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Review Article

Implementation of Artificial Intelligence in Public Services: Analysis of Readiness and Adaptation Strategies of The Indonesian Bureaucracy

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Abstract. Digital transformation through Artificial Intelligence (AI) is imperative for public services, but its implementation in Indonesia faces various challenges. This study analyses the readiness level of the Indonesian bureaucracy and the role of adaptation strategies as a mediating mechanism for successful AI implementation. Using explanatory sequential mixed methods, the study involved 287 respondents from 68 government agencies using PLS-SEM analysis, followed by in-depth interviews with 33 informants from 11 agencies for qualitative exploration. The results indicate that the readiness of the Indonesian bureaucracy is in the moderate category, with human resource readiness as the most critical weakness. PLS analysis confirmed that all readiness dimensions significantly influence adaptation strategies, with human resource readiness as the strongest predictor. Adaptation strategies partially mediated the readiness-implementation relationship, explaining 70.4% of the variance in AI implementation. Qualitative findings identified effective strategies: phased pilot projects, change management through champions, continuous capacity building, incremental implementation, and adaptive governance. Structural barriers include rigid regulations, silo mentality, and political turnover. The study produced the ARSI Framework as a practical guide for AI implementation in the Indonesian public sector, emphasising the importance of strategic execution in translating readiness into successful implementation.

Keywords: Adaptation Strategy, Artificial Intelligence, Organisational Readiness, Mixed Methods, Public Services.

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1. Introduction

Digital transformation has fundamentally shifted the paradigm of public service delivery around the world, with Artificial Intelligence (AI) being a key catalyst in creating more responsive, efficient, and citizen-centric bureaucracies. Developed countries such as Estonia, Singapore, and South Korea have demonstrated how AI can automate administrative processes, predict service needs, and personalise interactions between government and citizens (Wirtz et al., 2019; Meijer & Wessels, 2019). Estonia integrated AI into its national tax system, X-Road, reducing administrative burdens by half, while Singapore operates the chatbot Ask Jamie, which handles millions of citizen inquiries with high accuracy (Mergel et al., 2019). This phenomenon is not simply the adoption of technology, but rather a fundamental shift in the way governments perform their service functions, moving from a bureaucratic transactional model to an adaptive, data-driven digital ecosystem (Dunleavy et al., 2006). In this context, AI not only offers operational efficiency but also opens up

opportunities to create more inclusive and accountable public services, particularly in reaching marginalised groups who have been hampered by complex bureaucratic procedures (Sun & Medaglia, 2019).

Indonesia, as a developing country with a highly complex bureaucracy, faces unique challenges in adopting AI for public services. The Indonesian government has demonstrated its commitment through the launch of the National Artificial Intelligence Strategy 2020-2045 and the Electronic-Based Government System roadmap, which positions AI as a pillar of digital transformation (Ministry of Communication and Informatics, 2020). However, the implementation of AI in the field still faces various structural and cultural barriers that slow the transformation process.

The Indonesian bureaucracy, known for its hierarchical, risk-averse nature and uneven levels of digitalisation across regions, creates unique complexities in the technology adoption process (Janowski, 2015). Unlike the private sector, which can readily adopt technological innovations, the public sector must contend with strict regulations, rigid procurement procedures, and greater organisational resistance due to the stability of positions and entrenched work cultures (Bozeman, 1993). These conditions necessitate a different approach to understanding how AI can be effectively implemented in the Indonesian bureaucracy.

The gap between policy aspirations and the reality of AI implementation in Indonesian public services demonstrates a significant gap. Although various ministries and agencies have allocated budgets for digitalisation and AI programs, implementation success rates vary widely, and many initiatives stall at the pilot project or even the planning stage (Nugroho & Santoso, 2023). Several government agencies have successfully implemented complaint service chatbots or document automation systems, but the sustainability and scalability of these programs remain major questions. Furthermore, the lack of a systematic assessment of government agencies' readiness to implement AI has led to repeated failures, with the same pattern of technology investments unbalanced by human resource readiness, non-adaptive organisational structures, and the absence of a planned change management strategy (Mergel et al., 2019).

This phenomenon indicates that the primary problem lies not in the availability of AI technology itself, but rather in the readiness of the organisational ecosystem to accept, adapt, and integrate this technology into public service business processes. From a scientific perspective, the literature on AI adoption in the public sector still reveals several research gaps that need to be addressed. First, the majority of existing studies focus on the technical dimensions of AI implementation or partial success factors such as leadership support or technological infrastructure (Wirtz et al., 2019; Mehr, 2017). However, few have comprehensively examined the level of organisational readiness across multiple dimensions, including technology, organisation, human resources, and regulations.

Second, previous research tends to ignore the role of organisational adaptation strategies as an intervening mechanism linking readiness to successful implementation, as if readiness automatically leads to successful implementation without considering how the adaptation process is managed (Coombs, 2020). Third, the dominance of quantitative or qualitative approaches, isolated from each other, limits a holistic understanding of this complex phenomenon. Statistical data cannot capture the dynamics of organisational change processes, while qualitative studies struggle to generalise findings (Creswell & Clark, 2017). Fourth, the majority of research has been conducted in developed countries with very different

bureaucratic contexts, making findings difficult to transfer to developing countries like Indonesia, which face unique challenges related to fiscal capacity, the digital divide, and political stability (Janowski, 2015).

Theoretically, the relationship between organisational readiness and successful technology implementation has long been recognised in the information systems and change management literature. The Technology-Organisation-Environment Framework developed by Tornatzky and Fleischer (1990) emphasises that technology adoption is influenced by factors such as the technology itself, the organisational context, and the external environment. However, this framework does not yet accommodate the adaptation strategy dimension as an intervening variable mediating the relationship between readiness and implementation.

Weiner (2009), in his Organisational Readiness for Change theory, explains that readiness for change is a psychological and structural state in which organisational members feel ready to undertake change. However, this readiness does not automatically translate into action without a clear execution strategy. On the other hand, Rogers (2003), in his Diffusion of Innovation Theory, emphasises the importance of the adoption process, which involves the stages of awareness, persuasion, decision, implementation, and confirmation. In other words, there is an intermediary mechanism connecting potential adoption with actual adoption.

In the context of this research, bureaucratic adaptation strategies serve as such mechanisms, encompassing how organisations plan implementation, manage resistance, build human resource capacity, select technological approaches, and establish governance structures. An appropriate adaptation strategy can maximise the impact of readiness on successful AI implementation, while the absence of a deliberate strategy can result in even high levels of readiness failing to translate into effective implementation. This research offers a significant contribution by integrating readiness assessment and strategy execution perspectives into a comprehensive analytical framework developed specifically for the Indonesian bureaucratic context. Unlike previous studies that treat readiness and implementation as a direct relationship, this study proposes and empirically tests a mediation model in which adaptation strategies serve as intervening variables, explaining how and why readiness may or may not translate into successful implementation.

The mixed methods explanatory sequential approach employed allows researchers to first measure the level of readiness and test the causal relationships between variables through surveys, then delve deeper into the mechanisms of adaptation strategies operating in government agencies through interviews and case studies. The integration of these two types of data yields a richer and more practical understanding of not only "whether" readiness influences AI implementation (quantitative results), but also "how" and "why" it occurs (qualitative results).

This methodological novelty allows for the development of policy recommendations that are not only based on statistical evidence but also grounded in the realities of bureaucratic practice. Furthermore, this research produces a readiness measurement instrument that can be replicated by other government agencies for self-assessment, as well as an adaptation strategy framework that can serve as a practical guide for the digital transformation process in the Indonesian public sector. Based on the description above, this research seeks to answer the main questions: How prepared is the Indonesian bureaucracy to implement Artificial

Intelligence in public services, and how do adaptation strategies mediate the relationship between this readiness and the success rate of AI implementation?

2. LITERATURE REVIEW

Public Service Transformation and the Role of AI

Public services have undergone a paradigmatic transformation from the hierarchical Old Public Administration to Digital Era Governance, which emphasises system reintegration, citizen-driven technology adoption, and end-to-end digitalisation of administrative processes (Dunleavy et al., 2006). This paradigm transcends New Public Management, which focuses on efficiency, and New Public Service, which emphasises public value, by positioning technology as a fundamental enabler for redesigning government structures (Denhardt & Denhardt, 2000). Characteristics of digital public services include 24/7 accessibility, process automation, service personalisation, transparency, and collaborative governance involving multiple stakeholders in co-creating public value (Janowski, 2015).

Artificial Intelligence (AI) has emerged as a disruptive innovation in public services, defined as the ability of computer systems to perform tasks that require human intelligence, such as pattern recognition, decision-making, and learning from experience. AI applications in the public sector include machine learning for predictive analytics, natural language processing for chatbots, computer vision for recognition systems, and robotic process automation for administrative automation (Wirtz et al., 2019). Estonia's integration of AI in X-Road resulted in savings equivalent to 1,407 human-years of work per year, Singapore's Ask Jamie app achieved an 89% satisfaction rate, and South Korea's use of AI to predict traffic accidents with 85% accuracy (Vassil et al., 2016; Sun & Medaglia, 2019; Kim et al., 2020).

However, AI implementation also presents challenges: algorithmic bias that reproduces discrimination (Angwin et al., 2016), accountability issues in "black box" systems (Veale & Brass, 2019), privacy threats, job displacement that creates resistance (Mehr, 2017), and vendor dependence that creates lock-in (Margetts & Dorobantu, 2019). Indonesia demonstrates ambition through its 2020-2045 National Artificial Intelligence Strategy and the SPBE roadmap, with several initiatives such as the JAKI chatbot and the e-ticketing system (Ministry of Communication and Informatics, 2020; Nugroho & Santoso, 2023). However, the 2023 SPBE evaluation shows that the average index is still in the "poor" category with a score of 2.59 out of 5.0, indicating a large gap between policy and implementation (Ministry of Administrative and Bureaucratic Reform, 2023).

Organizational Readiness

Weiner (2009) defined organisational readiness for change as a shared psychological state in which organisational members feel committed to implementing change and confident in their collective capabilities. This concept emphasises two key components: change commitment and change efficacy. Armenakis et al. (1993) identified five essential beliefs: discrepancy, appropriateness, efficacy, principal support, and valence. Tornatzky and Fleischer's (1990) Technology-Organisation-Environment (TOE) Framework identified three contexts that influence technology adoption: the technological context (technology characteristics), the organisational context (structure, resources, management support), and

the environmental context (regulatory environment). This framework has been validated in various technology adoption contexts, from e-commerce to AI (Baker, 2012; Oliveira & Martins, 2011).

Technology Readiness encompasses basic digital infrastructure such as data centres with high computing capacity, high-speed internet connectivity, scalable cloud infrastructure, mature integrated information systems, data quality and availability, data governance capabilities, and cybersecurity infrastructure (Wirtz et al., 2019; Janssen et al., 2020). Organisational Readiness refers to substantial, not merely symbolic, leadership commitment, adequate allocation of financial resources, an adaptive organisational structure, and an innovation culture that encourages experimentation (Mergel et al., 2019).

Human Resources Readiness encompasses digital literacy as a basic skill, more specifically AI literacy, technical competency for IT staff, psychological change readiness, and technology acceptance, as explained in the Technology Acceptance Model, which encompasses perceived usefulness and perceived ease of use (Davis, 1989; Venkatesh et al., 2003). Research indicates that employee resistance stems more from perceived threats to job security than from technical incompetence (Autor, 2015). Regulatory Readiness includes an internal policy framework, Standard Operating Procedures, data protection compliance, and ethical guidelines to regulate the principles of fairness, transparency, accountability, and non-discrimination (Floridi et al., 2018; European Commission, 2021).

Adaptation Strategy as an Intervening Variable

Organisational adaptation strategy refers to a series of deliberate actions to adapt structures, processes, and culture to the demands of technological change. Lewin (1947) proposed a three-stage model: unfreezing, changing, and refreezing. Kotter (1996) developed a more elaborate eight-step process, while the ADKAR model offers an individual-focused perspective with five building blocks (Hiatt, 2006). Rogers (2003), in his Diffusion of Innovation Theory, identified five innovation characteristics that influence adoption: relative advantage, compatibility, complexity, trialability, and observability, and categorised adopters into innovators, early adopters, early majority, late majority, and laggards.

Planning strategy includes a feasibility study from multiple perspectives (technical, economic, operational, and legal), roadmap development with a phased approach, a comprehensive risk assessment, and stakeholder mapping (Laudon & Laudon, 2020; Kettinger & Grover, 1995). Change management strategies focus on effective communication of the vision, leveraging internal change champions, managing resistance through a participatory approach, and a quick-win strategy (Kotter, 1996; Klein, 1996; Ford et al., 2008).

Capacity building strategies include differentiated training based on roles (awareness, operational, and advanced levels), learning modalities that combine classrooms, e-learning, hands-on practice, mentoring, and coaching, and establishing communities of practice (Noe & Colquitt, 2001; Salas et al., 2012; Wenger, 1998). Technology strategies include build versus buy decisions, vendor selection, pilot project approaches for proving concepts, integration strategies with existing systems, and agile implementation methodologies (Lacity et al., 2010; Conboy, 2009). Governance strategies include establishing a dedicated team with clear roles, developing SOPs, an ethical governance framework with algorithmic impact assessment, a monitoring and evaluation framework with clear KPIs, and a continuous improvement mechanism (Weill & Ross, 2004; Floridi et al., 2018; Kaplan & Norton, 1996).

Relationships Between Variables and Mediation Models

The change management literature shows that the level of organisational readiness influences how the organisation approaches and executes change. Armenakis et al. (1993) argue that organisations with high readiness are more likely to engage in proactive and systematic change strategies. Weiner (2009) states that high organisational readiness creates collective efficacy that motivates coordination, resource pooling, and persistence—manifestations of sophisticated adaptation strategies. Empirically, Gil-Garcia et al. (2007) found that agencies with higher technological readiness are more likely to adopt phased implementation strategies with proper testing. Organisations with strong leadership commitment establish formal governance structures and allocate dedicated resources (Mergel et al., 2019). The contingency perspective suggests that optimal strategies are contingent upon situational factors. Organisations with high readiness can pursue ambitious strategies, while low readiness benefits from conservative approaches (Lawrence & Lorsch, 1967; Rogers, 2003).

Mediation analysis examines mechanisms through which antecedent variables influence outcome variables (Baron & Kenny, 1986; Hayes, 2018). Conceptually, mediating variables answer "how does X influence Y?" Pure readiness does not automatically translate into successful implementation, which requires deliberate actions in the form of adaptation strategies. The Resource-Based View suggests that resources and capabilities create an advantage only when deployed through effective strategies (Barney, 1991). The dynamic capabilities perspective emphasizes organizational ability to purposefully modify resources based on the essential definition of adaptation strategies (Teece et al., 1997). Organisational Learning Theory posits deliberate strategies, such as experimentation and feedback mechanisms, enable learning, which mediates how readiness translates into implementation (Argyris & Schön, 1978). Diffusion of Innovation explicitly models the innovation-decision process where characteristics influence the adoption process, which determines outcomes (Rogers, 2003).

Empirically, studies find technical readiness alone insufficient predictor; organisational factors such as training quality mediate relationships (Gil-Garcia & Pardo, 2005). In ERP implementation, readiness influences success through project management quality (Ngai et al., 2008). However, in the AI-specific context in the public sector, systematic examination of mediating mechanisms is largely absent, creating opportunities for this research (Wirtz et al., 2019; Mergel et al., 2019).

3. CONCEPTUAL FRAMEWORK AND HYPOTHESES

Based on a synthesis of the TOE Framework (Tornatzky & Fleischer, 1990), Organisational Readiness for Change Theory (Weiner, 2009), Diffusion of Innovation Theory (Rogers, 2003), and change management literature, this study develops an integrative conceptual framework. The model proposes that successful AI implementation depends on: (1) Organisational Readiness (technology, organisation, human resources, and regulations) as antecedent conditions; and (2) Adaptation Strategies (planning, change management, capacity building, technology, and governance) as mediating mechanisms that translate readiness into

implementation. Adaptation strategies are positioned as intervening variables influenced by readiness and thus influence the level of AI implementation.

Quantitative Hypothesis:

H1: Organisational readiness has a significant positive effect on bureaucratic adaptation strategies.

1. H1a: Technological readiness has a significant positive effect on adaptation strategy
2. H1b: Organisational readiness has a significant positive effect on adaptation strategy
3. H1c: Human resource readiness has a significant positive effect on adaptation strategy
4. H1d: Regulatory readiness has a significant positive effect on adaptation strategy

H2: Organisational readiness has a significant positive effect on the level of AI implementation (the predicted direct effect is reduced when the mediator is included).

H3: Adaptation strategy mediates the relationship between organisational readiness and the level of AI implementation. This study predicts partial mediation because it acknowledges that some aspects of readiness can directly facilitate implementation without elaborate strategies, while full potential requires strategic orchestration.

H4: Adaptation strategy has a significant positive effect on the level of AI implementation.

Qualitative Research Questions: RQ1: How does the adaptation strategy process unfold in practice? RQ2: What specific barriers and enabling factors are experienced? RQ3: How do different agency characteristics influence strategy choices? RQ4: What are the best practices and lessons learned? RQ5: How does the mediation mechanism of the adaptation strategy operate? The conceptual model and hypotheses derived from the theoretical synthesis provide a roadmap for empirical investigation, with expected contributions to theoretical advancement in the technology adoption literature as well as practical guidance for government agencies in navigating the AI Adoption journey.

4 RESEARCH METHODS

This research uses a pragmatist approach with an explanatory sequential mixed methods design (Creswell & Clark, 2017). The quantitative phase precedes the qualitative phase to measure readiness and test hypotheses. The quantitative results then inform the selection of cases for in-depth qualitative exploration. Quantitative Phase: The population includes government agencies implementing AI. A sample of 250-300 civil servant respondents was selected through stratified random sampling based on agency type and level of implementation. The instrument, a structured questionnaire, measured readiness (technology, organisation, human resources, regulations), adaptation strategies, and level of AI implementation using a Likert scale of 1-5. Validity was tested through Confirmatory Factor Analysis (AVE>0.5, CR>0.7), and reliability with Cronbach's Alpha>0.7 (Hair et al., 2017). Data analysis used Spearman correlation for relationships between variables, the Kruskal-Wallis test for differences between groups, and Structural Equation Modelling (PLS) with bootstrapping for mediation testing (Sarstedt et al., 2017). PLS-SEM was chosen due to its robustness for non-normal data and moderate sample size (Hair et al., 2019).

Qualitative Stage: Purposive sampling selected 9-12 institutions based on readiness categories (high, medium, low). Data were collected through in-depth interviews with 30-35 informants, focus group discussions (FGDs), observations, and document analysis. Analysis

used thematic analysis (Braun & Clarke, 2006) with the help of NVivo. Validity was maintained through triangulation and member checking (Lincoln & Guba, 1985). Integration: Joint display combined quantitative and qualitative findings to generate meta-inference (Fetters et al., 2013).

QUANTITATIVE ANALYSIS RESULTS

Respondent Characteristics and Descriptive Analysis

The study collected data from 287 civil servant respondents across 68 government agencies (response rate 82%). Respondents were represented by 42% from central ministries/agencies, 35% from provincial governments, and 23% from district/city governments. In terms of position, 28% of respondents were echelon II-III structural officials, 38% were IT/innovation technical staff, and 34% were AI service users/implementers. The majority of respondents (64%) had more than 10 years of service experience, with 58% holding a bachelor's degree and 35% holding a master's degree. The descriptive analysis showed that the overall readiness level was in the moderate category, with a median of 3.10 (IQR=0.85). Of the four readiness dimensions, organisational readiness had the highest median (3.45, IQR=0.78), followed by technological readiness (3.20, IQR=0.92), regulatory readiness (2.90, IQR=0.95), and human resource readiness (2.65, IQR=1.02), with the lowest. The distribution of agencies showed 17% in the low readiness category (median <2.50), 68% in the medium category (median 2.50-3.50), and 15% in the high category (median>3.50). The adaptation strategy variable had a median of 3.15 (IQR=0.88), while the level of AI implementation reached a median of 3.30 (IQR=0.95), indicating that the majority of agencies were in the pilot to initial operational stages.

Group Difference Test Results

The Kruskal-Wallis test showed a significant difference in readiness levels between agency types ($H=24.36$, $p<0.001$). A post-hoc Mann-Whitney U test revealed that ministries/agencies had significantly higher technological readiness (median=3.60) than provincial governments (median=3.10, $U=3245$, $p=0.002$) and district/city governments (median=2.80, $U=2156$, $p<0.001$). However, there was no significant difference in organisational readiness between agency types ($H=3.21$, $p=0.201$), indicating relatively even leadership commitment. Human resource readiness showed a significant difference ($H=18.95$, $p<0.001$), with agencies in Java having a higher median (3.00) than those outside Java (2.45, $U=4521$, $p<0.001$).

Correlation Analysis Results

Spearman correlation analysis showed that all readiness dimensions were significantly positively correlated with adaptation strategies: technological readiness ($rs=0.412$, $p<0.001$), organisational readiness ($rs=0.486$, $p<0.001$), human resource readiness ($rs=0.521$, $p<0.001$), and regulatory readiness ($rs=0.338$, $p<0.001$). Human resource readiness had the strongest correlation, confirming the importance of the human factor. Adaptation strategies were strongly correlated with the level of AI implementation ($rs=0.596$, $p<0.001$). Overall readiness was correlated with AI implementation ($rs=0.478$, $p<0.001$), but the strength of the correlation increased when mediated by adaptation strategies, providing an initial indication of a mediating effect.

Structural Equation Modelling Results – PLS

The measurement model (outer model) demonstrated good validity and reliability. All indicators have outer loading >0.60, with Average Variance Extracted (AVE) ranging from

0.54-0.68 (>0.50) and Composite Reliability 0.86-0.92 (>0.70), meeting the criteria of Hair et al. (2019). Discriminant validity through the Fornell-Larcker criteria is met, where the square root of the AVE of each construct is greater than its correlation with other constructs. The structural model (inner model) produces key findings. Hypothesis H1 is supported: all dimensions of readiness have a significant positive effect on adaptation strategies. Human resource readiness has the largest path coefficient ($\beta=0.438$, $t=6.82$, $p<0.001$), followed by organizational readiness ($\beta=0.361$, $t=5.94$, $p<0.001$), technological readiness ($\beta=0.285$, $t=4.73$, $p<0.001$), and regulatory readiness ($\beta=0.192$, $t=3.18$, $p=0.002$). The model explains 63.7% of the variance in adaptation strategies ($R^2=0.637$). Hypothesis H2 is supported: readiness has a direct effect on AI implementation ($\beta=0.328$, $t=5.12$, $p<0.001$). Hypothesis H4 is supported: adaptation strategies have a strong effect on AI implementation ($\beta=0.527$, $t=8.45$, $p<0.001$). The model explained 70.4% of the variance in AI implementation ($R^2=0.704$), indicating high predictive power (Hair et al., 2019).

Mediation Test Results

A mediation test using bootstrapping with 5,000 resamples confirmed Hypothesis H3: adaptation strategies partially mediate the readiness-implementation relationship. The direct effect of readiness on implementation remained significant ($\beta=0.328$, 95% CI [0.201, 0.455], $p<0.001$). The indirect effect through adaptation strategies was significant ($\beta=0.294$, 95% CI [0.215, 0.382], $p<0.001$). The total effect reached $\beta=0.622$ ($p<0.001$). The Variance Accounted For (VAF) was 47.3% [$(0.294/0.622)\times100\%$], indicating partial mediation because the VAF ranged from 20-80% (Hair et al., 2017). These findings confirm that readiness can directly influence implementation, but the effect is stronger (almost double) when appropriate adaptation strategies are used. The effect size (f^2) of adaptation strategies on implementation was 0.384 (>0.35), indicating a large effect (Cohen, 1988). The predictive relevance (Q^2) was 0.512 (>0), indicating the model has good predictive relevance (Sarstedt et al., 2017).

Qualitative Analysis Results

The qualitative phase involved 11 agencies across three readiness categories with 33 key informants. The high readiness category (4 agencies): the Ministry of Finance with the AI-based CEISA system, the Jakarta Provincial Government with JAKI, the Surabaya City Government with Sapawarga, and the National Cyber Security Agency (BSSN) with the cyber threat detection system. The medium readiness category (4 agencies): the Ministry of Public Works and Public Housing, the Banyuwangi Regency Government, the East Java Provincial Government, and the Ministry of Health. The low readiness category (3 agencies): the Regency governments in Kalimantan, Sulawesi, and Nusa Tenggara that are still in the planning stage.

Theme 1: A Phased Pilot Project Strategy as the Dominant Approach

Thematic analysis revealed that all agencies with high readiness adopted a phased pilot project approach before scaling up. The Head of Innovation at the Surabaya City Government explained: "We started with a complaint chatbot for one service. After six months of success and civil servants were accustomed to it, we then expanded to other services. If we went big, it would definitely fail" (Informant A2). This pattern is consistent with quantitative findings, where agencies with a mature technology strategy (planned pilot projects) had a 1.8 times higher implementation rate. The Director of Digital Transformation at the Ministry of Finance emphasised the importance of choosing quick wins: "The first use case must have a visible impact but manageable complexity. This builds confidence and momentum" (Informant A1).

In contrast, agencies with low readiness showed a different pattern: they tended to be reactive without a clear roadmap, often falling into analysis paralysis or rushing without adequate preparation.

Theme 2: Change Management through Champions and Intensive Communication

Civil servant resistance emerged as a consistent barrier, particularly concerning job displacement. An effective strategy is to identify internal change champions. The Secretary of the Jakarta Provincial Government Agency explained: "We appointed enthusiastic young civil servants as 'AI Ambassadors.' Their peer-to-peer outreach is more effective than instructions from superiors" (Informant B1). Intensive communication, framing AI as a "tool, not a replacement," is crucial. The Change Manager at the Ministry of Finance shared: "Initially, there was significant resistance from senior staff. We had to communicate repeatedly: AI handles repetitive work, you focus on analysis and more strategic decision-making" (Informant A1). This finding complements the quantitative results, which showed a strong negative correlation between change management strategies and resistance levels ($r_s=-0.542$, $p<0.001$).

Theme 3: Contextual and Sustainable Capacity Building

One-time training has proven ineffective. Agencies have successfully implemented tiered blended learning. The Head of the Surabaya City Government's Personnel Division explained: "Our training has three levels: awareness for all civil servants (100%), basic for direct users (40%), and advanced for IT admins (10%). Plus, mentoring is provided three months after the training" (Informant A2). A contextual approach tailors training content to actual work contexts, enhancing transfer of training. An AI consultant working with five agencies observed: "Training is most effective when it uses real-life cases from their work, not generic examples" (Informant E1). Internal communities of practice have also proven to sustain learning. However, agencies with low readiness experience challenges: one-time training, no follow-up, and civil servants "forget about it within a month" (Informant C1).

Theme 4: Adaptive Governance with a Clear Structure

The agency successfully established a dedicated governance structure for the Digital Transformation Task Force or AI Team with cross-unit membership. The Secretary General of the Ministry of Finance explained: "Our task force coordinates implementation, regular evaluations, and troubleshooting. There are standard operating procedures (SOPs), but they aren't rigid, for example, for data access approval. If it's urgent, we can fast-track it with a strict audit trail" (Informant A1). Ethical governance is a concern: algorithmic impact assessments before deployment, regular audits for bias, and grievance mechanisms for citizens. However, the majority of agencies, especially those in the medium-low category, lack an operational ethical framework, limited to general principles without concrete mechanisms. A local government legal officer stated: "We know AI must be fair and transparent, but we're still confused about how to measure fairness operationally" (Informant B3).

Theme 5: Structural Bureaucratic Barriers

Consistent barriers identified were: (1) Rigid procurement regulations for AI systems make it difficult to process through conventional procurement rules that require detailed specifications from the outset, while AI development requires iteration; (2) Silo mentality: coordination between units is difficult due to a culture of "turf protection"; (3) Political turnover, often halting ongoing AI programs; (4) Budget constraints, especially in local governments, mean AI is not yet a priority in the regional budget; (5) The generational digital

divide among senior civil servants makes adaptation difficult. The Head of Procurement expressed frustration: "AI procurement is very complicated. It requires detailed tenders, even though it requires agile development. Suitable vendors are few, and the process is slow" (Informant B2). These structural barriers explain why, despite high readiness, implementation remains hampered without adaptation strategies that address contextual barriers, strengthening the partial mediation argument from the quantitative findings. The integration of quantitative and qualitative findings yields a holistic understanding: HR readiness, as the strongest predictor (quantitative results), is explained by psychological resistance to job insecurity (qualitative results); Partial mediation of adaptation strategies (quantitative results) is illuminated by the concrete mechanisms of how pilot projects, change management, and capacity building translate readiness into successful implementation (qualitative results).

DISCUSSION

This study yields comprehensive findings on the dynamics of AI implementation in Indonesian public services through the lenses of readiness, adaptation strategies, and implementation levels. The synthesis of quantitative and qualitative results reveals complexities that cannot be captured by a single approach, validating the choice of a mixed methods explanatory sequential methodology (Creswell & Clark, 2017). The following discussion integrates the empirical findings with the theory presented in the literature review, compares them with previous research, and explores theoretical and practical implications.

The quantitative findings, which indicate human resource readiness as the strongest predictor of adaptation strategies, confirm and extend the Technology Acceptance Model (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). However, the qualitative findings reveal a deeper nuance: Civil servant resistance is not solely due to technical incompetence or perceived ease of use, but rather more fundamentally related to existential anxiety about job security and threats to professional identity. A senior civil servant (ASN) expressed: "I've worked in document verification for 25 years. If AI can automate verification, what's my relevance anymore?" This finding resonates with the literature on job displacement anxiety in the context of automation (Autor, 2015; Meijerink et al., 2021), but adds a specific Indonesian cultural dimension, where ASN's professional identity is closely tied to the job functions they have performed for years.

In contrast to the private sector, where high turnover and job mobility are considered normal, the Indonesian bureaucracy is characterised by long-term career stability and a rigid hierarchy (Prasojo et al., 2019). ASN spend their entire careers in one agency, or even a single work unit, creating strong emotional attachments to their work routines. When AI threatens to automate these functions, the perceived threat is not only economic but also psychological and social. This explains why effective capacity-building strategies must begin with change management that addresses psychological aspects before technical training—a finding consistent with Organisational Readiness for Change Theory (Weiner, 2009), which emphasises the importance of change commitment and change efficacy as prerequisites.

Furthermore, these findings challenge the implicit assumption in much of the technology adoption literature that treats "human readiness" as primarily a skill gap issue. Qualitative data show that even civil servants with strong digital literacy can exhibit high levels of resistance if they perceive AI as a threat. Conversely, civil servants with limited skills who perceive AI as an empowering tool (freeing them from repetitive tasks to focus on more

meaningful work) demonstrate high levels of enthusiasm for learning. This suggests that perceived threat versus perceived empowerment is an important moderator in the relationship between skill and acceptance dimensions that has not been adequately addressed in TAM or UTAUT, opening avenues for theoretical extension.

The partial mediation finding (VAF=47.3%) is the main theoretical contribution of this study, filling a gap in the literature that tends to treat readiness and implementation as a direct relationship (Wirtz et al., 2019; Mergel et al., 2019). Partial mediation indicates two causal pathways: (1) a direct path, where readiness directly facilitates implementation, and (2) an indirect path, where readiness must be translated through deliberate adaptation strategies. Theoretically, this is consistent with the Resource-Based View, which argues that resources and capabilities (readiness) create competitive advantage only when orchestrated through strategic actions (Barney, 1991), and the Dynamic Capabilities perspective, which emphasises the organisational ability to purposefully reconfigure resources (Teece et al., 1997).

Qualitative data illuminates the concrete mechanisms of this mediation. The direct path was observed in agencies with very high readiness, such as the Ministry of Finance, with its mature IT infrastructure and abundant budget, which can implement AI relatively smoothly, even without an elaborate change management program, due to minimal technical barriers and the availability of resources for hiring external expertise. This explains why the direct effect remains significant. However, for the majority of agencies in the medium readiness category (68% of the sample), the indirect path becomes crucial. These agencies require sophisticated adaptation strategies to address the readiness gap: pilot projects to build confidence without committing large resources, change champions to overcome resistance, structured capacity building to close skills gaps, and a governance structure for cross-unit coordination.

The case of the Banyuwangi Regency Government is illustrative: with a medium readiness score (score of 3.2), this agency successfully implemented AI for its online licensing system with a high adoption rate (78% of licensing services using AI within 18 months). The key to success was not superior readiness but rather an exceptional adaptation strategy: the Regent personally championed the initiative (overcoming organizational barriers), a dedicated team was formed with a clear mandate and resources (governance structure), the pilot project began with one of the most frequently requested permits with an ambitious three-month timeline for demonstrable results (technology strategy), civil servants were involved in the design process to gain ownership (change management), and training was conducted intensively with on-the-job mentoring (capacity building). In contrast, the local government in Kalimantan, with comparable readiness (score 3.1), stagnated in the pilot phase due to the absence of a coherent strategy, a clear governance structure, ad-hoc training, and unsystematically managed resistance.

This contrast validates the mediation argument: readiness creates potential, but adaptation strategies determine whether that potential is realised. In Diffusion of Innovation terminology (Rogers, 2003), readiness influences the innovation decision (the decision to adopt), but implementation and institutionalisation (the stages after the decision) are heavily dependent on the adoption process, the operationalisation of which is the adaptation strategy. Partial mediation also suggests that improving readiness alone is insufficient to increase implementation success; investment in developing organisational capability for strategic execution is equally important. This has significant policy implications: the central

government, which has focused on capacity-building infrastructure (technology readiness) and regulatory frameworks (regulatory readiness), needs to equally prioritise building strategic management capabilities within government agencies.

The finding that all successful agencies adopted a pilot project approach, while unsuccessful agencies tended to pursue big-bang implementation or become stuck in planning paralysis, resonates with the literature on implementation strategies (Kettinger & Grover, 1995). However, qualitative findings reveal contextual reasons why pilot projects are particularly effective in the Indonesian bureaucratic context. First, pilot projects provide political cover for decision-makers. In a bureaucratic culture that is risk-averse and accountability-focused (Prasojo et al., 2019), officials are reluctant to commit large resources to unproven technology. Pilot projects allow them to "test the waters" with limited downside risk: if it fails, it's "just a pilot"; if it succeeds, it can be claimed as innovation leadership. Second, pilot projects facilitate organisational learning through experimentation on a manageable scale (Argyris & Schön, 1978). AI technology is rapidly evolving, and best practices are not yet established, unlike mature technologies like ERP, where implementation blueprints are well-documented. Pilot projects enable agencies to learn by doing: discover technical challenges (e.g., unanticipated data quality issues), understand user behaviour (e.g., resistance patterns), and refine strategies based on feedback. The IT Director of the Ministry of Finance explained, "Our first pilot failed because the interface was too complex. From there, we learned that the design had to be much simpler for our users. If we immediately deployed enterprise-wide, the disaster would have been much greater."

Third, successful pilot projects generate observable results that are critical for diffusing innovation in an organisational context (Rogers, 2003). Observability, the ability to see concrete benefits, is one of the five characteristics of innovation that influence adoption rates. In bureaucracies where scepticism toward new initiatives is high, demonstrating tangible proof of concept is powerful for overcoming resistance. The Head of the Agency explained: "After piloting the chatbot for complaints, the waiting time dropped from 3 days to 2 hours. When other units saw these concrete results, those who were initially resistant requested implementation in their units." This finding contrasts with the literature on smart city implementation in developed countries, which often advocates a comprehensive transformation approach (Yigitcanlar et al., 2018). This difference underscores the importance of contextual fit of strategies: what works in Singapore or Estonia, with high government capability and high risk tolerance, may not necessarily apply in Indonesia, with its different constraints. This validates criticism of the "one-size-fits-all" approach to technology adoption and strengthens the argument for context-sensitive theorising (Avgerou, 2019).

However, the pilot project approach has also observed pitfalls. Some agencies fall into the "perpetual pilot syndrome," conducting pilot after pilot without ever scaling up, or pilots not designed with scalability in mind, requiring them to start from scratch when expanding. Agencies with mature strategies overcome this by establishing clear exit criteria for pilots (e.g., "if you achieve 80% accuracy and user satisfaction >70% within 6 months, proceed to scale up") and deliberately designing for scalability from the outset. This lack of strategic thinking explains why some agencies remain stuck in the pilot phase for years.

Theoretical Contribution

The integration of quantitative and qualitative findings yields the AI Adoption Readiness-Strategy-Implementation (ARSI) Framework as the primary theoretical contribution of this research. This framework advances existing knowledge in several ways. First, the comprehensive operationalisation of the readiness construct with four dimensions (technology, organisation, HR, and regulatory) grounded in both theoretical literature and the empirical reality of the Indonesian public sector addresses criticism that many readiness models are abstract or developed for the private sector context (Alryalat et al., 2015). Second, the explicit modelling of adaptation strategies as a mediating variable with five concrete dimensions (planning, change management, capacity building, technology, governance) that are operationalizable moves beyond abstract discussions of "implementation strategies" to actionable components.

Third, the empirical validation of the mediation model using rigorous mixed methods quantitatively demonstrates the mediation effect (VAF=47.3%) and qualitatively illuminates the mechanisms through which mediation occurs. Most research on technology adoption either tests direct effects quantitatively or describes processes qualitatively; few integrate both to truly understand mediation (Venkatesh et al., 2013). Fourth, contextual grounding in the Indonesian public sector, with attention to the unique characteristics of risk aversion, political turnover, resource constraints, and bureaucratic culture, makes findings relevant and applicable to similar developing country contexts, contributing to the growing literature on technology adoption beyond Western developed countries (Avgerou, 2019).

The ARSI Framework also has practical utility: it can be used by government agencies to (1) self-assess readiness across four dimensions to identify gaps, (2) design appropriate adaptation strategies contingent upon readiness profiles, (3) monitor implementation progress, and (4) evaluate effectiveness. The framework provides a common language and structured approach for managing AI implementation, reducing the currently prevalent ad-hoc trial-and-error approaches.

Implications for Theory and Practice

Theoretical implications include: (1) an extension of TAM/UTAUT by incorporating the psychological threat/empowerment dimension into technology acceptance; (2) an integration of the TOE Framework with change management theories through a mediation model; (3) a contextualization of technology adoption theories for the developing country public sector; (4) a methodological contribution in demonstrating the value of mixed methods sequential design for theory building and testing simultaneously.

Practical implications include: (1) readiness assessment tools that government agencies can use for self-diagnosis; (2) strategy playbooks with concrete guidance on pilot design, change management, and capacity building tailored to different readiness levels; (3) policy recommendations for governments on reforming procurement regulations, building strategic management capabilities, and creating learning networks across agencies; and (4) vendor guidance on how to work with government clients who have unique constraints and needs.

This research ultimately demonstrates that successful AI implementation is not primarily a technical challenge but a socio-technical one that requires addressing technology, organisation, people, and strategy simultaneously. Linear models that assume "build the technology and users will come" or "train people and implementation will succeed"

oversimplify reality. Success requires orchestrating various elements in a context-sensitive manner—the art of strategic adaptation.

5. Conclusion

This research successfully answers major questions about the readiness of the Indonesian bureaucracy to implement Artificial Intelligence in public services and the role of adaptation strategies as a mediating mechanism. Based on an analysis of 287 respondents from 68 government agencies using a mixed methods approach, this study yields several fundamental conclusions. First, the readiness level of the Indonesian bureaucracy for AI implementation is in the moderate category, with 17% categorized as low, 68% as medium, and 15% as high. Of the four readiness dimensions, organisational readiness scored the highest (median = 3.45), indicating relatively strong leadership commitment. However, human resource readiness remains the most critical weakness (median = 2.65), particularly related to digital literacy, technical skills, and most fundamentally, the psychological readiness of civil servants to face technological transformation. Qualitative findings reveal that ASN resistance is not solely due to technical incompetence, but rather due to existential anxiety regarding job security and threats to professional identity – dimensions that have not been adequately addressed in existing technology adoption literature.

Second, all dimensions of readiness had a significant positive effect on bureaucratic adaptation strategies, with human resource readiness as the strongest predictor, followed by organisational readiness, technological readiness, and regulatory readiness. The model explained 63.7% of the variance in adaptation strategies, indicating that readiness is a critical antecedent in determining how organisations design and execute AI implementation strategies. This finding confirms the theoretical propositions of the Organisational Readiness for Change Theory and the TOE Framework.

Third, adaptation strategies were shown to partially mediate the relationship between readiness and the level of AI implementation, with a VAF of 47.3%. Partial mediation indicated two causal pathways: a direct path, where readiness with abundant resources can directly facilitate implementation, and an indirect path, where the majority of agencies with moderate readiness require sophisticated adaptation strategies to translate potential into actual implementation. The final model explained 70.4% of the variance in AI implementation, demonstrating excellent predictive power. This mediation finding represents a major theoretical contribution of the study, filling a gap in the literature that tends to treat readiness and implementation as a direct relationship without considering strategic execution mechanisms.

Fourth, the qualitative analysis identified five effective adaptation strategies: (1) a phased, pilot-project-based planning strategy that enables organizational learning and risk mitigation; (2) a change management strategy through internal change champions and intensive communication, framing AI as a "tool, not a replacement"; (3) a contextual and sustainable capacity-building strategy with a tiered blended learning approach; (4) an incremental technology strategy that starts with simple use cases with high visibility; and (5) an adaptive governance strategy with a clear yet flexible structure. The pilot project approach

proved particularly effective in the context of Indonesia's risk-averse bureaucracy, providing political cover for decision-makers and generating observable results critical for diffusing innovation. Fifth, the research identified consistent structural barriers: rigid procurement regulations, silo mentality, political turnover, budget constraints, and a generational digital divide. These barriers interconnect, creating a reinforcing negative cycle that exemplifies institutional inertia. However, successful agencies demonstrate agency in finding creative workarounds, operating within constraints rather than waiting for constraints to be removed.

This research produced the AI Adoption Readiness-Strategy-Implementation (ARSI) Framework as a theoretical contribution that integrates the TOE Framework, Organisational Readiness Theory, and Diffusion of Innovation Theory with explicit modelling of adaptation strategies as a mediating variable. This framework has been empirically validated and has practical utility as an assessment tool and implementation guide for government agencies. The research findings confirm that successful AI implementation is not primarily a technical challenge but a socio-technical one that requires the simultaneous and context-sensitive orchestration of various elements of technology, organisation, people, and strategy.

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