunities for innovation and citizen-focused governance.

NIS, grounded in institutional theory, examines how external influences such as societal norms, regulations, and professional standards affect organizational structures and practices (Safari et al. 2020; Alsharari 2020). The theory emphasizes institutionalization as a survival strategy in which organizations adapt to external environments, resulting in isomorphism—achieving homogeneity to attain legitimacy (Ukobitz and Faullant 2022).

This conformity frequently emphasizes legitimacy at the expense of functionality or efficiency, thereby diminishing the proactive role organizations might assume. Isomorphic pressures, classified as coercive (regulations), normative (professional norms), and mimetic (imitation driven by uncertainty), may lead to "tightly coupled" compliance or "loosely coupled" resistance (Bayu Bawono et al. 2019). These responses frequently exhibit a deficiency in proactive engagement, as organizations adapt passively rather than innovate. Critics contend that NIS reduces organizational behavior to a simplistic framework, portraying organizations as mere responders rather than catalysts for institutional change (Asmara Br Barus and Hariwibowo 2024).

Furthermore, although social and cultural influences are crucial for technological adoption, an excessive emphasis on isomorphism may neglect the strategic, context-specific measures that could facilitate significant reform. Successful institutionalization requires not only acceptance but also the internalization of values and practices; however, this process differs significantly among organizations due to internal dynamics and external dependencies (Ningsih and Anggraeni 2023). The excessively deterministic perspective of NIS may conceal opportunities for organizations to resist, reformulate, or influence the institutional pressures they encounter.

2.2. E-Government Implementation

Digital governance enhances services, citizen engagement, and administration by revolutionizing interactions via technology and the internet (Savitri et al. 2023). E-government fundamentally modernizes public services through the utilization of ICT to enhance transparency, accountability, efficiency, and effectiveness. Governments integrate agency business processes into information systems to eliminate bureaucratic inefficiencies and facilitate informed regional development planning (Fernández-Portillo et al. 2020).

E-government initiatives are universally acknowledged as mechanisms for attaining good governance, yet they frequently encounter implementation obstacles. In Indonesia, initiatives primarily concentrate on urban regions, where they are either fragmented or in preliminary planning phases (Didin et al. 2024). Addressing this necessitates strategies including informal ICT education for governmental entities and the populace, coupled with robust leadership to cultivate digital communities throughout all regions (Karinda et al. 2024).

Key dimensions for improving public service delivery encompass fortifying public institutions, especially at the regional tier, ensuring leadership competence, establishing transparent processes that facilitate citizen engagement, and cultivating an organizational culture of innovation (Didin et al. 2024). Nonetheless, these strategies must also account for potential obstacles, such as disparate access to technology and privacy issues, which may impede the equitable execution of e-government (Savitri et al. 2023).

3. Research Method

This study utilized qualitative research methods with a case study approach to investigate the implementation of e-government (SISKEUDES) in the Indonesian village government. Case studies involve examining human or organizational circumstances using data obtained from documents, archival records, interviews, direct or participant observations, and physical artifacts under certain conditions. The collection of data used in this study was sourced from available literature, documentary evaluations, observations, and interviews with stakeholders, namely the regulator (MoHA), the supervisor (local government), and the executive (village government). The data collection occurred between January 2023 and February 2024 through contact with the aforementioned stakeholders.

4. Findings and Discussion

4.1. Indonesian Village Financial System (SISKEUDES)

With Act No. 6 of 2014 and the President's Nawacita of RI, Indonesia's goal is to develop

remote, lagging, and backward areas. Through the village funding program, the central government encourages village governments towards economic development in remote, lagging, and backward areas. The allocation given by the central government to the village governments is not a joke, which raises concerns about its management. On March 30, 2015, in the Hearing Meeting Opinion (RDP), Commission XI DPR-RI requested an estimate of the time required for the Indonesian Finance and Development Supervisory Agency (*BPKP-Badan Pengawasan Keuangan dan Pembangunan*) to create the application for the management of village funds. The testing of SISKEUDES was initiated by one of the representatives of the government agencies of BPKP from West Sulawesi as a pilot project in the vicinity of BPKP in May 2015. On July 13, 2015, SISKEUDES premiered, and its development was handed over to the central BPKP. On November 6, 2015, the Indonesian MoHA and the chief of the BPKP made a memorandum of understanding (No. 9001627115J and 16/D4/2015) on improving the management and financial management of the village. A letter issued by the Directorate General of the Village Government Development, MoHA No. 145/8350/BPD dated November 27, 2015, stated that the BPKP and the MoHA developed and distributed SISKEUDES applications for free to support the monitoring and management of the village funds.

The SISKEUDES application was designed using the Microsoft Access database system for user friendliness. It features simple and intuitive functionalities, making it easy for even those without prior accounting or IT knowledge to use after basic training. This design aims to enhance the accountability and efficiency of village financial management.

SISKEUDES is a transparent and accountable village fund financial management application that applies information technology to digital governance. The use of SISKEUDES is a promise of digital government in promoting the power of accountability within organizations to the public. Implementation of standardized software will lead to increased efficiency in public sector organizations.

SISKEUDES allows for straightforward data entry in line with existing transactions, producing administrative documents and reports that comply with legal requirements. These documents include the village budget (*APBDesa*), receipt, payment request letter (SPP), and tax payment letter (SSP), among others. The application also generates various reports, such as budgeting reports and administration reports, including general cash books, bank books, tax books, subsidiary books, and other administrative fund registers.

The effectiveness of the SISKEUDES application can be evaluated using 13 indicators: relevance, reliability, completeness, timeliness, understandability, verifiability, accessibility, individuality, procedures, data, software, technological infrastructure, and internal control. The goal is for SISKEUDES to enhance accountability in village financial management. Effective implementation of SISKEUDES is expected to prevent financial irregularities and improve the overall performance of village governance.

The effective implementation of SISKEUDES in village e-government can help improve the efficient use of village funds, streamline operational tasks, reduce the risk of budget misuse, and boost the performance of local authorities. Additionally, improving

the administrative skills of village authorities will further enhance the benefits of implementing SISKEUDES. When SISKEUDES is utilized optimally, it increases the accuracy of village fund accountability reports. The village financial system acts as a mediator between the competence of village officials and the transparency in managing village funds. Village e-governments play a crucial role in ensuring transparency in managing village finances, as they are responsible for reporting to the community how village funds are utilized. To enhance financial oversight and ensure compliance with relevant regulations, the village financial system, i.e., SISKEUDES, has been introduced. Its objective is to simplify financial reporting processes and optimize the management of village finances.

4.2. How Coercive Pressure Is Influencing the Implementation of SISKEUDES

For the successful implementation of the village financial management system, instructions were supplied by the Indonesian president and the Corruption Eradication Commission. The MoHA and the local governments formulated the guidance throughout the various stages. Coercive pressure from the implementation of SISKEUDES is explained as follows:
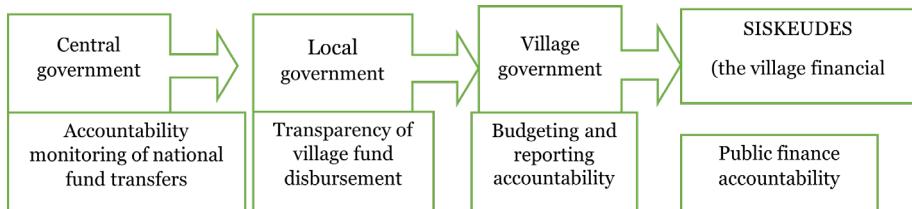
Figure 1: Coercive pressure stages in the implementation of SISKEUDES

The diagram outlines the interaction among various governmental levels in guaranteeing the accountability of public finances, particularly concerning village funds. The central government is tasked with monitoring the accountability of the national fund. This phase implies the exertion of top-down pressure from senior authorities to guarantee effective financial governance. The local government serves as an intermediary, guaranteeing transparency in the allocation of village funds. This signifies the regulatory impetus for transparency and precise reporting at the local level. The village government executes SISKEUDES, utilized for budgeting and reporting village finances. This phase emphasizes the accountability frameworks at the community level, bolstering financial integrity. The primary aim of public finance accountability is to ensure effective management and responsible allocation of funds through collaboration among all tiers of government. In conclusion, this diagram illustrates a systematic framework for financial governance, wherein coercive influence from superior authorities is pivotal in ensuring accountability at various stages.

Central government pressure

Subsequent to the launch of SISKEUDES on August 31, 2016, the Corruption Eradication Commission—via instruction letter No. B.7508/01-16/08/2016—mandated all village governments to familiarize themselves with the SISKEUDES application for the village financial management process. Then, on May 18, 2017, the Indonesian president instructed and reaffirmed that SISKEUDES should be implemented throughout village governance in Indonesia. Based on this instruction, SISKEUDES implementation is mandated as one of the steps in the creation of public accountability that manages the finances of the village governments so that the quality of open service can be delivered to the public.

Following the enactment of MoHA regulation No. 20 in 2018, regarding village financial management, SISKEUDES was enhanced to comply with this regulation and to accommodate various restrictions during the pandemic from 2020 to 2022. Consequently, the new SISKEUDES system has been implemented online in the past year and is integrated with the banking system to facilitate cash management. The subsequent enhancements were mandated for implementation in the village with the assistance of the local government budget, as per MoHA letter No. 100.3.3.3/5552/BPD, dated August 21, 2023.

Based on the interviewee's responses, the implementation of SISKEUDES in village government aims to ensure the secure transfer of funds from the central government, hence lowering occurrences of corruption and mismanagement, as evidenced by the interview findings.

> *SISKEUDES, created to maintain the standard operation of village financial management, was implemented… All village governments should implement this new system (Interviewee No. 1, MoHA Officer)*
>
> *We wanted to secure the money transferred to the village; we didn't want this money to be unmanaged… We heard many cases of corruption in the villages, thus we wanted to minimize this. (Interviewee No. 2, MoHA Officer)*

Another rationale for SISKEUDES implementation is to attain openness in managing villages' financial affairs, ensuring public accountability. As this obligation directly affects the funds paid to the accounts of village governments, village governments must comply with it without any objection.

Local government pressure

Following the regulation and instruction from the central government, local governments are required to provide the following local regulations to provide supporting facilities and a budget for SISKEUDES implementation. Certain local governments in Java have also instructed their village governments to implement SISKEUDES, incorporating sophisticated accounting principles, including accrual accounting. Although the MoHA regulation only mandates the implementation of cash accounting. See the response from the interviewee below:

> *Village money and village assets needed to be measured… for measuring assets, we needed accrual accounting. The MoHA [regulation] did not mandate a clear balance sheet; they only asked for a budget realization report. (Interviewee No. 4, District Government Officer in Central Java)*

Despite the enactment of numerous regulations by local governments in Indonesia for the implementation of SISKEUDES in village governance, the implementation of all platforms in the SISKEUDES remains problematic across various districts, including rural areas in Sulawesi, Kalimantan, Papua, Maluku, and Nusa Tenggara. These problems persist mainly due to the low human resources for understanding the technology.

Village government response

Most village officials do not complain about SISKEUDES, as it serves as a mechanism to mitigate the misuse of village financial management and enhance the transparency and accountability of village finances. It enhances reporting accuracy, minimizes recording errors, and fosters greater transparency among village officials towards the local community and the local and central government. Another interviewee's response is below:

> To be honest, SISKEUDES really helps us in preparing budgets, making reports, and providing accountability to the community and the government… (Interviewee No. 6, Village Government Treasury)

However, resistance remains evident among certain village officials accustomed to manual tools. Village officials indicated that this system entails its own challenges, particularly during initial implementation when they must acclimatize to new technology.

Certain village officials are encountering challenges attributable to technical factors, particularly those with limited technological proficiency. Village officials in areas with restricted internet connectivity frequently encounter challenges in operating SISKEUDES. The lack of training and/or additional technical support hinders village officials' comprehension of the system. Numerous village officials contend that they require support in utilizing SISKEUDES, particularly during the initial implementation stage. This support is necessary to alleviate apprehensions regarding administrative errors and to enhance their comprehension of system operation. Certain village officials believe that the functionalities of SISKEUDES should be enhanced to facilitate more meticulous budget management and financial documentation. They anticipate that SISKEUDES can be integrated with other commonly utilized village applications from other ministries and local governments. However, it can still be concluded that SISKEUDES significantly aids in preparing budgets, generating reports, and ensuring accountability to both the community and the government. The response of the village governments to this forced implementation is closely linked and influenced by the rule and the fine imposed on the community for not complying.

Given the government's mandate to enforce the use of SISKEUDES, it is evident that there is a forceful push towards transforming the e-government. By 2023, about 95% of village administrations in Indonesia had already adopted this method. Indonesia has a total of more than 80,000 villages (MoHA internal reports).

In the case of Indonesia, coercive pressure in SISKEUDES implementation in village government provides the benefit, such as:

1. Faster, widespread implementation was seen in only four years (from mid-2015 to mid-2019), with almost 90% villages, out of 80,000 villages, implementing this system as mandated by the regulations.

2. More village government staff were given training and coaching.
3. In terms of vertical accountability, the village financial report can be readily completed for both the local and central government.
4. The goals of SISKEUDES in achieving digital governance, providing public transparency, and enhancing accountability in general are achieved.

4.3. Problems and Challenges

As already mentioned in the previous section, the implementation of SISKEUDES faces multiple hurdles. Firstly, there are still regions experiencing a scarcity of skilled human resources in the field of financial management at the village level. This shortage is not due to a lack of individuals but rather a lack of competence in using SISKEUDES. The root cause of this issue is the inadequacy of education and training programs for human resources in financial management. Furthermore, SISKEUDES is still regarded as intricate by certain operators, resulting in frequent errors in SISKEUDES applications. Several sections of the report have not yet been integrated into the SISKEUDES application system, necessitating the continued use of manual reporting. In many regions, there is still a lack of transparency in publicly reporting and implementing the village budget, which hinders accountability. Additionally, it has been shown that the management of village money is extensive and challenging. Ultimately, the level of commitment to addressing corruption in criminal law remains insufficient.

There appears to be a greater demand from the central government for the SISKEUDES implementation compared to the actual demands of village governments for transparent village budgeting disbursement. The results indicate that the implementation of SISKEUDES has only achieved vertical accountability and has not yet fully achieved horizontal accountability. Therefore, further efforts are required to enhance public accountability.

Rural villages situated in isolated areas or islands have topographical barriers that impede their connectivity to the internet and other technological resources. Because SISKEUDES operators have diverse educational backgrounds, they lack a sufficient understanding of their own capabilities. Some operators had only recently completed either their junior or senior year of high school. Due to the limited financial literacy of villagers, they are not interested in their village government's actions. Enhancing SISKEUDES is necessary to ensure rigorous compliance with the existing rules. Additional training and coaching are essential to achieving a comparable level of comprehension among operators. Consequently, a greater budget is necessary for these endeavors.

5. Conclusion

SISKEUDES exemplifies effective e-government, demonstrating substantial

advancements in improving accountability in village financial management. The implementation signifies a strategic initiative to modernize public sector operations through the utilization of digital technologies, enhancing transparency and accuracy in financial reporting. This initiative corresponds with overarching financial reform objectives, which this study analyzes through the perspective of NIS—a framework that emphasizes the impact of institutional pressures on the implementation of e-government systems. Utilizing SISKEUDES enables village administrations to optimize financial procedures and cultivate a culture of accountability, both essential for efficient resource management and public scrutiny. Nonetheless, despite these accomplishments, challenges persist, including insufficient technical skills, resistance to change, and inadequate infrastructure, all of which may impede the attainment of complete accountability.

This research underscores how coercive institutional pressures compel adherence to SISKEUDES, promoting standardization, albeit occasionally at the cost of local autonomy and flexibility. Policymakers are, therefore, tasked with reconciling regulatory enforcement and participatory governance. Coercive measures may foster uniformity but may also create resistance among village officials, especially if the system is viewed as imposed rather than collaboratively created. This resistance might threaten the long-term viability of e-government initiatives. The study additionally observes that although coercive mechanisms can enhance digital accountability, they may neglect local challenges, including deficiencies in technical infrastructure and disparate levels of digital literacy. Recognizing these disparities is essential for equitable and efficient execution.

Despite these challenges, coercive pressures have been instrumental in facilitating the extensive implementation of SISKEUDES by village administrations. This method has facilitated the standardization of financial practices and ensured compliance, thus integrating accountability mechanisms into local governance. The study indicates that additional research could clarify the primary stakeholders engaged in SISKEUDES implementation and examine their roles in other e-government initiatives, including the Assets Management System and the Digital Village Information System. This analysis might provide significant insights into the dynamics of digital transformation at the village level and enhance comprehension of how these changes facilitate financial reform and governance accountability.

In considering these findings, the study provides multiple policy recommendations:

1. Enhance capacity-building initiatives: Central and local governments must deliver extensive training for village officials on digital governance to supplement their expertise with SISKEUDES. Establishing local support centers can provide technical assistance and facilitate the adoption process, particularly in remote regions.

2. Enhance collaboration efforts among multiple stakeholders: Promote grassroots engagement by incorporating village representatives in the decision-making processes for e-government systems. Establish feedback systems, enabling villages to communicate challenges and propose enhancements directly to policymakers.

3. Enhance regulatory frameworks: Transition from a predominantly rigid approach to a more adaptable regulatory model that considers local circumstances. Implement incentives for compliance to enhance motivation and diminish resistance.

4. Enhance digital infrastructure and inclusivity: Increase internet accessibility and digital infrastructure in underprivileged villages. Formulate programs for addressing digital literacy deficiencies, guaranteeing equitable participation of all communities in e-government initiatives.

By focusing on these aspects, policymakers can facilitate the sustainable and equitable execution of SISKEUDES and analogous digital governance frameworks, thereby enhancing accountability and transparency at the village level.

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FROM INFRASTRUCTURE TO INCLUSION: RETHINKING CITIZEN ENGAGEMENT IN VIETNAM'S DIGITAL PUBLIC ADMINISTRATION

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Abstract

This study explores the role of citizen participation in the digital transformation of Vietnam's public administration. As the country advances e-government platforms such as the National Public Service Portal, VNForm, and VNeID, effective governance increasingly depends on active civic engagement. To analyze this phenomenon, the study applies multiple theoretical lenses including deliberative democracy, participatory governance, and platform theory to examine how digital tools mediate state citizen interactions. These

frameworks help conceptualize participation not only as informational access but also as collaborative policymaking, shaped by legal foundations such as the current Constitution promulgated in 2013 of Vietnam and laws on information access and grassroots democracy. A mixed-method approach was employed, including document analysis and a survey of 400 citizens across seven provinces. Findings reveal that while Vietnam has built robust digital infrastructures, actual participation remains limited. Many citizens are unaware of available channels or lack confidence in data security and government responsiveness. Platforms often omit critical consultation documents or fail to provide transparent feedback loops. Moreover, platform theory reveals that the architecture of these systems tends to prioritize administrative efficiency over deliberative engagement. Social media channels such as Zalo OA and Facebook, despite their potential to foster public dialogue, remain underutilized. These insights underscore the need to reimagine digital governance not just as a technical upgrade but as a democratic opportunity.

1. Introduction

In the context of Vietnam's ongoing digital transformation across all sectors, the application of digital technology in public administration has become a pivotal strategy for enhancing transparency, efficiency, and citizen-centric governance (Government of Vietnam, 2024). The country's efforts to develop a digital government, evidenced by platforms such as the National Public Service Portal and mobile applications, underscore a strong commitment to administrative modernization. However, the success of these technologies relies not solely on digital infrastructure but critically on meaningful citizen participation.

Citizen involvement includes more than the passive use of online services; it entails active engagement in providing feedback, monitoring public operations, and co-developing solutions to governance challenges (Webler et al., 1995). Yet, in practice, the gap between policy ambitions and actual public uptake persists, driven by barriers such as limited digital literacy and skepticism surrounding data privacy (Doyle, 2015; Nguyen, 2015). This research aims to investigate the current status of citizen participation through digital technology applications in Vietnam's state management, identify enabling and inhibiting factors, and propose strategic solutions to promote inclusive, smart governance in which technology and citizen agency evolve synergistically.

Although Vietnam has invested heavily in digital platforms, citizen engagement remains low. Existing literature rarely examines the behavioral and institutional barriers to participation. This study fills that gap by analyzing usage patterns and proposing inclusive design solutions. While digital infrastructure has expanded, theoretical clarity on citizen participation remains limited. This study addresses that gap by applying frameworks from IAPP (2000), Webler et al. (1995), and Margetts (2022).

2. Theoretical Framework on Citizen Participation

Citizen participation has evolved into a fundamental concept within public administration and policy-making discourse, drawing insights from diverse theoretical perspectives. Since the 1990s, "participation" has gained scholarly attention not only as a democratic principle but also as a mechanism for improving the quality and legitimacy of governance (Webler et al., 1995; Doyle, 2015). The International Association for Public Participation (IAPP, 2000) characterizes participation as a process whereby individuals affected by a decision are engaged in its formulation. The IAPP framework identifies five progressive levels of involvement: information, consultation, involvement, collaboration, and empowerment. This highlights the need for transparency and mutual understanding between citizens and state actors.

Grabow et al. (2002) contribute a decision-oriented view, emphasizing participation as a route through which stakeholders can influence the content of decisions. This reinforces the importance of inclusivity and representation in policy-making, especially for those directly impacted by government actions.

Doyle (2015) expands on the concept by positioning participation along a continuum from simple information-sharing to collaborative decision-making partnerships. This gradient reflects the varying degrees of public influence depending on institutional will, policy urgency, and citizens' capacity to engage.

In the context of European deliberative governance, public participation is increasingly viewed as a process grounded in reasoned dialogue among affected citizens, civil society organizations, and government actors prior to the finalization of policies. Such deliberative interaction transforms participation into a structured arena for collective problem-solving, where diverse perspectives contribute to more legitimate and socially grounded decisions. Building on broader public governance scholarship, citizen participation is also understood as a continuum of engagement that extends beyond deliberation to include the identification of community needs, contributions to policy development, and collaboration in the design and improvement of public services (Brandsen, Steen, & Verschuere, 2018).

Recent contributions have expanded the understanding of digital inclusion and platform governance. For instance, platform-based governance dynamics are explored by Margetts (2022), while comparative studies by Kim & Choi (2023) offer regional benchmarks from Singapore and South Korea, highlighting best practices in citizen-centric digital administration.

Synthesizing these viewpoints, citizen participation in state management can be seen as both an ethical obligation and a strategic approach to improving governance outcomes. In the context of digital transformation, technology-enabled platforms offer new opportunities for citizens to engage meaningfully, whether through information access, feedback submission, or policy co-creation. However, the effectiveness of such participation depends on inclusivity, trust, and the government's willingness to facilitate genuine two-way communication (Justice, 2001; IAPP, 2000).

Research findings indicate that citizen participation in state management occurs through various channels and at different levels, either directly or indirectly. To operationalize "inclusive participation," we define it as the meaningful and equitable involvement of citizens in digital governance processes, beyond mere access to platforms. This includes the ability to understand, influence, and co-create public services. We adopt a four-level (Figure 1) framework adapted from IAPP and Webler et al. (1995):

+ Level 1 - Information: Citizens receive relevant public information through digital platforms.
+ Level 2 - Consultation: Citizens provide feedback or opinions on draft policies or services.
+ Level 3 - Collaboration: Citizens co-design or co-deliver public services with government agencies.
+ Level 4 - Empowerment: Citizens monitor, evaluate, and hold agencies accountable through digital tools.

These levels reflect increasing depth of engagement, from passive receipt of information to active governance roles. Survey items were mapped to these levels to assess the depth and quality of engagement.
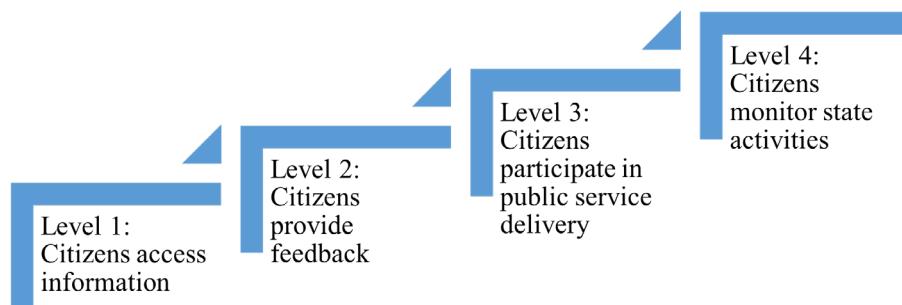
Figure 1. Forms of Citizen Participation in State Management

3. Research Methodology

This study employs a mixed-method research design, integrating both secondary and primary data sources to examine the current state of citizen participation in digital technology applications for public administration in Vietnam. The secondary data collection was conducted through a comprehensive desk review of official documents, digital platforms, and statistical reports published by government agencies (Government of Vietnam, 2024). These sources provided insights into the policy environment, legal frameworks, and technological initiatives relevant to citizen engagement. Particular emphasis was placed on analyzing the structure and functionality of platforms such as the National Public Service

Portal and various ministry-level and provincial websites.

Primary data were obtained through a structured survey administered across seven provinces and cities, representing the northern, central, and southern regions of Vietnam. A total of 400 questionnaires were distributed, with participant selection based on population size, concentration of government agencies, and socioeconomic diversity (Nguyen, 2015). Specifically, 140 responses (35%) were collected in Hanoi, followed by Quảng Ninh (40 responses), Yên Bái (30), Thừ Thiên Huế (30), Dak Lak (30), Ho Chi Minh City (100), and Binh Phuoc (30). Participants were selected from various age groups (18–65 years old) and different demographic groups to ensure representative sampling. The age distribution of the surveyed participants is illustrated in Figure 2, with the highest proportion (39.8%) belonging to the 25–40 age group.

The analysis included factors such as age distribution, educational background, and prior experience with digital platforms. Quantitative data from the surveys were processed using SPSS Statistics 20.0 software, allowing for descriptive statistics, cross-tabulations, and comparative analysis to identify patterns in citizen engagement (Doyle, 2015). This dual approach facilitated a multidimensional understanding of the motivations, challenges, and behaviors associated with digital participation in public administration. By triangulating insights from both document analysis and field data, the study aims to generate robust and actionable recommendations for improving citizen involvement through technology-driven governance.
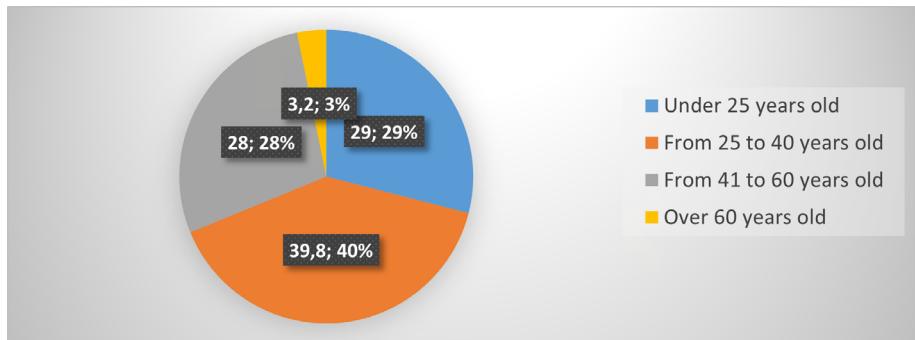
Figure 2: Age Distribution of Surveyed Participants

In addition to the survey and document review, we acknowledge the limitations of self-reported data and propose future integration of behavioral trace data. This includes scraping public feedback posts from the National Public Service Portal for topic-sentiment modeling, extracting completion rates and dwell time from VNForm, and conducting conversation analysis on Zalo OA messages to quantify engagement quality.

4. Current Situation of Citizen Participation

In recent years, Vietnam has made significant strides in deploying digital technology to enhance public administration and citizen engagement. Several platforms have been introduced to facilitate access to public information, gather feedback, and promote collaborative governance. Among the most prominent is the Government Electronic Portal, established under Decision No. 83/2008/QĐ-TTg (Government of Vietnam, 2024). Designed as a single point of access, it links users to various governmental services and resources, including Q&A tools and feedback mechanisms. Despite its comprehensive structure, the portal's usage by the public remains modest due to limited awareness and digital capacity (Justice, 2001).

The "Policy Consultation" section within these portals is another initiative aimed at soliciting public input on draft regulations (Government of Vietnam, 2024). While technically equipped to publish full drafts and collect comments, the implementation varies across agencies and often falls short of procedural completeness. Many draft postings omit essential documents such as explanatory reports or structured feedback templates, thereby reducing clarity and engagement incentives for the public. Figure 3 illustrates citizens' experience with the "Policy Consultation" section on governmental platforms.
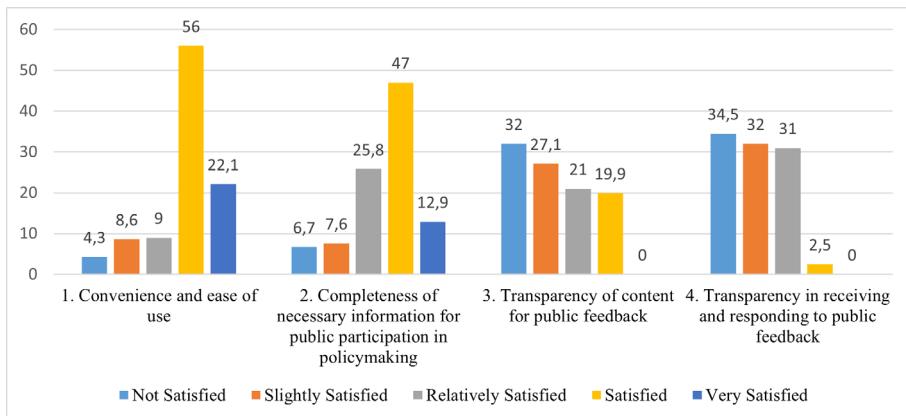
Figure 3. Citizens' Experience in Policy and Law-Making Participation Through the "Policy Consultation" Section

The National Public Service Portal (https://dichvucong.gov.vn) stands out as a critical component of Vietnam's digital government. Operational since 2019, it offers hundreds of administrative services online and integrates with local and sectoral portals (Government of Vietnam, 2024). Coupled with the VNeID application for digital identification, this system enables citizens to access services and update personal data efficiently. Nevertheless, barriers such as digital literacy, lack of trust in data protection, and uneven infrastructure

continue to impede widespread adoption (WHO, 2002).

Platforms such as VNForm (https://form.gov.vn) allow citizens to participate in surveys and satisfaction assessments of public services. However, survey results reveal extremely low user engagement, with 98% of respondents reporting never using VNForm (Government of Vietnam, 2024), suggesting a disconnect between technical availability and actual user adoption. Similarly, other specialized petition channels intended to facilitate public input also suffer from limited visibility and low participation rates. Figure 4 presents the percentage of citizens using digital technology applications to participate in policy-making and public service delivery.
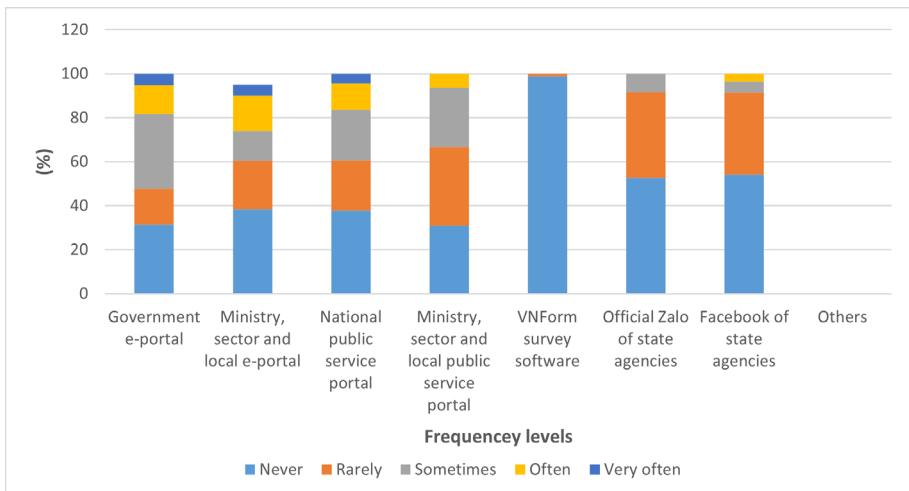
Figure 4. Percentage of Citizens Using Digital Technology Applications to Participate in Policy and Law-Making and Public Service Delivery

Social media has also been leveraged, with Zalo OA and Facebook fan pages serving as real-time communication channels between state agencies and the public. Despite their ubiquity, engagement with these platforms remains underdeveloped. More than half of the surveyed citizens had never interacted with government Zalo OA accounts or Facebook pages, highlighting the need for improved outreach and content strategy (Doyle, 2015).

The "Policy and Lawmaking" section at https://xaydungchinhsach.chinhphu.vn, introduced in 2022, aims to provide comprehensive updates and forums for citizen input. However, the actual level of participation remains low. Among 30 posted policy proposals, only 1,290 comments and 489 expressions of interest were recorded, suggesting limited public impact (Government of Vietnam, 2024). Further analysis shows that while citizens appreciate the simplicity and completeness of the application, they remain unsatisfied with the transparency of opinion processing and feedback integration (Grabow et al., 2002).

Consultations conducted between August and November 2024 indicate that for 20

draft legislative documents, no public feedback was received. This lack of interaction was compounded by incomplete documentation, with only 40% of proposals accompanied by explanatory reports and no agencies providing formal feedback templates (Justice, 2001).

Moreover, survey responses underscore the public's dissatisfaction with how state agencies manage feedback. Citizens perceive a lack of responsiveness and poor transparency in how their opinions are handled and integrated into policymaking. This reveals a pressing need to improve not only digital tools but also the institutional culture and mechanisms that support citizen participation (Webler et al., 1995; Doyle, 2015).

5. General Assessment

Vietnam has made notable progress in fostering citizen participation through digital technology applications in public administration. Legally, the country has developed a relatively comprehensive framework that affirms the right of citizens to engage in governance processes (Nguyen, 2015). Article 28 of the 2013 Constitution explicitly guarantees citizens' rights to participate in the management of the state and society, further reinforced by the Law on Access to Information, the Law on Promulgation of Legal Documents, and the Law on Grassroots Democracy Implementation.

In addition to the legal architecture, state agencies have demonstrated efforts in diversifying technology applications to facilitate citizen interaction. The integration of multiple platforms, ranging from the National Public Service Portal to ministry-level and local portals, has provided citizens with increased access to administrative services and opportunities to contribute opinions (Government of Vietnam, 2024). Most platforms offer user-friendly interfaces with automated features for submitting feedback and receiving notifications, while certain portals publish engagement metrics such as comment counts and approval ratings to enhance transparency (IAPP, 2000).

Nevertheless, several challenges constrain the effectiveness of these initiatives. A primary issue lies in the incomplete disclosure of consultation documents on official portals. Although regulations require full publication of proposals, explanatory notes, and impact assessments, many agencies share only partial information (Justice, 2001). This limits the public's capacity to provide constructive input. Additionally, citizens report dissatisfaction with agency responsiveness, noting frequent delays or complete absence of replies to submitted feedback, which undermines trust and discourages future engagement (Doyle, 2015). Figure 5 presents citizens' evaluation of how government agencies provide feedback to public opinion.
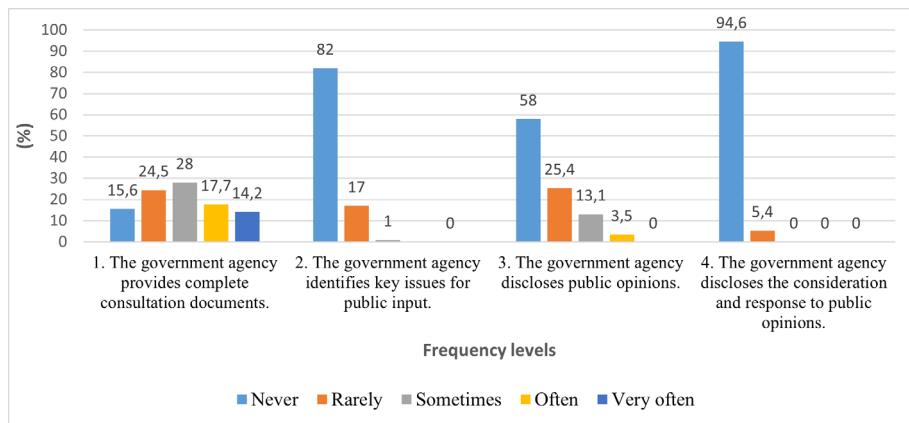
Figure 5. *Citizens' Evaluation of the Provision and Reception of Feedback by Government Agencies on the Government's Electronic Information Portal*

Technological shortcomings also persist. Fragmented software ecosystems, low interoperability, and inadequate interface design hinder participation, especially among disadvantaged groups (WHO, 2002). Security and privacy concerns further impede usage, with citizens hesitant to provide personal data on digital platforms due to fears of misuse or breach (Webler et al., 1995).

Institutionally, citizen engagement has yet to be mainstreamed as a strategic priority. Consultation processes often lack dedicated funding or trained personnel, and some agencies regard public opinion as secondary to administrative efficiency (Grabow et al., 2002). Stereotypes about citizens' lack of expertise or capacity further contribute to tepid efforts at fostering participatory governance.

Finally, citizen-related constraints remain significant. While internet penetration is high in urban centers, rural areas face infrastructural gaps. Groups such as older adults, ethnic minorities, and low-income populations struggle with digital literacy and civic awareness, leading to low levels of proactive engagement.

6. Strategic Approaches to Strengthening Citizen Engagement

Promoting citizen engagement in digital governance requires a holistic approach that combines technical innovation with institutional reform and capacity building. First, awareness campaigns should leverage traditional and digital media to disseminate knowledge about e-governance benefits, targeting demographics with limited access or skills (Nguyen, 2015). Educational programs in schools and communities can introduce digital skills and civic responsibilities, fostering long-term engagement (WHO, 2002).

Second, digital platforms should adopt inclusive design principles. Features such as

voice guidance, simplified interfaces, and multilingual support can improve accessibility. The government's VNeID application serves as a successful model of user-centric design (Government of Vietnam, 2024). Trust-building is equally crucial; implementing robust cybersecurity measures and ensuring user data protection can mitigate privacy concerns (Justice, 2001).

Third, institutionalizing feedback mechanisms is key. Multi-channel systems (e.g., websites, apps, and hotlines) should be implemented with transparent workflows for receiving and responding to citizen input. The presence of independent oversight, possibly through civil society organizations, can help monitor response quality and fairness (Doyle, 2015).

Fourth, policy and infrastructure reforms must accompany digital transitions. Updating legal frameworks on electronic authentication, online service validity, and privacy protection will align Vietnam with global best practices (IAPP, 2000). Expanding broadband access, particularly in remote areas, and supporting public-private partnerships to build smart solutions can further strengthen infrastructure (Webler et al., 1995).

By implementing these multi-dimensional solutions, Vietnam can progress toward a digital public administration system that empowers citizens as active stakeholders in governance.

7. Discussion

Despite the proliferation of digital platforms, meaningful citizen participation in Vietnam remains limited due to both institutional and structural constraints. The most persistent challenge is institutional responsiveness. Survey respondents frequently reported that their feedback on official portals receives slow or generic replies, which diminishes confidence in digital participation and discourages continued engagement.

A second challenge concerns digital inequality. Older adults, ethnic minorities, and rural residents continue to face barriers related to internet access, device availability, and digital literacy. As a result, participation remains concentrated among groups with higher education and better digital skills, creating unequal opportunities to influence policy.

The analysis also highlights shortcomings in platform design and information provision. Many consultation portals publish draft documents without accompanying explanatory reports or impact assessments, limiting citizens' ability to provide informed opinions. Likewise, although Zalo OA and Facebook have wide reach, government accounts mainly disseminate information rather than facilitate two-way discussion, leaving their participatory potential underutilized.

The limited engagement of intermediary actors such as civil society organizations or community groups reduces support for citizens who lack the capacity or confidence to navigate digital systems. Without these facilitators, participation remains largely individual rather than collective, and marginalized voices remain underrepresented..

8. Conclusion

This study underscores the growing significance of citizen participation in Vietnam's digital public administration. While digital platforms and legal foundations have been established, the real challenge lies in converting technical capability into meaningful civic engagement. Through mixed-method research, the paper reveals barriers that limit public involvement, ranging from institutional responsiveness to digital literacy gaps. Importantly, it contributes new insight by evaluating the actual usage and effectiveness of national e-government tools from the citizens' perspective. The proposed solutions focused on inclusive platform design, feedback transparency, and strategic outreach offer a practical roadmap toward more responsive, citizen-driven governance. Ultimately, the paper advocates for a shift from technology-led reform to one rooted in human-centric, participatory state management. This study contributes to governance theory by demonstrating how digital inclusion requires more than infrastructure; it demands institutional responsiveness, inclusive design, and civic trust. By mapping participation across four levels, we offer a scalable framework for evaluating citizen engagement in digital contexts.

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REGULATION OF THE DEVELOPMENT OF DISTRIBUTED ENERGY GENERATION

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An essential component of supporting sustainable development is the expansion of distributed renewable energy source generation. The purpose of this work is to identify the key areas of influence of state authorities in support of the formation of distributed energy generation. The example of Ukraine revealed the potential of their use in conditions of military threats. The methodological basis of the study encompasses tools of institutional, historical, genetic, structural, comparative, and complementary analysis. Instruments of state regulation of the development of decentralized power generation are presented. The potential for regulating the development of renewable energy generation through artificial intelligence is shown. Attention is focused on the contradictory influence of scaling effects on the stimulation of its development.

Keywords: *artificial intelligence, digital technologies, distributed energy generation, energy policy, regulation, renewable energy*

1. Introduction

The purpose of this article is to identify the key areas of influence of state authorities in support of the formation of distributed generation. The example of Ukraine revealed the potential of their use in the face of military threats.

The development of renewable energy has led to a return to the historical origins of energy systems as they evolve into microgrids. The first electrical system in history was

created in 1882—the Pearl Street Microgrid in Manhattan, New York. A coal-fired generator supplies electricity to power a hundred lamps (Monaco 2011).

Accounting for 40% of CO_2 emissions, the energy sector's heavy reliance on fossil fuels is the result of a lack of social responsibility. Traditionally, energy production has been concentrated in large power plants, which are combined into centralized energy systems. This increases the efficiency of carbon resource use. Simultaneously, the rapid growth of consumption in developing countries, high dynamism, and periodic crises of the world economy are accompanied by significant fluctuations in the supply, demand, and price of carbon resources in global markets. Energy systems face challenges such as deficits, low efficiency of use, and the need to update distribution systems. Additional problems arise from the aggravation of confrontations between leading players in the global economy. The war in Ukraine has demonstrated the vulnerability of centralized energy generation systems. By targeting thermal and hydroelectric power plants, distribution centers, and energy networks, the aggressor hopes to destroy the country's ability to organize and resist.

The importance of ensuring the development of distributed generation (Soshinskaya et al. 2014) and the formation of a hybrid energy system capable of combining the advantages of centralized and decentralized energy supply is growing. Reliance on digital technologies and the exploitation of artificial intelligence (AI) potential pave the way for integrating power generation microgrids and accumulating energy from multiple dispersed participants (IEA 2025). It provides microgrid stability, automatic monitoring of energy flows, and two-way communication between participants. Systems can be implemented to respond to fluctuations in demand. The list of services and products provided in the electricity market is growing significantly every year. Zhang et al. (2017) emphasize that the number of end-user participants has increased in the energy market. Digital platforms are forming full-fledged value chains (networks) within renewable energy microgrids. They provide the ability to combine distributed generation, redistribution, accumulation, consumption, monitoring, control, energy flow balancing, and microgrid management, as well as ensure mutual settlements between its participants. The development of distributed generation becomes relevant in conditions of hostilities. The emergence of threats to energy state security has resulted in targeted attacks on centralized generation objects and the distribution of energy flows (Lypov 2024).

Various factors complicate the development of distributed generation systems. First, we discuss the need for a radical restructuring of the national energy system. This involves the technological and resource components in the energy supply organization. The institutional environment is critical in the energy generation process. Effective utilization of natural resources and climate change are key components of sustainable environmental management (Nosova 2024). And effective state management of transformation processes in the energy sector is also crucial.

2. Literature Review

Platformization and technology for producing renewable energy are essential components of the Third Industrial Revolution, as they create opportunities for a radical restructuring of the energy sector (Nosova 2024). Among the models of the transition from centralized to distributed power generation, researchers have singled out microgrids (Soshinskaya et al. 2014; Hirsch et al. 2018), smart grids (Zhang et al. 2017; Dawn et al. 2024), and virtual power plants (Abdelkader et al. 2014). Grytsenko and Lypov (2024) highlighted a strategy of combining independent energy producers through the entire ecosystem cooperation or creating a commercial intermediary platform. Simultaneously, significant gains in renewable grid formation are obtained despite challenges. The regulation of distributed generation is a component of renewable energy development policy (IREA 2018). The need for a targeted multi-vector policy to support its development by government agencies is recognized as a necessary condition (Good et al. 2017). The need for AI usage in energy policy is studied (IEA 2025). Distributed generation is relevant in countries with limited development resources (Kona et al. 2018; Lytvyn and Levitsky 2023). The study of the possibilities of stimulating the association of owners of renewable energy stations in federal structures focuses on T. T. Morstin and coauthors (2018). The involvement of equipment owners in the renewable energy microgrids is recognized as a crucial element in the formation of "energy citizenship" (Ryghaug et al. 2018). Scientists have concentrated on the essence, role, and importance of energy democracy (Fairchild and Weinrub 2016), energy inclusion (Lypov 2024), communitarian principles of energy market formation (Moret and Pinson 2018), and ways to enhance the involvement of local authorities in strengthening the energy sustainability of territorial communities (Bauwens and Eyre 2017). Grytsenko and Lypov (2025) asserted that the complementarity of the state and the market is a tool for ensuring the development of renewable generation. Highlights the development of distributed generation (Kloppenburg and Boekelo 2019), the creation of a regulatory framework (Schneiders and Shipworth 2018; De Almeida et al. 2021), the study of problematic issues in the following scientific works, and energy policy (Zame et al. 2018)

A distinct avenue of research involves examining the advancement of technical and technological developments in distributed generation (Cavus 2024).

Organizational and economic aspects of the use of accumulation systems are the focus of the research team led by Xia et al. (2022). A cost assessment of the distributed generation intermediary of microgrids is the research theme for scientists (Lee and Cho 2020). A stimulating mechanism for renewable energy microgrids applies the scale effect in distributed generation (Bauwens et al. 2020).

A distinct area of research involves examining the factors that promote the development of technical, technological, and economic aspects of ensuring the effectiveness of distributed energy generation.

3. Methodology

The methodological basis of this study includes tools of institutional, historical, genetic, structural, comparative, and complementary analysis. We use the institutional approach to studying the regulatory framework and organizational forms of distributed generation. A historical, genetic approach analyzes the evolution of renewable energy generation. Structural and comparative analysis determines and analyzes the construction of options for controlling and stimulating the development of distributed generation. Complementary analysis highlights the institutional unity, interconnection, and interdependence of the elements of the distributed generation development regulation system. A multidisciplinary approach provides specific tools for distributed energy generation. It estimates technical, technological, and socioeconomic components in energy production. Developers, market participants, and renewable energy suppliers are among the stakeholders. The last includes enterprises and households, system operators, and consumers. These economic agents are interested in technological advancements in the energy sector.

4. Results

Transformation of energy markets as a foundation for developing policies to stimulate distributed generation

The necessity for a substantial transformation of energy sector management systems arises from a radical restructuring of the energy market (Good et al. 2017). This transformation involves creating a multi-level structure. The first level consists of prosumers (Morstyn et al. 2018)—households and small to medium-sized enterprises that own energy generation equipment and view this ownership as a distinct avenue for business activity. The second level includes traditional entities involved in centralized energy generation and distribution (Grytsenko and Lypov 2024). There is an opportunity to create energy islands and peninsulas in local communities. Local markets become the first link in the trading of electricity. Real examples include the blockchain-based microgrid energy market in Brooklyn (USA), the Piclo platform in the United Kingdom, and the De Ceuvel project in the Netherlands (Shan et al. 2023). The introduction of accumulation and digital control systems provides the following functions. These systems stipulate exchange flows. It maintains the stability of energy supply and performs calculations between participants at the microgrid level (Zame et al. 2018). With the establishment of the Institute of Aggregators, producers can now actively participate in activities across a range of renewable energy sectors at the regional level. Their presence makes it possible to use flexible generation as a market product. In turn, energy distribution network managers ensure that the entire energy system is stable. To maintain grid operation in the event of an energy imbalance, small power producers can engage in the retail market.

Commercial power generators enter wholesale markets and offer their energy resources

to distribution network operators. The latter, in both retail and wholesale energy markets, is responsible for balancing energy production and consumption. The transition from centralized to distributed generation systems is associated with the emergence of significant challenges and necessitates the restructuring and strengthening of the energy system management system.

The controversial nature of transition effects on microgrids' distributed generation

The reliance on digital technologies and the virtual nature of energy contribute to the emergence of scaling effects in distributed generation networks. A crucial factor is the contradictory consequences of decentralization on certain components of maintaining energy supply stability. The possibility of obtaining the inherent centralized generation of economies of scale of production is lost. Simultaneously, decentralized generation creates opportunities for the network effects, and how the placement of other organizations reinforces imprinting (Bauwens et al. 2020). At the same time, dispatching and energy flow management systems have become more complicated. This, in turn, complicates the task of minimizing the use of fossil energy sources. The potentially achievable volumes of generation and income of owners are lost due to various factors, one of which is the need to develop accumulation systems. The use of dynamic pricing systems increases the costs of balancing energy flows in the network.

Data work is controversially organized. Continuous automatic data exchange is the key to the success of this network. Increasing their volume does not incur additional margin costs. The more network members there are, the more valuable the data acquired. Their openness is a prerequisite for the mutual trust of participants, the necessary component in the formation of the territorial community unity. Simultaneously, the importance of preserving their confidentiality and security is growing. Threats of data loss and external unauthorized interference in the network increase costs for ensuring cybersecurity.

The growth of the number of energy generation entities affects consumer protection from interruptions in the energy supply. The infrastructure required for interregional energy flow redistribution and the direct costs of transportation are lessened when production is located closer to consumers. Simultaneously, the mechanisms for ensuring the coherence of their functioning in a single system are significantly complicated (Cavus 2024).

The self-sufficiency of renewable generation station proprietors reduces the demand on the network for consumers. However, from the perspective of the offer, there is a request for the transfer of excess generation. Moreover, there are significant fluctuations in the supply and demand. The owners of generating stations are acting as either producers or consumers of extra energy due to changes in the environment. This creates additional problems for system operators (Young and Brans 2017). The approximation of generation and the growth of the spectrum of techniques for accumulating excess generation have a contentious impact on the cost of energy to consumers. Finally, the expanding importance of the regulator in organizing the development of dispersed generation is determined by the paradoxical influence of its development.

Leveraging AI's potential to facilitate the advancement of distributed generation

In the context of decentralized supply networks, energy flow management is a complex task. System implementation can provide significant support for its artificial intelligence solution.

The efficiency of its application of asset utilization, operational management, technical assistance, and microgrid development is illustrated in Figure 1. It should be noted that all other AI functions are applicable in the context of micro networks. The Report on Energy and AI claims that "AI can help optimize the available capacity in the system—balancing generation, consumption, and grid utilization more efficiently in an increasingly variable environment. This approach delivers faster and potentially more cost-effective improvements without requiring new infrastructure investment. For long-term planning, AI helps navigate the substantial uncertainties in future electricity demand driven by widespread electrification, as well as the unpredictable evolution of power system technologies—from sophisticated grid solutions to emerging generation options—all while accounting for interactions with broader energy system developments" (IEA 2025, 130).
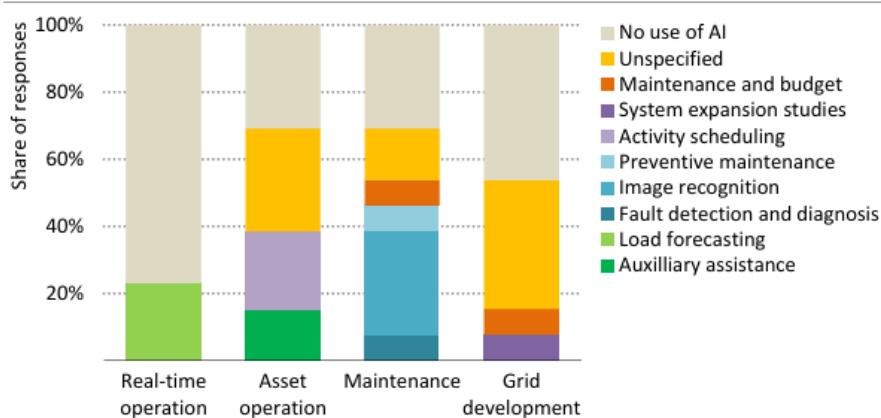
Figure 1. Utilities using AI applications by category, 2024
Source: IEA (2025, 12)

Table 1 shows the potential of using AI for operational optimization of energy flows in microgrids.

Table 1. Potential applications of AI in the real-time operations of electricity networks

Application	Description		Impact on energy	Example
Operational optimization				
Dynamic operating envelope	A framework that sets real-time, adjustable operating limits for grid-connected devices based on current network conditions to maximize available capacity while maintaining security; includes a dynamic security assessment		High: Reduces congestion costs, increases renewable integration, defers grid reinforcement investment, and optimizes existing infrastructure utilization without breaching security limits	A grid operator increases line capacity by 15–30% during cooler weather conditions, safely accommodating additional renewable generation
Fault detection and localization	Uses sensors and AI algorithms to quickly identify and pinpoint grid faults, reducing outage duration and improving response times		High: Reduces outage duration by 30–50%, improves system reliability metrics (SAIDI/SAIFI), lowers restoration costs, and enhances customer satisfaction	A distribution system operator detects a fault within seconds and precisely locates it within a 100-meter section, immediately dispatching repair crews to the exact location
State estimation and automation	Employs advanced algorithms to monitor distribution grid conditions in real time by inferring from measured points the electrical parameters at points without direct observability, enabling automated responses to maintain stability and optimize performance		High: Improves grid stability during variable renewable generation, reduces operating margins, enables higher distributed renewables integration, and decreases manual intervention requirements	An AI system continuously monitors voltage levels across the distribution network, automatically adjusting transformer tap settings to maintain optimal voltage profiles

Source: constructed on data of IEA (2025, 129)

Identifying the challenges of managing distributed generation

Distributed generation is a logical continuation and the deepening of understanding and improvement of tools to stimulate the development of renewable energy. It is based on the support toolkit accumulated by many countries over the past decades. "The Renewable Energy Policies in a Time of Transition" report summarizes administrative, price,

and non-regulatory (including financial, tax, and non-financial) methods (IREA 2018). Researchers propose a classification of actively applied renewable energy support policies (see Figure 2). The criterion for classification is the size of the control object.
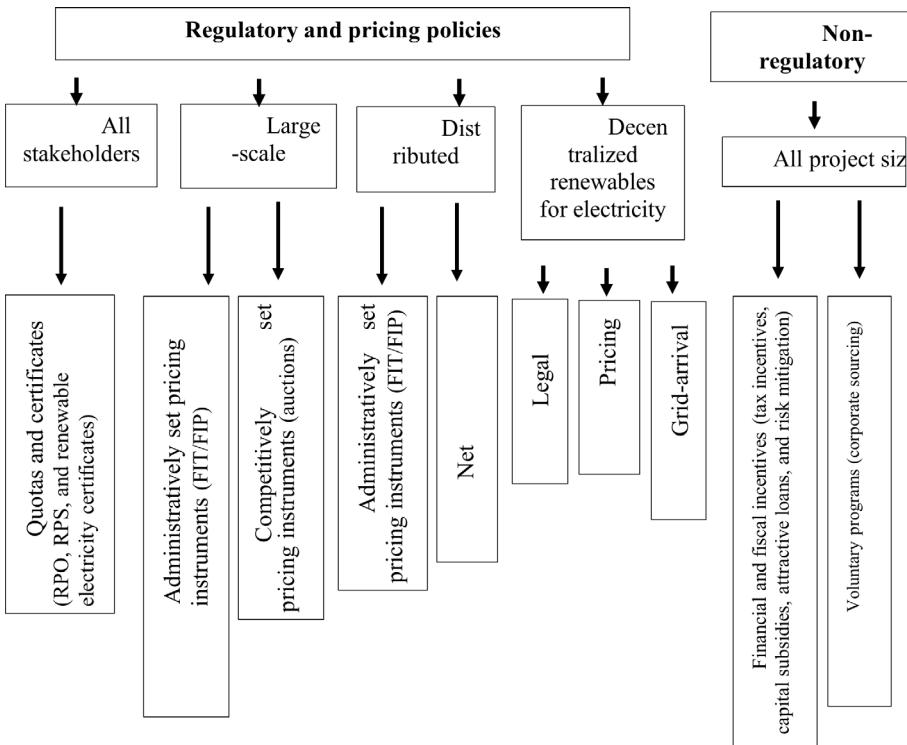
Figure 2. Classification of policies in the energy sector
Source: constructed on data of IREA (2018, 60)

The policy related to supporting the development of distributed generation entities is defined in a separate place. It provides for the use of feed-in tariffs, feed-in premiums, and systems of net metering/net billing. At the same time, one could mention that stimulating the development of distributed generation is not limited only to the use of these tools. An important incentive was the reduction in prices for renewable energy equipment. The possibility of implementing excess generation accelerates its payback period. Market pricing instruments are updated. Regulatory importance increases. In particular, the problems of microgrid function and the usage of centralized and distributed generation can be solved through regulatory and pricing policies. The toolkit of non-regulatory support for the development of distributed generation is expanding both at the national and local levels. The researchers consider that maintaining the incentive impact of taxes and emission

allowance systems on CO_2.

All the defined regulatory, pricing, and non-regulatory policies can be applied in the process of ensuring the formation of local microgrids of distributed generation. The decentralization of electricity production and the emergence of a wide range of diverse sources and goals determine multiple approaches. The scale of the energy generation subjects does not exclude the provision of coordination of their activities. Such interaction is an effective tool for the efficiency of the equipment used, accelerating its payback and ensuring the reliability of energy supply not only to owners but also to residents of local communities.

At the same time, the organization into a single microgrid of independent energy producers implies the need to solve technical, regulatory, economic, and social problems. Motivation involves the use of specific instruments for distributed energy generation, organization, and functioning (Bauwens and Eyre 2017).

The first set of tasks involved in controlling the creation and maintenance of stable operations for distributed generation pertains to technical and technological support. This includes addressing purely technical limitations and challenges that hinder the coordinated operation of the network system. The second set of tasks focuses on establishing institutional foundations to ensure the coordinated functioning of distributed generation networks. This encompasses efforts to secure social recognition and public support for the development of distributed generation, as well as overcoming sociopolitical, economic, and regulatory barriers to its advancement.

5. Discussion

The policy of forming social support for the development of distributed generation

The policy of forming social recognition and supporting the development of distributed generation involves participation in a wide range of public structures. It combines sociopolitical movements, volunteer organizations, state structures, potential energy producers on a commercial basis, small and medium-sized enterprises, and households (prosumers and ordinary energy consumers). It creates opportunities for access to energy markets. The installation of distributed generation stations by individual enterprises and households contributes to the diversification of the energy supply. The key subjects of the flow are business structures, local territorial communities, small and medium-sized enterprises, and households. A separate consideration deserves a set of tasks related to the sociopolitical, economic, and regulatory aspects of supporting the development of distributed generation. Overcoming the problem of monopoly in the generation and distribution markets implies the need to develop a system of interaction in which the prompt coordination of the interests of various independent entities is ensured. Table 2 shows the dynamic growth of renewable generation in global energy consumption.

Table 2. Share of types of renewable generation in global electricity production, 2024

Renewable generations	Total (TWh)	Share in energy production (%)	Generation per capita (kWh)	Growth in 2024 (TWh)
Hydro	4413,13	14,31	540,85	179,39
Wind	2498,3	8,1	306,14	186,17
Solar	2128,49	6,9	260,82	471,77
Biogeneration	710,61	2,3	87,08	19,54
Other	88,76	0,29	10,88	-0,16

Source: constructed on data from the Electricity Data Explorer (https://ember-energy.org/data/electricity-data-explorer/?fuel=res&metric=absolute&chart=trend#datasets)

Figure 3. Dynamics of the share of renewable generation in selected countries
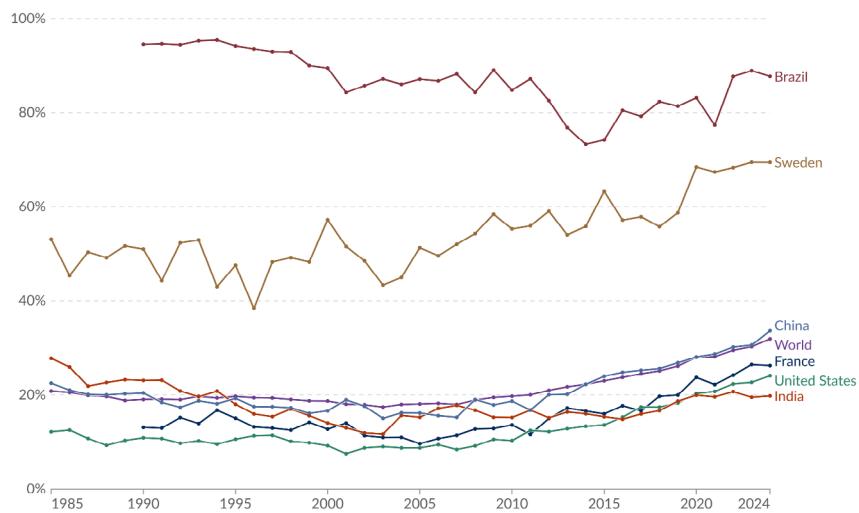
Source: *constructed on the data of Ember 2025; Energy Institute; Statistical Review of World Energy 2024; and OurWorldinData.org/renewable-energy*

Figure 3 illustrates the significant impact that variations in resource potential have on a country's role and position in national energy production. Brazil stands out as a leader in this area, while developed nations such as the USA and France fall below the global average for the share of renewable energy generation. This highlights the importance of establishing

a focused national policy to support the development of distributed generation.

Managing the distributed generation: Ukrainian experience

Since October 2022, more than 50% of Ukraine's energy facilities have sustained considerable damage due to Russian attacks. By 2025, it was reported that 42.8% of the energy generation capacity had been destroyed. The largest occupied facility is the nuclear power plant in Zaporizhzhia (6 GW). Heat generation suffered the most significant losses (87% of coal-fired thermal power plants are irretrievably lost). A total of 2.3 thousand MW of hydro generation capacity was destroyed and damaged. This situation has exposed the vulnerabilities of an energy system based on centralized production and distribution, which heavily relies on large nuclear, thermal, and hydroelectric power plants. In response, both businesses and households have intensified their efforts to ensure their energy security. In 2024, about 1 GW of distributed generation capacity was built in Ukraine. The first half of 2025 saw the implementation of the same number (In the first half of 2025, 2025).

The distributed generation system should be incorporated into Ukraine's unified energy system. Wind, solar, and bioenergy plants and small hydroelectric power plants are examples of renewable energy sources. Various entities may be involved in distributed generation systems, including:

- Business entities specializing exclusively in the production of electricity
- Entities focused on the storage of electricity
- Companies engaged in the sale of electricity
- Entities involved in the purchasing and selling of electricity across all market segments
- Providers of balancing services
- Providers of ancillary services

Additionally, both individuals and legal entities may participate as consumers in this system.

Conclusions

1. The necessary component of the functioning of the economy under external threats and support of sustainable development is the functioning of distributed generation. The state plays a decisive role in ensuring active development.
2. Renewable generation microgrids form the second circuit in the national energy system. The state's efforts are aimed at supporting the restructuring of energy markets.
3. The transition from centralized to distributed generation systems requires the restructuring and strengthening of energy management. This process is complicated by the contradictory nature of the effects of forming distributed generation

microgrids. The state is designed to maximize the influence of the favorable and minimize the role of the negative.

4. The significant potential for ensuring the efficiency and stability of distributed generation is proposed using artificial intelligence.

5. Significant differences in the sources, conditions, and natural and institutional environments of the implementation of renewable generation determine the differentiation of tools and methods for regulating its development. Researching and creatively applying other countries' experiences, considering national specifics, will contribute to strengthening the energy sustainability of the economy.

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DEVELOPING A STRUCTURAL REFORM INDEX FOR ARMENIA: METHODOLOGY AND ECONOMIC IMPLICATIONS

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Abstract. *The purpose of this paper is to develop and analyze a structural reform index (SRI) for the Republic of Armenia, aimed at identifying the trends, sectoral patterns, and underlying dynamics of structural reforms. According to the results of this study, reform activity in Armenia has been episodic and strongly influenced by crisis events, political transitions, and the presence or absence of external policy anchors. Fiscal and financial reforms dominate in contribution, while social and monetary reforms remain underdeveloped. The findings suggest that the sustainability of structural reform efforts in Armenia is constrained by limited institutional capacity, weak implementation follow-through, and reform asymmetries across sectors. The proposed index provides an analytically grounded and replicable instrument for tracking reform momentum and informing public policy design.*

Keywords: *structural reform index, public policy, principal component analysis (PCA), sectoral reform, institutional change*

Raktiniai žodžiai: *struktūrinių reformų indeksas; viešoji politika; pagrindinių komponenčių analizė (PCA); sektorių reforma; instituciniai pokyčiai.*

Introduction

Understanding and measuring structural reforms is essential for tracking institutional transformation and long-term development in post-transition economies. These issues gain urgency in light of global uncertainty, technological change, and rising expectations on governance and fiscal institutions. Structural reforms aim to enhance economic efficiency and resilience by reforming the regulatory and institutional frameworks that govern

public finance, labor markets, and financial systems (Duval 2008, 5; Roland 2000, 12).

Armenia's experience, shaped by the collapse of the Soviet Union, has been marked by deep political and economic transitions. Structural reforms have shaped state capacity and macroeconomic resilience (Aslund 2013, 34; Blanchard 1997, 22). However, reform implementation has often been inconsistent, with episodes of liberalization and donor-led restructuring not always followed by institutional consolidation. Reform progress has been shaped more by external conditions, crises, and political cycles than by a sustained, endogenous reform strategy (Campos et al. 2010, 95; Drazen and Grilli 1993, 600).

Many cross-country indexes (e.g., OECD PMR and Fraser's Economic Freedom Index) provide benchmarking tools but often overlook national specificities, timing, and sectoral depth (Conway et al. 2005, 9). As a result, these approaches may lack granularity for policy evaluation in small, transitional states such as Armenia.

This study addresses that gap by constructing a structural reform index (SRI) tailored to Armenia. Drawing on the IMF's Monitoring of Fund Arrangements (MONA) database, it applies a binary and weighted approach, aggregated through principal component analysis (PCA), to capture sectoral reform intensity over time. In doing so, it offers a replicable tool for tracking reform momentum and understanding how political, institutional, and crisis-related factors shape reform trajectories.

The index aims to provide empirical insights into Armenia's reform dynamics, identify sectoral asymmetries, and highlight the role of external actors and domestic political conditions. It also offers a framework for future policy evaluation and comparative analysis in other post-transition settings.

Literature Review

Structural reforms are widely recognized as a key component in promoting economic efficiency, institutional resilience, and good governance, particularly in post-socialist and developing economies (Duval 2008, 5; Roland 2000, 12). In transition contexts, reforms typically span public administration, financial regulation, labor markets, and social protection systems, all of which are essential for moving from centrally planned to market-based economies (Aslund 2013, 34; Blanchard 1997, 22).

However, the multidimensional and often qualitative nature of reform processes poses challenges for measurement. Initial evaluations relied on narrative assessments or expert-based indicators, such as the EBRD transition scores and the World Bank's governance metrics, which lacked sectoral specificity and temporal granularity (Tompson 2009, 15).

To address these limitations, scholars and institutions have developed standardized indices. Notable examples include the OECD's Product Market Regulation (PMR) index and the Fraser Institute's Economic Freedom Index (Conway et al. 2005, 9). While valuable for cross-country comparisons, these tools often miss country-specific reform timing and institutional context.

Event-based approaches using binary coding improved transparency and comparability. Alesina et al. (2005, 793) and Duval (2008, 5) introduced scoring methods that consider reform depth and ambition, particularly in labor and product markets. Complementary studies, such as Campos and Nugent (2012, 3), emphasized the distinction between reform passage and enforcement, while Anderson et al. (2017, 455) tracked legislative output to measure reform intensity.

To consolidate multiple reform dimensions, many studies have turned to PCA. This technique offers a data-driven way to derive composite indices by reducing dimensionality and generating objective weights (Ostry et al. 2009, 3; Hwang and Sunwoo 2018, 260). Bruno et al. (2018, 10) further applied PCA to assess institutional reform dynamics in post-transition states. Although PCA strengthens rigor, its effectiveness depends on the availability of standardized and well-classified data.

Beyond technical concerns, reform dynamics are shaped by political economy factors. Delayed reforms often stem from distributional conflicts and election-related political constraints (Alesina and Drazen 1991, 1171; Nordhaus 1975, 175; Rogoff 1990, 22). Crisis-driven reform theory adds that shocks can open policy windows for implementing otherwise unpopular reforms (Drazen and Grilli 1993, 600; Campos et al. 2010, 95).

External actors also influence reform direction and intensity. The IMF, World Bank, and EU use structural conditionalities to guide reforms in return for financial support. The MONA database tracks such benchmarks under IMF programs. Studies by Kentikelenis et al. (2016, 545) and Babb and Kentikelenis (2018, 18) analyze both the influence and limitations of such externally anchored reforms.

Despite global progress in reform measurement, there remains a lack of nationally tailored, sector-disaggregated, and time-consistent indices, especially for smaller transition economies such as Armenia. Existing reform assessments tend to be fragmented and narrative-based, limiting their suitability for longitudinal or empirical analysis.

This study fills that gap by constructing a structural reform index for Armenia using binary-coded, weighted MONA benchmarks and PCA. This approach aligns with international standards while providing sector-specific insights into reform scope and timing. It offers a replicable framework for policy evaluation and academic research in the post-transition context.

Research Methodology and Database

To construct the SRI for Armenia, we utilized the IMF's MONA database, which contains over 1,000 records of structural conditionalities under IMF-supported programs since 1995. While MONA does not comprehensively capture all reforms, it offers the most systematic dataset available for Armenia and serves as a strong empirical foundation for reform quantification.

Each reform entry was coded using a binary scale: 1 for full implementation, 0.5 for

partial or delayed, and 0 for non-implementation, following established practices (Alesina et al. 2005; Duval 2008). To reflect their anticipated institutional impact, reforms were also weighted by their systemic importance: minor (0.25), moderate (0.5), or major (1.0).

We categorized reforms into five policy domains: fiscal, financial, social, monetary, and governance-related. For each sector, annual reform intensity was calculated by aggregating the weighted scores. These subindices were standardized using z-scores to ensure comparability across sectors, a crucial step for the PCA.

PCA was then applied to extract the first principal component (PC1), representing the composite SRI. The final index was normalized to a [0,1] scale using min-max normalization for interpretability. The SRI thus captures reform intensity trends over time and across sectors, offering a replicable framework for monitoring structural transformation.

Beyond descriptive value, the SRI can support empirical applications such as examining the relationship between reform intensity and macroeconomic variables (e.g., growth, investment, or institutional quality), and potentially inform policy design in similar transition contexts.

Analysis and Results

Since independence, Armenia's transition toward a market economy has been shaped by multiple waves of structural reform across fiscal, monetary, financial, social, and governance domains. Understanding the evolution of these reforms is crucial for designing more effective and targeted policy interventions.

Between 1995 and 2025, sector-specific reform trajectories displayed distinct patterns. Financial sector reforms experienced notable surges during 2001–2004, 2009, and 2018, primarily driven by efforts to modernize banking supervision, liberalize capital markets, and respond to post-crisis vulnerabilities. Fiscal reforms peaked between 2007 and 2011, a period marked by comprehensive public financial management upgrades and tax system restructuring.

Social sector reforms showed a gradual but consistent increase, particularly after 2004, with key measures targeting pension reform, healthcare systems, and social assistance mechanisms. Although less frequent, monetary reforms peaked in 2006–2007 and again in the early 2010s, aligning with shifts toward inflation targeting and enhanced central bank independence.

Governance-related (other) reforms—including judicial, regulatory, and anti-corruption initiatives—were characterized by volatility. Their most active phases occurred in the early 2000s and post-2018, corresponding to broader institutional modernization efforts (see Figure 1).

These differentiated sectoral trends underscore the importance of disaggregated analysis. They reflect how reform intensity has evolved not only in response to technical priorities but also amid political cycles and external pressures.
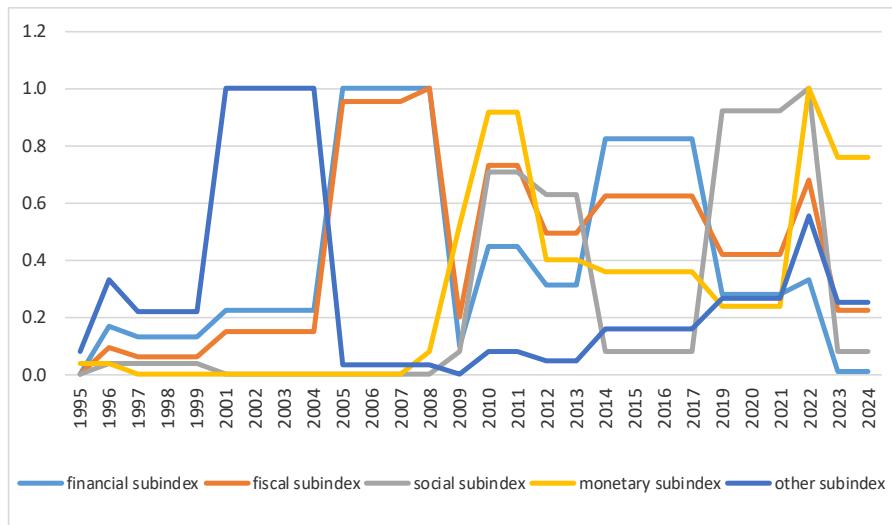
Figure 1. Trends in sectoral structural reform sub-indices in Armenia, 1995–2024
Source: Authors' calculations based on the IMF MONA database

Overall, Armenia's reform landscape has been uneven, with fiscal and financial sectors receiving sustained attention, while social, monetary, and governance reforms remain comparatively underdeveloped. This reflects both domestic policy preferences and external influences shaped by IMF-supported programs. The SRI captures these sectoral imbalances and temporal dynamics, serving as a diagnostic tool to evaluate reform momentum.

Beyond mapping trends, the SRI enables interpretation of reform patterns with broader institutional and political economy conditions. Periods of low or negative index values often coincide with electoral cycles or weakened administrative capacity. Notably, the index aligns with political business cycle theory (Nordhaus 1975; Rogoff 1990), which posits that reform activity tends to decelerate before elections due to short-term political incentives. Thus, the SRI also offers explanatory value by revealing how reforms respond to shifts in political and institutional context.
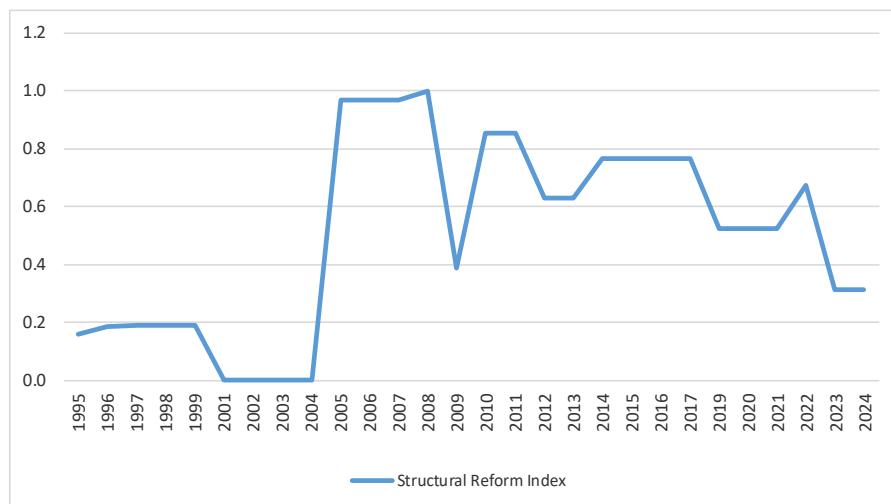
Figure 2. Dynamics of the structural reform index in Armenia, 1995–2024
Source: Authors' calculations based on the IMF MONA database

Analysis of the SRI reveals three major categories of factors influencing Armenia's reform patterns: political business cycles, crisis episodes, and post-revolutionary processes.

Periods of electoral transition—specifically 2007–2008 and 2022–2023—correspond to noticeable slowdowns or stagnation in reform activity. These declines align with the 2008 presidential and 2021 snap parliamentary elections, suggesting that governments tend to delay politically sensitive reforms ahead of elections. This supports the political business cycle theory (Nordhaus 1975; Rogoff 1990), where reform momentum weakens in pre-election periods due to risk aversion and short-term voter considerations.

In contrast, crises have served as key accelerators of reform. Notable post-crisis reform waves occurred in 2004–2007 and 2009–2011, following domestic stabilization and the global financial crisis, respectively. These periods saw increased engagement with the IMF and implementation of structural benchmarks in taxation, public expenditure, and banking regulation. Such episodes illustrate the "window of opportunity" hypothesis (Drazen and Grilli, 1993, 598–607), where crises reduce resistance to reform and realign political priorities.

The post-2018 phase also saw renewed reform efforts, particularly in governance. Driven by political change, reforms targeted public procurement, legal transparency, digital administration, and civil service modernization. However, this momentum was partially reversed after 2021 due to implementation gaps, lack of reform sequencing, and external shocks—including the COVID-19 pandemic and the 2020 Artsakh war—which diverted policy attention toward crisis management.

Persistent underperformance in the social and monetary reform subindices suggests

limited state capacity or political will to undertake redistributive and institutional reforms. This reflects a broader trend identified in the structural reform literature: that socially sensitive reforms face greater resistance due to their political cost.

The SRI thus not only reflects Armenia's reform history but also captures the interaction between reform intensity and underlying political, institutional, and crisis-related dynamics.
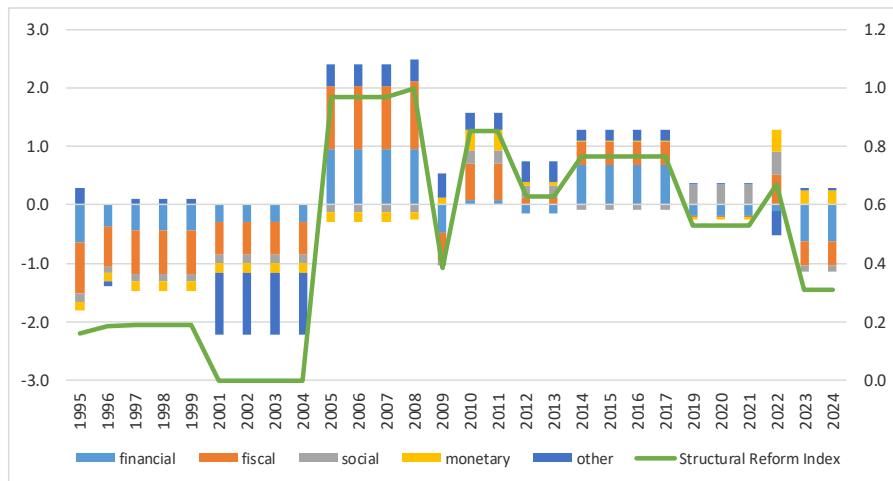
Figure 3. Dynamics of the structural reform index in Armenia and sectoral contributions, 1995–2024

Source: Authors' calculations based on the IMF MONA database

Note: Normalized SRI scaled to [0,1] is not directly decomposable

Examining sectoral contributions to the structural reform index reveals clear asymmetries. Financial and fiscal reforms have been the primary drivers of overall reform momentum throughout the review period, while social and monetary reforms played a more limited role. Governance-related reforms—categorized as "other"—show episodic influence, particularly during institutional reform phases in the early 2000s and post-2018.

These trends underscore the unequal prioritization of reform domains in Armenia, shaped by both domestic policy preferences and international engagement, particularly through IMF programs. Reform waves often coincide with major political transitions or economic shocks, highlighting the combined role of internal and external stimuli in shaping reform intensity.

The SRI thus functions as more than a historical index; it serves as an analytical framework for interpreting reform surges, gaps, and their underlying policy drivers. By tracing sectoral weight and reform timing, the index offers a structured view of Armenia's evolving reform landscape.

Conclusions

1. Armenia's structural reform trajectory has been marked by sectoral imbalances, episodic momentum, and institutional constraints. The structural reform index developed in this study reveals how reform dynamics have evolved over time, with fiscal and financial reforms taking precedence. Social and monetary reforms remain underdeveloped, raising concerns about inclusiveness and long-term resilience.

2. Reform intensity in Armenia reflects both internal and external drivers. Fiscal and financial reforms benefited from international program alignment and feasibility, while social and monetary domains faced political and institutional barriers. The SRI effectively captures the role of political business cycles, crisis windows, and post-revolutionary opportunities in shaping reform waves.

3. The methodological framework applied—combining binary coding, weighted significance, and PCA aggregation—provides a transparent, replicable model for tracking reforms. Beyond descriptive insights, the SRI offers practical value for cross-country comparison, reform diagnostics, and evidence-based policymaking. It emphasizes the need for sustained, balanced reform strategies to ensure economic sustainability and institutional strengthening in Armenia and similar transition contexts.

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THE SIGNIFICANCE OF THE EUROPEAN DIGITAL STRATEGY IN THE CONTEXT OF DIGITAL TRANSFORMATION

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Summary. Digital transformation and data policy are no longer peripheral concerns but strategic imperatives at the heart of the European Union's (EU) digital agenda. More than a technological shift, this transformation signals a fundamental change in governance logic—one where data-driven decision-making, cross-sectoral innovation, and inclusive design shape the contours of public service delivery. Anchored in the European Digital Strategy (EDS), the EU's vision for a digitally resilient society is not merely a regulatory framework but a multidimensional blueprint that connects digital infrastructure with civic value. This article examines how such ambitions materialize on the ground through a case study of Vilnius City Municipality's Smart City initiative, focusing on its Mobility Map project. Through the integration of anonymized real-time mobility data, the platform exemplifies the practical application of EDS principles: transparency, responsiveness, and citizen-centered governance. It also underscores the role of municipalities not as passive implementers but as strategic agents in shaping Europe's digital transformation. Yet, the research highlights persistent asymmetries in local capacity, infrastructural readiness, and policy coherence. The EU's digital vision often collides with on-the-ground realities, from fragmented data systems to ethical dilemmas surrounding automation. The study argues that sustainable and equitable digital transformation demands not only technical proficiency but also institutional reflexivity, ethical safeguards, and adaptive leadership. Vilnius emerges as a microcosm of both the potential and the complexity embedded in Europe's digital future.

Keywords: *digital transformation, European digital strategy, smart cities, data-driven governance, urban mobility, digital infrastructure, smart governance, public sector innovation, local implementation of EU policy, real-time data analytics, citizen-centric services, urban data policy, digital public administration*

Raktiniai žodžiai: *Europos Sąjungos skaitmeninė strategija, skaitmeninė transformacija, viešasis sektorius, inovacijos, išmanusis miestas, miestų valdymas, duomenų politika, dirbtinis intelektas, skaitmeninė strategija, didieji duomenys, duomenimis grįsti sprendimai, strategijos įgyvendinimas, išmanusis valdymas, viešasis administravimas.*

Introduction

Relevance of the Topic. The modern world is inevitably moving toward a digital society, where digital transformation and data policy play a crucial role. As defined by the European Parliament (European Parliament 2024), digital transformation refers to the integration of digital technologies into both business operations and public services, while also shaping broader societal change. In this context, innovation and data-driven decision-making are no longer optional but necessary instruments in rethinking governance and service models. The EDS places particular emphasis on data policy as a strategic enabler of transformation, linking technological progress with societal well-being. In urban governance, this is especially visible in the integration of smart technologies and data infrastructures that support responsive, transparent, and efficient services. The case study presented in this article—the Vilnius City Municipality's digital mobility initiative—illustrates how data-driven approaches are being operationalized to address urban mobility challenges through locally grounded, evidence-based innovation.

Extent of Research on the Topic. Despite its policy centrality, digital transformation remains an emerging field within scientific research. Studies point to a gap between the pace of technological advancement and the development of applicable methodologies to guide its implementation in the public sector. As (Alvarenga 2020) observe, there is still insufficient research on digital governance and knowledge management in public administration. Moreover, empirical case studies from local contexts—especially within smaller EU Member States—are particularly lacking. This article seeks to fill part of that gap by offering practical insight into how digital strategy and data policy are realized at the municipal level. The empirical analysis contributes not only to theoretical discourse but also to actionable recommendations for policymakers, urban developers, and all actors engaged in smart governance. Through the lens of Vilnius, this research explores both the promise and complexity of digital transformation in contemporary urban systems.

Digital Transformation in the European Union

Digital transformation is one of the EU's strategic priorities. The European Parliament (EP) plays a key role in reviewing policies aimed at strengthening Europe's capabilities in emerging digital technologies, unlocking new opportunities for businesses and consumers, enhancing digital skills, and supporting the digitalization of public services, all while

ensuring respect for fundamental rights and values (European Parliament 2024). The core priorities of the EDS include commitments to digital innovation, technology, scientific research, education system modernization, digital skill development, societal digital literacy increase, and data protection and privacy guarantees. Considering these priority areas, the EU is implementing a large-scale digital transformation aimed at strengthening the economy and improving citizens' quality of life. The EU's digital transformation strategy is focused on investments and cutting-edge technologies, such as artificial intelligence (AI), data analytics, cloud computing, and blockchain technologies, which open new opportunities for business and scientific research, while fostering sustainable economic growth and innovation (European Commission 2024). This drives the EU's primary objective, which is to strengthen and maintain its global competitiveness by leveraging its key instrument: digital innovation. The EDS defines digital transformation as the integration of digital technologies into business operations and public services, as well as its broader impact on society (Lanfranchi 2025). Given that digital transformation is essential for remaining competitive, its effective implementation is a strategic necessity.

From Definition to Action: The European Digital Strategy in the Context of Digital Transformation

The absence of a universally accepted definition of digital transformation in academic discourse has been empirically demonstrated by Cheng Gong and Vincent Ribière, who conducted a comprehensive analysis of 134 existing definitions in an effort to establish conceptual consistency.

After conducting extensive research, the scholars define digital transformation as a fundamental change process enabled by digital technologies aimed at radically improving operations and fostering innovation within an organization. This transformation seeks to create value for stakeholders by strategically leveraging key resources and capabilities (Gong and Ribiere 2021).

Researchers Justyna Dąbrowska, Argyro Almpanopoulou, and others define the concept of digital transformation as a socioeconomic shift occurring among individuals, organizations, ecosystems, and society. This transformation shapes the adoption and utilization of digital technologies, influencing the way they are integrated into various domains (Dąbrowska and Argyro 2022).

Researchers Dmitrij Plechanov, Henrik Frank (Plekhanov and Franke 2023), and others, drawing on the perspectives of Erik Brynjolfsson (Brynjolfsson and Hitt 2000), argue that digital transformation occurs when companies utilize digital technologies to develop new or modify existing business models and processes. Additionally, digital transformation supports the evolution of organizational structures, resource management, and relationships with internal and external stakeholders (Holmström 2022).

Although definitions of digital transformation vary among scholars worldwide, they

all consistently emphasize digital technologies and their impact on change processes, the creation of new structures and processes for both businesses and society, and the necessity of adapting to rapidly evolving technological environments to maintain competitiveness in the digital era.

While scholarly debates highlight the conceptual plurality of digital transformation, the EU operationalizes this fluid concept through concrete policy instruments that prioritize scientific research, innovation, and digital capacity building as the foundational pillars of a future-ready society. The promotion of scientific research and innovation is one of the EU's top priorities, with investments in these areas—particularly in digital technologies—playing a crucial role in ensuring Europe's leadership in innovation (European Commission 2024). The Digital Education Action Plan (2021–2027) and initiatives such as the European Research Area reflect the EU's commitment to developing a highly skilled workforce capable of utilizing and advancing cutting-edge technologies. These efforts outline a shared vision for high-quality, inclusive, and accessible digital education in Europe, aiming to support the adaptation of education and training systems to the digital era (European Union 2022). Europe strives for a human-centered, sustainable, and prosperous digital future (European Commission 2024), making digital education and skill development essential for a successful digital transformation. The EU aims to ensure that all citizens have access to essential digital skills (European Commission 2024), promote the modernization of education systems, and enhance access to digital resources and learning platforms. Improving society's digital literacy is fundamental, given the increasing integration of digital technologies into everyday life. The EU emphasizes the need to enhance digital literacy to ensure that every citizen can safely and responsibly use digital services (Mykytyuk and Mykytyuk 2025). EU legislation and measures in the digital space play a crucial role in ensuring the fairness and security of digital transformation. They not only foster innovation and economic growth but also guarantee that the digital society is built upon citizens' rights and freedoms.

The Core Priorities of the European Digital Strategy and Their Local Implementation

Digital transformation within the EU is not merely a technological shift but a value-driven initiative to enhance competitiveness, cohesion, and governance. The EDS defines political and regulatory priorities across all governance levels, yet its true impact depends on local-level implementation. At the heart of EDS lies the strategic use of data. The initiative to create common European data spaces reflects the belief that high-quality, secure, and interoperable data infrastructures can generate public value, particularly in sectors such as mobility, health, and energy (European Commission 2020). In parallel, by 2030, the EU aims to ensure all essential public services are accessible online (European Commission 2021).

AI is also a core element. The EU's AI Act (European Parliament 2025) seeks to foster human-centric, transparent, and trustworthy AI. Additionally, digital skills and inclusion are treated as prerequisites for transformation, with the Digital Decade 2030 setting targets for ICT workforce expansion and baseline digital literacy (European Commision 2025). Finally, digital autonomy and cybersecurity are emphasized as foundations of resilience. Although shaped at the EU level, these priorities are activated through national and municipal agendas. Local governments, far from passive executors, are strategic implementers. Vilnius City demonstrates this through its Smart City program, especially the Mobility Map, which exemplifies EDS-aligned innovation: leveraging real-time anonymized data for optimizing transport systems and enhancing citizens' quality of life.

The Vilnius case illustrates how EDS goals become tangible through data-driven governance. The city's use of urban mobility data directly corresponds with the EU's ambition to treat data as a public asset and a foundation for innovation. Digital transformation is not merely a technical shift but a multidimensional process that requires leadership, structural readiness, policy alignment, and social inclusivity to ensure meaningful innovation and public trust (ly 2025). Likewise, digitalizing public services in Vilnius aligns with the 2030 targets of accessibility and responsiveness.

Plans to integrate AI in mobility management further reflect the EU's commitment to ethical, responsible technology deployment. Citizen participation and digital literacy—integral to EU documents—are embedded in Vilnius' approach. The city promotes inclusion through participatory tools and open-access platforms, while ensuring alignment with EU standards such as the GDPR, fostering trust and digital security.

These parallels demonstrate not mere compliance but active local reinterpretation of supranational policy. Vilnius serves as an implementer and a contributor to the evolving European digital landscape. Ultimately, the EDS's value lies not just in its strategic texts but in its ability to inspire grounded, local innovation. The case of Vilnius highlights how EU-level ambitions can be real through coordinated local action, reinforcing the need for strong interconnection between strategic vision and operational delivery.

Implementation Challenges and Scope Limitations

While the EDS outlines a cohesive vision for digital transformation across the EU, its implementation at national and local levels remains uneven. Structural differences in digital maturity, institutional capacity, and administrative readiness continue to shape outcomes. Legal frameworks alone are not sufficient; effective application depends on organizational preparedness, policy stability, and technological integration (Boya-Lara 2025). A major challenge is the persistent digital capability gap. Many local administrations lack the infrastructure or expertise to integrate EU priorities in areas such as AI, real-time data, and open governance (Dąbrowska and Argyro 2022). Even where the strategy is formally adopted, its implementation is often hindered by fragmented coordination, underfunding,

and public sector inertia (Holmström 2022).

These challenges reflect a broader disconnect between ambitious EU policy and local operational realities. Legacy systems, cultural resistance to algorithmic solutions, and political uncertainty at the municipal level frequently inhibit meaningful progress. Sophisticated digital systems can also introduce technological friction; if not properly aligned with local workflows, they risk partial implementation or even failure.

To explore these dynamics, this article focuses on a single case—Vilnius City—not as a universal model but as an example of how EDS principles are interpreted and applied locally. The case was selected based on two factors: first, the availability of empirical data from the GDPR-compliant Mobility Map project; and second, the format limitations of this article, which precluded broader comparative analysis. Nevertheless, single-case studies carry limitations. While they allow for deep contextual insight, they do not reflect the full variety of digital governance practices across the EU. Future research should address this gap by including more cities with diverse institutional and technological conditions to evaluate how EDS priorities are adopted, resisted, or reinterpreted at local levels.

Research Methodology

This study applied a qualitative case study approach to examine how the EDS is implemented at the municipal level. A case study design was selected because it enables the in-depth exploration of a specific instance of digital transformation in a real-world setting, allowing the researchers to identify not only existing implementation practices but also systemic gaps and areas for future improvement. This approach was most suitable for achieving the study's objective: to uncover how EU-level digital policy is translated into local governance structures and to analyze the institutional, technological, and strategic factors influencing that process. Vilnius City's Smart City initiative—specifically its Mobility Map—was selected as a representative, data-rich example of municipally driven digital transformation aligned with EU policy goals. This platform was chosen due to its exclusivity and the fact that anonymized real-time mobility data are held and processed only by a limited number of authorized entities. The data were collected during the first quarter of 2024 and sourced directly from the platform, which aggregates real-time data from telecommunications providers under GDPR-compliant agreements. These data were selected for their accuracy, objectivity, and relevance to mobility-related service delivery. The analysis employed descriptive and comparative methods to assess how the platform reflects EDS priorities such as data utilization, AI potential, and digital service quality. In addition, strategic document analysis and direct observation were used to contextualize findings and evaluate alignment with EU benchmarks. The combination of multiple sources ensured triangulation of evidence and a more comprehensive understanding of local digital governance dynamics. The reliability of this research was supported by the objectivity of the data, their lawful acquisition, and the transparency of collaboration with municipal actors.

All data were processed in a secure and confidential manner, with full awareness from institutional stakeholders regarding their research use. Alternative methods, such as surveys or interviews, were deemed insufficient for capturing the systemic and infrastructural dimensions critical to understanding policy implementation. By employing case-based and document analysis, this methodology enabled a systemic and context-sensitive examination of how digital transformation unfolds at the urban level, revealing not only structural innovations but also underlying social and institutional changes within the municipality.

Digital Strategy of Vilnius City

The EU has the potential to serve as a global example of a society where business and public sector entities leverage data-driven decision-making to improve outcomes (European Commission 2020). To effectively manage resources, deliver high-quality services to residents, and enhance competitiveness, every city requires a comprehensive digital strategy. The application of a digital strategy in urban governance helps address existing challenges while delivering multifaceted benefits aimed at improving citizens' quality of life. This includes, but is not limited to, better integration of public transportation systems, more efficient waste management, and advanced healthcare services. A well-designed digital strategy positions Vilnius as a global benchmark in digital transformation, utilizing digital innovation to drive progress. The success of this strategy depends on how effectively the city can engage diverse stakeholders in the digital transformation process. The importance of implementing a digital strategy and data policy is particularly crucial for cities, especially Vilnius—the capital of Lithuania—as these approaches foster economic growth and innovation while ensuring citizen well-being, effective urban governance, and sustainable city development. Digital transformation in cities is inevitable, and its success depends on multiple factors, including strategic planning, data policy, technological infrastructure, and citizen engagement. These elements must work harmoniously toward a common goal: creating a smart, sustainable, and vibrant city. The digital transformation of cities and its implementation strategies have received significant attention in scientific research and literature. Studies highlight key benefits and challenges, emphasizing the importance of digital transformation in enhancing urban infrastructure and public services. A central focus is placed on the need to integrate various data sources and technologies to improve quality of life and address urban challenges effectively. In urban planning, the use of big data analytics provides deeper insights into citizen behavior, transportation usage, and environmental quality. Big data and digital technologies are among the most critical elements in the management and planning of smart cities. According to Kandt and Batty (Kandt and Batty 2021), a new generation of big data analytics offers substantial benefits, including real-time forecasting, improved quality of life, and optimized transportation flow. Furthermore, digital technologies integrated into urban governance enable cities to achieve desired outcomes. Sensor networks, connected through the Internet of Things

(IoT) and linked to computational platforms, continuously process large streams of data, facilitating new decision-making approaches. Urban analytics using big data is widely applied in city management and planning, making it a fundamental component of smart city development and governance. The VILNIUS2IN initiative outlines Vilnius' strategic digital direction, emphasizing the importance of an integrated smart city approach. This strategy is based on six core principles and focuses on nine key areas, including: Administration, Mobility, Education, Environment and Urban Development, Culture, Health and Well-Being, Social Protection, Safety and Security, and Economic Development. These focus areas align with the EU Digital Strategy's objectives to strengthen digital infrastructure and services, emphasizing citizen engagement and innovation-driven development. Mobility as a Strategic Priority: Mobility is one of the key strategic priorities in Vilnius' Smart City digital strategy. A significant R&D project, Efficient Mobility Management and Administration in Vilnius, aims to create advanced services for urban transportation. One of its flagship initiatives, the Vilnius Mobility Map, is designed as an interactive platform integrating all available data sources that influence urban movement and transportation. This tool will provide real-time insights and optimize urban mobility management for Vilnius and its surrounding metropolitan area.

Figure 1. Vilnius City Mobility Map. The figure was created by the authors based on the project "Efficient Mobility Management and Administration in Vilnius."

Figure 1 illustrates the Vilnius City Mobility Map, which enables the tracking of transportation intensity across Vilnius, including the movement of cars, public transport, pedestrians, and cyclists. The system allows traffic monitoring over selected time intervals, e.g., daily, weekly, monthly, and yearly. The color intensity of street lines visually represents traffic density, indicating how busy specific streets are at different times.

This project is part of the Smart City vision, developed using cutting-edge technologies and innovations. As a pilot initiative, it aims to become an integral component of smart

city service management and urban planning. The role of the virtual mobility map is essential, as it helps identify and monitor the busiest and most congested areas, allowing for data-driven problem-solving related to urban infrastructure in Vilnius. The mobility map is built on anonymized data provided by mobile network operators.

By analyzing citizen mobility patterns, the system will enable more efficient public transport route planning, optimize traffic light synchronization, and improve overall traffic flow. Additionally, integrating artificial intelligence, such as AI-powered urban analytics, could significantly enhance these capabilities and redefine how cities understand traffic patterns, optimize mobility, and plan infrastructure upgrades, especially when relying on anonymized mobile network data (Umeike 2025). Another key objective of the virtual mobility map is to identify how residents travel to and from specific institutions, detect accident-prone areas, and pinpoint traffic congestion hotspots. The interactive Vilnius City Mobility Map currently does not incorporate AI; however, the integration of AI technologies could significantly enhance autonomous monitoring of problematic areas and issue identification. As noted in research (Vanderhorst 2024), the absence of a unified framework for integrating digital twin and metaverse technologies has resulted in fragmented development, limited accessibility, and inadequate consideration of ethical dimensions such as data privacy and information security, despite the promise these tools hold for improving urban resilience and real-time decision-making. By leveraging machine learning algorithms, AI could help detect pedestrian crossing needs and changes, optimize urban lighting based on real-time mobility data, and improve public safety and well-being in Vilnius.

Additionally, AI could support pedestrian pathway condition monitoring, prioritizing maintenance and repair efforts according to traffic flow intensity. Another critical aspect is mobility forecasting, which would allow for accurate assessments of transportation dynamics and traffic flow patterns. Currently, traffic congestion negatively affects travel time and public safety, making data-driven infrastructure improvements essential for enhancing urban mobility and optimizing transportation planning.

Conclusions and Recommendations

This study shows that digital transformation is a structural shift and not only a technological change, which is vital for modern public governance. The EDS aligns innovation with institutional reform through data-driven services. The Vilnius case highlights both public value creation through smart mobility and challenges such as local capacity gaps, resistance to change, and ethical risks in automation.

To enhance policy relevance, several actionable recommendations are proposed:

1. Strategic Alignment Across Levels: National and municipal authorities should harmonize digital transformation goals with EDS priorities through integrated policy frameworks and resource planning.

2. Strengthen Local Capacities: Invest in digital skills and infrastructure at the municipal level to reduce technological asymmetries between EU regions.
3. Institutionalize Feedback Loops: Introduce mechanisms for continuous monitoring, citizen feedback, and agile adaptation of digital strategies.
4. Ethical Governance: Establish clear ethical standards and oversight mechanisms for data use, algorithmic transparency, and AI integration in public services.
5. Pilot and Scale: Use cities such as Vilnius as experimental sandboxes to test scalable digital innovations before broader EU-wide adoption.

Future research should explore comparative case studies across diverse EU cities to better understand how EDS principles adapt to differing sociopolitical and infrastructural contexts. Policymakers and urban planners are encouraged to move beyond compliance-based implementation and instead treat digital strategy as a living, evolving system that must remain responsive to citizens' needs, risks, and values.

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FROM BORDER CONTROL TO POLICY INNOVATION: RETHINKING IMMIGRATION THROUGH THE SELECTIVE RISK-BASED RESILIENCE FRAMEWORK IN INDONESIA

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Abstract. *This article introduces the Selective Risk-Based Resilience (SRBR) framework as a critical and context-sensitive approach to immigration governance in the Global South, with Indonesia, specifically Bali, as a key case. Rooted in theories of biopolitics, securitization, and postcolonial bordering, SRBR explains how the state regulates foreign mobility not merely through legal enforcement but through cultural values, moral narratives, and selective risk classification. Drawing on critical discourse analysis of government documents, media coverage, and interviews with immigration officials, the study uncovers how migration control in Bali operates as a mechanism to maintain institutional legitimacy and cultural identity amid limited administrative capacity. Beyond its theoretical contribution, this study highlights how SRBR can inform more adaptive and locally grounded public policies. It offers practical insights for policymakers to develop selective visa regimes, enhance community-based monitoring, and align immigration governance with public values. In this way, SRBR supports a more balanced model of migration management that respects both national resilience and human security and has the potential to be applicable across the Global South.*

Keywords: *Selective Risk-Based Resilience, SRBR, immigration governance, public policy, administrative reform, human security*

Introduction

In the past two decades, border management and human mobility have become one of the most crucial issues in global policy. The tension between the right to mobility and the demands of state security continues to increase with the expansion of the migration crisis, digital transformation, and unconventional threats to national sovereignty (Geddes and Scholten 2016; Collyer and King 2015). However, the dominant approach to migration surveillance is still heavily influenced by the security architecture of the Global North, which emphasizes exclusion based on legal status and militaristic logic, even in the context of developing countries in the Global South (Jones and Johnson 2016).

The Global South countries face a different dilemma. On one hand, they are required to be open to the influx of tourists, workers, and international investments. On the other hand, they are overshadowed by sociocultural risks and a legitimacy crisis if they are perceived as too permissive towards foreign mobility (Achiume 2019; Nail 2016). The disparity in institutional capacity, pressure from local morality, and the absence of a contextual oversight framework have often led developing countries to uncritically replicate the exclusion models of the Global North, without considering domestic complexities.

Indonesia, particularly Bali Province, provides a highly relevant empirical context. This island has become a center for tourism-based economic growth (contributing to nearly 50% of the tourist population in Indonesia), but it has also become a hotspot for value conflicts between global mobility and local norms (BPS-Statistics Indonesia Bali Province 2025; Bangso et al. 2023; Hanita et al. 2024). Phenomena such as the proliferation of digital nomads working illegally with tourist visas, selective expulsion of expatriates who violate local moralities, and the "proper behavior for tourists" policy promoted by local officials demonstrate the contestation between economic openness and cultural protection. In practice, immigration in Bali now operates not only through legal logic but also through moral and symbolic filtration (CNA 2024).

Table 1. Comparison of the Number of Foreign Visitors to Bali and Indonesia

Year	Number of foreign visitors to Indonesia	Number of foreign visitors to Bali
2022	5.889.031	2.155.747
2023	11.677.825	5.273.258
2024	13.902.420	6.333.360

Source: BPS-Statistics Indonesia Bali Province (2025)

Unfortunately, until now, there has been no theoretical framework capable of explaining this complex dynamic holistically, namely, one that encompasses the discursive, technocratic, and symbolic dimensions of migration surveillance in developing countries. The classical securitization model (Buzan et al. 1998) is too focused on existential threats to the state, while the risk society theory (Beck 1992) and resilience theory (Chandler 2014) fail to capture the dynamics of selectivity based on local values and moral politics.

Therefore, this article proposes Selective Risk-Based Resilience (SRBR) as an alternative framework for understanding migration control practices in the Global South. SRBR is a governance framework that explains how Global South states manage migration not solely through legal-administrative procedures but through context-driven risk discourses, moral filtering, and symbolic legitimacy. Integrating grand theories of biopolitics, middle-range concepts such as securitization and pre-emptive governance, and applied frameworks such as symbolic bordering and selective mobility regimes, SRBR conceptualizes migration control as a layered strategy of resilience. Rather than replicating the security models of the Global North, SRBR reveals how states such as Indonesia articulate immigration governance as an adaptive response to sociocultural pressures, institutional capacity limits, and the demand for public legitimacy.

This article contributes to the literature in two ways: first, theoretically, it expands the scope of security and migration studies by explicitly bringing the Global South context into the theoretical design; second, practically, it offers an analytical model that can be adapted by other developing countries in designing more selective, effective, and domestically rooted migration policies. This study employs a critical case study approach, using critical discourse analysis (CDA) techniques on policies, official narratives, and immigration practices in Bali.

The structure of this article is divided into five main sections: after the introduction, the second section presents a literature review highlighting the theoretical gap in migration and security literature in the Global South while introducing the SRBR theoretical framework; the third section explains the research methodology; the fourth section presents the results and analysis from the Bali case study; and the fifth section concludes with theoretical reflections and policy implications.

Literature Review: Theoretical Gap and the SRBR Framework

The literature on contemporary international migration is dominated by the experiences and frameworks of the Global North, particularly Europe and North America (Oliveira Martins and Strange 2019; Boswell 2007a, 2007b). This approach focuses predominantly on refugees, terrorism, and external border control, applying a logic of securitization that emphasizes exclusion based on legal status and militaristic paradigms (Buzan et al. 1998; Lemberg-Pedersen 2019). However, as Squire (2010) argues, migration surveillance is not solely a response to factual threats but also a symbolic and discursive process through

which states classify who is considered risky or legitimate.

In the context of the Global South, especially postcolonial countries such as Indonesia, the logic of surveillance is more complex. It is not only rooted in geopolitical security but also deeply encompasses cultural protection, public morality, and social stability (Achiume 2019; Landau and Freemantle 2010). This creates a fundamental point of tension: these states are pressured to be open to tourists and investment while facing a legitimacy crisis if perceived as too permissive (Achiume 2019; Nail 2016). The resulting governance challenges are distinct, as summarized in Table 2.

Table 2. Comparative Migration Logic of the Global North and South

Aspects	Global North	Global South
Foundational Principle	The "Liberal Paradox" (tension between open markets and closed borders)	Postcoloniality, state formation, and structural dependency
Key Policy Mechanism	Externalization and militarized border control	Typology of regimes (Nationalizing, Developmental, and Neoliberal)
Primary Motivation	Control and containment, framed by security and humanitarianism	State-building, economic development, and capitalization on mobility
Historical Parallel	Transatlantic slave trade and 19th-century suppression efforts	Colonial legacies and unequal global power structures
Primary Challenge	The internal contradiction of liberalism and democratic accountability	Structural dependency and the risk of reproducing internal inequalities

Source: Bastia and Piper (2024), Gisselquist and Tarp (2019), Adamson and Tsourapas (2020), Lemberg-Pedersen (2019)

As Table 2 illustrates, migration governance in the Global South is characterized by adaptive operations, complex multi-level actor landscapes, and a policy focus that is highly responsive to local dynamics and internal stability. While concepts such as selective mobility regimes (Mau et al. 2015) and symbolic bordering (Yuval-Davis et al. 2018) help explain the discriminatory and non-physical nature of modern borders, they remain grounded in the experiences of the Global North. Similarly, the literature on resilience positions it as a technocratic form of risk management (Chandler 2014), often depoliticizing the cultural repression and inequalities hidden within it.

While theories of securitization and risk society effectively explain the securitizing logic of Northern states, they remain largely silent on the moralizing logic prevalent in postcolonial contexts such as Indonesia. These frameworks accurately describe how states exclude based on legal or terrorist categories but fail to capture how exclusion is justified through discourses of cultural disrespect and public morality. This gap is particularly evident in the literature on resilience, which often overlooks how "resilience" is mobilized to protect symbolic and cultural boundaries, not just physical or economic ones. It is precisely this

gap, the theorization of a morality-driven, culturally grounded selectivity, that the SRBR framework seeks to fill.

To address this theoretical and practical gap, we propose the SRBR framework. SRBR explains how migration control in the Global South is shaped not only by institutional capacity but also by moral values, cultural narratives, and the politics of legitimacy. It bridges critical theories with the grounded governance challenges faced by countries such as Indonesia, offering an interpretive tool that is both analytical and applicable.

SRBR integrates theories across three layers: grand, middle, and applied. These are used to analyze migration governance that includes discourse, institutional logic, and symbolic practices. As detailed in Table 3, rather than being elaborated in isolation, these theories are linked directly to the three core analytical pillars of the SRBR framework: 1) Risk Discourse Production; 2) Mobility Selectivity; and 3) National Resilience.

Table 3. Theoretical Layers of the SRBR Framework

Theory Layer	Key Concepts	Brief Description	Contribution to the SRBR Pillar
Grand Theory	Biopolitics (Kelly 2010)	The state regulates population and life through supervision, classification, and regulation of the body.	The philosophical basis for Risk Discourse Production: migration is framed as an object of state intervention.
Middle Theory	Securitization (Buzan et al. 1998)	The state makes migration a security issue through the construction of a threat discourse.	Supporting Risk Discourse Production and explaining the narrative of migrant threats.
	Pre-emptive Justice (Zedner 2007)	Actions are taken before the risk occurs, based on potential threats.	Provides the basis for Mobility Selectivity and preventive interventions.
	Governance of Unease (Bigo 2002)	The state manages social uncertainty with surveillance of the "foreigners."	Relevant for National Resilience based on symbolic stability.
Applied Theory	Selective Mobility Regimes (Mau et al. 2015)	Global mobility access is highly selective based on status, nationality, and "capital passports."	Provides a direct foundation for Mobility Selectivity.
	Symbolic Bordering (Yuval-Davis et al. 2018)	Borders are not only physical but are shaped through symbols, narratives, and social norms.	Supporting Risk Discourse Production and discursive understanding of exclusion.
	Human Security (Gasper and Gómez 2015)	Security is defined as the protection of sociocultural dignity and values.	Legitimizing National Resilience as a legitimate interest of developing countries.

As summarized in Table 3, the SRBR framework synthesizes theories across three levels to form three core analytical pillars: 1) Risk Discourse Production, 2) Mobility Selectivity, and 3) National Resilience. These pillars provide the conceptual architecture for understanding immigration governance in the Global South.

To translate this theoretical architecture into an empirical research tool, each pillar is operationalized using a set of analytical indicators. These indicators, detailed in Table 4, serve as the specific empirical entry points for applying the SRBR framework. They guide the collection and analysis of data, allowing us to trace how abstract concepts such as "securitization" or "symbolic bordering" manifest in the concrete language of officials, the logic of visa screenings, and the rhetoric of cultural protection.

Table 4. Analytical Indicators for SRBR Application

SRBR Pillar	Analytical Indicators
Risk Discourse Production	Officials' narratives, media framing, and immigration policy language
Mobility Selectivity	Visa classification, surveillance operations, community reports, and selection logic
National Resilience	Cultural rhetoric, local morality, and symbolic social security

This operationalization is what enables the application of SRBR to a specific case study, such as Bali. The indicators outlined in Table 4 form the basis for the critical discourse analysis that follows, allowing us to systematically examine texts, institutional practices, and symbolic dynamics in the field.

Research Methodology

This study utilizes a critical qualitative methodology with an exploratory case study strategy, facilitating the evaluation and development of the SRBR framework within the actual context of migration policy in Indonesia. This design was used because SRBR is a novel conceptual framework that has not been thoroughly empirically validated and necessitates comprehensive observation of the state's symbolic and institutional behaviors. Case studies are seen not as statistical generalizations but as "transferable conceptual insights" (Flyvbjerg 2006; Yin 2018).

Bali was selected due to its status as a highly dynamic site within the context of modern Indonesian migration, characterized by the influences of international tourism, the presence of foreign nationals under diverse visa categories, and local moral governance. This location exemplifies a postcolonial filtering hotspot, where migrant selection is executed through a synthesis of security narratives, cultural ethics, and symbolic considerations (Achiume 2019; Nail 2016). Bali serves as a trial ground for a massive immigration

surveillance activity, such as *Jagratara* operations. The scale of these operations underscores their centrality to the SRBR model. According to a press release from the Directorate General of Immigration, the nationwide *Jagratara* operations in Q3 of 2024 resulted in the scrutiny of over 1.293 foreigners within 507 surveillance areas. Over 400 people were deported from Bali, and while not all were for moral violations, officials noted that a significant portion was initiated by community reports of "inappropriate behavior," demonstrating the tangible effects of public discourse on enforcement attempts (Humas Direktorat Jenderal Imigrasi 2024; NusaBali.com 2024; Wilson 2024).

Bali, as a component of the Global South and intricately linked to the movement of the Global North, facilitates empirical examination of the SRBR framework, which underscores selectivity, social resilience, and the discursive construction of risk. Data were gathered through semi-structured interviews, categorized as shown in Table 5 below.

Table 5. Informant Categorization

Informant Code	Role and Affiliation	Experience	Interview Date	Focus of Interview
INF-1	Chief of Central Immigration Investigator, HQ	15 years	May 23, 2025	National policy, high-profile cases, and ops
INF-2	Senior Policy Analyst, HQ	15 years	May 23, 2025	Visa policy formulation and regulatory frameworks
INF-3	Chief of the Forensic Digital Identification Team, HQ	15 years	May 23, 2025	Cyber patrol and data-driven risk assessment
INF-4	Head of Enforcement, Immigration Office Ngurah Rai	18 years	May 23, 2025	Field operations (e.g., *Jagratara*) and deportations
INF-5	Visa Screening Officer, Immigration Office, Ngurah Rai	12 years	May 27, 2025	Visa application review and risk indicators
INF-6	Public Relations Officer, Immigration Office, Ngurah Rai	16 years	May 26, 2025	Community reports and media relations
INF-7	Chief of IT, Immigration Office, Ngurah Rai	15 years	May 15, 2025	Surveillance systems and data integration
INF-8	Senior Lecturer, Immigration Polytechnic	16 years	July 10, 2025	Critical assessment of policy and legal foundations

A small and elite interview approach was employed, as the research aims to uncover institutional discourses and rationalities rather than to achieve statistical generalizability. The eight informants were selected for their direct involvement in policy formulation, field operations, and critical analysis, ensuring a holistic view of the SRBR mechanism. Data saturation was indicated when interviews yielded redundant information concerning the core themes of risk, selectivity, and resilience.

Data were analyzed using Fairclough's (1995) three-level CDA framework: 1) textual analysis of linguistic features; 2) discursive analysis of institutional narrative production; and 3) sociopolitical analysis linking discourse to power structures. Each data point is encoded utilizing NVivo 12 software to discern narrative patterns and discourse classification, subsequently organized into the three pillars of SRBR: Risk Discourse Production, Selectivity Regime, and National Resilience.

To guarantee the accuracy and dependability of the data, source triangulation was performed using interviews, official documents, and media analysis. Member checking was conducted on select key quotations to verify accuracy. All research procedures comply with the relevant social research ethics code, encompassing informed permission, secrecy of identification, and the right to withdraw from the study at any point. The researcher acknowledges their role as a citizen and a non-neutral academic, thereby actively employing reflexivity in the interpretation process. The power dynamics between the researcher and state informants (officials) are acknowledged as integral to the framework of postcolonial research. Consequently, this methodology not only conforms to the standards of academic rigor but also facilitates the empirical implementation of the SRBR framework. This section will show the results of a field study that incorporates the narratives of state actors, risk representation, and surveillance practices related to international mobility in Bali.

Results and Discussions: Application of Critical Discourse Analysis in SRBR

The CDA approach used in this study follows the three-layered model of analysis: textual, discursive, and social. At the textual level, the study examined the language used by informants, particularly keywords, metaphors, and repeated phrases such as "misbehaved foreigner," "disrupting culture," or "Bali is not a free place." At the discursive level, the analysis traced how narratives were circulated through media reports, community complaints, and inter-agency coordination meetings, revealing how certain discourses gained institutional traction. Finally, at the social level, the study connected these discourses to broader dynamics of postcolonial identity, legitimacy, and risk governance in Indonesia, particularly in the context of mass tourism and cultural preservation. These three layers were not treated separately but iteratively woven through the SRBR analytical pillars.

The coding process followed three stages:

1) Open coding: Meaningful phrases and expressions were extracted to form initial themes (e.g., "viral foreigners," "sacred site violations," "investor one man show," and "middleman villa").

2) Axial coding: These codes were grouped around SRBR sub-dimensions such as moral risk, cultural legitimacy, procedural ambiguity, and local collaboration.

3) Selective coding: Key storylines and dominant rationalities were identified to explain how the state constructs, interprets, and responds to perceived migrant risks.

This layered coding process enabled a robust mapping of how risk, legitimacy, and resilience emerge not only from legal violations but also from symbolic and moral interpretations shaped by local culture and public expectations. For instance, Informant 1, a national-level official with field experience in Bali, observed, "Many viral cases... foreigners start to take over businesses at the micro or small level." This quote illustrates how economic domination by foreigners is perceived as a form of social threat, reinforcing the risk discourse dimension of SRBR. Similarly, the perception of cultural disrespect was highlighted by Informant 5: "We have received reports from the community about the '*bule*' (foreigner) appearing to harass the local culture, even though it is not necessarily a violation of the law." Here, public perception alone, even without legal evidence, becomes a trigger for state action. This reveals a pre-emptive governance logic aligned with the selective mobility pillar of SRBR, where cultural legitimacy becomes a condition for inclusion.

Another layer of SRBR is seen in the use of technology as anticipatory control, shown in Informant 3's description: "We have also done pre-emptive... with cyber patrol... from open source in cyberspace." This suggests that risk classification is now shaped by digital behavior and national origin, representing the anticipatory resilience logic embedded in current surveillance infrastructures. Lastly, Informant 7, a high-level IT and immigration official, stressed the balancing act between openness and sovereignty: "We support openness but also ensure that Indonesia's cultural and legal sovereignty is not compromised." This confirms that resilience in immigration governance is not merely technical but also symbolic and moral, ensuring that global mobility aligns with local value systems.

Through these excerpts, the study demonstrates how the SRBR framework operationalizes discourse and policy by embedding risk perceptions into governance rationales. CDA has proven effective in capturing these layered dynamics, and the open coding process provides a transparent pathway from raw data to conceptual abstraction.

- **Risk Discourse Production**

CDA of informant transcripts revealed that the state produces risk categories of foreigners not only based on violations of the law but also local moral and manneristic narratives. Informant 1, the chief of Central Immigration Investigator, stated, "If foreigners are drunk or naked in a place of worship, it is not only a violation of ethics but also a violation of our identity as a nation." This statement reflects how surveillance practices against migrants are situated within a framework of collective morality, rather than simply positive law. In SRBR, this shows the work of the Risk Discourse Production pillar formed from the synthesis of securitization theory and symbolic bordering (Buzan et al. 1998; Yuval-Davis

et al. 2018). Informant 2, who works at the headquarters, added that in some cases, a visitor who causes social unrest, for example, can be detained based on public exposure, so that the framing of the public and the media is the basis for the legitimacy of intervention. Phrases such as "wild *bule*" (misbehaved foreigner), "disrespectful digital nomads," and "norm breakers" often appear in discussions and news, reinforcing the discursive logic of selection and restriction (Direktorat Jenderal Imigrasi 2021; Indo Bali News 2024; Metro TV 2023; Direktorat Jenderal Imigrasi 2023). The results of the coding show the dominance of the themes of "morality," "social disturbance," and "cultural framing" as the foundation for the production of risk discourse.

- **Selectivity Regime and Adaptive Surveillance Practices**

The second pillar of SRBR, Mobility Selectivity, is evident in administrative filtering practices that combine spatial data, institutional intuition, and local symbolic pressures. Informant 6 mentioned, "Bali Immigration implements a selective visa policy to screen which foreigners are beneficial to the country, and if it harms the community, we will definitely deport them." This shows the implementation of a risk-based selection regime that looks not only at the documents but also at the individual's background, behavior, and potential for social disturbances. Operation *Jagratara* and the strengthening of community-based supervision by TIMPORA (Foreigner Surveillance Team) are the main instruments that allow the adaptation of institutional responses to various profiles of migrants. Thematic coding shows a strengthening of the themes of "preventive intervention," "risk classification," and "social reporting," which emphasizes that Indonesia's surveillance model is not neutral but rather highly contextual and selective. This is in line with the logic of pre-emptive governance (Zedner 2007) and selective mobility regimes (Mau et al. 2015) that form the heart of this pillar.

- **National Resilience and Sociocultural Justification**

The last pillar in the SRBR framework, National Resilience, emerges through the articulation of the discourse of "protection of local culture" voiced by almost all informants. In addition, Bali's governor (2025) asserts, "Bali is a home that is open to foreign tourists. However, everyone who comes to Bali is obliged to respect local laws, customs, and culture. There is no room for actions that disturb public order, let alone endanger the community." This speech shows how the security discourse has shifted from the issue of physical threats to the protection of local norms, culture, and morality. The concepts of human security (Gasper and Gómez 2015) and governance of unease (Bigo 2002) work simultaneously to explain this phenomenon, and the state acts as a protective agent of social discomfort not just a physical gatekeeper. Coding detects high frequencies in the categories of "cultural protection," "symbolic legitimacy," and "public propriety" as the basis for the state's exclusive actions. Even the chief of IT at the Immigration Office (INF-7), a local official, emphasized, "Surveillance is not a symbol of tension, but... maintaining state sovereignty and harmony in a pluralistic society." This strengthens the argument that SRBR is able to explain the dimensions of non-material protection that have been missed in conventional migration approaches.

- **Internal Dynamics and Institutional Fragmentation**

The effectiveness of SRBR in practice depends heavily on the coordination capacity between agencies. The second pillar of SRBR, Mobility Selectivity, is evident in adaptive yet often contradictory practices. As a local visa officer (INF-5) noted, the intent is to "screen which foreigners are beneficial." However, this selectivity is not a purely technocratic process. It is fundamentally shaped by what Informant 8 termed "epistemic conflict" between the logic of open economics and cultural securitization. This internal tension is a defining feature of SRBR in practice. For instance, while Operation *Jagratara* represents a strict enforcement logic, its implementation is often asynchronous with tourism promotion campaigns run by a separate ministry. This "regulatory ambiguity" is not a failure of the system but rather the very context within which SRBR's adaptive resilience is negotiated. The state's ability to navigate this internal friction, for example, by deporting a viral offender to placate public outrage while simultaneously welcoming investors, demonstrates SRBR's core function: maintaining legitimacy amid competing pressures. Informant 4 commented, "Through an integrated, synergistic, and firm approach, it is hoped that Bali can remain a safe and comfortable destination for foreign tourists and investors."

- **SRBR as an Adaptive and Contextual Framework**

Despite this complexity, field data show that the SRBR approach provides a fairly adaptive framework in responding to these tensions. The chief of the Forensic Digital Identification Team (INF-3) stated, "We have started using risk mapping, intelligence data from the center, and community reports. So not all foreigners are treated equally." This marks a shift from a generalization-based approach to context-based selection logic. SRBR serves not as a universal formula but as a heuristic framework that allows for local adaptation to migration challenges. One of the SRBR's strengths, as seen from these results, is its flexibility in accommodating sociocultural pressures, limited resources, and the need to maintain a national image. Coding also supports the strengthening of the core themes of "contextual adaptation" and "institutional resilience," two indicators that are the foundation of policy effectiveness in developing countries.

- **Social Legitimacy and Symbolic Effects of SRBR**

One of SRBR's strengths is its ability to build social legitimacy in the midst of local communities that feel culturally threatened. The operationalization of SRBR can be traced through a specific case that occurred in Tabanan Regency in mid-2022, when a foreign national posted a video of himself climbing a sacred banyan tree near a Hindu temple on social media (CNN Indonesia 2022; Kompas.com 2022). The process unfolded as follows:

1) 1) Risk Discourse Production: The video went viral on local Balinese social media channels. The discourse was framed not around a specific law but around terms such as "*tidak sopan*" (disrespectful) and "*merusak kesakralan*" (destroying sacredness).

2) 2) Mobility Selectivity: The viral discourse triggered institutional action. Community reports flooded the TIMPORA network, which were then formalized into a report for the Ngurah Rai Immigration Office (INF-6). The individual was flagged

not for a specific visa violation initially but under a broader category of "potential public order disturbance."

3) 3) National Resilience: The immigration office's subsequent investigation and eventual deportation of the individual was publicly justified by Informant 4 as necessary to "maintain harmony and respect for local cultural norms," directly invoking the rhetoric of sociocultural protection.

This case exemplifies how SRBR functions: a moral transgression, amplified through digital media, is converted into an administrative risk category, leading to a selective enforcement action that reinforces the state's role as the guardian of cultural resilience.

This shows that migration policy in Bali is not only about human mobility but also about the symbolic security of the local community. Within the framework of SRBR, the pillars of National Resilience are not read solely as physical protection but as value protection, a concept derived from the theory of human security and postcolonial power. The narrative of local morality, customs, and ethics became a powerful instrument of legitimacy, and the coding results showed a strong correlation between "selective action" and the themes of "social legitimacy" and "protection of local identity." Thus, SRBR allows the government to respond to public unrest without sacrificing policy rationality.

- **Critical Evaluation and Regionalization Prospects**

However, the effectiveness of SRBR also faces structural limitations. Informant 8, a senior lecturer at Immigration Polytechnic Indonesia, argues, "This framework is good, but we still lack an integrated data system. So sometimes decision-making is not completely evidence-based. Moreover, our immigration law confirms that preventive and repressive actions can be carried out just based on suspicion." This indicates the need to strengthen digital capabilities and coordination between sectors if SRBR is to be used as a long-term policy. Outside the Indonesian context, these results suggest that SRBR has the potential to be translated to other Global South countries facing similar pressures, i.e., economic openness, resource constraints, and local value protection challenges. The potential for regionalization under the ASEAN Migration Governance Framework is promising, particularly if advanced through policy interoperability indicators, collective risk management, and the enhancement of institutional capacity. With its multi-pillar structure and contextual flexibility, SRBR can be an alternative framework to the dominant hard security-based exclusion model in the Global North.

- **Academic and Policy Implications**

The main contribution of this study lies in the development of the theoretical framework of SRBR as a hybrid approach in migration and security studies. By combining biopolitical, securitization, and postcolonial filtering perspectives, SRBR offers an alternative to the threat-based securitization model widely developed in the Global North (Buzan et al. 1998; Yuval-Davis et al. 2018). SRBR shows that the logic of surveillance in the Global South is not always imitative but can evolve contextually based on local values, cultural pressures, and the tension between economic and moral logic.

In addition, this study expands the application of CDA in migration policy studies by

displaying the relationship between discourse practices, policy regimes, and postcolonial sociopolitical structures. As a result, SRBR can be seen not only as an analytical tool but also as an epistemological contribution to critical migration studies, especially in filling the gap between bordering studies and global governance in the Global South region (Achiume 2019; Nail 2016).

From a policy perspective, the implementation of SRBR in Indonesia, particularly through the Bali case study, shows that selective, risk-based, and sensitive migration management can strengthen public legitimacy while maintaining social stability.

Some policy points that can be drawn are as follows:

1) 1) Need for a data-driven migrant risk classification system: The implementation of SRBR requires integrated spatial, historical, and social intelligence data to make accurate and fair selective decisions.

2) 2) Strengthening the capacity of local immigration institutions: The state needs to invest in training and coordination between institutions (immigration, tourism, intelligence, and local government) so that the implementation of selectivity is not discriminatory but proportional.

3) 3) Integration of local values and norms in policy: The SRBR emphasizes that successful migration policies in developing countries must respect local cultural values, without falling into discrimination or xenophobia. This is a strong argument for strengthening human security-based regulations.

4) 4) Regionalization of SRBR within the ASEAN framework: The SRBR model has great potential to be adapted by ASEAN countries facing similar dilemmas. Cooperation mechanisms between immigration, information sharing, supervision systems, and standardization of risk indicators can be the first step in regional implementation.

By drawing on Indonesia's concrete experience and demonstrating the effectiveness of the SRBR framework in addressing the tensions between global mobility and local security, this study offers a new direction for more adaptive, equitable, and contextual migration policy formulation in the Global South.

Conclusion

- The SRBR framework moves beyond the outdated binary that views Global South immigration governance either as a weak imitation of Northern securitization models or as merely chaotic and corrupt; it provides a dedicated theoretical tool for contexts where these existing models fall short.

- SRBR allows us to see that what appears as institutional ambiguity or inconsistency (e.g., deporting a tourist for a viral post while welcoming digital nomads) is not a failure of governance; it is, in fact, a sophisticated strategy of adaptive resilience to navigate complex pressures.

- The framework provides the analytical lens to identify and analyze borders not just in laws and fences but in everyday practices, such as community complaints, media narratives, and the moral judgments of local officials. It takes cultural sovereignty seriously as a legitimate security imperative.
- SRBR equips policymakers to design and evaluate migration policies based on contextual legitimacy rather than just technical compliance or imported models. It advocates for policies that are effective because they are seen as fair and protective by the local populace.
- By centering the experiences of the Global South, SRBR does more than offer a new model; it challenges the entire field to rethink its core assumptions about what constitutes effective, equitable, and resilient migration governance in a diverse world.

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PROFESSIONALISM AND TRANSPARENCY OF THE BUREAUCRACY'S ACTIVITIES

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Abstract. *Professionalism in the public administration system is an important factor in the efficiency of state and municipal bodies, as well as the most important factor in maintaining public trust. In modern conditions, governments around the world have complex challenges, which is why the role of professional civil servants increases. Transparency is another factor in increasing efficiency in the public administration system, since it ensures the accountability of public authorities to society, and this directly affects public trust in government bodies. This article considers the theoretical foundations of professionalism and transparency of bureaucracy in the public administration system, as well as the actual aspects of their implementation in the Republic of Kazakhstan. The purpose of this article is to assess the state and problems of professionalism and transparency of bureaucracy in the public administration system of the Republic of Kazakhstan at the present stage. To achieve the goal of the article, the theoretical aspects of professionalism and transparency of bureaucracy are considered, and*

the analysis and assessment of professionalism and transparency of bureaucracy in the public administration system of Kazakhstan are carried out.

Introduction

Professionalism and transparency are key factors for the successful and efficient operation of public administration bodies (bureaucracy). These qualities are important for a number of reasons. For bureaucracy, professionalism means the competence of civil servants (a high level of qualification) and the effectiveness of their work in the civil service (taking into account the possibility of solving problems and saving resources). In addition, a high level of qualification allows civil servants to effectively solve the tasks of public administration set before them, improving the quality of work and public services for the population and business. A clear understanding by civil servants of their role and responsibilities contributes to the stable functioning of the state administration system. For example, the continuous professional development of civil servants in the state administration system and their physical training (intellectual sports and game sports) form a fair and reasonable civil servant structure. In order for a human being to use their physical resources to the maximum, they undergo special sport-related physical training. Behind every decision made in the creation of a professional state apparatus, a special role is played by stable, healthy, and mentally sound civil servants who are necessary for the implementation of state policy in the right direction. One of the features of bureaucracy in the state apparatus is that it arises from the biological, physical, and moral fatigue of a person as a being. Transparency implies ensuring public confidence in government agencies (due to openness and accessibility of information), accountability, reputation management, and the involvement of citizens in solving socially significant issues. That is why professionalism and transparency are the fundamental principles of the effective functioning of the state apparatus, ensuring the stability and development of society.

The Concept of Development of the Civil Service of the Republic of Kazakhstan for 2024–2029 (2024) envisages "the formation of a civil service model based on the principles of service and customer focus and professionalization of the civil service," as well as "strengthening the responsibility of civil servants for decisions and actions taken before citizens and the state," ensuring transparency and openness of the civil service and government agencies. At the same time, in the Republic of Kazakhstan, there are certain problems related to the professionalism and transparency of the civil service and public administration bodies, reflected in the National Reports on the Development of the Civil Service in the Republic of Kazakhstan (2024, 2025), in the results of sociological research.

These problems boil down to the problems of low efficiency of public administration and insufficient trust on the part of society in the activities of government agencies.

Therefore, the stated objective of the study is to assess the state and problems of professionalism and transparency of the public administration system's bureaucracy in the Republic of Kazakhstan at the present stage. To achieve this, the following tasks should be solved: theoretical substantiation of the concept and importance of such aspects as professionalism and transparency in ensuring the effectiveness of the bureaucracy; generalization of assessments of professionalism and transparency in the activities of state bodies of Kazakhstan, and public trust in public administration institutions.

Materials and Methods

This study is primarily theoretical in nature, but it also reflects data from statistics of the civil service in the Republic of Kazakhstan, as well as the results of studies conducted by other authors on issues of the population's trust and perception of the work of public administration bodies of the Republic of Kazakhstan.

The materials of the study, firstly, were scientific articles devoted to the issues of professionalism and transparency (openness and accountability of activities) among civil servants and government agencies. Both the theoretical approaches of the authors of the articles to defining these key parameters and the main aspects of their application in foreign practice were studied. The articles of authors such as Hughes (2023), Batista and Michener (2023), Mendy (2023), Azkiya et al. (2025), Syadiyah et al. (2024), Pananrangi et al. (2024), Setyasih (2023), Mofuoa (2025) (taking into account the practice of implementing these principles in South Africa), and Pambudi et al. (2023) (taking into account the practice of implementing these principles in Indonesia) were used. Practical research, the results of which are used in the article, included research by the Agency of the Republic of Kazakhstan for Civil Service Affairs (2024, 2025), as well as the results of research by the Economic Research Institute (2023), the Qalam Foundation (2022), the Institute for the Study of Europe, Russia and Eurasia at the George Washington University (2024).

The main methods included the analysis of concepts characterizing "professionalism" and "transparency" in the activities of the bureaucracy as a system of public administration bodies and civil servants, in their relationship with such terms as "accountability," "public trust," and "efficiency of activities." Synthesis and comparison were used. The analysis of the results of sociological research and the synthesis of conclusions on them regarding the assessments of the effectiveness of public trust in the activities of public administration bodies in the Republic of Kazakhstan were carried out. The study was done in two stages: theoretical analysis with an analysis of the practice of application abroad and an analysis of the results of sociological and statistical research.

Results

First, the role and essence of bureaucracy in the public administration system were assessed. Weber (1966) assessed the place of bureaucracy in the system of legitimate political domination as follows. He defines bureaucracy as a rational organization of public administration, and bureaucratic rule means domination based on knowledge. Therefore, the domination of the bureaucratic elite is the basis of modern public administration. Weber believed that in a bureaucratic system, power does not come from one person but is distributed among bureaucrats, i.e., officials and employees. Serpa and Ferreira (2019, 13–14) point out that Weber identified the following main aspects of bureaucratic activity:

– Officials (employees) are free, independent, and focused only on the responsible performance of their official duties.
– A strict service hierarchy is observed.
– Employees have clearly defined knowledge (competence).
– Employees work under a contract on the basis of free choice, and receive monetary compensation for their work.
– The service is considered the main profession, while career growth is carried out according to the order of transition to higher positions and based on one's abilities.

These statements substantiate the fact that the basis of bureaucracy is knowledge, which provides opportunities for the approval of activities. That is, it was knowledge or professionalism that he considered as one of the important foundations of bureaucrats' activities. At the same time, in addition to Weber's bureaucratic theory, the theory of New Public Management (NPM) is now used, which emphasizes the importance of professional management in the public sector and also proposes management methods characteristic of the private sector to improve efficiency and effectiveness (Indahsari and Raharja 2020, 73). There is also the theory of Public Service Motivation (PSM), which assumes that civil servants should be motivated by the desire to serve the public interest, but in it, professionalism is also crucial for the effectiveness of their work (Ritz et al. 2016, 414).

In modern studies, the professionalism of bureaucrats is also given sufficient importance. The professionalism of bureaucracy is defined as high productivity of the bureaucracy, corresponding to its capabilities and powers (Pambudi et al. 2023, 244). Professionalism is demonstrated through the efficiency of the bureaucracy. Unlike commercial structures, where the assessment of efficiency is determined by the company's profit, in the public sector, it is determined by the solution of tasks that are set before the government body, taking into account time and resource constraints (Pambudi et al. 2023, 243).

Hughes (2023, 1159–62), Batista and Michener (2023, 1260), and Azkiya et al. (2025, 4245) describe the following components of professionalism of a civil servant: technical skills (specialized knowledge and skills in the area in which employees work), managerial skills (the ability to manage subordinates, teams, projects—for executive employees), and communication skills (the ability to communicate both within the bureaucratic system and with external parties, including citizens and business representatives).

Mofuoa (2025), using the example of South Africa, where large-scale reforms of the civil service aimed at professionalization have been carried out since 1994, after the fall of apartheid, defines the specifics of the use of the principle of professionalism in the civil service:

- Preliminary assessment and selection for civil service
- Adaptation and professional development of civil servants
- Promotion and career growth solely based on assessment of competence, experience, and performance

It should be noted that in Kazakhstan, the Civil Service Development Concept (2024) reflects this approach, as the system of competitive selection, professional training, and systematic assessment is applied. However, Mofuoa (2025) points to the importance of transparency and assessment of the professionalism of civil servants, and to the control and accountability of the bureaucracy as another basis for the growth of professionalism.

Pambudi et al. (2023, 242–43) also point to retirement age as another professionalism factor. For example, in Indonesia, the retirement age for civil servants is set at 58 years (or 60 for managers). It is noted that this is a young age for a modern person, and a civil servant reaching it is just gaining the necessary experience and competence when they are forced to leave the service by virtue of the provisions of the law. In Kazakhstan, the retirement age for civil servants is 63 years for men and 61 years for women, as stipulated in the Law of the Republic of Kazakhstan "On the Civil Service of the Republic of Kazakhstan" (2015). Just as in Indonesia, reaching retirement age is grounds for termination of civil service, and there are few exceptions for retaining a position. The problem of the "washing out" of professionals in certain areas of work may, therefore, be even more acute in the civil service than in private companies Pambudi et al. (2023, 245).

The importance of transparency in the work of bureaucracy can also be highly appreciated, along with professionalism. Max Weber did not exclude the possibility of using "plutocracy" (deception) and "lack of respect for the individual" (formalism) in the work of bureaucracy, which did not contribute to the effective solution of the tasks set before bureaucrats (Serpa and Ferreira 2019, 14). Weber distinguished between bureaucrats and politicians, noting that a politician is accountable to the voter and strives for a positive image, whereas a bureaucrat does not (Serpa and Ferreira 2019, 14). The concept of "bureaucratic pathology" is used, which Setyasih (2023) defines as "a disease of state bureaucracies caused by the actions of bureaucrats and the social, cultural, political, and technological environment in which they thrive." Here are its varieties that he names:

1) Pathology based on the views and management style of officials, which manifests itself in abuse of power, corruption, and nepotism
2) Pathology associated with the violation of legal norms by bureaucrats (kleptocracy and total corruption)
3) Pathology based on the low abilities, competence, or experience of civil servants

4) Pathology as a result of internal problems in government agencies, which manifests itself in the exploitation of subordinates, inadequate motivation, excessive workload, and poor working conditions

Control, as an important part of public policy, can reveal the pathology of bureaucracy, based on which decisions can be made to eliminate it (Setyasih 2023, 141).

In general, the activities of the bureaucracy are actively connected with the development of the executive power and the increase in the number of tasks assigned to it. The competence of civil servants working in the executive power system includes making important decisions on which certain social processes may depend. At the same time, as many researchers estimate, the "privileged" position of the executive power in comparison with other branches of power (legislative and judicial) is also ensured by the fact that it is the least subject to public control. In addition, the executive power itself often seeks to make its activities more closed and uncontrolled than is necessary by its nature and purpose (Mendy 2023, 110). Therefore, public control over the functioning of executive bodies is becoming increasingly difficult, complex, and bureaucratic. All this determines the importance of the issue of transparency in the activities of executive bodies. Transparency will identify and prevent those decisions of government bodies that do not meet the criteria of efficiency and are directed against the interests of society (Batista and Michener 2023, 1270).

Transparency is becoming one of the important principles of public administration ethics, along with professionalism. Transparency ensures not only a reduction in negative phenomena in the organization of bureaucracy and an increase in the results of bureaucracy, but it also becomes a key element in strengthening public trust in the government (Syadiyah et al. 2024, 118). Transparency in the activities of the bureaucracy is largely determined by the accountability system, in which Mendy (2023, 110–15) distinguishes the following levels:

1) Vertical accountability in the system of bureaucratic hierarchy, when a higher authority personally or through special control structures checks the work of an accountable subordinate authority, determining the effectiveness of the work and identifying violations that have been committed or may be committed (in order to prevent them)

2) Horizontal accountability in the system of separation of powers, when supervisory, judicial, or specially created legislative bodies under legislative bodies, and the participants in legislative activity themselves, through special procedures, can control various executive bodies

3) Public accountability, when executive authorities report to the public and provide feedback to the population and businesses, thus making their activities transparent

Taking into account the above, one can imagine the relationship between the professionalism of the bureaucracy and the transparency of the work of government agencies (see Figure 1).
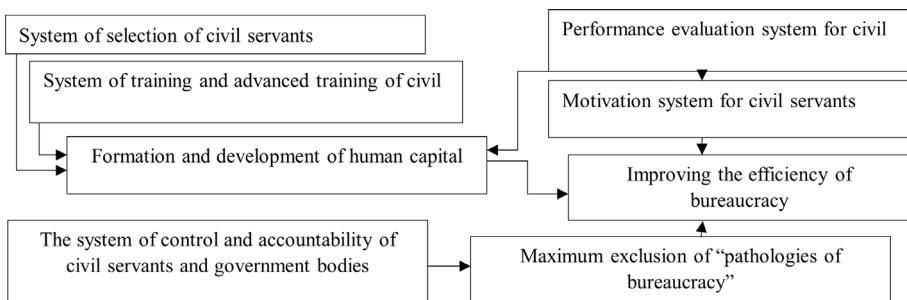
Figure 1. The relationship between the professionalism of the bureaucracy and the transparency of government agencies

Source: compiled by the author based on Batista and Michener (2023), Syadiyah et al. (2024), and Mendy (2023)

Thus, to improve the efficiency of bureaucracy, which is manifested through the solution of socially significant problems and the satisfaction of end users of public services and the results of public administration, both the professionalism of the bureaucracy (achieved through selection, training and advanced training, and assessment and motivation) and transparency (as a system of control and transparent assessment of results to eliminate the pathologies of bureaucracy) are important.

If we consider modern assessments of the effectiveness of the bureaucracy in Kazakhstan, the research results have obvious differences. For example, the National Reports on the State of the Civil Service in the Republic of Kazakhstan (2024, 2025) note that in recent years, Kazakhstan has adopted new standards for selection for the civil service, professional standards for the work of civil servants, and standards and methods for assessing the performance of civil servants, and it is also working on the creation of a reserve system for political servants. However, according to the survey results, 73% of respondents (employees of central and local government agencies) note a shortage of employees in structural divisions, and about 7.5 thousand vacancies are not filled, 1.4 thousand of which have not been filled for a significant amount of time. This in itself already creates the basis for reducing the opportunities for selecting the most professional personnel. Moreover, over 50% of respondents have already thought about changing their activities. At the same time, generally positive results are noted in the assessment of the activities and competencies of civil servants (94% received a good assessment based on the results of 2024).

According to the results of the 2024 public service quality assessment, conducted annually among the population and businesses, the average score reached 4.88 (out of 5) with 91.4% satisfaction, while in 2023, it was only 4.83 and 82.6%, respectively. This is a fairly high figure, and the best places in the ranking were taken by the National Security Committee (5 points and 100% satisfaction), the Civil Service Agency, and the Agency for the Protection and Development of Competition (4.98 points each). Even the lowest assessments of government agencies were above 4 points and above 80% satisfaction, with

growth rates compared to 2023 (Eksendirova 2025).

Independent assessments conducted by non-governmental organizations reveal more problems of professionalism and transparency of the civil service in Kazakhstan. For example, according to the results of the assessment in 2024 by the Institute for European, Russian and Eurasian Studies of the George Washington University, based on 556 civil servants, a significant part of respondents (57.6%) assessed the level of professional development programs as low (including 12.9% who rated them as "low" and "very low"). Additionally, 14.6% of respondents assessed career prospects as poor, and a significant part of civil servants assessed the current level of salaries as low (Drobny 2024).

The Economic Research Institute's research showed a significantly lower level of public trust in government agencies. For example, according to the results of population surveys, in three large cities (Shymkent, Almaty, and Astana), in 2023, the lowest levels were found in *maslikhats* (26.9%, 36.5%, and 27.9%, in each city respectively), and a low level of trust was also found in *akimats* (33.3%, 40.3%, and 35.2%, in each city respectively), but it is higher in the government of the Republic of Kazakhstan and the police. The level of corruption in government agencies is assessed differently in different regions on a 10-point scale (the lowest score is 3.99 in the North Kazakhstan region, the highest is 7.2 in the Zhambyl region, and in Almaty, Shymkent, and Astana, it is also quite high, at 6.87, 6.84, and 7.12 out of 10, respectively). Therefore, the authors of the survey concluded that the population has low trust in government agencies in the megacities of Kazakhstan due to the high level of corruption (ERI 2023).

The Qalam Foundation conducted a similar study on trust in government bodies in 2022. The survey results showed that while the level of trust in the President of the Republic of Kazakhstan is 48%, the government has 37%, and *akims* and *akimats* (regional and local administrative bodies) have an average of 31% (but this differs by region, and on average, 41% of the population distrusts *akims*) (Exclusive 2022).

Such independent social surveys are more important than those conducted by government bodies, since they help ensure greater transparency in the work of government bodies of Kazakhstan and identify problems and pathologies of bureaucracy and citizen satisfaction with the work of bureaucracy. That is why on March 16, 2022, in the Address to the Nation, the President of the Republic of Kazakhstan pointed out the need to conduct independent social surveys in this direction.

Discussion

Considering the current problems of professionalism and transparency in the activities of government agencies in the Republic of Kazakhstan, one can reflect on problems such as:

1) A shortage of professional personnel for the civil service, which is a factor in the large number of vacancies and the understaffing of government agencies with specialists, and this in itself creates the basis for reducing the efficiency of their work,

as well as for reducing competition and opportunities for high-quality selection for the civil service

2) Low motivation, meaning dissatisfaction of civil servants with their level of well-being, working conditions, wages, and career prospects, which negatively affects turnover in the civil service and also does not contribute to the growth of professionalism

3) Low assessments of the system of training and advanced training for civil servants, which also does not contribute to the high-quality formation of human capital in the civil service of the Republic of Kazakhstan

4) Insufficient transparency of the activities of state bodies, which forms the basis for corruption, low efficiency of state bodies, and this worsens the reputation of the civil service and bureaucracy as a whole in the eyes of citizens and businesses

The development of the civil service and bureaucracy as a total human capital in this area is seen in improving the system of personnel training and the formation of a personnel reserve, which is noted by authors such as Sergaliyeva et al. (2021). However, as noted, without the development of a motivation and career management system, only measures for improving qualifications, assessment, and selection, as well as professional standards, are not enough (Issenova et al. 2024, 13).

In addition, improving public control over the work of the bureaucracy in the person of specific officials or in the person of certain state bodies seems to be a completely obvious direction for increasing the efficiency of the bureaucracy. The instruments of such control include independent surveys conducted on a regular basis, the creation of public councils under state bodies, and public reporting by state bodies (Öge 2017, 135).

Conclusions

1. Bureaucracy is a layer of state and municipal employees who work professionally in public administration bodies. Their activities are aimed at solving important, socially significant problems, and the effectiveness of their work is assessed by solving these problems.

2. The professionalism of the bureaucracy is determined through the competence of civil servants, training, quality of human capital, personnel potential in the bodies, and the ability to solve the tasks set. Transparency is associated with the organization of control both within the bureaucratic system and from the outside to evaluate the results of work and eliminate the "pathologies of bureaucracy," and, therefore, it is associated with the professionalism of the bureaucracy.

3. In modern Kazakhstan, there are certain problems both in terms of professionalism and in terms of transparency of bureaucracy. Insufficient material and non-material motivation negatively affect the staffing and formation of human capital of state bodies, reducing the efficiency of their work. And the high level of corruption in

this area, assessed by the population, is closely associated with the low performance of state bodies, especially at the local level.

4. Therefore, in addition to measures to improve the selection, qualifications, and motivation of civil servants (in order to increase the prestige of the civil service and promote the development of human capital), it is necessary to develop transparency and control by society in this area.

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SMART CITY CONCEPTS, GOVERNANCE, AND SUSTAINABILITY: A COMPARATIVE STUDY OF MALAYSIA AND INDONESIA

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Abstract

Smart city development has become increasingly crucial as technology continues to shape urban governance and daily life, particularly in Southeast Asia. This study examines the development of smart cities in Malaysia and Indonesia, with a focus on governance, policy frameworks, technological implementation, and stakeholder engagement. Through a comparative analysis of Kuala Lumpur and Jakarta, the research explores how contextual factors influence strategies and collaborations in each city. Methodologically, the study draws on secondary data such as official reports, policy documents, and academic literature, as well as

primary data collected through interviews with local authorities, policymakers, stakeholders, and residents. The findings indicate that while both countries pursue smart city initiatives to enhance sustainability and urban quality of life, Malaysia adopts a centralized governance approach through the Malaysia Smart City Framework (MSCF), whereas Indonesia's 100 Smart Cities program is more decentralized. Kuala Lumpur emphasizes smart infrastructure and integrated data systems, while Jakarta focuses on improving public service delivery via digital platforms such as JAKI. Despite shared objectives, differences in governance models and socioeconomic conditions shape each city's approach. The study concludes with key insights and recommendations for enhancing smart city frameworks and promoting sustainable urban development in Southeast Asia.

Keywords: smart cities, urban governance, sustainability, Malaysia, Indonesia

Introduction

In an era characterized by rapid urbanization and technological advancement, the concept of a "smart city" has emerged as a promising solution to address the complex challenges of modern urban environments. A smart city integrates advanced technology, data-driven approaches, and innovative urban planning strategies to increase the efficiency, sustainability, and livability of cities (Galati 2018). The emergence of the smart city idea stems from the community's needs for simpler, faster, and more efficient public services (Grossi et al. 2020). Due to this, smart cities emphasize technology, socioeconomics, human capital, regulations, infrastructure, and the resolution of urban problems (Chen and Cheng 2022).

However, this paradigm shift is not only about integrating technology into the urban fabric but also fostering sustainable development, ensuring inclusivity, and enhancing citizen engagement. This integration also concerns tackling the needs of marginalized communities and providing equitable access to a better quality of life. Currently, an increasing number of diverse concepts are emerging regarding the characteristics of smart cities (Angelidou 2015), especially with the evolution of smart city models through various generations, namely Smart City 1.0, Smart City 2.0, Smart City 3.0, and Smart City 4.0 (Zwick and Spicer 2023).

The smart city concept revolves around three key elements: Smart People, Smart Technology, and Smart Collaboration (Meijer and Bolivar 2016). Its relevance is increasing due to urbanization, technological advancements, sustainability concerns, and economic growth. The COVID-19 pandemic further underscored the need for smart solutions in healthcare, remote working, and economic recovery (Kostina and Kostin 2022). Additionally, Industry 4.0 trends, such as IoT, cloud computing, open data, and big data, are optimizing city operations. As a result, smart city initiatives are accelerating, addressing modern urban challenges through integrated, technology-driven solutions (Sancino and Hudson 2020).

Malaysia and Indonesia pursue smart city initiatives with distinct approaches. The Malaysia Smart City Framework (MSCF), introduced in 2018, outlines seven items: Smart Economy, Smart Living, Smart Environment, Smart People, Smart Government, Smart Mobility, and Smart Digital Infrastructure. While lacking a fixed timeline, it includes seven core components, 16 policy directions, and five pilot cities. Malaysia's centralized governance and stronger economy enable efficient decision-making and resource allocation, fostering a cohesive national strategy for smart cities (Samsudin et al. 2022). This structured approach distinguishes Malaysia's smart city from Indonesia's.

Indonesia's Smart City Development Strategy 2015–2045 aims to establish 100 smart cities by 2045, focusing on economy, living, environment, people, government, and mobility (Mahesa et al. 2019). It focuses on economic, social, and environmental intelligence while promoting regional collaboration (Hasna and Room Fitrianto 2022). With decentralized governance and regional autonomy, operation varies across regencies and cities, allowing for tailored innovation based on local needs. This approach raises adaptive smart city expansion, ensuring strategies align with diverse urban challenges.

Thus, while both Malaysia and Indonesia are committed to developing their urban landscapes through smart city initiatives, their distinct contexts require tailored approaches that leverage their strengths and address their specific challenges. This comparison highlights that, despite the global trend towards smart city development, the diverse governance, cultural, and socioeconomic contexts of Malaysia and Indonesia may present unique opportunities and challenges in implementing and managing smart city initiatives. Acknowledging and adapting to these contextual differences is crucial for both countries to extend the advantages of smart city technologies and adopt sustainable growth.

This study explores the similarities and differences in Malaysia's and Indonesia's smart city agendas through an analytical framework that focuses on four key dimensions: governance structures, policy frameworks, stakeholder involvement, and technology integration. By comparing their approaches, it examines how conceptual and governance variations shape urban dynamics, socioeconomic impacts, citizen engagement, environmental considerations, and technological advancements. The findings provide insights into refining strategies, improving governance, and fostering inclusive, sustainable smart city development aligned with the 17 Sustainable Development Goals (SDGs). This study contributes to better policy formulation and cross-country learning in advancing smart cities in Southeast Asia.

Literature Review

The growing literature on smart cities explores various definitions and strategies for urban innovation. Grossi and Welinder (2024) highlight the importance of public governance in managing smart cities, ensuring sustainability, accountability, and stakeholder coordination. Effective governance drives policy implementation and aligns strategies with local

needs. Governance concerns organizations and their environments (Jacobsson et al. 2015). The datapolis also supports governance by leveraging data to enhance decision-making, transparency, productivity, and citizen engagement (Meijer 2018). Beyond governance structures, factors such as service provision, business dynamics, and national agendas emphasize the need for democracy and accountability mechanisms (Ehwi et al. 2024).

Public governance relies on educated citizens to share input, follow policies, and support resilient urban development (Hartley 2023). Thus, smart city strategies should enhance citizen awareness, digital skills, and access to digital resources while ensuring affordable, efficient, and inclusive technologies. Achieving this requires a balance between community, technology, and policy (Tsonkov and Petrov 2024). Additionally, different actors may respond differently, necessitating collaborative innovations at the micro-level (Dolmans et al. 2023).

As cities become smarter, comprehensive policy frameworks are essential for improving public services and governance across social, environmental, and economic dimensions (Castelnovo et al. 2016). A bottom-up approach enhances public engagement and policy legitimacy (Choi and Kenney 2024). To unlock their potential, policies must promote knowledge-based, innovative, and proactive strategies (Badran 2021). Additionally, policy transfer plays a key role in building political and policy capacity, understanding local contexts, and fostering effective ecosystems (Li et al. 2022).

The following case studies from Malaysia and Indonesia illustrate smart city initiatives in public governance, citizen involvement, technological adoption, and policy frameworks. These examples highlight how local contexts shape policy adaptation, showcasing both successes and challenges. However, a gap remains in comparative studies on smart city governance models in both countries. This research addresses that gap by analyzing and comparing the adaptability of smart city strategies in Malaysia and Indonesia, offering insights into policy implementation and urban innovation across different governance structures.

Research on smart cities in Malaysia primarily focuses on stakeholder acceptance (Lim et al. 2021) and environmental sustainability (Hamzah et al. 2023), reflecting the concept's relatively recent emergence in the national context. Other studies examine smart communities, e-government (Omar et al. 2017), and mobility solutions (Kee and Ching 2020). In Indonesia, the literature addresses urban challenges (Utomo and Hariad 2017) and smart solutions (Abdurrozzaq and Sulaiman 2019). Tosida et al. (2024) link smart economy with smart villages, while Rifaid et al. (2023) emphasize the role of human resources, financial capacity, and infrastructure. Furthermore, Sarosa et al. (2023) underscore the significance of digital literacy, equitable access, and data security.

Methodology

This study employs a qualitative approach to examine how historical, socioeconomic, technological, and policy contexts influence smart city initiatives in Kuala Lumpur and Jakarta. These two cities are selected as case studies based on their high rankings in the 2024 Smart City Index published by the Institute for Management Development (IMD 2024), which reflects their active engagement in smart urban development. The research utilizes both secondary and primary data sources. Secondary data include official reports, policy documents, and academic literature. Primary data were gathered through semi-structured interviews with five informants from each city, comprising local authorities, policymakers, stakeholders, and residents. Data were analyzed using content analysis and a comparative case study method (Yin 2009) to explore similarities and differences between the two cities. To ensure the validity of findings, data triangulation was conducted by cross-verifying information from multiple sources. The consistency between secondary and primary data supports the trustworthiness of the analysis (Stewart 2012).

Results

Malaysia's smart city development marks a shift from an industrial to an informational global society, driven by humanware, technoware, infoware, and valueware (Jalaluddin 2019). The focus is on seven essential components: Smart Economy, Smart Living, Smart Environment, Smart People, Smart Government, Smart Mobility, and Smart Digital Infrastructure. These goals are guided by five major policies: the New Urban Agenda, Sustainable Development Goals, Twelfth Malaysia Plan, National Physical Plan 3, and National Urbanization Policy 2. Led by the Ministry of Housing and Local Government, alongside the Malaysia Digital Economy Corporation (MDEC), Malaysia is currently in Phase 3 (2023–2025), emphasizing advanced development and monitoring (*Malaysia Smart City Framework* 2018).

Kuala Lumpur leads Malaysia's smart city transformation, evolving from vision to implementation. Kuala Lumpur City Hall (KLCH) oversees initiatives under the Kuala Lumpur Smart City Master Plan (2021–2025), aligning national policies with local needs. Local governments manage urban planning, public health, and infrastructure, ensuring responsive governance. In 2023, Kuala Lumpur ranked 89th in the Smart City Index, improving to 73rd in 2024 due to enhanced online transport tickets, medical appointments, and job listings (Berita Harian 2024). With a growing population of 1.98 million (Department of Statistics Malaysia 2023), Kuala Lumpur's digital transformation reflects Malaysia's broader push for urban innovation and smart governance.

Kuala Lumpur's smart city vision is central to KLCH's Digitalisation Strategic Plan, emphasizing citizen-centric services. Key initiatives include: (i) the Go KL mobile app for

public transport, (ii) cashless payments for KLCH services, (iii) the Mobile Integrated Services app, (iv) the Visit KL one-stop tourism portal, (v) the Kuala Lumpur Urban Observatory for data analytics, (vi) IoT gateways for smart city data, (vii) IoT devices for public services, and (viii) AI-powered big data integration. While the Digitalisation Plan targets 2030, the Kuala Lumpur Structure Plan 2040 (PSKL 2040) addresses the city's rapid expansion and long-term urban challenges.

Table 1. *List of Project Implementation Briefs (PIBs) for Kuala Lumpur Smart City*

PIBs	Component	Project Type	Ease of Implementation	Key Agencies
Kuala Lumpur Urban Observatory (KLUO)	Smart Government	System	Difficult	Kuala Lumpur City Hall
Smart Bin at public housing and tourist attraction areas	Smart Environment	Project	Easy	• Kuala Lumpur City Hall • SWCorp • National Solid Waste Management Department • Department of Environment
E-payment usage for lower retail activities	Smart Economy	Project	Easy	• Central Bank of Malaysia • Service providers
Installation of Smart Pole	Smart Living	Project	Moderate	• Kuala Lumpur City Hall • Service providers

Source: Malaysia Smart City Framework (2018)

Table 1 categorizes Kuala Lumpur's smart city initiatives by project type, implementation ease, and responsible agencies. The Kuala Lumpur Urban Observatory (KLUO), a "Smart Government" system managed by KLCH, is challenging to implement. Easier projects include Smart Bins (Smart Environment, SWCorp) and e-payment systems (Smart Economy, Central Bank). Smart Poles (Smart Living) are moderately challenging, coordinated with service providers. Kuala Lumpur Intelligent City (KliC) integrates systems for KLCH, residents, businesses, and tourists. Other initiatives include electric buses, a low-carbon city, and expanded CCTV installations (*Kuala Lumpur Smart City Plan 2021-2025* 2021; Berita Harian 2023).

However, Kuala Lumpur's smart city initiatives face key challenges, including low public transport usage, which worsens congestion and pollution. High solid waste generation

and poor recycling practices strain waste management systems. A high crime rate raises security concerns, affecting investment and tourism. Additionally, slow internet speeds and limited digital infrastructure hinder digital transformation. A major obstacle is the lack of data sharing within KLCH, limiting the integration and efficiency of smart city solutions (*Malaysia Smart City Framework* 2018). Addressing these issues is critical to achieving a seamless, sustainable, and secure smart city.

KLCH benchmarks against global smart cities, such as Singapore, Dubai, Oslo, Copenhagen, Boston, Amsterdam, New York, London, Barcelona, and Hong Kong, to adopt best practices (*Kuala Lumpur Smart City Master Plan*, n.d.). KLCH also collaborates with industry leaders, including Huawei (Fokus 2024), and partners with international stakeholders, such as China, to enhance smart city solutions (Bernama 2024). These efforts aim to position Kuala Lumpur as a globally competitive smart city, leveraging technology, innovation, and strategic partnerships for urban development and sustainability.

Kuala Lumpur's smart city initiatives are ongoing, making immediate impacts uncertain. However, 5G adoption and digital infrastructure improvements are expected to enhance public services, mobility, economic growth, and overall quality of life. These innovations aim to create a connected, efficient, and sustainable urban environment. In 2023, Kuala Lumpur achieved a sustainability score under the Malaysian Urban-Rural National Indicators Network for Sustainable Development (MURNInets), a framework established by the Town and Country Planning Department (PLANMalaysia), which assesses economy, environment, healthy community, land use and natural resources, infrastructure and transportation, and governance (MURNInets, n.d.). Moreover, Kuala Lumpur's commitment to smart city implementation is demonstrated by its hosting of the Smart City Expo Kuala Lumpur 2025, the first Southeast Asian edition of the globally renowned Smart City Expo World Congress. The event will carry the theme "AI Cities: Shaping Our Digital Future."

Indonesia's e-government journey began in 2003 with Presidential Instruction No. 3, transitioning public services from conventional to digital platforms. Smart city initiatives have since become key to enhancing service efficiency. Jakarta Smart City (JSC), launched in 2016, pioneered urban digitalization (Akbar et al. 2024). In 2017, the "Movement Towards 100 Smart Cities" was introduced by multiple ministries to promote smart city development, focusing on tourism and the seven pillars of "smart": Environment, Economy, Branding, People, Governance, Mobility, and Living. These initiatives drive Indonesia's digital transformation and improve its urban services and governance.

The JSC office, under the Department of Communications, Informatics, and Statistics, supports smart city development across DKI Jakarta. Government Regulation No. 59 of 2022 guides urban governance through smart city principles, covering bureaucracy, economy, society, environment, and mobility. Additionally, Governor DKI Jakarta Law No. 25 of 2022 outlines the 2023–2026 Regional Development Plan, emphasizing public service transformation and improved governance. JSC plays a key role in fostering smart provinces and cities, ensuring digital innovation enhances urban living and administrative efficiency

within Jakarta's smart city framework.
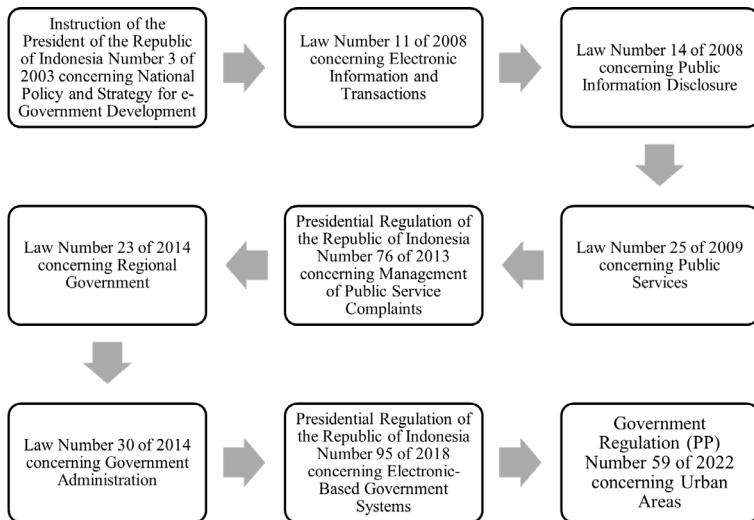
Figure 1. *Governing the Development of Smart Cities in Indonesia*
Source: JSC Annual Report (2023)

JSC is managed by 16 state civil servants and supported by 126 experts with diverse expertise, including information technology, marketing, research analysis, product analysis, social media analysis, and administration. By 2018, the IoT had been integrated into public services, such as Transjakarta buses and smart streetlights. The following year, the JAKI super-app was introduced as a one-stop digital platform for various public services, significantly enhancing service delivery. During the 2020 pandemic, JSC spearheaded Jakarta's digital transformation through the JAKI app and a dedicated COVID-19 website. In 2021, JAKI expanded to include a vaccination registration system, and in 2022, the Citizen Account (Digital ID) feature was launched to provide more personalized services.

Table 2. *Components of Smart City, Implementation, and Maturity Level of Service Capability*

Components	Implementation	Maturity Level
Smart Environment	Air Quality Check (JAKI App)	Level 1
	Flood Monitoring (JAKI App)	Level 2
	Emission Test Registration and Result (JAKI App and JakEmisi App)	Level 4

Smart Economy	Grocery Price (JAKI App)	Level 1
	Market Location (JAKI App)	Level 1
	Small and Medium Enterprise (SMEs) Activities (JAKI App and JakPreneur App)	Level 3
	Tax Check and Bill Payment (JAKI App) vehicle, property, regional tax, e-retribution	Level 4
	Banking Transaction (JAKI App and JakOne Mobile App/Bank DKI)	Level 4
Smart People	Citizen Report JAKI App Twitter (Now X): @DKIJakarta Facebook: Pemprov DKI Jakarta Instagram: Social Media of the Governor/Vice Governor of Jakarta E-mail: dki@jakarta.go.id SMS/WhatsApp: 08111272206 LAPOR 1708 *Aspirasi Publik Media Massa*	Level 4
	News (JAKI App)	Level 1
	Career Training Program (JAKI, prakerja.go.id, and Jaknaker.id)	Level 3
	Read and Borrow Digital Books (JAKI App-Jakarta Library and iJakarta App)	Level 4
	Finding Free Wi-Fi (JAKI App and Molecool App)	Level 4
	Education-Online Learning (JAKI App and Sekolahmu App)	Level 4
Smart Mobility	Public Transport: MRT, LRT, Transjakarta, and Mikrotrans (JAKI App-JakLingko App)	Level 4
Smart Governance	Public Survey (JAKI App)	Level 2
	Sharing Ideas in the *Musrenbang* (JAKI App)	Level 2
	Online Attendance for Civil Servants (JAKI App)	Level 2
	One-Stop Licensing Service (https://jakevo.jakarta.go.id/)	Level 4

Smart Living	Citizenship and Settlement (JAKI App and Alpukat Betawi)	Level 4
	Affordable Housing Info (JAKI-Sirukim App)	Level 1
	Healthcare (ambulance service and appointments) JAKI App	Level 4
Smart Branding	Festival Ini Jakarta	Level 1
	Travel Destinations (JAKI App and Jakcation App)	Level 3

Source: JAKI App, analyzed by authors (2024)

The seven indicators are realized through the best products and services of JSC, all linked to the JAKI App. However, challenges remain, as several criteria are still at Level 1, representing one-way information. In terms of smart city implementation and the maturity level of service capability, the reliance on one-way information within the JAKI App and the lack of integration with other applications pose significant challenges to JSC's development. Additionally, users still need to access websites and download multiple applications to meet their needs, which complicates the overall experience.

JSC aims to achieve cost efficiency in service delivery for the government, private sector, and citizens alike. One notable innovation is the *Antar Jemput Izin Bermotor* (AJIB) service, which enables the delivery of licensing documents and official letters directly to applicants' homes, significantly enhancing service efficiency. To further support Jakarta's economic ecosystem, JSC streamlines the licensing process for business permits, making it easier for investors to establish operations in the city and contribute to economic growth. Additionally, JSC has introduced the JSCLab Sharing initiative, which connects citizens with experts through classes focused on technology, smart city, public policy, and digital literacy, empowering participants to improve their skills across various fields.

Discussion

As cities face rapid urbanization, many adopt smart city strategies using technology to enhance governance and quality of life. Kuala Lumpur and Jakarta, despite differing political, social, and infrastructural contexts, exemplify smart governance in tackling environmental issues, traffic, public services, and sustainability. Their approaches differ based on governance structures and stakeholder roles. Kuala Lumpur follows a structured administrative model, while Jakarta struggles with coordination amid complex urban expansion. This comparison highlights distinct smart city strategies, reflecting unique national priorities and governance dynamics.

Table 3. *Comparison of Kuala Lumpur and Jakarta's Smart City Experience*

	Kuala Lumpur	**Jakarta**
Concepts	1) Smart Economy 2) Smart Living 3) Smart Environment 4) Smart People 5) Smart Government 6) Smart Mobility 7) Smart Digital Infrastructure	1) Smart Economy 2) Smart Living 3) Smart Environment 4) Smart People 5) Smart Government 6) Smart Mobility 7) Smart Branding
Governance (Organizations and Environment)	• The government has had a master plan for the Kuala Lumpur Smart City since 2021 • The focus is on addressing environmental issues, traffic congestion, public services, and sustainability	• The government has a clear organizational structure, a wide range of policies, and a defined vision, and has recently completed the JSC 2025–2029 master plan • The focus is on addressing environmental issues, traffic congestion, public services, and sustainability
Sustainability	Has a priority in addressing social, environmental, and economic issues	Has a priority in addressing social, environmental, and economic issues

Source: Analyzed by authors (2025)

Jakarta's smart city implementation is more established than Kuala Lumpur's, with diverse initiatives enhancing urban living through technology. In contrast, Kuala Lumpur is still in its early stages, with many projects under development. Indonesia's earlier adoption of smart city concepts has fostered greater community awareness and engagement. Jakarta's proactive residents drive continuous innovation, while Kuala Lumpur can learn from Jakarta's experiences. By encouraging community participation and prioritizing technological advancements, Kuala Lumpur can develop a more responsive and sustainable smart city that effectively meets citizens' needs.

JSC focuses on applications such as JAKI to streamline public services, enhancing citizen access and issue reporting. In contrast, Kuala Lumpur's strategy extends beyond mobile apps, incorporating broader innovations such as Smart Bins for waste management and Smart Poles for monitoring and lighting. Currently, 10 Smart Bins and 31 Smart Poles are deployed, with further expansion planned (New Straits Times 2022). These initiatives integrate Smart Environment and Smart Living, aiming to enhance urban sustainability and livability. By combining environmental and technological advancements, Kuala Lumpur strives to improve the quality of life while promoting digital convenience.

However, three common weaknesses can be identified in the implementation of smart

city initiatives in both Kuala Lumpur and Jakarta. First, digital literacy remains relatively low, which limits effective public participation in smart city services. Second, both cities tend to emphasize technological adoption without effectively linking it to outcomes related to broader urban challenges, such as quality of life and social equity. This results in a tendency toward techno solutionism, where technology is seen as an end rather than a means. Finally, there is concern that smart services are concentrated primarily in well-developed or tourist-centric areas, leading to uneven service delivery and the marginalization of peripheral or underserved communities. Therefore, these weaknesses must be properly addressed to ensure the successful realization of smart city objectives.

Conclusions

Both Kuala Lumpur and Jakarta share the goal of enhancing public services and promoting sustainability through smart city initiatives. While both integrate technology, people, and the environment, their governance structures differ—Kuala Lumpur adopts a collaborative approach, while Jakarta's smart city unit centralizes efforts. Both cities use digital platforms such as JAKI in Jakarta and various apps in Kuala Lumpur to streamline services and engage citizens. Sustainability remains a priority, especially in tackling pollution and urban challenges. Though long-term impacts remain uncertain, both cities are progressing, emphasizing public participation, infrastructure development, and SDG alignment, ensuring a sustainable and livable future.

Kuala Lumpur and Jakarta have implemented policies, regulations, and master plans, and both strive to enhance urban sustainability and service delivery through digital innovation. To make these findings actionable, several specific policy strategies are recommended. The Kuala Lumpur government should prioritize addressing data silos by unifying cross-departmental data. A centralized urban data platform, which is modeled after Jakarta's JAKI, could streamline services and enhance evidence-based policymaking. Policymakers in both cities should allocate resources, from both government and citizens, to improve digital literacy. Additionally, both cities should adopt a performance-based budgeting mechanism tied to smart city key performance indicators (KPIs), such as internet accessibility, waste management efficiency, and public transport usage. Targeted infrastructure investments, such as expanding 5G coverage in Kuala Lumpur and integrating fragmented digital services in Jakarta, are essential to optimize impact. Finally, enhancing public–private–academia innovation ecosystems is crucial to ensure smart city development aligns with each city's master plan.

However, this study is limited by its focus on Kuala Lumpur and Jakarta, the capital cities of Malaysia and Indonesia, which may not fully represent the diversity of smart city development across other regions in these countries. Future research should incorporate broader comparisons and variables, including both developed and developing cities. Assessments of citizen satisfaction, the digital literacy of both government officials and

citizens in using technology, and the impact of smart city development using quantitative methods would complement this research and provide deeper policy insights.

Acknowledgement

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APPLYING ORGANIZATIONAL RESILIENCE MANAGEMENT TOOLS IN THE LITHUANIAN PUBLIC SECTOR

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Abstract. The paper analyses the trends of organizational resilience management in Lithuanian central government institutions based on the "bounce-back" concept, examining the impact on the organization from both internal and external environments and incorporating the resulting uncertainty conditions conceptualized through the prism of the organization's available information for decision-making. The results of an empirical qualitative study in the Lithuanian public sector suggest that performance deterioration in Lithuanian central government organizations arises from both the internal and the external environment. The study reveals that the strength and the frequency of these impacts are comparably similar in each environment, affecting organizational performance with regular and unexpected factors. Regular environmental influences tend to create conditions of moderate uncertainty, where information is either known and available or there is a constant demand for new information acquisition. Unexpected environmental influences tend to create high uncertainty conditions, where there is a persistent need for information in order to make decisions, escalating to not knowing what information is needed and where it can be obtained. Experts suggest that managing resilience and decision-making under uncertainty requires organizations to invest in information processing and communication, emphasizing free information flow and live, substantive communication between managers, adjusting provided information on the situation that is limiting or expanding it. Effective knowledge management and learning processes that help organizations adapt to changing conditions are best supported by personnel who possess institutional memory, suitable digitization of management information, and active engagement in national networking (or international networking if no national equivalent exists). Inadequate preparation for periods of negative impact disrupts the organization's information exchange, and the learning element becomes unmanageable, especially if the negative impact situations

are frequent and unforeseen, depriving the organization of the necessary time to "take a breath, look back and learn, and consolidate learning."

Keywords: public management, organizational resilience management, bounce-back, conditions of uncertainty, qualitative research

Introduction

The concept of organizational resilience has been studied in science for decades (Bhamra et al. 2011; Hepfer and Lawrence 2022), but after the events of recent years (COVID-19, hybrid attacks, the wars in Ukraine and the Middle East, etc.) that have severely affected organizations' activities, the topic of organizational resilience is often highlighted in national agendas (e.g., the report of the Lithuanian National Audit Office 2022), in planning documents of public sector and business activities, and at international scientific conferences (Arnault 2020; Resilience in the Public Sector 2022; Sustainable Public Sector under Uncertainty 2023).

The dynamic landscape of managerial resilience research, both in Lithuania and internationally, showcases various applications of the concept of organizational resilience. This diversity arises from the original resilience concepts developed in different scientific disciplines before being adapted for management and other fields. One scholarly discussion highlights the context in which organizational resilience is applied in engineering-applied sciences (Bracci and Tallaki 2021), or otherwise from a conservative perspective (Humbert and Joseph 2019), as the ability of an organization to bounce back to balanced performance conditions after being impacted (DesJardine et al. 2019; Shaw 2012; Sutcliffe and Vogus 2003). Studies also analyze the more dynamic, transformational side of organizational resilience, which has emerged in the field of ecology/ecosystem science (Barbera et al. 2017), and regard it as the ability of an organization to "bounce forward," becoming better, stronger, and improved after an impact.

The current proliferation of research on organizational resilience, dominated by the diverse application of organizational resilience, has led to a situation in which the research findings are fragmented or applied universally and are too abstract (Hepfer and Lawrence 2022). In Lithuania, research and scholarly discussions on organizational resilience emphasize the transformational "bounce-forward" concept. It remains uncertain whether this concept suits Lithuania's central government institutions, as these institutions align more with continental Europe's career model, operate under strict legal constraints, and prioritize continuity. The equivalent application of the "bounce-back" concept in organizational resilience research misses the opportunity to assess which interactions of organizational resilience management tools are better suited to fulfill the ideas of the resilience concept. Due to the perceived lack of practical and theoretical applications of organizational resilience in the context of the Lithuanian public sector, it is valuable to add to the discussion on it. This

paper examines which managerial approaches and tools used in Lithuanian central public sector organizations contribute to organizational resilience management.

Discussion of the concept of organizational resilience. In the rapidly evolving scholarly debate on organizational resilience (Annarelli and Nonino 2016; Duchek et al. 2020; Hepfer and Lawrence 2022), organizational resilience is regarded as the ability of an organization to adapt to a changed situation and bounce back to a balanced situation after facing challenges (Barasa et al. 2018). The discussion surrounding organizational resilience highlights not only the important characteristic of bouncing back (Sutcliffe and Vogus 2008) but also an organization's capacity to grow and evolve, which can be described as bouncing forward (Sutcliffe and Vogus 2008). Questions are still being raised about resilience, such as whose interests it serves; what it means; and whether it's a capability (Parsons 2010), capacity (Goldschmidt et al. 2019), characteristic, outcome, process, behavior, strategy, attitude (Annarelli et al. 2020; Duchek 2020), a type of activity, or a combination of these elements (Chen and Liu et al. 2021; Hillmann and Guenther 2021; Munoz et al. 2022; Williams et al. 2017; Woods 2015).

Further discussion on the dimension of organizational resilience in research is connected to applying its related management elements: organizational robustness, anti-fragility, sustainability, learning organization theories, or variations of these elements (Hillmann and Guenther 2021; Munoz et al. 2022). These elements are often not even distinguished as separate, complementary elements of the resilience phenomenon but presented as a kind of "better, newer" model of resilience. Refining these ideas in the context of organizational resilience research would contribute to a more qualitative development of the concept of resilience and practical fulfillment.

Organizational robustness (Lengnick-Hall and Beck 2005) describes an organization's ability to be unaffected by external change, subject to the dynamism and uncertainty of the organizational environment. Resilience (Duchek 2020) enables an organization to return to its previous state within a certain period of time, irrespective of whether the organization's environment is stable or dynamic and its level of uncertainty. In turn, applying the ideas of an anti-fragility theory depends on the organization's environment. Taleb (2012) emphasizes in his study that fragile organizations fail when faced with uncertain and dynamic environments, i.e., no matter how robust they are, they cannot build or exploit organizational resilience. However, anti-fragile organizations will become stronger, learn, and improve if they withstand the impact. Nevertheless, the learning element only occurs due to the negative impact on the organization. In designing the empirical research instrument and correctly interpreting the results obtained, it is important to define in detail the concepts of resilience and the other managerial categories attributed to it.

Organizational resilience is divided into several phases related to an organization's activities. Various authors have identified key components of resilience, including the ability to anticipate potential threats, manage unexpected events, and learn from experiences (Duchek et al. 2020; Williams et al. 2017). Anticipation means knowing what to expect, monitoring means knowing what to look for, responding to unexpected impacts means

knowing what to do, and learning means understanding what has happened (Tennakoon and Janadari 2021). Stephenson et al. (2010) present the dimensions of planning and adaptation (post-impact) in their resilience model. Other researchers structure the elements of resilience more closely to a bounce-back approach, distinguishing between two parts of resilience: static and dynamic resilience (Annarelli and Nonino 2016; Chen and Liu et al. 2021; Chen and Xie et al. 2021; Liu et al. 2021; Sevilla et al. 2023). Static organizational resilience is seen as the reduction of the likelihood of negative impacts through anticipation and prevention, usually through formalized processes. Dynamic organizational resilience involves quickly recovering from unexpected events through rapid actions and more informal processes.

Static organizational resilience refers to the preparation and planning of what is necessary to mitigate potential impacts on an organization (Chen and Liu et al. 2021). It is related to the functional perspective of an organization, where internal processes of the organization shape static resilience. Sevilla et al. (2023) place static resilience in the context of an organization's capacity by distinguishing between the organization's available resources, information, knowledge, or learning. Stephenson et al. (2010), Gibson and Tarrant (2010), and Zighan (2023) identify the tools under static resilience of strategic planning and management, quality management and standards, risk management, and change management, as the formalized processes of the organization that form the overall organizational management framework.

Dynamic resilience often appears as interactions between an organization's processes, employees, and environment that allow the organization to adapt and return to stable operating conditions as quickly as possible. We can highlight key aspects such as information management, internal communication, decision-making, knowledge management, learning processes, and the importance of organizational culture (Al-Ghattas and Marjanovic 2021; Duchek et al. 2020; Tasic et al. 2020; Williams et al. 2017). The organization utilizes its existing resources and the benefits of static resilience investments to enhance the organization's impact and the individual resilience of its employees. This research connects knowledge management and learning to the bounce-back perspective by examining the public sector context, where organizations experience minimal competition and face heavy constraints from laws and formalized procedures. These factors hinder radical, rapid organizational change. However, public sector organizations continue to improve and learn through incremental changes that enhance organizational performance once they return to operational balance.

The impact of the environment on an organization. Most authors highlight the importance of organizational resilience when organizations face unexpected external events, such as disasters or crises (Duchek et al. 2020). Other studies view organizational resilience as the ability to adapt to expected changes in external influences, including political, economic, and technological factors (Tengblad and Oudhuis 2018). There is a discussion about both unexpected and regular influences on organizations, which is further analyzed by evaluating the effects of the internal environment on organizational performance (Grote

2018; Halmaghi et al. 2017; Zain and Kassim 2012), revealing the specific nature of organizational resilience. Therefore, it is important to equally assess both internal and external environmental impacts—whether they are regular or unexpected.

An organization's performance in uncertain environments, a poorly operationalized variable, contributes significantly to the chaos and fragmentation in the scientific and practical debate on the dimensions of the organizational environment and resilience. It is usually abstractly presented as a contextual fact, for example, turbulent conditions, crisis, organizational shock or upheaval, and conditions of social transformation (Butkus et al. 2023; Ramašauskienė 2022). However, this criterion is not qualitatively applied and controlled when conducting research or applying the proposed theoretical resilience model. Therefore, the adaptability of the proposed resilience frameworks and models to the specific case of organizational functioning loses the value added for the organization. There are two main theories worth mentioning that explain uncertainty conditions: (i) information uncertainty (contingency), which states that the key variable is the organization's lack of information and knowledge to make decisions under uncertainty; and (ii) resource dependence theory, which states that the organization relies on critical resources, with external stakeholders influencing their acquisition and use (Hatch and Cunliffe 2013; Ruiz-Martin et al. 2018). Connecting the elements of organizational resilience with the uncertainty conditions examined in the public sector context, we will further operationalize the uncertainty conditions through the information management (contingency) approach. Organizational uncertainty is defined as the difference between the amount of information required to perform a task and the amount of information already possessed (Grote 2018).

According to scholars studying the performance of organizations in changing environments (Duncan 1972; Hatch and Cunliffe 2013; Ashworth et al. 2007), an important and poorly expressed element in existing research is the identification of an organization as a system in an environment of complexity and compatible performance (Sharfman and Dean 1991; Walker et al. 2003). For example, in studies of an organization's uncertainty conditions, when assessing an organization's operating system as simple-complex or static-chaotic, a distinction is made between the levels of uncertainty that affect the organization: situations of low, moderate, or high uncertainty (Duncan 1972; Jucevičius et al. 2017). This distinction of the concept of uncertainty relies on the information the organization possesses for decision-making (Samsami et al. 2015). In order to operationalize the uncertain environment through the prism of information, it is necessary to assess the information management situations that arise in an organization: (1) the required information is known and available; (2) there is a continuous demand for new information; (3) information saturation—over-saturation; and (4) the necessary information remains unidentified (Hatch and Cunliffe 2013). As this discussion evolves, researchers are also modeling more sophisticated sets of ideas for uncertainty conditions (Samsami et al. 2015). However, capturing this is not easy in practice, especially when it is not the main focus of the study but only a component.

Empirical research methodology. To assess how the complex components of

organizational resilience management work in Lithuanian central public administration organizations, it is appropriate to apply a qualitative research method. Such a research model is designed to let the researcher understand the research object better and to form conceptual, theoretical insights in the context of resilience management in Lithuanian central government organizations (Newcomer et al. 2015). The qualitative research method allows deeper insights into the problem and enables learning about the context from the different perspectives of the subjects under study (Döringer 2021). The development of the research instrument followed an analysis of the theoretical concepts of organizational resilience, and the following criteria for a qualitative empirical study are distinguished:

1. **Environmental impact on the organization:** The organization assesses the impact of both the internal and external environment. It evaluates the resulting uncertainty conditions through the dynamism and complexity of the environment and the context of the information available for decision-making.

2. **Organizational management criteria:** This involves dividing approaches into static resilience, which includes strategic management and planning tools; quality management approaches and changes in standards; risk management and change management—formal processes forming an organization's overall management system—and dynamic resilience, which include elements of internal communication, decision-making, and organizational culture.

3. **Information management approaches:** Studying information management tools is important for dynamic resilience and uncertainty conditions. However, as formalized information management tools fall within the scope of structural resilience, the criterion is presented as a separate issue.

4. **Knowledge management approaches:** Knowledge management or learning organization applications in the concept of resilience correspond to adaptation to changing conditions (bounce-back) but can also be linked to conditions for improvement (bounce-forward). In this case, the issue of knowledge management is to assess the importance of the existing processes in adapting to changing conditions and fulfilling a bounce-back approach. The criterion distinguishes itself from the criteria for organizational management approaches by its relevance to static and dynamic resilience.

We developed eight semi-structured interview questions based on the four research criteria derived from theoretical analysis. We chose this method for its precise structure, ability to interpret the results, and capacity to allow experts to provide more constructive guidelines for the questions without influencing their answers by specifying the questions' limits. This approach retained the possibility of steering the conversation due to the complexity of the research (Kakilla 2021; Kallio et al. 2016).

The empirical research was carried out in July–November 2024 and is a part of a dissertation in preparation. The selection of experts for the empirical study relied on their current and previous top and middle management positions in public sector central government organizations over the past five years. The study depersonalized the experts' information

and assigned codes to the experts (E1, E2, E3, etc.). Researchers transcribed and analyzed the expert survey results using qualitative content analysis. This allowed the resulting data, widely distributed and expressed in depth, to be structured, interpreted according to criteria, and used to justify the study's findings (Lindgren et al. 2020). The data analysis identified categories and sub-categories based on the criteria used to develop the questions. This paper only presents a summary of the analysis.

Survey results: Environmental impact on an organization

Internal environment. The experts believe that the most common and consistently disruptive factors affecting an organization's performance stem from its internal environment, particularly staff turnover. It includes changes in management and the departure of key personnel, such as long-term employees, highly skilled workers, and those with essential competencies that others depend on for support. Researchers frequently identify these aspects as significant influences on organizational dynamics.

When the experts commented on the uncertainty condition*s* that arise in an organization's internal environment, the most emphasized aspect was the complexity of the environment. The various functional tasks and the different specific knowledge needs, as well as the hierarchical management structure, all lead to the identification of the internal environment as complex. Experts are less likely to view an organization's internal environment as static (five informants), highlighting its dynamism due to unplanned tasks, staff turnover, shifting strategies, decision-making processes, and the societal/government demand for speed.

In the case of routine activities, the experts consider that the situation for managing internal environmental information is one of moderate uncertainty; there is a constant need for information, and sometimes information is known and available. However, when unexpected impacts on performance occur, high uncertainty conditions increase the need for information, emphasizing the importance of managing the required information to avoid overload or uncertainty about what information is needed, where to find it, and who is responsible for it.

External environment. When commenting on the regular impact of the external environment on the quality of the organization's performance, experts were much more likely to highlight aspects of the organization's immediate environment: the impact of stakeholders on the organization and the reasons for changes in the civil service law or status. The most frequently mentioned are the electoral cycle and the change of government. Historically, in Lithuania, the ruling majority in the newly elected parliament is held by other parties; therefore, the periodic change of government is a decisive influencing factor, and the change of political leaders of central government organizations affects the government program (changes in priorities/objectives). Other factors influencing performance decline include environmental pressures, mainly from parliamentary politicians, and negative

impacts from the public, media, private sector, and social networks, as noted by experts.

Assessments of the dynamic and complex environment dominate an organization's external environment, regardless of whether the organization operates in a steady-state (routine) environment or experiences an impact. Experts complement the description of the environment by assessing high uncertainty, which arises from the alignment of interests, communication and collaboration challenges, and the delegation of unplanned, urgent tasks to the forming and implementing organizations. Experts also consider the activities of interest groups and the pressure from various actors.

Information management in an organization's external environment is distinguished by lower uncertainty in routine activities—in most of them, there is a constant need for information, or information is known and available. However, when unexpected impacts occur, the situation shifts to information overload and high uncertainty, where the location, quality, and means of obtaining the information remain unclear.

Organization management approaches

Static resilience factors represent the organization by communicating as a partner rather than a subordinate and form constraints on tasks delegated to the organization. Experts identified this aspect as one of the necessary features of an organization to balance the unplanned and excessive delegation of tasks that arise from an overly possessive attitude towards subordinate organizations—a toxic form/culture of communication.

In the category of formalized management processes, most comments and examples given by the experts came from the application of managerial processes in performance management: process management, description, improvement, digitalization of performance management, systematic gathering of information about an organization's internal environment through surveys and research methods (on learning, trust, burnout, etc.). The identification of the elements of quality management is not exhaustive. Managers play a key role in implementing quality management methods, especially since Lithuanian public sector organizations often adopt them independently. While full certification may not be necessary, a fragmented application can still contribute to organizational resilience.

While recognizing the benefits of formalized management processes in preparing an organization to recover from adverse impacts, experts stress the need to balance formalizing processes and methods, achieving standards, and investing in generic competencies, as formalized procedures slow down processes during recovery. However, if organizations do not follow formalized procedures, they impact the elements of the strategic management process and the transfer and retention of information and knowledge in writing.

Dynamic resilience factors are the most common factors identified by experts and include the stability of middle management, motivation, and the importance of civil servants with institutional experience in the organization. The role of managers or leaders was not particularly emphasized, with the importance of timely and unmistakable delegation

of responsibilities and leadership. Quick and effective decision-making creates the right conditions for developing empowering leadership and a performance improvement philosophy. Empowering staff to work in teams, to deal with new situations without formally restricting the exchange of information within the organization.

Experts believe that middle managers lack leadership and managerial skills, often due to the narrow range of specialist qualifications required for the positions. The dominant narrative of organizational culture in the experts' responses elaborates on the importance of focusing on team building and individual psychological resilience, possibly with the help of an organizational psychologist and systematically developing a quality improvement philosophy, including sessions to discuss mistakes, mismatches, or suggestions among managers or within the organization.

Information management is one area in which experts emphasized the importance of internal, interpersonal, and verbal communication tools while they were answering a question about successful information management practices when an organization faces negative internal or external influences. Emphasis was also placed on filtering and limiting information to avoid overloading the staff implementing the tasks. Management meetings and spreading information at the managerial level were also stressed, as they should convey information to the workforce professionally and through various communication methods. The views of the experts point to the importance of striking a balance between limiting and providing information in the event of a negative impact on an organization's performance. Regarding the emotional and contextual meaning of the information, several experts pointed out that it is appropriate to provide a broader context of the situation in an organization, thus reassuring and, to some extent, involving the employees more, ideally enabling them to contribute to proposals and action plans.

Another aspect linked to communication is fostering a culture of openness in an organization, ensuring that staff are informed about context, solution paths, and upcoming changes. The importance of verbal communication in an organization, especially during situations of negative impact, is highlighted. Digitizing management information for decision-making is vital but comes with drawbacks. In organizations with less advanced digitization, experts often downplay the role of internal communication and culture in managing information, focusing more on challenges related to possessing, processing, and using information. Experts rarely mention quality management, leadership, and cooperation with external actors regarding information management in an organization's return to equilibrium after a negative impact.

Knowledge management approaches sparked considerable discussion among the experts. When asked which organizational learning approaches and processes help an organization return to equilibrium after a negative impact, the experts identified the importance of generic competencies and placed the most significant emphasis on the aspect of lively internal communication in the exchange of knowledge, especially in the context of the competencies of management. It is important to be able to manage the learning process (i.e., to plan and record the results of learning in the organization) both at individual and

divisional/departmental levels, and to formalize it where possible. Creating a digital analogy of the organizational memory would enable it to be used in the organization's work, so that it is not "buried in drawers" (E3).

The statement also highlights that organizations improve most effectively in a balanced environment, mainly when using different learning forms. Both national and international networking contribute to an organization's bounce-back from impact and organizational learning. However, they are more likely to work better in routine settings, depending on the organization's culture, the attitudes of managers, and the ability to take advantage of it.

Conclusions

1. The complexity of organizational resilience creates a wide range of interpretable applications in practice. However, it does not accurately assess the impact of the environment, after which an organization needs to exploit its resilience and return to equilibrium conditions. It is, therefore, important to give equal weight to the factors affecting the organization's performance from both the internal and external environment, whose uncertainty conditions can be assessed through the availability of information for the organization's decision-making.

2. Also, in the context of public sector activity, which is characterized by (i) limited competitiveness of organizations, (ii) seeking to ensure a predefined continuity of activities, i.e., the uninterrupted provision of public administration functions and public services, and (iii) activities based on a strict legal framework that limits operational flexibility. The conservative bounce-back concept of organizational resilience overlooks the importance of development and learning, focusing instead on returning to operational balance before systematically assessing the tools necessary for recovery after negative external impacts.

3. Qualitative research indicates that performance decline in Lithuania's central public administration stems equally from internal and external factors. The turnover of staff in management positions and those with historical memory mainly shape the impact of the internal environment, directly influencing the aspects that contribute to a negative organizational culture. External elements link to changes in government due to the election cycle, strategic priorities, stakeholder activity, and emerging pressures from stakeholders, politicians, the public, and the media on the organization.

4. Recurring environmental factors create moderate uncertainty, while unexpected ones lead to high uncertainty, requiring improved information management. Unexpected environmental influences tend to create conditions of high uncertainty, where there is a constant need for information to make decisions, evolving into not knowing what information is needed and where it is located. According to the expert interviews, in managing resilience and decision-making under uncertainty,

organizations need to invest in the ability to process and disseminate information through the organization's internal communication channels in a variety of forms, with a particular emphasis on the free flow of information between colleagues and substantive live communication between managers, both limiting and expanding the information provided.

5. As an organization adapts to changing operating conditions, it most positively influences the knowledge management and learning process by (i) the involvement of staff with institutional memory, (ii) the digitization of the organization's management information, and (iii) the quality of engagement with national networks (or international networks if there is no national equivalent). Inadequate preparation for periods of adverse impacts disrupts the organization's information exchange, and the learning element becomes unmanageable, especially if the adverse impact situations are frequent and unexpected, and the organization does not have enough time to implement learning processes.

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THE ROLE OF THE PORT AUTHORITY IN ENHANCING THE RESILIENCE OF THE PORT ORGANIZATIONAL ECOSYSTEM

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Abstract. This research explores the pivotal role of port authorities (PAs) in enhancing the resilience of the port organizational ecosystem (POE), emphasizing their dual responsibility as operational entities and representatives of public interests. Situated within public administration frameworks, PAs are tasked with advancing societal goals while ensuring efficient governance, innovation, and adaptability in the face of maritime challenges. The study investigates how PAs act as central drivers of resilience by aligning their governance structures, business models, and strategic initiatives with public and private interests. Key objectives include analyzing governance frameworks, assessing management effectiveness, and identifying interventions that promote stakeholder cooperation within entrepreneurial ecosystems. Through qualitative methods, such as stakeholder interviews and focus group discussions, the research highlights the shared responsibilities of PAs and their partners in fostering resilience. Areas of significant PA influence include regulatory oversight, infrastructure development, technological innovation, and environmental sustainability. Effective management and collaboration between PAs and other actors—such as terminal operators, municipalities, and communities—are shown to be critical for building resilient ecosystems. The findings emphasize the strong link between management effectiveness, public accountability, and resilience-building. PAs demonstrate their ability to drive green transitions, support innovation, and balance public and private goals through proactive governance and strategic partnerships. By situating PAs within the entrepreneurial and public administration contexts, the study underscores their capacity to serve public interests while fostering resilient, sustainable port ecosystems.

Keywords: port authority, public administration, resilience, governance, entrepreneurial ecosystems, shared responsibility, managerial effectiveness, sustainability

Raktažodžiai: uosto direkcija, viešasis administravimas, atsparumas, valdymas, antrepreneriškos ekosistemos, paskirstytoji atsakomybė, vadybinis efektyvumas, darni plėtra

Introduction

Ports play a crucial role in global trade, acting as the primary nodes that facilitate the exchange of goods and services across international borders and between land and water transportation systems. The main aspects highlighting and justifying their importance and roles in global trade are trade facilitation, economic impact, supply chain global connectivity, technological and managerial innovation, strategic importance of security and tourism, and leisure services development. Based on these aspects, it is seen that ports not only enable the physical exchange of goods but also play a strategic role in connecting economies, fostering economic development, and driving technological advances (Li et al., 2019). Their effective management is crucial for enhancing competitive advantage in the global marketplace (Silva et al., 2017), especially in the conditions of uncertainties and emergent market fluctuations. In these conditions, ports and their companies become subject to various vulnerabilities due to economic fluctuations, and these vulnerabilities can significantly impact their operations, efficiency, and financial stability (Garrido-Moreno et al., 2024). To enhance port resilience and firm performance, governance must focus on improving operational performance and connectivity. Port governance and management practices directly influence long-term outcomes, with experts seeking effective governance patterns to sustain attractiveness in maritime transportation. In the short term, adaptable practices help maintain stability amid market vulnerabilities (Baafi, 2024). Ports need to regularly update strategies to address market and regulatory changes, ensuring continued operational effectiveness and connectivity. Incorporating knowledge management into these strategies can further improve firm performance (Kusa et al., 2024). The main idea is to investigate managerial interventions rooted in entrepreneurial practices aimed at boosting regional competitiveness and economic benefits through resilient port operations. In this context, optimizing maritime port management strategies through effective short-term managerial interventions is crucial for ensuring the efficiency, sustainability, and competitiveness of ports in the global economy (Valionienė & Župerkienė, 2024). Port authorities must focus on critical areas, including operational efficiency, infrastructure development, environmental sustainability, and stakeholder engagement (Baafi, 2024). By doing so, ports can improve performance and effectively address the challenges of the modern maritime industry.

The object of research is the port organizational ecosystem resilience enhancement through entrepreneurial interventions. And **the aim** of the research is to investigate the role of entrepreneurship in the field of the port organizational ecosystem's resilience enhancement.

The main objectives are as follows:
- To describe the role of entrepreneurial practices in the context of the port organizational ecosystem's resilience enhancement framework
- To prepare the research methodology based on what is required to develop the framework of entrepreneurial interventions
- To analyze the data for the identification of the main effective working entrepreneurial practices
- To discuss research results and identify the entrepreneurial practices driving forces within POEs to enhance POE resilience during international trade volatilities and disturbances

The methodology of research presented in this paper is a preparatory methodology in anticipation of the complex methodology of the wider research. The methodology used in the second stage of the research involved carrying out interviews with experts, and under the rules and methods of deep context analysis, some reasoning principles and visualization techniques were applied.

Theoretical framework

Ports are vital components of global commerce, serving as essential transfer points for goods and services across various transportation modes (Verschuur et al., 2022). Their importance is rooted in roles such as trade facilitation, economic contribution, supply chain integration, global connectivity, geopolitical strategy, and tourism. Consequently, ports function as complex organizational networks involving public and private entities working together to optimize maritime transport (Ilyas et al., 2024). However, ports face inherent vulnerabilities such as economic fluctuations, environmental hazards, and technological disruptions that threaten operational efficiency and resilience (Gurtu & Johny, 2021). The resulting challenges include reduced trade volumes, infrastructure damage, and cybersecurity risks. Given the evolving global supply chain and logistics landscape, a static organizational approach to port management is insufficient (Autio & Thomas, 2022). The competitive environment demands a more dynamic perspective, with competition extending beyond individual port capabilities to encompass entire port organizational ecosystems (Ascenio et al., 2014; Li et al., 2020).

Verhoeven (2010) first defined the port as an ecosystem management object, highlighting the port authority's transformative role in value creation for stakeholders. This perspective acknowledges that ecosystem attributes are not isolated but rather co-evolve with internal and external entities (Li, Urbano, & Guerrero, 2011). This interconnectedness is further amplified by the incorporation of sustainable development goals (United Nations, 2020), leading to the more recent definition of the port organizational ecosystem (Tsvetkova et al., 2017). The port is thus understood to be not merely a single organization but a network of organizations collectively pursuing shared objectives (Ibrahimi,

2017; Golzarjannat et al., 2021; Liu et al., 2024). Scholarly literature (Teece, 2016; Acs et al., 2017; Spigel, 2017; Zdravkovic & Rychkova, 2017; Malecki, 2018; Stam, 2018; Thomas, 2019; Riquelme-Medina et al., 2021; Spaniol & Rowland, 2022; Crnogaj & Rus, 2023) presents several ecosystem typologies:

- Organizational ecosystems, characterized by a central organization's internal and external interactions (Zdravkovic & Rychkova, 2017; Thomas, 2019)
- Business ecosystems, emphasizing value creation through inter-firm collaboration within specific markets (Teece, 2016; Riquelme-Medina et al., 2021; Spaniol & Rowland, 2022)
- Entrepreneurial ecosystems (Acs et al., 2017; Spigel, 2017; Malecki, 2018; Stam, 2018; Crnogaj & Rus, 2023), focusing on the environment fostering innovation and new venture creation (Table 1)

Port ecosystems exhibit characteristics of all three, but the entrepreneurial ecosystem framework offers a particularly valuable lens for understanding dynamic adaptation, innovation, and resilience (Crnogaj & Rus, 2023). The business ecosystem model (Spaniol & Rowland, 2022) focuses on value creation through inter-firm collaboration and the dynamics within a specific market, but the entrepreneurial ecosystem perspective (Crnogaj & Rus, 2023) adds the imperative of supporting new ventures, innovation, and the creation of a robust and dynamic environment for long-term growth and adaptability. Main differences and specific findings based on these findings are presented in Table 1.

Table 1. Feature comparison for organizational, business, and entrepreneurial ecosystems

Feature	Organizational ecosystem	Business ecosystem	Entrepreneurial ecosystem
Central focus	Central organization and collaborative stakeholders	Networks of organizations	Environment for business
Scope	Narrow	Broad	Broad
Emphasis	Internal efficiency	Value creation innovations	Business status creation, value-added creation, and growth

Modern seaports operate as complex, multi-layered business platforms serving diverse stakeholders, such as shippers, agents, energy companies, and port authorities (Bichou, 2007; Golzarjannat et al., 2021). The intricate network requires efficient resource management across multiple institutions (Ratten, 2022) and highlights the need for a robust framework to ensure resilience (Loubet et al., 2024; Valionienė & Župerkienė, 2024). The entrepreneurial ecosystem model offers a comprehensive approach by emphasizing resource availability (funding, talent, and knowledge), supportive institutions, and a culture of risk-taking and innovation, significantly enhancing port resilience (Kehinde et al., 2022; Valionienė & Kalvaitienė, 2023).

The framework presented in Table 2 builds upon previous evolutionary stages of port ecosystems. Initially, the organizational ecosystem laid the groundwork with a focus on regulatory compliance, collaboration, development, and interaction management. The business ecosystem stage expanded on these functions to include connectivity, integration, cooperation, diversification, and value creation. Evolving into an entrepreneurial ecosystem requires a broader scope, incorporating innovations, diversification strategies, sustainability initiatives, sustainable business models, stakeholder and community engagement, and culturally sensitive interventions (Henríquez et al., 2022). Strategic management actions focusing on engagement, leadership, adaptive capacity, co-evolution, and cultural sensitivity are crucial for realizing this evolution. By implementing these approaches across ecosystem categories—such as innovations, diversification, sustainability, stakeholder engagement, dynamic skills, and cultural aspects—ports can enhance their flexibility and adaptability to meet the diverse challenges of the modern globalized maritime environment.

Table 2. Framework of entrepreneurial practices and interventions, according to the relationship between different types of ecosystems, with the strategic tasks of organization management for POE resilience enhancement

Categories of managerial interventions	Strategic management tasks: practices and interventions		
	Organizational ecosystem	Business ecosystem	Entrepreneurial ecosystem
Innovations	Regulation Compliance Collaboration Development Interactions	Connectivity Integration Cooperation Diversification Added-value	Engagement Leadership Entrepreneurship Adaptiveness Co-evolution Culture
Diversification			
Sustainability initiatives			
Sustainable business modes			
Community/Stakeholder engagement			
Dynamic skills			
Culture			

Based on the findings presented in Table 2, two types of actions can be identified within the context of entrepreneurial ecosystem development and the evolution of the seaport organizational ecosystem: entrepreneurial practices and entrepreneurial interventions. Entrepreneurial practices encompass the methodologies and activities undertaken by entrepreneurs to identify and realize business opportunities, focusing on innovation, risk-taking, and proactive problem-solving to create value and drive growth (Champenois et al., 2019; Wilmsmeier et al., 2024; Valionienė & Kalvaitienė, 2023). This approach includes actions such as product development, business model innovation, market expansion, and strategic networking, allowing entrepreneurs to adapt and sustain competitiveness in dynamic market conditions (Kuakoski et al., 2023; Szymanowska et al., 2023).

In contrast, entrepreneurial interventions involve targeted strategies implemented by various stakeholders to enhance entrepreneurial activity and support business outcomes. These interventions—initiated by government entities, educational institutions, and business incubators—aim to foster an environment conducive to entrepreneurship by removing obstacles and creating supportive ecosystems (Oluchi, 2023). Interventions may include policy reforms, financial support, mentorship programs, and skill-building initiatives, addressing specific challenges such as access to capital and regulatory barriers (Henríquez et al., 2022; Kuakoski et al., 2023).

The integration of both entrepreneurial practices and interventions is vital for the resilience of port organizational ecosystems. By establishing shared roles among stakeholders, ports can drive advancements in innovation, diversification, sustainable business models, skill development, cultural growth, stakeholder engagement, and sustainability initiatives. Port authorities act as catalysts for technological advancements, while private sector companies contribute to sustainability and workforce enhancement. Government agencies provide essential regulatory frameworks and community engagement, and educational institutions facilitate the exchange of knowledge and skills. Community organizations promote responsible practices, ensuring that development aligns with local interests.

This collaborative approach enhances the port ecosystem's ability to address the multifaceted challenges posed by modern maritime environments. It fosters a resilient and adaptive port ecosystem that prioritizes innovation and sustainability, ultimately contributing to a robust, competitive global trade network that can respond effectively to disruptions and changing market dynamics.

Research methodology

This research employed semi-structured interviews, a flexible approach that combines structured questions with open-ended responses. The researcher utilized a list of guiding questions while adapting them based on the conversation flow, enabling a broader exploration of topics alongside systematic coverage of essential areas (Allmark et al., 2009). Semi-structured interviews were chosen for several key reasons (Patton, 2015), but the main one is that they balance consistency and flexibility, allowing for essential topics to be covered while encouraging the emergence of new ideas. Given the complexity of the topics studied, semi-structured interviews enable a deeper understanding through follow-up questions, allowing rich narratives to enhance findings. Adjusting questions based on participant responses fosters relevance to research objectives. Additionally, this format aids in gathering detailed qualitative data that can be compared across interviews, leading to deeper insights. In conclusion, utilizing semi-structured interviews provides an effective balance between comprehensive understanding and organized data collection, making it an ideal method for exploring the complexities of the research topic.

Given the broad implications of the research field and the diverse stakeholders

involved, an international expert group was formed, including individuals from the eastern Baltic Sea region: Estonia, Lithuania, and Latvia. The participant selection process utilized a combination of purposeful and stratified sampling (Patton, 2015; Makwana et al., 2023). Purposeful sampling was employed to select participants based on specific criteria relevant to the research objectives, aiming to include individuals who could provide diverse perspectives within the maritime industry and related scientific fields. Stratified sampling ensured representation across different subgroups within the port organizational ecosystem, encompassing primary port service providers, management companies, and governmental and non-governmental organizations (NGOs) (Patton, 2015). This stratification enhances the diversity and comprehensiveness of the collected data.

According to prior research (Ibrahimi, 2017; Lagoudis et al., 2019; Valionienė, 2020), the stakeholder distribution typically includes primary port service providers (44%), management companies (15%), governmental and non-governmental organizations (15%), hinterland logistics providers (15%), and scientists and researchers (1%). The sample reflected this structure, with most experts from primary port activity sectors. To maximize diversity, stakeholders from various countries (Lithuania, Latvia, and Estonia) were also included, as shown in Table 3.

Table 3. Structure of POE stakeholders invited to be interviewed

Type of stakeholder	Professional activities of the experts
Representatives of general cargo operations and services providers in ports (four experts) (R2)	International representatives from the stevedoring companies' association (one expert from Estonia [R5-1] and one expert from the Latvian maritime market [R5-2]), shipowners' association (one expert from the Lithuanian maritime market [R2-1] and one expert from Estonia [R2-2])
Port governance representatives (two experts)	Representatives of the port authority and municipality (one expert from the Klaipėda port authority [R1] and one expert from Klaipėda municipality [R3])
Representatives of other port private and public organizations, including NGOs (two experts)	Representatives of an environmental NGO (Latvia) (R4) and the Estonian maritime industry labor forces (R7)
Representatives of hinterland companies and other maritime-related services providers (one representative)	Representative of land transportation sectors (one expert from the Lithuanian logistics sector [R6])
Representatives of scientific research in the maritime field (one representative in each group, 9%)	Researcher from the University of Latvia (R8)

The structured agenda addresses the best entrepreneurial practices and possible managerial interventions for the implementation of statically described port resilience documents and guidelines. The main questions guiding the agenda are as follows:

1) What entrepreneurial practices contribute most significantly to the resilience of port organizational ecosystems? What are the main expectations of their implementation in practice?

2) Who could be the main driver for accelerating the entrepreneurship practices in the port organizational ecosystem?

The research was conducted in accordance with ethical requirements (Allmark et al., 2009; Nii Laryeafio & Ogbewe, 2023; Maldonado-Castellanos & Barrios, 2023). Participants were informed about the study's purpose, procedures, potential risks, and benefits, and informed consent was obtained prior to interviews to ensure voluntary participation. Confidentiality was maintained by anonymizing transcripts and securely storing data, with identifiable information removed from published materials. Experts were introduced to the research theme and interview objectives, focusing on identifying effective managerial practices that enhance the resilience of the entrepreneurial ecosystem.

Data collection occurred through remote meetings via Zoom, using NVivo software and a semi-structured discussion guide facilitated by a moderator. Discussions were audio-recorded, adhering to ethical requirements, and transcripts were generated along with field notes, though participant non-verbal cues were not analyzed. Thematic analysis was employed to code transcripts according to stakeholder functional types.

To ensure reliability, experts from diverse shipping regions and governance patterns were strategically invited, with emphasis on mid-sized and smaller ports due to their unique challenges. A balanced representation was achieved by focusing on issues relevant to the Baltic Sea region, particularly involving Lithuanian, Latvian, and Estonian maritime sectors. Participants were required to have a minimum of five years of managerial experience in the relevant field. Validity was reinforced by cross-verifying data for inconsistencies within stakeholder groups and comparing responses across various fields. Remote discussions gathered feedback on generalized conclusions, which were incorporated into the study's findings, enhancing the credibility and applicability of the results.

Scientific discussion of results: identifying the sources of initiatives for the implementation of entrepreneurial interventions for POE resilience enhancement

By combining the content of Table 1 and Table 2, some entrepreneurial practices for POE resilience enhancement could be identified by horizontal analysis for the explanation of the entrepreneurship influence on POE resilience and long-lasting monitoring and managerial practices:

– Development and integration of **innovations** for:
   • Port infrastructure as well as hinterland infrastructure, which will lead to the enhancement of resilience in the port disruption field through the operational performance and high adaptability of operations

- Port superstructure and all equipment, reducing the time of ship operations and increasing throughput
- Marine and port innovation management study programs, strengthening simulated and virtual training technologies for students, seafarers, and port labor to increase the level of versatile understanding of port operations and disruptions
– **Diversification** of port activities, which will enhance the business continuity opportunities during unexpected events in the global markets:
- Developing new business areas in marine tourism, and also developing the technological services for vessels and trucks
- Developing customer-oriented business models consisting of solutions for the deeply individualized advanced customer services creation
- Diversifying the field of business activities through the development of value-added services, such as those designed to decrease the environmental footprint of customers, which links this priority with the environmental category
- Diversifying port activities to increase community engagement opportunities for the establishment and alignment of port operations with the needs and values of communities, increasing the minimization of potential external risks that can lead to slower decision-making processes and influence the decrease in adaptability and flexibility of the whole POE
– Implementation of **sustainability** initiatives, which increase the PE compliance with international and national environmental regulations and also increase the importance of cooperative legislation formation on the different levels of port environments: micro-macro-mezzo-maxi-giga. These sustainability initiatives help maritime business companies bolster their reputation, comply with regulations, and—for public or public-private managing bodies—develop strong, eco-friendly port conceptions dedicated to urbanized areas and strengthening interaction between port authorities and municipalities.
– Development of innovative integrative **business models** for port business companies, which include sustainability-centric functions, value-added services promotions, and eco-friendly process orientation by including high-level services and the customization of algorithms for an increase in operational efficiency and flexibility, maximization of revenue, and optimization of operational decision-making under the pressure of disruptions and uncertainties.
– Ensuring up-to-date professional **competence** is an important entrepreneurial practice and could be implemented through safety and training programs, specialized lifelong learning and continuous training programs, cross disciplinary education models, and learning models on maritime innovation management and entrepreneurship, which influence the enhancement of resilience through important outcomes, such as up-to-date professional competence, adaptable and skilled workforce, health, security, cohesion, sustainability, and resilience, resulting in satisfied and loyal employees in the main POE labor force.

Summarizing the results of this study, it can be said that, by prioritizing the anti-principal practices according to the source of identification in the sample of experts, it is possible to highlight the importance of cooperation between private and public capital operators in enhancing the resilience of the whole port organizational ecosystem, but it is also possible to see more significant expressions of leadership in the initiation and support of certain different entrepreneurial practices, which could be possible or probable sources of initiation of a particular entrepreneurial managerial intervention:

– The private sector as an initiator is visible in the initiation, implementation, and maintenance of entrepreneurial practices such as the promotion and development of innovations, development of sustainable business models, and provision of dynamic competence of the labor force, both in terms of reskilling and upskilling, and in terms of the provision of up-to-date competence.

– The private sector as an initiator is visible in practices—and in their initiation and maintenance—for example, the development of diversification of activities, both at the regional and international level, sustainability initiatives, the involvement of communities, and the creation of a sustainable consumption culture conditioned by sustainable behaviors.

The results of the study also point to a number of areas where a gap between public and private actors in the organizational ecosystem has been highlighted, such as community engagement and culture-building practices (Table). The results of the study showed that, when it comes to community engagement, the experts largely referred only to the external community of the seaport but failed to identify the internal community of the seaport ecosystem. Partly based on theoretical assumptions, the experts placed more emphasis on communities as a component of stakeholders, and therefore, the private equity segment did not give importance to community engagement. This is also the case for the cultural practices of behavioral and consumption culture formation, which were given a strong focus by the public sector, where the general culture of consumption can also be shaped through the components of the organizational culture, which is particularly important for the development of an internal culture of sustainability in the organizational ecosystem.

Table 4.

Entrepreneurial interventions	Possible driving forces within POEs		
	Public sector	**Public and private sector partnership**	**Private sector**
Innovation		Initiators: port operators Support: port authority	
Diversification	Initiators: municipality and hinterland logistics Support: port authority		

Sustainability initiatives	Initiator: port authority Support: municipality and education			
Sustainable business models			Initiator: port operators Support: education and research	
Community engagement	Initiators: port authority Support: municipality	X		
Dynamic competence			Initiator: port authority Support: port operators and education	
Culture	Initiator: education Support: port authority	X		

Thus, an examination of the impact of entrepreneurial interventions on POE resilience shows that public–private partnerships are an important factor, with exceptional initiatives distributed in this way: the business operators of the port operations should initiate and ensure the implementation of supra-generic initiatives such as innovation, sustainable business models and, in perspective, further research should be carried out, the initiation of the implementation of sustainability initiatives in the field of the port authority's competence, in the field of competitions, the involvement of communities, and the development of dynamic competence in the formation of a sustainable port workforce, leaving the initiatives for diversification processes to the segment of municipalities in cooperation with land-based logistics companies, and the initiatives for the formation of sustainable behavior and a sustainable consumer culture in cooperation with the port authority to be implemented through higher education and vocational training institutions providing qualification, retraining, and study and research services.

According to the research results, one of the most effective ways of implementing the identified anti-retrospective interventions, such as community involvement, is to activate private sector organizations, expand the concept of communities as stakeholders in the port's organizational ecosystem, and seek innovative methods of involvement in decision-making in the field of resilience and sustainable development. In the context of cultural anti-consumption interventions, the interaction of consumption behavior and consumption ultras with the culture of organizations in the port organizational ecosystem should be developed, and these latter interventions should be developed in parallel, since they have both horizontal and vertical interactions as a key component of building organizational resilience.

Conclusions

The theoretical analysis of the role of entrepreneurship in enhancing the resilience of port organizational ecosystems reveals that entrepreneurial practices serve as a bridge between various governance patterns. These practices are embodied through leadership, engagement, adaptability, and organizational culture, and they contribute to the benefits of networking and the cooperative and entrepreneurial governance practices in parallel with the conservative, cooperative, and entrepreneurial governance patterns described in the previous studies. The analysis also identified key criteria for resilience, which were later validated through empirical research. These criteria, according to the theoretical model, include the following: innovation and creativity, coordination and collaboration, inclusivity and participation, adaptability and flexibility, value creation, transparency and accountability, risk management and business continuity, long-term sustainability, and cultural development. The transformed system of criteria for the empirical research was applied, and due to limited information accessibility of some information, the empirical list of criteria was applied as follows: innovations and creativity, diversification, sustainability initiatives and business models transformations, community engagement, dynamic competence, and cultural developments.

The research methodology employed semi-structured interviews, utilizing both stratified and purposive sampling to ensure scientific validity and reliability of the research results. The sampling framework was based on a typical stakeholder structure, as outlined in previous studies on the attractiveness of the maritime transport sector and governance effectiveness.

Expert findings highlighted several entrepreneurial practices that enhance the resilience of port organizational ecosystems. According to the research, the driving forces behind these practices can be categorized as follows: innovation management requires partnerships between public and private entities within the port organizational ecosystem, including port authorities, educators, port labor, stevedoring companies, shipowners, and logistics firms. The development of dynamic competence is closely tied to innovation, with an emphasis on managing operational efficiency, adaptability, and the generation of versatile knowledge. Sustainability initiatives, on the other hand, are largely driven by municipalities, port authorities, maritime education and training institutions (MET), and labor forces, whereas business model adaptation in the context of resilience and sustainability is more commonly pursued by private organizations within the POE. Similarly, the development of competence and culture is spearheaded by port companies and educational institutions through efforts focused on skilling, upskilling, and reskilling. However, cultural initiatives aimed at fostering sustainability and resilience are more commonly associated with public entities, such as municipalities, port authorities, NGOs, and educational institutions.

It is important to note that across these various interdependencies, educational institutions play a crucial role. These institutions can act as connectors by offering specialized

courses, programs, and research initiatives aimed at ensuring greater resilience and promoting coastal sustainability.

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KYBERNOLOGY AS AN ALTERNATIVE PERSPECTIVE IN GOVERNMENTAL SCIENCE FROM THE GLOBAL SOUTH: A CRITICAL COMPARISON WITH GOVERNANCE THEORY

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Abstract. *This article positions Kybernology as a Global South—rooted alternative in governmental science, engaging the mainstream governance paradigm in critical dialogue. Drawing on a systematic literature review (SLR) of 27 publications (1964–2025) from Scopus and Google Scholar, it synthesizes insights across ontology, epistemology, and axiology, and across macro, meso, and micro levels. Findings show governance excels in architecture and instruments (network design and accountability), while Kybernology foregrounds state–citizen relations and process values (procedural fairness, responsibility, and service recovery). Epistemically, standard good governance indicators should be complemented by citizen experience–based measures, i.e., trust, fairness, dignity, and civic voice, as coequal evidence. The article proposes a Hybrid Governance–Kybernology Model, encompassing macro institutional architecture, meso process values, and micro citizen control, undergirded by an epistemic layer of cognitive justice. Overall, government performance depends on the combination of institutional effectiveness and relational legitimacy. Kybernology is, therefore, not merely a*

critique but a strategic Indonesian contribution that enriches global theories and practices of governance.

Keywords: *Kybernology, governance theory, government studies, Global South epistemology*

1. Introduction

Over the past two decades, governmental studies have undergone a paradigmatic shift, with governance becoming the mainstream framework. Emerging from the legitimacy crisis of the welfare state in the Global North during the 1980s, governance emphasizes collaboration among state, market, and civil society actors, network coordination, and institutional accountability. With these orientations, governance is regarded as adaptive to the complexities of modern administration and offers seemingly universal principles and indicators to measure performance.

However, when applied to the Global South—particularly Indonesia—epistemic and practical challenges emerge. Governance tends to normalize proceduralism, prioritize universal indicators, and highlight formal actors, while, in fact, local values, informal structures, and community spirituality strongly influence governance dynamics. The concepts of "cognitive justice" (Visvanathan) and "epistemologies of the South" (Santos) underline these asymmetries, showing how knowledge rooted in community experience is often marginalized within the governance discourse.

Indonesian studies show similar tendencies—governance practices are frequently shaped more by cultural norms, social relations, and patronage systems than by rational-bureaucratic models assumed in governance standards. Thus, there is a need for a framework that treats values, relationships, and citizen experience as core explanatory variables, rather than simply contextual background. This shift is crucial to better understand and improve governance performance in the Global South.

From this perspective, Kybernology—introduced by Taliziduhu Ndraha—emerges as an Indonesian conceptual contribution. Kybernology defines governance as "the art of steering collective life," conducted not only by the state but also by communities, families, indigenous institutions, and non-state structures. Ontologically, it situates governance as a living value system; epistemologically, it is inter- and transdisciplinary, embracing verstehen and community intuition; and axiologically, it emphasizes civility, social justice, and balance across subcultures. Hence, Kybernology is not merely a critique but an alternative framework rooted in the Global South experience, ready to engage on equal terms with Global North traditions.

This article formalizes Kybernology as an alternative perspective in governmental studies, placing it in critical dialogue with governance theory across three domains: ontology (what counts as "government"), epistemology (how knowledge is produced and

what indicators are legitimate), and axiology (the values and goals pursued). Empirically, it demonstrates the relevance of Kybernology in explaining Indonesian governance practices shaped by subcultural interactions and sociocultural capital, such as deliberation (musyawarah) and cooperation (gotong royong). The article contributes theoretically by constructing a comparative matrix of governance and Kybernology methodologically by presenting a transparent and replicable SLR protocol across North–South contexts, and practically by proposing citizen experience–based performance indicators, such as trust, procedural fairness, and dignity, as complements to good governance metrics.

2. Literature Review

2.1. Governance: Mainstream and Its Logic

Governance studies emerged as a critique of government-centrism and hierarchical bureaucracy. The governance literature emphasizes:

1. The shift from government to governance: multi-actor network coordination among state, market, and civil society (Rhodes, 1996; Rosenau, 1995)
2. Institutional architecture and governance instruments: *steering* rather than *rowing*, policy instruments, and *meta-governance* (Pierre & Peters, 2020; Kooiman, 2003; Peters, 2011)
3. Normative standards: transparency, accountability, effectiveness, and participation, formulated as *good governance* (UNDP, 1997)
4. Intellectual roots: Anglo-Saxon public administration (White, 1955), philosophical reflections on values in administration (Waldo, 1955), and interpretive approaches (Bevir, 2010)

Strengths: This framework provides the language of institutional design and performance measurement that is comparable across contexts.

Limitations: Particularly in the Global South, it tends toward proceduralism (compliance with standards) and universal abstraction, often neglecting micro-level government–citizen relations and local values that drive substantive compliance.

2.2. Global South Critiques: Cognitive Justice and Epistemic Plurality

Global South literature advances epistemic corrections to the mainstream:

1. Sociopolitical hybridity: Transplantation of *best practices* often fails due to dual structures (formal–informal), political culture, and patronage (Riggs, 1964; Dwivedi & Nef, 1982).
2. Cognitive justice: Visvanathan (2009) demands equal recognition of diverse ways of knowing; local knowledge must not be subordinated to "universal" indicators.

3. Epistemologies of the South: Santos (2014) warns of *epistemicide*—the erasure of local knowledge through the hegemonization of Western standards—and calls for an ecology of knowledges.
4. Alternative paradigms: Drechsler (2015) and Farazmand (2018) advocate *Non-Western Public Administration* and "governance from the South" that foreground context, values, and social justice as core variables.
5. Critical participation: Hickey & Mohan (2004) caution against the "tyranny of participation," where participation is standardized without granting substantive power to citizens.

The core of these critiques is the same: governance is proper as architecture but requires a value compass and epistemic justice to remain relevant in the South.

2.3. Kybernology: Foundations from Indonesia (the Global South)

Kybernology (Ndraha, 2001; 2003) offers a repositioning of governmental science:
1. Ontology: its *formal object* is governmental relations—interactions between rulers and the ruled in the provision of public and civil services
2. Epistemology: inter-/transdisciplinary, combining empirical analysis and *verstehen*, recognizing community intuition, and positioning citizen experience as valid evidence
3. Axiology: process values (reason-giving, fairness, responsibility, and service recovery), social justice, and dignity as service goals; trust as the relational outcome

Contributions from Indonesian scholars reinforce this framework by positioning governmental science as an autonomous discipline and clarifying its core focus. Labolo (2014) defines it as an independent field, while Wasistiono and Simangunsong (2015) emphasize government–citizen relations in authority and service as its central object, a point reiterated by Simangunsong (2022) through the ontological lens of authority and service. Philosophically, Kurniawati (2015) affirms that although governmental science shares the same material object with other disciplines, it is distinguished by its formal object of governmental relations. Complementing this, Van Ylst (2008) frames it as a critical, non-positivistic epistemology that is multi- and interdisciplinary, while Sutoro Eko (2016) provides empirical grounding through village-level governance practices centered on participation. Polyando (2016) further calls for clarifying the position of governmental science to better address contemporary challenges. All converge on one point: values, relationships, and citizen experience must be core explanatory variables, not mere contextual background.

2.4. Comparative Matrix: Governance vs. Kybernology

To avoid the bias of a "reactive counter-narrative," this study employs three comparative dimensions consistently throughout the manuscript: ontology, epistemology, and axiology.

Table 1. Comparative Dimensions of Governance and Kybernology

Dimension	Governance (mainstream)	Kybernology (Indonesia/Global South)
Ontology	Networks and institutional architecture	Government–citizen relations as the heart of governance
Epistemology	Universal indicators; *best practices*	Plural & contextual; citizen experience as valid evidence
Axiology	Effectiveness, efficiency, and accountability	Process values (reason-giving and fairness), dignity, and trust

This matrix is used to (i) assess the theoretical narratives of each article in the SLR, (ii) map epistemic gaps, and (iii) propose a hybrid model combining governance architecture with the value compass of Kybernology.

2.5. Research Gaps and Propositional Synthesis

From the corpus of literature, three significant gaps motivate this study:

1. Relational gap: *Good governance* indicators rarely capture relational outcomes—trust, fairness, and dignity—that determine legitimacy. **Proposition 1**: Integrating citizen experience indicators into evaluation frameworks enhances the explanatory power of governance performance in Southern contexts.
2. Epistemic gap: Knowledge production processes are more often centered on universal metrics than on cognitive justice. **Proposition 2**: Evaluation models that combine quantitative metrics with experience-based (coproduced) evidence yield more accurate policy diagnoses.
3. Design–service disconnect: Governance is strong at the design level but weak at the frontline where citizens encounter the state. **Proposition 3**: Strengthening Kybernology's "process values" at the meso–micro levels (procedures, service recovery, and reason-giving) increases legitimacy without sacrificing efficiency.

These propositions guide the design of the SLR and serve as interpretive frameworks in the Findings & Discussion, particularly when proposing the Hybrid Governance–Kybernology Model and citizen experience–based performance indicators (trust, procedural fairness, and dignity) as complements to *good governance*.

3. Research Method

3.1. Design and Reporting

This study employs an SLR to trace, screen, appraise, and synthesize literature on Kybernology and governance theory. Reporting follows PRISMA 2020 (selection flow) and the SPAR-4-SLR framework (process transparency and replicability). The review period

is set for 1964–2025, capturing both classical works (e.g., Riggs, 1964) and the latest developments. The last search was conducted on September 10, 2025 (Western Indonesian Time). Study selection followed PRISMA 2020; (identification n=200; duplicates removed n=30; screened n=170; excluded n=93; full-text assessed n=77; excluded n=50; and included n=27).

3.2. Data Sources and Scope

Two major databases were used: Scopus and Google Scholar. Both were chosen for their multidisciplinary coverage (governmental science, public administration, political science, sociology, and law) and their accessibility to both Indonesian and international publications. Accepted languages were Indonesian and English. The systematic search range was set to 1964–2025, because 1964 marked the publication of Fred W. Riggs's *Administration in Developing Countries: The Theory of Prismatic Society*, widely regarded as the starting point of Global South administrative discourse. However, to strengthen the theoretical framework, this study also refers purposively to several classical works prior to 1964—such as Van Poelje (1953), White (1955), and Waldo (1955). These classics are positioned as background references that provide historical context for the development of governmental science from *bestuurskunde* and Anglo-Saxon public administration toward the governance paradigm. Thus, they are not part of the systematic corpus but serve as purposive references to ensure the historical continuity of the argument.

3.3. Inclusion–Exclusion Criteria

Inclusion criteria:
1. Contains concepts/theories/practices of Kybernology or governance (including studies on government–citizen relations, process values/procedural fairness, and citizen experience indicators)
2. Relevant to North–South epistemic comparison (e.g., cognitive justice, epistemologies of the South, and institutional hybridity)
3. Empirical or theoretical contributions that can be mapped to the ontology–epistemology–axiology dimensions

Exclusion criteria:
1. Non-academic publications (popular opinions and media articles) or policy documents without scholarly grounding
2. Studies discussing managerialism in administration without clear relevance to governance, Kybernology, or government–citizen relations
3. Duplicates, abstracts without full texts, or inaccessible documents

3.4. Quality Appraisal

Given the mixed corpus, a tiered appraisal was applied. Conceptual/theoretical studies were scored 0–2 on three items: argument clarity/coherence, contribution to the ontology–epistemology–axiology lens, and relevance to Global South/government–citizen relations. A total score of 0–6 was given, along with an inclusion threshold of ≥4. Qualitative studies used the CASP 10-item checklist with an inclusion threshold of ≥7/10 (scores 5–6 retained conditionally when thematically pivotal, with limitations noted). Quantitative studies were assessed with JBI checklists per design, requiring moderate–high internal and external validity for inclusion. Quantitative studies were assessed with the JBI Critical Appraisal Tools appropriate to design (e.g., randomized, quasi-experimental, and observational), requiring moderate–high internal and external validity for inclusion.

3.5. Data Extraction and Coding Scheme

Information extracted from each document included (i) bibliographic details (author, year, and publication type), (ii) focus/subject, (iii) approach/method, (iv) key findings, and (v) implications. The thematic coding scheme, derived from the research questions and theoretical framework, included:

1. Ontology: definitions and loci of "government" (network vs. government–citizen relations)
2. Epistemology: types of evidence/indicators (universal–procedural vs. citizen experience/cognitive justice)
3. Axiology: goals/values (effectiveness–efficiency–accountability vs. process values, i.e., reason-giving and fairness vs. dignity and trust)
4. Levels: macro (architecture), meso (process/rules of the game), micro (frontline service points)
5. Indicators: efficiency/efficacy, trust, fairness/procedural justice, and dignity
6. Contexts: Global North/Global South, Indonesia, and other countries

Reliability assurance: Coding was conducted by the researcher with a documented audit trail. To mitigate bias, 20% of the sample was re-coded after a seven-day cooling-off period and compared with decision rules. Discrepancies were resolved by revising coding rules to ensure consistency.

4. Results and Discussion

4.1. Corpus Mapping

The 27 selected articles cluster into three strands. Mainstream governance works (White, Waldo, Rhodes, Rosenau, UNDP, etc.) focus on macro-level design networks,

accountability, and good governance standards. Global South critiques (Riggs, Dwivedi, Drechsler, Farazmand, Visvanathan, Santos) expose institutional hybridity and epistemic asymmetries, calling for cognitive justice. Kybernology and Indonesian scholars (Ndraha, Labolo, Wasistiono, Sutoro Eko, Geertz, Kurniawati) stress government–citizen relations, process values, and cultural practices such as musyawarah and gotong royong. In synthesis, governance provides the architecture, Southern critiques offer epistemic correction, and Kybernology highlights relational–value dimensions.

4.2. Comparative Synthesis: Ontology, Epistemology, and Axiology

1. **Ontology: What is "government"?** Governance models government as institutional networks centered on design, architecture, and coordination. Kybernology, instead, models government as *living relations* between the rulers and the ruled at the service interface. Performance is, thus, located not only in structures but in interactions and procedures experienced by citizens.
2. **Epistemology: What counts as valid evidence?** Governance relies on universal indicators such as transparency, accountability, and effectiveness. These enable comparison across contexts but risk overlooking local knowledge and lived realities. Kybernology emphasizes *cognitive justice* through citizen trust, fairness, dignity, and civic voice as valid evidence.
3. **Axiology: What values are pursued?** Governance seeks efficiency, effectiveness, and accountability as primary goals. Kybernology enriches this with process values—reason-giving, fairness, and responsibility—plus dignity and trust.

Implication: Governance and Kybernology are complementary; governance provides architecture and instruments; Kybernology provides the value compass and relational meaning.

4.3. Three Levels of Analysis: Macro, Meso, and Micro

1. Macro (design/architecture): Governance is strong in networks, steering, external accountability, and *good governance*. Kybernology evaluates whether designs align with citizens' lived experiences.
2. Meso (process/rules of the game): Kybernology contributes reason-giving, appeal rights, service recovery, and due process. These are often missing when evaluation stops at compliance.
3. Micro (frontline services): Kybernology stresses coproduction, feedback channels, and trust audits; governance ensures reporting and sanction mechanisms.

Conclusion at level: "Good" designs without process values at meso–micro levels tend to yield procedural compliance lacking meaning for citizens.

4.4. Hybrid Governance–Kybernology Model

Based on synthesis, we propose the Hybrid Governance–Kybernology Model:
1. Macro – Governance/Architecture: multi-actor networks, coordination and accountability, policy instruments, meta-governance, and performance standards
2. Meso – Kybernology/Process Values: reason-giving, transparency, fairness, responsibility, substantive due process, and service recovery
3. Micro – Citizen Control and Services: citizen contact points, coproduction, feedback channels, trust audits, and rapid service-recovery protocols
4. Epistemic Layer (cross-cutting): cognitive justice (Visvanathan) and epistemologies of the South (Santos) guiding the integration of formal metrics with citizen-experience evidence

Learning loop: citizen experiences → epistemic reflection → improved design & indicators → enhanced cycle

Result: governance that is institutionally effective, procedurally fair, and socially legitimate

This model can be described as follows:
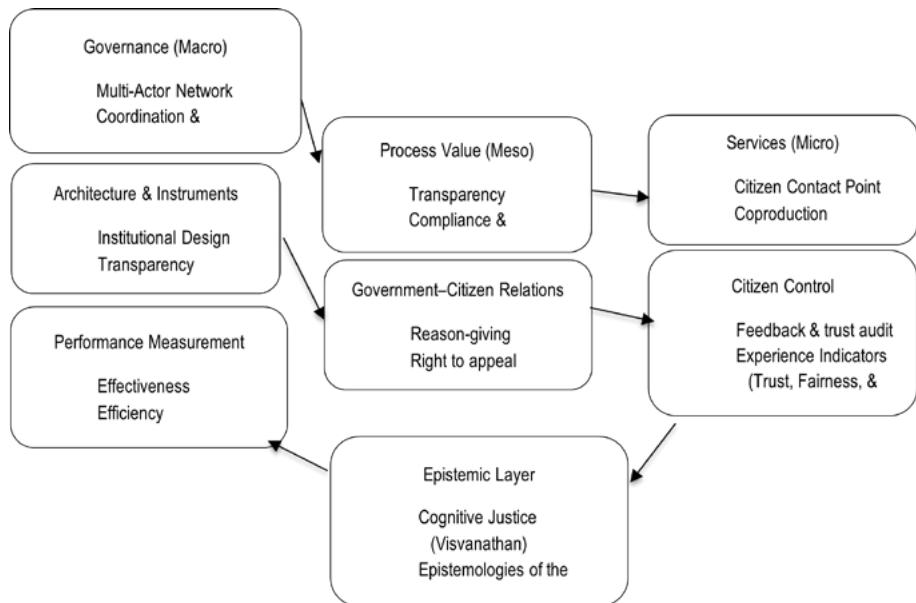
Figure 1. Hybrid Governance–Kybernology Model

4.5. Citizen Experience–Based Indicators (Complementing Good Governance)

As operationalization, four citizen experience–based indicators are developed:
1. TS – Trust (Cross-Subcultural Trust): belief that government acts fairly/competently; Measure: Likert scale + quarterly trust audit
2. KP – Procedural Fairness: the perception that processes are clear, consistent, and include appeal mechanisms; Measure: indices of reason-giving, appeal use, and response time
3. KD – Quality of Deliberation: clarity, relevance, politeness, and empathy in communication; Measure: scorecards and citizen ratings
4. KS – Service Cohesion and Dignity: extent to which services uphold dignity and promote coproduction; Measure: proportion of coproduction cases and Likert dignity scores

These indicators do not replace *good governance* KPIs but bridge institutional performance and relational legitimacy.

5. Conclusion

Based on the overall arguments above, the following conclusions can be drawn:

Kybernology offers a Global South–rooted alternative in governmental science and marks a distinctive Indonesian contribution. Rather than opposing governance, it complements it. Governance supplies institutional architecture and instruments, while Kybernology adds a value compass, a relational lens, and epistemic justice often missed by universal metrics.

Ontologically, government is not only institutional networks but also government–citizen relations at the frontline where legitimacy is formed. Epistemologically, standard good governance indicators should be complemented by citizen experience evidence—e.g., trust, procedural fairness, dignity, and civic voice—on equal footing. Axiologically, performance must be judged not just by effectiveness and efficiency but also by process values—e.g., reason-giving, fairness, responsibility, and service recovery—that cultivate public trust.

Practically, we propose a Hybrid Governance–Kybernology Model integrating macro-level architecture, meso-level process values, micro-level citizen control, and an epistemic layer of cognitive justice. The model supports governance that is institutionally efficient, procedurally fair, and socially legitimate. Thus, Kybernology enriches theory and offers a strategic pathway for practice in Indonesia while advancing a more epistemically just global discourse on government.

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COLLABORATION IN CORPORATE SOCIAL RESPONSIBILITY: TRANSITIONING FROM A QUADRUPLE HELIX TO A HEXA-HELIX PERSPECTIVE

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Abstract

Corporate social responsibility (CSR) has evolved from a company-centered approach to a collaborative effort involving various stakeholders, and it is aimed at enhancing community

welfare. This research examines the collaboration of the quadruple helix, which includes government, industry, academia, and civil society, and seeks to develop an innovation model for managing CSR programs in the Kolaka and South Konawe districts of Southeast Sulawesi Province. The research employed a qualitative method with a descriptive analysis approach. Data were collected through in-depth interviews, focus group discussions (FGDs), and documentation. The results indicated that collaboration among the quadruple actors in managing CSR programs was not optimal due to a lack of coordination and communication. The CSR/TJSLP forum, intended as a platform for stakeholders, struggled to formulate effective programs because of differing perspectives on CSR program management, leading to insufficient motivation to establish long-term communication and cooperation. Therefore, it is essential to innovate a robust form of collaboration through the institutional development of the CSR/TJSLP forum. The proposed institutional innovation model for collaborative CSR program management is the hexa helix model, which includes government, academia, companies, civil society, mass media, and law enforcement. The inclusion of these two additional actors is a crucial strategy for enhancing the impact and effectiveness of CSR programs, as it fosters a diversity of viewpoints and expertise in decision-making related to CSR program management. This approach also helps increase access to resources, including finance, expertise, and networks. This research has long-term implications, both for companies and the community. For companies, strengthening collaboration in managing CSR programs through the hexa helix model will increase social legitimacy (social license to operate), build a positive image of a company, and encourage the creation of sustainable partnerships with stakeholders at the local level. Increased public trust facilitates the smooth operation of companies, reduces the potential for social conflict, and increases investment stability in the operational area. Meanwhile, for the community, the existence of this collaborative model can increase the effectiveness of CSR programs in responding to local needs. The involvement of civil society, mass media, and law enforcement in the planning and monitoring process will increase transparency, accountability, and sustainability of social programs. In the long run, this is expected to encourage community capacity building, reduce social inequality, and strengthen the socioeconomic resilience of communities around industrial areas. Thus, the implementation of this innovative model not only creates synergy between the public and private sectors but also strengthens the foundation of inclusive and participatory sustainable development in Kolaka and South Konawe districts.

Keywords: collaboration, CSR, hexa helix, multistakeholder, quadruple helix

Introduction

Corporate social responsibility (CSR) is an essential part of a company's business strategy. CSR aims to drive profitability while simultaneously promoting a positive impact on society and the environment. The UN Global Compact (2016) describes CSR as a

company's commitment to generating sustainable value over the long term across financial, environmental, social, and ethical dimensions (Butković et al. 2021, 146). Therefore, the effective implementation of CSR programs requires a comprehensive and integrated approach, leveraging collaboration and synergy among various stakeholders to address the inherent complexities in social and environmental challenges. Husted and Sousa-Filho (2016) propose that collaborative governance is the preferred mode of governance for corporate social responsibility practices (Vazquez-Brust et al. 2020, 3).

An effective and innovative approach to enhancing the management of corporate CSR initiatives is the quadruple helix model. As proposed by Etzkowitz and Leydesdorff (2000), this model builds upon the foundation of the triple helix theory, which emphasizes the dynamic interaction between government, academia, and industry within a knowledge-based society. The quadruple helix expands this framework by introducing a fourth element— representing the public, media, cultural communities, civil society, consumers, or end users (Arnkil et al. 2010; Carayannis and Campbell 2009; Pascu and Van Lieshout 2009, as cited by Zotorvie et al. 2024, 326–27).

Although the practice of collaboration has been extensively discussed in the literature, researchers continue to face challenges in explaining collaborative processes and formulating policy recommendations applicable across various contexts. For instance, research by Prentice et al. (2019) explores the use of collaboration tools—such as information, facilities, and staff—as a means to support collaboration between organizations. This includes research conducted within the framework of the quadruple helix model. Most existing studies adopt a macro perspective and overlook micro aspects (McAdam and Debackere 2018). Building on this foundation, this study will explore the quadruple helix model from a micro perspective, focusing on the collaboration among quadruple helix actors.

This is due to the increasing challenges and dynamics of actor relations within the quadruple helix model. The issues at hand include a lack of coordination, communication, commitment, and active participation from each quadruple helix actor. Differences in interests, organizational culture, and perspectives among actors often hinder effective collaboration. Muscio and Vallanti (2014) also highlighted problems in fostering collaboration among quadruple helix actors. They noted that, despite broader involvement and prioritization in the policy agenda, the level of implementation remains disappointing (McAdam et al. 2018, 2). This collaboration faces numerous challenges related to relationship management (McAdam et al. 2018). Factors such as authority issues, trust, interdependence, reciprocity, transparency, commitment, active participation, and communication skills play a crucial role in determining the success of stakeholder collaboration (Bouwen and Taillieu 2004; Graci 2013; Gray 1989; Hall 1999; Huxham and Vangen 2000; Jamal and Stronza 2009; Selin and Batu 1995; Selin et al. 2000; 2012, as cited in Wondirad et al. 2020, 3).

This research aims to describe the collaboration among quadruple helix actors in managing CSR programs and to develop an innovative model for relationships within a collaborative framework. This model serves as an alternative approach to managing sustainable CSR programs. It is anticipated that this innovative collaboration model will provide a

reference for local governments in fostering collaborative relationships in public services and sustainable development.

2. Theoretical Background

2.1 Collaboration Theory with the Quadruple Helix Approach

Interorganizational collaboration is a process that occurs when two or more legally independent organizations work together to address a specific problem characterized by interdependence. The involved organizations jointly define the problem and then establish common goals that serve the interests of each organization (Schruijer 2020, 2). The underlying idea of intersectoral collaboration, according to Huxham and Vangen (2004) and Quélin et al. (2017), is to gain collaborative advantage by combining partners' resources and expertise and jointly capitalizing on each partner's strengths (Stadtler and Karakulak 2020, 2).

Elston J. M. (2013) describes interorganizational collaboration as a joint effort among stakeholders or organizations working together to reach a unified objective and generate mutual benefits. This form of collaboration entails building a shared structure in which responsibilities, decision-making, and resource allocation are collectively managed, with authority and accountability equally distributed among participants (Aunger et al. 2021, 2). Additionally, Roberts and Bradley (1991) characterize collaboration as an interactive process with a common goal, defined by voluntary membership and joint decision-making (Qvarfordt et al. 2024, 91).

Within the context of collaborative frameworks, the quadruple helix model serves as a key approach. Schütz et al. (2018) describe this model as pertaining to the micro level of a knowledge-based innovation system, emphasizing the interactions and collaborations among actors from four distinct subsystems: academia, industry, government, and society (Hafedh 2022, 26). Carayannis and Grigoroudis (2016) state that the concept of quadruple helix can serve as a blueprint for academic innovation, simultaneously involving four sectors: government, universities, companies, and civil society. The integration of these perspectives aims to create concepts and contexts for designing, implementing, and developing entrepreneurship and innovation ecosystems that promote sustainable and inclusive growth (Sabaruddin et al. 2023, 881).

Arnkil et al. (2010) describe the quadruple helix approach to collaboration as a facilitator of innovation. The stakeholders involved in the quadruple helix include the public sector, businesses, academia, and citizens (Qvarfordt et al. 2024). The relationships among these stakeholders can be described as shown in Figure 1.
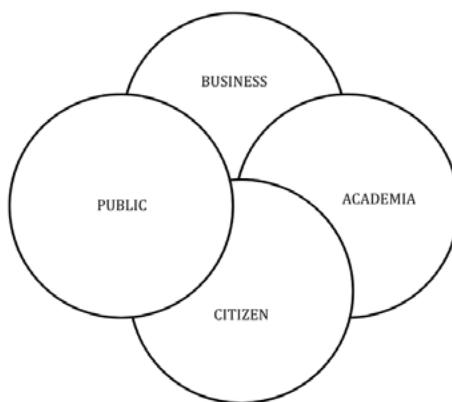
Figure 1. Stakeholders in the Quadruple Helix (Arnkil et al. 2010, as cited in Qvarfordt et al. 2024)

2.2 Corporate Social Responsibility Program Management

In theory, CSR program management refers to the "*triple bottom line" concept* proposed by John Elkington, known as the 3Ps: profit, people, and planet. In this context, the success of CSR is not only measured by the amount of financial contribution but also by the extent to which the program contributes to sustainable development. According to Kleindorfer et al. (2005), CSR practices describe the social dimension of sustainability (Khan et al. 2022, 5).

CSR includes company programs that support the welfare of employees and society. Boso et al. (2017) and Brown et al. (2006) revealed that CSR has become an essential component for companies to demonstrate their performance in reducing environmental impact and contributing to sustainable development. Zheng et al. (2015) explained that CSR reflects a form of cooperative action with stakeholders such as employees, shareholders, suppliers, customers, and society (Adomako and Tran 2022, 1414). In Indonesia, CSR management is regulated by Law No. 40 of 2007, which mandates that companies, particularly in the natural resources sector, implement CSR initiatives. This is reinforced by Government Regulation No. 47/2012, emphasizing the importance of CSR towards surrounding communities and the environment. Companies in natural resources must fulfill their social and environmental responsibilities (PP Nomor 47 Tahun 2012 2012).

3. Methodology

This research was conducted in the Kolaka and South Konawe districts, Southeast Sulawesi Province, focusing on quadruple helix actors' collaboration and the innovation

model of stakeholder collaboration in CSR program management. A case study approach was chosen as the research method to examine this collaboration, as highlighted by Miller et al. (2016), which emphasized the need for more case-based research at the micro level to understand the complexity of quadruple helix activities. Eisenhardt and Graebner (2007) and Siggelkow (2007) also argue that case studies can generate new insights that refine existing theoretical knowledge (Hasche et al. 2020, 527–28).

This research aims to both describe the collaboration among quadruple helix actors and develop an innovative model for actor collaboration in managing CSR programs. This model can serve as a framework for government CSR program management. The research employed is qualitative, aimed at describing empirical data gathered through in-depth interviews and FGDs. Semi-structured interviews were conducted with members of the TSLP forum in each district, representing key stakeholders in the quadruple helix model: government, academia, business, and civil society. These interviews sought to explore the roles, experiences, and perceptions of collaboration among actors in the implementation of CSR programs. Additionally, FGDs were held with 20 informants from each study area, purposively selected for their active involvement in social, environmental, and local development issues related to CSR. The informants included representatives from local government, local mass media, companies managing CSR (specifically mining and banking companies), academics, and community organization representatives.

The role of the informants in this research is to provide an overview of the implementation of CSR programs, the potential and obstacles in applying the quadruple helix collaborative model, the sustainable CSR management innovation model, and the identification of forms of cross-sector collaboration. Informants also contributed to understanding the dynamics of relationships among stakeholders involved in CSR program implementation, including evaluating the effectiveness of the TSLP forum. The information gathered serves as a crucial foundation for formulating strategies to strengthen CSR governance through the quadruple helix approach, considering the social, economic, and institutional characteristics of Kolaka Regency and South Konawe Regency. The data collected were analyzed thematically to identify patterns of interaction between stakeholders and to provide recommendations for enhancing cross-sector synergies in CSR program management.

4. Results and Discussion

4.1. Quadruple Helix Collaboration in Corporate Social Responsibility Program Management

To improve CSR program management in the regencies of Kolaka and South Konawe, Southeast Sulawesi Province, stakeholders collaborated to form a corporate social and environmental responsibility forum (TSLP) or CSR forum. This forum aims to enhance coordination and synergy in implementing CSR initiatives within these regencies. It includes

government representatives, corporate entities, community organizations, and academic institutions, thereby embodying the quadruple helix framework. The stakeholder forum in Kolaka Regency is officially recognized as the corporate social responsibility forum (TSLP) based on Kolaka Regent Decree No. 188.45/031/2015. In South Konawe District, the forum operates as a CSR forum under Regulation of South Konawe Regent No. 35/2016, which outlines implementation guidelines for corporate social responsibility.

The research findings indicate that communication challenges significantly hindered the development of effective CSR programs within the CSR/TSLP forum. Participants exhibited a lack of commitment to promoting sustainable communication and collaboration. This issue arose from differing perceptions regarding the management of CSR programs, particularly concerning authority over CSR funds—whether it should be held by a company, local government, or the CSR/TSLP forum.

The research findings illustrate that the collaboration among quadruple helix actors in managing CSR programs aligns with the views of Wood and Gray (1991, 140) and occurs primarily in the preconditioning phase. In this phase, actors collaborate due to their motivation and desire for participatory, transparent, and accountable CSR management. Additionally, efforts should be made to synchronize, harmonize, and synergize CSR programs implemented by companies in collaboration with local governments and communities. Collaboration has not yet advanced to the implementation stage of the process and its outcomes. To ensure the sustainability and success of CSR programs, strong commitment and effective communication among actors are essential. This indicates that obstacles remain in building sustainable collaboration, stemming from differing perceptions and interests in managing CSR programs.

Consequently, the government lacks data on the CSR activities conducted by companies. This absence of reporting diminishes the perceived transparency of these companies in their social and environmental program initiatives, as they do not provide written reports to the local government to demonstrate accountability to the community. As a result, the Regional Development Planning Agency (BAPPEDA), which is responsible for assisting regional leaders in the preparation, coordination, and oversight of development planning at the district level while integrating various cross-sector programs in alignment with regional and national development policies, does not receive information pertaining to the CSR activities of these companies.

This situation indicates that the collaborating actors do not have a strong commitment to building long-term partnerships. This lack of commitment is evident in the absence of transparency and open communication between the quadruple helix actors involved in the CSR/TSLP forum, as well as the lack of a working mechanism to support the synchronization of company CSR programs with the regional development priority programs outlined in the Regional Medium-Term Development Plan (RPJMD). The RPJMD is a regional development planning document that outlines a five-year framework, encompassing the vision, mission, policy direction, development strategies, priority programs, and performance indicators to be achieved by the regional head during their term of office. As

a result, collaboration remains limited to formal aspects and does not progress to a deeper implementation stage, preventing the community from fully realizing the potential positive impact of CSR programs.

In addition to commitment, a significant challenge faced by the CSR/TSLP forum pertains to the differing perspectives among stakeholders regarding the management of CSR programs. Research indicates that companies often operate under the principle that, as capital owners, they are responsible for independently managing and formulating CSR initiatives. Conversely, forum members advocate that CSR programs should align with local needs and regional development priorities. These divergent viewpoints can create conflicts in defining the direction and objectives of the programs, thereby hindering effective collaboration.

The regulations established by the Regent of South Konawe and the Regional Regulation of Kolaka Regency clearly stipulate that sustainable CSR planning must incorporate the outcomes of development plan deliberations (Musrembang) at the village, sub-district, and district levels. Musrembang serves as an annual participatory forum that engages local governments, communities, and other stakeholders in formulating development priorities. This process is conducted in stages, progressing from the village to the sub-district, district/city, and provincial levels. The objective is to ensure that CSR programs implemented by companies do not duplicate local government activities.

The study results revealed that corporate social responsibility programs in Kolaka Regency include empowerment-based social and environmental development; partnerships with micro, small, and cooperative enterprises; and direct community programs. Furthermore, the partnership program includes aspects of activities for the following: a) research and needs assessment; b) strengthening community socio-economic institutions; c) training and mentoring in entrepreneurship; d) training in management functions and financial governance; e) training in business development, such as improving product quality and design, packaging, marketing, cooperation networks, and improving company classification; f) improving management capabilities and productivity; and g) encouraging the growth of innovation and creativity. In South Konawe Regency, company CSR programs focus on empowerment of community economy, education, health and sanitation, infrastructure, energy resources, environment, capacity building, and partnerships with governmental, religious, social, and cultural organizations, as well as emergency response.

4.2. Ideal Model of Inter-Actor Collaboration in Corporate Social Responsibility Program Management

This section aims to develop an innovation model based on a study of quadruple helix actor collaboration in the implementation of CSR programs. A key finding from the research is that the collaboration among quadruple helix actors in managing CSR programs is less effective than expected. Empirically, the CSR/TSLP forum, which represents the involvement of actors in the quadruple helix model, should expand its scope by incorporating

two additional participants: mass media and law enforcement. This inclusion would enhance the collaborative ecosystem.

With this addition, the relationship between actors forms a six-helix structure that defines the hexa helix model. Mass media plays a dual role in innovation: it not only disseminates information but also shapes public opinion, influencing policy direction and public acceptance of innovation. Additionally, the law enforcement dimension of the hexa helix highlights the importance of ensuring that innovations develop within legal boundaries, protect public interests, and uphold ethical standards. The hexa helix model is depicted below:
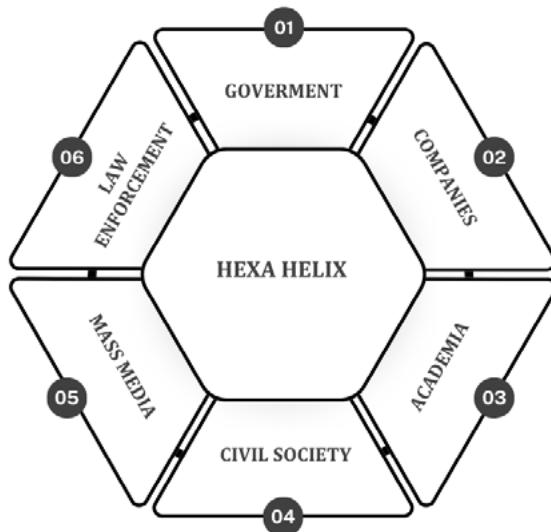

Figure 2. Hexa Helix Model (processed by the author, 2024)

Figure 2 illustrates the relationship among the hexa helix actors—government, companies, academia, civil society, mass media, and law enforcement—showing an integrated pattern of collaboration aimed at achieving sustainable development goals. Each actor plays a strategic role that complements the others, fostering innovative solutions to public problems.

The roles of each actor are presented below:

1. **Government**: The government acts as both a regulator and a facilitator. As a regulator, it creates policies, regulations, and standards that support collaborative programs. As a facilitator, it serves as a liaison between companies, communities, and other institutions to ensure that these programs benefit the public interest. Additionally, the government can foster multisectoral cooperation and help overcome obstacles to collaboration.

2. **Companies**: Companies are responsible for allocating resources—financial, human, and technological—to support collaborative programs that have social and environmental impacts and to implement sustainable business practices.
3. **Academia**: The institution of higher education provides support grounded in research, theory, and scientific studies to inform decision-making related to development programs and innovations in sustainable development.
4. **Civil Society**: Civil society encompasses communities, non-governmental organizations (NGOs), and other public interest groups. Its role includes acting as watchdogs, mediators, and promoters of participation, ensuring that collaboratively produced innovations align with social values and positively impact society.
5. **Mass Media**: The mass media plays a crucial role in disseminating information, raising public awareness, and shaping opinions that support collaboration among actors. It also acts as a watchdog by evaluating the success or failure of collaboration programs, ensuring that organizations remain transparent and accountable in their activities.
6. **Law Enforcement**: Law enforcement ensures compliance with existing laws, maintains security, mediates conflicts, and resolves violations. By promoting justice and order, law enforcement supports an environment conducive to innovation and collaboration, allowing *all actors* to work together effectively without legal barriers.

Each actor must follow a structured framework in executing their roles. This framework is designed to facilitate collaborative relationships among actors, ensuring alignment with the agreed-upon goals and objectives. It serves as a guideline to clarify each actor's responsibilities, authorities, and limits of authority. Overall, the relationship and framework of the hexa helix actors can be described as shown in Figure 3 below.
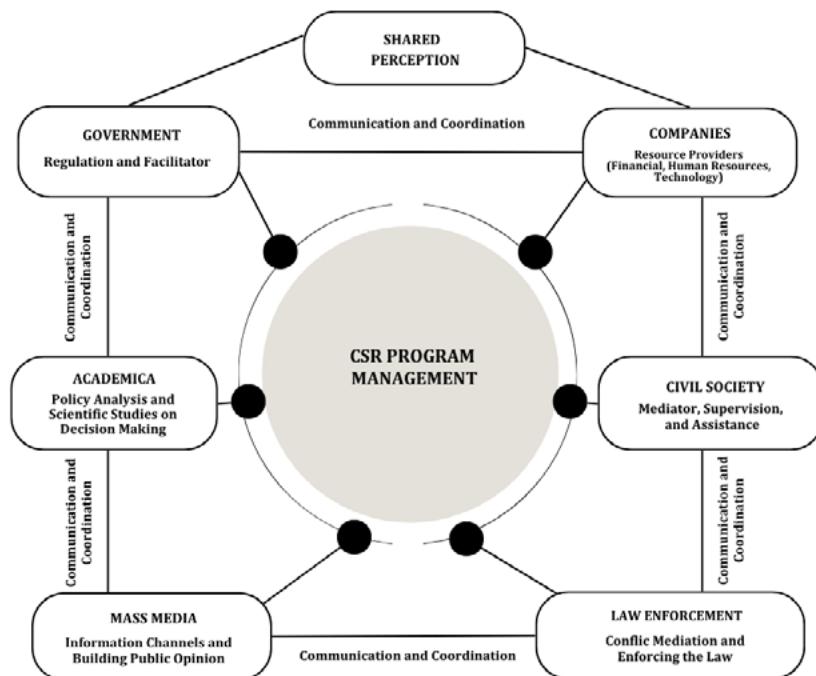
Figure 3. Hexa Helix Relationship Model and Framework for CSR Program Implementation
(processed by the author, 2024)

Figure 3 illustrates that the relationship between actors in CSR program management is characterized by communication and coordination as the main factors in the collaboration process. This relationship includes government actors, companies, academics, civil society organizations, mass media, and law enforcement, which together represent the hexa helix model. The model also highlights that a shared perception serves as the binding element among hexa helix actors in formulating, determining, and implementing CSR programs. This shared perception in CSR program management ensures that all involved actors have aligned views on the objectives, strategies, and implementation of CSR activities.

The evolution from the quadruple helix to the hexa helix addresses the increasing complexity of challenges in innovation, particularly those related to sustainable development, socioeconomic advancement, and technological transformation. The original quadruple helix model consisted of four main entities—government, academia, industry, and society—but has now evolved into a more collaborative framework within the innovation ecosystem. Given the dynamic environmental landscape, the involvement of additional stakeholders is essential for creating comprehensive and inclusive solutions.

The research findings indicate that the implementation of CSR programs in the Kolaka and South Konawe regencies does not fully demonstrate effective collaboration among

quadruple helix actors—government, companies, academics, and civil society. The primary issue is the lack of coordination between sectors and weak ongoing communication. The CSR/TSLP forum, intended as a joint platform for formulating and evaluating programs, has not been able to function optimally. This is attributed to differing views and interests among stakeholders, as well as a lack of motivation to establish long-term commitment and cooperation.

The findings of this study provide the foundation for developing a more comprehensive collaboration model known as the hexa helix model. This model encompasses six key elements: government, academia, companies, civil society, mass media, and law enforcement. It represents a novel approach proposed in the research to address communication and coordination barriers across these sectors, while enhancing transparency and accountability in the management of CSR programs. Additionally, it aims to improve the sustainability and social impact of CSR initiatives at the local level. Future research will focus on the contextual application of the hexa helix model in Indonesia, including strategies for institutional strengthening and mechanisms for synergy among actors relevant to local social, economic, and institutional conditions.

5. Conclusions

1. Collaboration among government, academia, companies, and civil society in managing CSR programs in Kolaka and South Konawe districts, Southeast Sulawesi Province, remains suboptimal. Members of the CSR/TSLP forum encounter challenges in aligning their vision due to differing perspectives on CSR management. This discord arises from insufficient coordination and communication among stakeholders, leading each company to plan, implement, and evaluate CSR programs independently, without engaging the CSR/TSLP forum. This situation illustrates that the effectiveness of quadruple helix collaboration is affected by both structural factors and social dynamics, culture, and leadership styles.

2. To enhance the management of sustainable CSR programs, the quadruple helix model can be expanded into a hexa helix model, facilitating more structured and strategic collaboration. This innovative model optimizes the roles of each stakeholder—government, companies, academia, civil society, mass media, and law enforcement—allowing them to contribute based on their respective expertise and resources. Furthermore, this model is expected to improve communication and coordination between sectors, strengthen transparency and accountability in CSR management, and promote the sustainability of programs that positively impact local communities.

3. This research opens opportunities for further investigation into the application of the hexa helix model in broader contexts, both regionally and globally. Future studies should focus on how this model can be adapted and implemented in specific

contexts, as well as evaluating its impact on the effectiveness of CSR programs and the improvement of community welfare. Additionally, further development of monitoring mechanisms and institutional strengthening in CSR implementation is an area that warrants exploration in future research.

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FACTORS INHIBITING SPATIAL INFORMATION AND SYSTEM-BASED PUBLIC SERVICE INNOVATION IN SPATIAL PLANNING

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Abstract

This study examined the driving and inhibiting factors influencing the implementation of website-based service innovation (e-government) through the Spatial Planning Information System (SPIS) in Mojokerto Regency, Indonesia. SPIS, locally branded as Majapahit GIS, is a spatial planning information system designed to deliver online maps, tabular data, and animated statistical visualizations. A descriptive qualitative research design was employed. Data were collected through in-depth interviews, observations, and document analysis, and analyzed using an interactive qualitative data analysis approach. The findings indicate that SPIS has been implemented effectively and complies with key e-government principles, including accessibility, service continuity, technical feasibility, efficiency, and accountability. A distinctive feature of SPIS is its ability to automatically generate thematic maps based solely on numerical data input at predefined locations. This functionality eliminates the need for specialized cartographic expertise and enables broader user participation, representing a significant innovation in the application of Geographic Information Systems (GIS) for e-government. Despite these achievements, the aspiration to establish an integrated "one database system" capable of comprehensively supporting regional development planning has not been fully realized. The main driving factors include strong leadership commitment, supportive human resources, adequate infrastructure, and alignment with central government policies. Conversely, inhibiting factors comprise limited availability of IT specialists, slow internet access due to reliance on open networks, underutilized

public consultation features, incomplete supporting data, weak inter-agency coordination, and the absence of incentive-based governance mechanisms. This study contributes empirical insights into the sustainability and institutional challenges of GIS-based e-government innovation in local government contexts.

Keywords: inhibiting factors, public service, service innovation, special planning

Introduction

One form of public service innovation through e-government in the government bureaucracy is the Spatial Planning Information System (SPIS) service innovation implemented by the Mojokerto Regency Regional Development Planning Agency. The Spatial Planning Information System (SPIS) is a website-based spatial planning information system designed to provide transparent, accurate, and easily accessible land-use information to the public. This SPIS service provides information to the public about land use per Mojokerto Regency Regional Regulation No. 9 of 2012 concerning the Mojokerto Regency Spatial Planning for 2012–2032. The information presented in SIPR includes zoning designation, spatial utilization policies, and land-use suitability based on official regional spatial plans. Most of the SIPR customers are people with interests in or plans to use land in the Mojokerto Regency area. Before they invest, they must ensure that the designation suitability of the land they intend to use is in accordance with the applicable provisions. In this context, SPIS functions as an initial reference and verification tool for land-use compliance. This service is the initial stage before investors carry out the licensing process for industry, property business, or other purposes. Thereby supporting legal certainty, reducing information asymmetry, and improving the efficiency of investment-related public services.

The implementation of spatial information services at the Mojokerto Regency Regional Development Planning Agency is done offline or manually. This means that service users—in this case, the public—who wish to obtain spatial information must go directly to the Mojokerto Regency Regional Development Planning Agency office and meet the officer in charge to obtain the desired information service. This manual service system has been running for years. Systems and work procedures run as they are without any standard provisions. There is one officer in charge, who has one member of support staff, and is equipped with one computer device that supports spatial information application software. This kind of service condition causes the process to take longer, and it can often be convoluted and less transparent. Not infrequently, the customer has to visit the Mojokerto Regency Regional Development Planning Agency office several times because the officer in charge is working outside the region or carrying out other tasks.

Against the background of these various shortcomings, along with the development of information technology (IT) and the demands of the community for excellent, fast, and efficient service, at the end of 2017, the head of the Mojokerto Regency Regional

Development Planning Agency sparked an innovative website-based spatial information service, which represents the operational realization of the SPIS service innovation and was realized through the SIPR application known as "Majapahit GIS." In this context, SPIS refers to the institutional public service innovation framework, while Majapahit GIS is the concrete digital application used to deliver the service. Majapahit GIS contains spatial information related to land use plans in Mojokerto Regency based on the Mojokerto Regency Regional Regulation concerning regional spatial planning. This service is helpful for people who want to know about allotment and land use provisions, especially for investment and other activities. The advantages or uniqueness of this SPIS service innovation compared to other applications, namely the SIPR application, lie in its ability to present spatial planning information through interactive digital maps, using the Global Positioning System (GPS) for location reference and processed with geographic information system (GIS) technology, so that it can be presented in map form.

By using this online-based service system, the SPIS application can be accessed online by all people who wish to find information on land use in Mojokerto Regency through the website https://sipr.mojokertokab.go.id. If the community only wants to find spatial information (land allotment), then the service can be accessed independently through the intended website. This can be done simply by looking at the spatial plan map feature that has been prepared in the application. Furthermore, information can be obtained regarding the intended land use for housing, industry, trade, and so on. However, if someone wants a printed copy of the spatial information letter, they must go to the Mojokerto Regency Regional Development Planning Agency office in person. A spatial information letter is an official document issued by the local government to confirm the conformity and approval of a proposed land use with the applicable regional spatial plan. The spatial information letter must be verified and signed by the authorized official before being issued. The customer can then use this spatial information letter as a further requirement for managing the relevant business licensing process.

In general, the concept of an online-based service system innovation implemented by the Mojokerto Regency Regional Development Planning Agency seems to make it easier for service users to access more focused and systematic services. Transparent public service is one of the principles that is used to realize good governance. Previous research by Taufiqurokhman and Satispi (2018) unveiled that transparency in the administration of public services is the implementation of tasks and activities that are open to the public, especially in policy, planning, implementation, and monitoring/control processes, for example, which should be easily accessible to all parties who need information. Transparency is built in an atmosphere with a free flow of information. In this atmosphere, processes, institutions, and information can be directly accessed by those who are interested. In addition, there is also sufficient information available to understand and monitor these three things. However, many ideal prerequisites must be fulfilled to improve the quality of public services and achieve good governance; likewise, the application of e-government was chosen as an innovative step to improve public services. Therefore, based on existing

theory, as well as a set of initial information on issues surrounding the implementation of website-based public services at the Mojokerto Regency Regional Development Planning Agency, as mentioned above, the authors are interested in further analyzing the implementation of SPIS services as a website-based innovation (e-government). In response to the gaps and the need to analyze the implementation of e-government, two research questions are addressed in this current study:

1. What factors inhibit website-based service innovation (e-government) in the SPIS service "Majapahit GIS" at the Mojokerto Regency Regional Development Planning Agency?
2. What are the strategies to overcome obstacles in website-based service innovation (e-government) in the SIPR service "Majapahit GIS" at the Mojokerto Regency Regional Development Planning Agency?

Literature Review

Innovation in the public sector

Innovation in bureaucracy can be done through several models. Mas'ud (2009) contended that innovation in bureaucracy could be realized through implementing e-government, applying the citizens' charter, and using regional autonomy as a driving force for innovative bureaucracy. In its implementation, several experts identify public sector innovation models or types. There are three types of innovation spectrum in the public sector. The first is incremental innovation to radical innovation (characterized by the level of change, incremental improvements to existing products, and service processes).

The second is that innovation in changing public service behavior must start from the commitment of top management as a role model that plays a strategic role in changing the behavior of the apparatus, so that public service innovation can be realized, if it is driven from the top down through visionary leadership and strengthened from the bottom up through the active participation of all apparatus. The last is need-led and efficiency-led innovation (depending on whether process innovation has been initiated to solve specific problems or make existing products, services, or procedures more efficient). The types of innovation in the public sector, as identified by Sangkala (2013, 31), can be seen in Table 1 below.

Table 1. Types of Innovation in the Public Sector

No.	Innovation Type	Example
1	New service or service improvement	Home health care
2	Process innovation	Changes in making a service or product
3	Administrative innovation	Use of new policy instruments as a result of a policy change

4	System innovation	A new system or a fundamental change of an existing system by establishing a new organization or new patterns of cooperation or interaction
5	Conceptual innovation	Changes in the way actors such as change are achieved by using new concepts, e.g., integrating resource management
6	Radical change is now rational	Perspective or shift in the mental matrix of an organization's employees

Strategies, opportunities, and barriers to innovation

The United Nations World Public Sector Report in 2004, as mentioned in Sangkala (2013), notes that "the main strategies used in successful innovation practices in government bureaucracies are:

1. Providing integrated services. The government offers an increase in the number of services.
2. Involving citizens. The government gives citizens an active role in participating in the success of innovation and allows citizens to express their needs while ensuring successful and sustainable innovation.
3. Establishing cooperation/collaboration. The government conducts innovative collaboration and cooperation with various parties to improve the quality of public services.
4. Utilizing IT. The government provides computer and internet-based public administration services to accelerate and simplify governmental administrative and information services."

In addition, comprehensive strategy from the bureaucracy is needed to achieve success in innovating. The choice of the right strategy can be adjusted to the situation and conditions faced by the bureaucracy when carrying out its innovation. Whether it uses an integrated service delivery strategy that provides various services according to community needs, collaborates with the private sector, involves citizens in getting ideas for sustainability of innovation, or uses IT to simplify services, the most important thing is the bureaucracy's commitment to continuously improving efforts to develop community needs.

The use of innovation opportunities can result in outcomes that exceed initial expectations and were not previously planned, thereby producing positive and sometimes unexpected successes, whether in government organizations, companies, or other social organizations. We can use many opportunities to develop innovation, especially if we are willing to learn from reality by comparing expectations and reality. Innovation begins with the search and discovery of opportunities that can be obtained by members from outside an organization and within an organization. The dynamics of innovation opportunities arise from the organization's ability to read predictable conditions and respond to unpredictable situations, so that innovation is not only reactive but also anticipatory.

Changes in people's perceptions, including the demand for the fulfillment of structural needs and the development or changes in science and technology, create an opportunity if we respond well to create innovation. The development of social conditions fluctuates greatly. Each member of society determines this. Members of society who develop dynamically are members of society who can seize opportunities. Opportunity and innovation are mutually reinforcing—opportunities create innovation, and innovation creates new opportunities.

Supporting factors in spatial planning

Management experts put forward other definitions in a book by Hasibuan (2016), George R. Terry, in particular, says planning is an effort to select and connect facts and make and use assumptions about the future by describing and formulating the activities needed to achieve the desired results. From some of these definitions, several essential components in planning can be explained, namely goals (what is to be achieved), activities (actions to realize goals), and time (when these activities are to be carried out).

Research Method

Data collection

Data for this study were collected through in-depth interviews, observations, and document analysis at the SPIS service under the Mojokerto Regency Regional Development Planning Agency, located at the Mojokerto District Government, East Java, Indonesia. The interviews were conducted with the head, staff, and sub-division team of the agency.

Data analysis

The data analysis technique used in this research was the interactive model analysis informed by Miles et al. (2014). This data analysis technique included data collection, reduction, presentation, and conclusion drawing and verification. The interactive analysis model can be described as follows: the data reduction stage, the data presentation stage, and the conclusion. In the first stage, the data reduction stage, the data were reduced by summarizing, selecting, and focusing on data that were in accordance with the research objectives. Next, the data presentation stage was carried out after the data had been reduced or summarized. In addition, the data observations, interviews, and documentation were analyzed and presented as interview notes, field notes, and documentation. The final step in the qualitative data analysis interactive model is conclusion and verification.

Results and Discussion

Inhibiting factors

The first set of questions aimed to investigate the factors that inhibit website-based service innovation (e-government) in the SPIS service "Majapahit GIS" at the Mojokerto Regency Regional Development Planning Agency. Service providers had to identify inhibiting factors in public services. The identification results can now be used as input material for further policy improvements. Table 2 below illustrates the factors that inhibit e-government in the SPIS service.

Table 2. Inhibiting Factors in the "Majapahit GIS" Service

No.	Inhibiting Factors	
	Internal	**External**
1	Lack of human resources in the IT field to operate and control the "Majapahit GIS" service	Infrequently updated supporting data
2	The e-government application using free networks (open-source system) / lack of internet connection	Lack of support from other related regional apparatus organizations
3	The SPIS "Majapahit GIS" application is not fully meeting the needs of customers who would like to consult in person as yet	Absence of a regional government policy that supports implementing the "one database system and one map policy," such as a reward and punishment system for implementing spatial data services in Mojokerto Regency

As shown in Table 2, there are several obstacles to carrying out service innovation, namely that communication is not smooth and the budget is not sufficient. The results of the study indicate that several inhibiting factors in the SPIS service are as follows:

1. Internal factors, including the fact that there is limited human resource department support in the IT field. The results showed that, although a supporting factor, the lack of human resource in this service was also an inhibiting factor. The "Majapahit GIS" SPIS service is an innovative website-based service. In its implementation, this kind of service system does not rule out the possibility of system problems or disturbances. Therefore, special experts in the field of IT are needed, and their job is to oversee the running of this application system. Currently, the Mojokerto Regency Regional Development Planning Agency does not yet have staff or experts specialized in IT. Meanwhile, recruiting personnel (non–civil servants, i.e., contract-based or private-sector professionals who are not part of the permanent

government workforce) in the IT field is still constrained by the region's budget and regulations, so it becomes a separate obstacle for this service.

2. The application uses a free network (open-source system). The "Majapahit GIS" SPIS application is a website-based service that depends on the available internet network. The research results show that a slow internet connection often limits access to the SPIS application. This is because this application uses an open-source or free network system and does not use a paid network. This has an impact on access, as it is slower than that of paid applications.

3. The SPIS application has not met the needs of customers who wish to consult it. The implementation of website-based services has shifted several service functions that were previously handled directly by human resources to technology-based processes supported by information technology (IT). This certainly impacts changes in various aspects, both in mindset, habits, and work mechanism systems, as well as with this SIPR service. The transition from offline to online services requires preparation for maturity from various sides.

The study results show that in the third year this website-based service has been running, many service user communities still prefer using offline services and going directly at the Mojokerto Regency Regional Development Planning Agency. The main reasons given by these customers are that by coming in person, there is more flexibility during the consultation, and they can get more information. This condition is supported by other information that says that the public dialogue service menu provided in the SPIS application is not optimal. People very rarely use the menu that has been provided. This indicates that a rigid, less flexible system still hinders the use of e-government media in the SPIS application. Consultation and two-way communication functions that are usually done offline cannot be accommodated in this application. This is absolutely an obstacle to optimizing the use of e-government in the SPIS spatial information service at the Mojokerto Regency Regional Development Planning Agency.

E-government development is directed at achieving four goals according to Presidential Decree No. 3 of 2003 concerning National Policy and Strategy for e-Government Development, namely a. the establishment of an information network and public service transactions that have quality and scope that can satisfy the public at large and be reached in all parts of Indonesia at any time without being limited by time barriers and that is at an affordable cost to the community; and b. the formation of interactive relations with the business world to enhance the development of the national economy and strengthen the ability to deal with changes and competition in international trade.

Thus, it can be concluded that the inhibiting factors in SIPR service innovation include internal and external factors, such as the Mojokerto Regency Regional Development Planning Agency as the service provider. Internal factors lead to a lack of experts in the field of IT and weaknesses in the application system used, which is not optimal as a two-way communication channel. In contrast, external factors lead to the lack of integration of services, which is caused by the lack of data and support from other related agencies. The constraints

or inhibiting factors encountered also indicate a lack of readiness for the local government's support of IT network infrastructure.

Strategies involved

To overcome obstacles in the implementation of the Spatial Planning Information System (SPIS), several interrelated strategies were implemented by the Mojokerto Regency Regional Development Planning Agency. These strategies were designed to improve service effectiveness, efficiency, and sustainability, while responding to organizational, human resource, technical, and institutional challenges in delivering website-based public services.

The first strategy is leadership commitment which plays a fundamental role in supporting the success of public service delivery. In the context of public sector innovation, Sangkala (2013) emphasized that leadership firmness in policy formulation and implementation is a key determinant of successful innovation. The findings indicate that leadership commitment within the Mojokerto Regency Regional Development Planning Agency is very strong and serves as a major supporting factor in the development and improvement of SPIS as a website-based service. The Head of the agency demonstrates a high level of commitment to enhancing service quality so that it is easy to use, effective, efficient, transparent, and accountable. In addition, structural officials appointed as service implementers provide consistent support and cooperation. Such leadership conditions are essential for maintaining policy consistency and enabling continuous improvement in public service delivery.

Second, human resources are no less important in supporting the success of public service innovation. This strategy also involves encouraging citizen participation by providing opportunities for users to contribute input that supports the sustainability and improvement of the SPIS service. According to Hasibuan (2016), human resources refer to the abilities possessed by individuals, which are determined by intellectual capacity and physical capability. Regardless of how advanced the technology or equipment used; service innovation cannot function effectively without competent human resources. In public service delivery, service officers are often the main focus of public assessment, particularly in terms of politeness, discipline, and competence. The results show that officers assigned to manage the SIPR service, ranging from frontline staff and technical officers to spatial information letter verifiers, demonstrate a high level of competence. Frontline officers, in particular, are perceived as friendly, capable, and responsive in providing consultation services. These human resource conditions significantly support the successful implementation of the SPIS service.

Third, adequate facilities and infrastructure also constitute an important strategy in supporting the effectiveness of the SPIS service. The research findings indicate that the facilities provided are generally very good. The front desk service area is comfortable for visitors, and supporting infrastructure such as computer equipment, internet networks, and office furniture has been sufficiently provided. The importance of human resource competence and supporting infrastructure as components of service quality is also explicitly

recognized in Law No. 25 of 2009 concerning Public Services, which identifies these elements as part of public service standards.

The fourth important strategy involves strengthening cooperation between central and local governments, as well as collaboration with other stakeholders. Support from the central government is reflected in policies such as Presidential Regulation No. 27 of 2014 on the National Geospatial Information Network and Presidential Regulation No. 9 of 2016 on the Acceleration of the One Map Policy Implementation, which aim to improve data integration and spatial information accuracy. These policies provide opportunities and institutional support for enhancing SPIS service quality, particularly in efforts to develop an integrated "one database system" for comprehensive regional planning. At the local level, government support is primarily reflected in budget allocation for improving SPIS service quality at the Mojokerto Regency Regional Development Planning Agency. In addition, collaboration with both public and private sector partners is necessary to strengthen service capacity and innovation sustainability.

The last strategy focuses on the optimal utilization of information technology to deliver public services that are fast, easy to access, transparent, and reliable. The Mojokerto Regency Regional Development Planning Agency has made significant efforts to develop an IT-based service system that is trustworthy and accessible to the broader community. These efforts include improving system reliability, increasing private sector participation, and aligning management systems and work processes with ongoing technological advancements. Nevertheless, although these strategies have been implemented effectively, they have not yet fully achieved the goals of service integration or the provision of comprehensive, accurate, and up-to-date data required for regional development planning in Mojokerto Regency.

Conclusion

This investigation aimed to analyze the driving and inhibiting factors in applying website-based service innovation (e-government) in the SIPR service. In addition, the current study has shown that there were two factors (internal and external) that inhibited the SPIS "Majapahit GIS" services at the Mojokerto Regency Regional Development Planning Agency. First, the internal factors were the lack of IT experts, inadequate internet connection, and the large number of customers. So far, the governance does not have an IT expert to control and operate the e-service system. Then, during the operational service, users of the "Majapahit GIS" application often faced issues and poor network performance due to the use of the open-source system's internet connection. As a result, a backlog had formed due to customers waiting to be served and the SPIS application system gave ineffective service. Second, the external factors were the infrequent updates, lack of support, no regional government policy of one database system, and unclear regulatory policy. The Mojokerto Regency Regional Development Planning Agency has also provided several strategies to

optimize the quality of the SPIS "Majapahit GIS" services. However, recently, the strategies could not be stated as working 100%smoothly in achieving the goal of service integration and providing comprehensive, accurate, and updated data for regional planning needs in Mojokerto Regency. The strategies implemented included establishing cooperation with the private sector to provide IT personnel, utilizing a fiber-optic network, and optimizing the public dialogue menu function. Overall, this current research provides insights for the government of Mojokerto Regency and the people around there to constantly develop and improve the quality of the e-governance system. The findings reported here also shed new light on other governments using e-systems in public services. Last, although the current study is based on a small sample in one city, the findings suggest investigating a broader and larger e-governance public service system in Indonesia.

Acknowledgment

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