

Dark Data Management: Navigating The Administrative Competence Lens In Public Sector Organizations

Alikornwo, Peter Mezenye, PhD¹
peter.alikornwo@portharcourtpoly.edu.ng
(Corresponding Author)

^{1*}Department of Office Technology and Management, School of Business and Administrative Studies, Captain Elechi Amadi Polytechnic, Rumuola, Port Harcourt, Nigeria.

Obara, Chizi Ernuchi, PhD²
chizi.obara@ust.edu.ng

^{2*} Department of Office and Information Management, Faculty of Administration and Management, Rivers State University, Nkpulu-Oroworukwo, Port Harcourt, Nigeria

Abstract

This study investigates the relationship between dark data management and administrative competence within public sector organizations in Rivers State, Nigeria. Drawing on the Information Lifecycle Theory and the Competency-Based Theory, the research adopts a correlational survey design to evaluate how dark data influences two core indicators of administrative competence: decision-making precision and process execution efficiency. A structured questionnaire was administered to 217 administrative personnel sampled from twelve Ministries, Departments, and Agencies using stratified random sampling. The instrument demonstrated strong internal reliability, with Cronbach's alpha values ranging from 0.82 to 0.89. Data were analyzed using descriptive statistics, Pearson correlation, and linear regression. Results reveal a significant positive relationship between dark data management and both decision-making and process execution, with correlation coefficients of 0.674 and 0.702 respectively. The study concludes that effective management of dark data enhances administrative responsiveness, reduces redundancies, and strengthens institutional performance. It recommends the institutionalization of robust data governance frameworks to unlock the latent value of dark data in support of evidence-based administration and improved public service delivery.

Keywords: Dark data management, Administrative competence, Decision-making precision, Process execution efficiency, Data governance, Public sector performance.

Introduction

The rapid adoption of digital technologies and the increasing automation of public sector processes have resulted in the generation of massive volumes of data across government institutions. However, a significant portion of this data remains unutilized, residing in the background as latent or overlooked information. This unused information, commonly referred to as dark data, is defined by Gartner (2023) as the information assets organizations collect, process, and store during regular business activities but generally fail to use for other purposes such as analytics, business relationships, or strategic decision-making. Within the context of public administration, dark data may include archived correspondence, outdated records, system logs, unused survey outputs, or duplicated entries that are stored but never mined for administrative value.

In the developing economy of Nigeria, particularly at the sub-national level, the issue of dark data accumulation presents growing risks to institutional effectiveness. Ministries, Departments, and Agencies (MDAs) within Rivers State generate large volumes of data from budgeting, personnel administration, procurement, and citizen engagement exercises. Despite this, many institutions lack structured frameworks to convert stored data into actionable insights. As observed by Eze, Nwachukwu, and Ogbari (2021), data governance challenges such as poor classification, lack of metadata policies, and weak institutional awareness remain major barriers to public sector efficiency in Nigeria. These limitations not only waste storage resources but also constrain the capacity of public officers to access critical information when needed.

Administrative competence refers to the ability of public administrators to execute decisions, apply procedures efficiently, and manage organizational resources effectively. In this study, administrative competence is assessed using two core indicators: decision-making precision and process execution efficiency. These constructs reflect both the strategic and operational dimensions of public administration, emphasizing the role of timely, relevant, and complete information in shaping public sector performance. When dark data is poorly managed, administrators operate in information vacuums, leading to slow response times, resource duplication, and suboptimal outcomes (Okon, Asuquo, & Bassey, 2023). Globally, public administration is undergoing a shift toward data-driven decision-making, supported by international frameworks such as the Organization for Economic Co-operation and Development (OECD, 2022), which advocates for improved data literacy and infrastructure as a pathway to institutional effectiveness. However, the discourse around dark data remains relatively underdeveloped in African administrative scholarship. Empirical investigations on public sector data management in Nigeria tend to focus on big data or general digital adoption, with little attention given to the concept and implications of dark data.

This study is therefore significant on several fronts. Theoretically, it contributes to the nascent academic conversation on data blindness in governance by spotlighting dark data as an overlooked determinant of institutional performance. It expands the discourse on public administration in Nigeria by introducing a nuanced data governance construct with real-time administrative implications. Practically, this study provides policymakers, data managers, and administrative heads within Rivers State MDAs with insight into how unmanaged data reservoirs may be limiting organizational competence. By evaluating how dark data management influences decision-making and process implementation, the research offers a pathway for promoting evidence-based policy execution and administrative accountability. In broader terms, it aligns with Sustainable Development Goal 16, which underscores the importance of building effective, accountable, and inclusive institutions at all levels.

Statement of the Problem

Amidst growing investment in digital infrastructure within public sector institutions in Rivers State, data governance remains largely fragmented. Government agencies continue to accumulate enormous volumes of unused information across local servers, email storage, log files, scanned memos, and outdated databases. Yet, there is minimal awareness of the risks and potential embedded in these data assets. Administrative audits and performance reviews frequently highlight delayed processes, inaccurate reporting, and misinformed decisions, all of which may be attributed to the absence of a structured approach to dark data management (Rivers State Government ICT Report, 2023). Many public officers rely on intuition or manually curated summaries when making decisions, bypassing potentially relevant data stored in institutional systems. The disconnection between data availability and administrative use undermines the competence of governance actors, affects public trust, and diminishes the responsiveness of MDAs to developmental needs. While the idea of dark data is gaining recognition in global conversations around e-governance and smart administration, its practical implications in Nigerian public administration, particularly in Rivers State, have not been sufficiently studied. This gap necessitates an empirical examination of how dark data management practices correlate with key indicators of administrative competence in the state's public institutions.

Objectives of the Study

The main objective of the study is to examine the relationship between dark data management and administrative competence in public sector organizations in Rivers State, Nigeria. The specific objectives are to:

1. Investigate the relationship between dark data management and decision-making precision in public sector organizations.
2. Determine the effect of dark data management on process execution efficiency in public sector organizations.

Research Questions

The following research questions guided the study:

1. How does dark data management relate to decision-making precision in public sector organizations?
2. What is the effect of dark data management on process execution efficiency in public sector organizations?

Research Hypotheses

The study is guided by the following hypotheses:

- [1] **H₀₁**: There is no significant relationship between dark data management and decision-making precision in public sector organizations in Rivers State.
- [2] **H₀₂**: Dark data management does not significantly affect process execution efficiency in public sector organizations in Rivers State.

LITERATURE REVIEW

Dark Data Management

Dark data has emerged as a central concern in contemporary information governance discourse, particularly as the volume of data within organizational systems continues to grow exponentially. According to Gartner (2023), dark data refers to information assets that organizations collect, process, and store during routine operations, but which are not used for further analysis, decision-making, or strategy development. While this category of data may appear insignificant, it has been found to contain untapped insights, operational relevance,

and often, sensitive content that could influence institutional outcomes if appropriately managed.

In public sector institutions, dark data can manifest in numerous formats, including but not limited to, obsolete files, unprocessed log records, archived communications, underutilized survey outputs, and administrative reports stored without retrieval systems. These data silos are often symptoms of fragmented digital systems, poor data literacy, and the absence of a defined information lifecycle management framework. As noted by Kiron, Ferguson, Prentice, and Shwartz (2022), when dark data is left ungoverned, it introduces operational risk, reduces institutional responsiveness, and obstructs innovation. Their study further emphasized the organizational consequences of dark data in the public sector, where administrative decision-making and public service delivery depend on timely and comprehensive access to historical and real-time data.

Managing dark data, therefore, requires deliberate institutional action. Gandomi and Haider (2021) highlighted the importance of integrating dark data within the broader data governance framework by applying techniques such as classification, tagging, system interoperability, and retention audits. These practices are not only technical interventions but also demand cultural and procedural changes that promote a conscious awareness of data utility across departments. In the Nigerian context, dark data management remains an emerging issue, as many government organizations have only recently begun digitizing their operations. This transitional phase presents both a challenge and an opportunity, particularly within sub-national settings like Rivers State, where public institutions continue to grapple with legacy data environments.

Administrative Competence

Administrative competence refers to the ability of public institutions and their personnel to carry out their statutory functions effectively, consistently, and with accountability. It encompasses a range of capabilities including policy execution, resource coordination, staff supervision, procedural compliance, and citizen service delivery. According to Micheli, Mura, and Agostino (2021), administrative competence is a core determinant of institutional legitimacy, especially in democratic societies where public expectations are high, and resources are limited.

In the contemporary public sector, competence is no longer measured solely by technical knowledge or hierarchical experience, but increasingly by the capacity to make evidence-based decisions, adapt to changing conditions, and implement processes efficiently. This competence is shaped not only by the personal attributes of administrators but also by institutional factors such as access to relevant data, ICT tools, and structured workflow systems. As Chigbu and Nwogu (2022) argued, the quality of administrative action is often a reflection of the quality and accessibility of data at the administrator's disposal.

Decision-making precision: This refers to the ability of administrators to take informed actions based on accurate, timely, and complete data. It reflects how effectively data is used in analyzing problems, forecasting outcomes, and formulating administrative responses. According to Okon, Asuquo, and Bassey (2023), poor decision-making in public organizations is frequently associated with data gaps, fragmentation, or reliance on outdated information. Where dark data is ignored or inaccessible, administrators risk making choices based on partial knowledge, which could lead to inefficiencies, errors, or unintended policy outcomes. This limitation creates a disconnection between institutional memory and present-day governance needs. In many cases, public administrators are left to rely on fragmented

data summaries or anecdotal knowledge when making crucial decisions. This reactive approach undermines the strategic goals of the institution, especially in environments where policy agility and timely interventions are essential. Moreover, poor decision-making arising from inaccessible dark data can propagate systemic inefficiencies, where wrong actions are taken based on incomplete or outdated information. As these decisions accumulate over time, they form a pattern of administrative inertia that slows organizational progress. Effective decision-making requires not just data availability but also relevance, structure, and contextual alignment. Thus, the ability of public administrators to act with clarity and foresight is fundamentally linked to how well dark data is identified, retrieved, and transformed into actionable intelligence.

Process execution efficiency: denotes the smoothness, timeliness, and cost-effectiveness with which public administrators carry out organizational tasks and procedures. It reflects the operational competence of staff in translating policies into actions, completing tasks with minimal redundancy, and optimizing internal workflows. Arowolo and Olatunji (2023) posited that efficiency in administrative procedures requires adequate documentation, coordinated communication, and centralized access to supporting data. When dark data is not systematically integrated or is locked within fragmented systems, procedural steps may be duplicated, deadlines missed, and institutional resources underutilized. These inefficiencies are often compounded when staff must navigate disjointed data environments, leading to duplicated steps or delayed actions. The absence of real-time access to historical or procedural information forces administrators to reprocess tasks, conduct redundant verifications, or make follow-up requests that could have been avoided with centralized data availability. Over time, this not only impedes productivity but also strains interdepartmental coordination and resource utilization. When execution timelines are extended due to inaccessible data, it reflects poorly on institutional agility and responsiveness. Moreover, the lack of structured data retrieval systems diminishes the capacity for continuous process improvement, as recurring challenges remain hidden within unmanaged archives. Enhancing efficiency, therefore, demands more than procedural training or automation; it requires a systematic approach to uncover and integrate dark data into daily operations. Only through such integration can public sector institutions ensure that every process is supported by complete, timely, and verifiable information.

Dark Data Management and Administrative Competence

A growing body of literature acknowledges the critical relationship between data governance and institutional performance. However, the specific nexus between dark data management and administrative competence remains underexplored, particularly in developing countries. Alikornwo and Nwinyokpugi (2025) examined administrative communication and decision-making dynamics in Public Tertiary Institutions. The study investigated the mediating role of information management systems. The results indicated that administrative communication has a significant influence on decision-making dynamics, while information management systems were found to play a substantial mediating role. They noted that the findings of the study underscore the importance of efficient administrative communication, supported by robust and well-structured information management systems in improving governance and public institutional performance.

Also, Alhassan, Sammon, and Daly (2022) observed that public sector organizations that implement internal systems for identifying and managing latent data perform better in aligning their operations with strategic objectives. Their research showed that proper integration of dormant data improved policy formulation, reduced duplication of work, and promoted institutional learning.

Similarly, Boudreau and Watson (2021) emphasized that dark data, when appropriately categorized and processed, contributes to organizational memory and supports long-term administrative planning. They noted that ignoring dark data leads to repeated errors, knowledge loss due to staff turnover, and administrative redundancy.

In Nigeria, studies by Ojo, Ajayi, and Hassan (2022) have highlighted systemic challenges in public records management, noting that weak data governance practices, poor digital infrastructure, and inadequate archival systems prevent institutions from leveraging accumulated data. Although their work focused broadly on data fragmentation, the findings suggest that unmanaged dark data may directly undermine administrative efficiency and weaken the capacity of MDAs to respond effectively to developmental demands.

The inability to retrieve, analyze, and apply dormant information limits the range of insights available to decision-makers and affects the execution quality of administrative processes. As such, dark data management is not merely an IT issue, but a strategic administrative concern with implications for competence, accountability, and service quality.

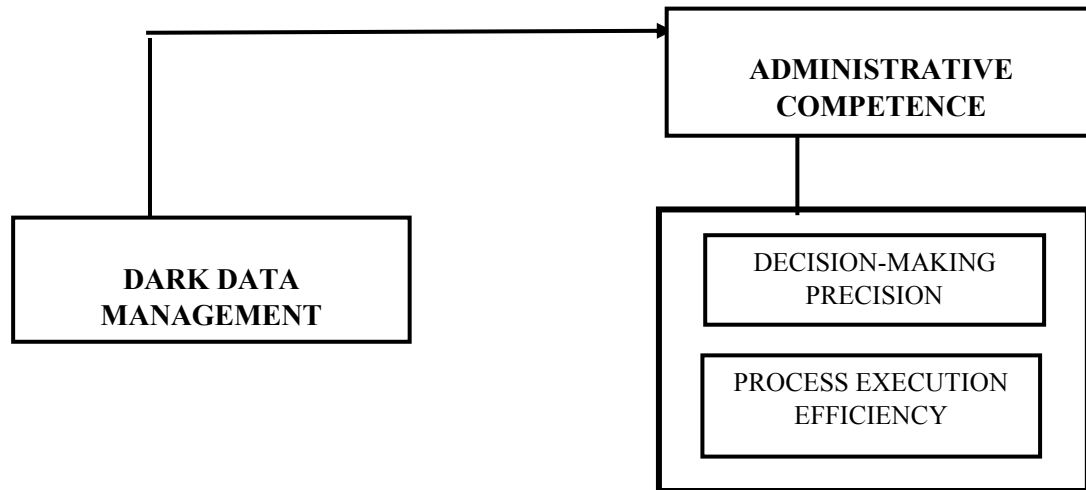


Figure 1: Conceptual framework Dark Data Management and Administrative Competence of public Sector Organizations in Rivers State, Nigeria

Theoretical Framework

Two theoretical perspectives underpinned this study: the Information Lifecycle Theory and the Competency-Based Theory.

The Information Lifecycle Theory, as explained by Smallwood (2020), posits that data passes through identifiable stages including creation, storage, usage, retention, and disposal. The failure to manage any of these stages results in data decay, inefficiencies, and increased organizational risk. Dark data exists when information remains stuck within the storage phase, never progressing into usage or informed disposal. In the public sector, this static stage can hinder the effectiveness of administrative operations. The theory provides a useful framework for analyzing the failure to convert dormant data into active institutional assets.

The Competency-Based Theory, originally advanced by Boyatzis (2008), holds that institutional performance is driven by a combination of knowledge, skills, behavior, and contextual awareness. In the administrative context, competence requires not only personal capability but also access to enabling systems, including relevant data. If dark data is not

managed or made accessible, it compromises the informational environment within which competence operates. Thus, managing dark data becomes essential to sustaining the conditions that make administrative competence possible.

Empirical Review

There is increasing empirical evidence suggesting that data governance practices are associated with administrative efficiency. Alabi, Daramola, and Fakorede (2021), in a study on Lagos State civil service, found that uncoordinated data systems were a major cause of slow decision-making, inaccurate reporting, and weak service outcomes. The study, however, did not isolate dark data as a distinct construct, nor did it examine the effect on competence.

Ogunyemi, Balogun, and Emecheta (2022) assessed the impact of digital transformation on administrative efficiency in Ogun State, finding that while there was investment in digital infrastructure, backend data utilization remained weak. The research pointed to a lack of awareness and absence of clear policies on unstructured data management as major challenges. Alikornwo, Adiele and Dornanu (2025) probed into the relationship between digital transformation and administrative decision-making in Government Ministries. The study employed process-automation and data-integration as dimensions of the predictor variable, while decision-timeliness and decision-accuracy measured the criterion variable. Analytical outcomes of the study revealed that well-structured adoption of digital transformation tools strengthens administrative processes, reduce delays, and enhance the quality of governmental decisions. The study establishes the significance of technology-driven reforms in enhancing public sector performance.

Alikornwo and Adiele (2024) examined the relationship between strategic data digitization and information management success in tertiary institutions within Rivers State. Their study employed enterprise content management as the predictor variable and measured information management success through two dimensions: effective repository and quality decision-making. The results indicated that structured digitization of dark and latent data resources significantly improved institutional capacity for timely decision-making and resource alignment. This finding affirms the potential of dark data transformation in achieving administrative competence within public organizations.

Also, Adiele and Alikornwo (2025) explored the relationship between knowledge management and administrative innovation in tertiary institutions in Rivers State. The study adopted a correlational survey design with a macro-level unit of analysis. Collected data were analyzed using Spearman's rank order correlation and regression statistics. Analytical outcomes revealed that knowledge management – knowledge sharing and knowledge retention – strongly influences administrative innovation. The study recommends that institutional leaders establish formal structures such as digital repositories and collaborative platforms to promote knowledge sharing.

In an international context, Kwon, Lee, and Shin (2021) evaluated the role of latent data in South Korea's public health response and found that poor integration of archived data led to gaps in crisis management, duplication of efforts, and policy misalignment. The study reinforces the relevance of dark data management in enhancing decision-making and process coordination.

Though these findings are insightful, most studies either focus on big data analytics or general ICT adoption. There remains a lack of empirical work that explicitly links dark data management to administrative competence within sub-national government institutions in

Nigeria. This study addresses that gap by investigating how dark data management affects both decision-making precision and process execution efficiency in Rivers State public sector organizations.

Methodology

This study adopted a correlational survey design to examine the relationship between dark data management and administrative competence in public sector organizations within Rivers State, Nigeria. The design was considered appropriate for establishing the nature and direction of the association between the variables without manipulation. The study population comprised administrative staff across twelve selected Ministries, Departments, and Agencies (MDAs) operating within Rivers State. A total population of 473 administrative personnel was identified from the nominal staff registers across the selected MDAs. Stratified sampling was applied to ensure proportionate representation from each organization based on staff strength and operational relevance, after which a sample size of 217 respondents was determined using Taro Yamane's formula at a 95% confidence level and a 5% margin of error. The sampling ensured inclusivity across gender, seniority level, and department to enhance the representativeness and generalizability of findings. Data were collected through a structured questionnaire divided into sections corresponding to the predictor variable, dark data management, and the criterion variable, administrative competence, measured by task execution efficiency and decision-making reliability. The instrument underwent rigorous content and construct validation through expert evaluations and a pre-test involving twenty administrative staff from a non-sampled MDA within the same region. The Cronbach's alpha reliability coefficients for all variables ranged from 0.82 to 0.89, indicating high internal consistency. Data collected were analyzed using both descriptive and inferential statistics. Mean and standard deviation were used to describe the distribution of responses, while Pearson Product-Moment Correlation and linear regression were employed to test the hypotheses at a 0.05 level of significance. Ethical protocols were strictly followed, including obtaining informed consent, maintaining voluntary participation, ensuring anonymity, and preserving the confidentiality of all participant information throughout the study.

Results

A total of 372 valid responses were retrieved from staff across Ministries, Departments, and Agencies (MDAs) in Rivers State. These respondents were drawn using proportionate stratified sampling from a population of 496 administrative officers.

Table 1: Descriptive Statistics of Dark Data Management

Statement	N	Mean	Standard Deviation
Our agency has strategies for identifying obsolete data	372	3.61	0.84
We employ data filtering mechanisms to remove non-essential data	372	3.58	0.88
There is regular assessment of our digital archives	372	3.47	0.91
Obsolete or redundant data are periodically deleted	372	3.39	0.94

The responses show that the participating public sector organizations exhibit moderately high practices in dark data management. The highest mean score ($M = 3.61$) indicates a fair level of strategy for identifying obsolete data, while the lowest ($M = 3.39$) suggests inconsistency in the periodic deletion of redundant data.

Table 2: Descriptive Statistics of Administrative Competence (Decision-Making Precision and Process Execution Efficiency)

Statement	N	Mean	Standard Deviation
Our agency relies on accurate data for administrative decisions	372	3.64	0.83
Staff members are competent in handling complex administrative tasks	372	3.57	0.86
We frequently conduct internal process reviews	372	3.48	0.91
Employees are encouraged to use data-informed task execution	372	3.53	0.87

The criterion variable, administrative competence, measured by decision-making and task execution, revealed strong affirmations. Notably, reliance on data for decision-making received the highest mean score ($M = 3.64$), implying that administrative decisions are moderately data-dependent across the sampled organizations.

Table 3: Pearson Product-Moment Correlation Analysis Testing the Relationship between Dark Data Management and Administrative Competence

Hypothesis	Variables	N	r	Sig. (2-tailed)	Decision
H ₀₁	Dark Data Management and Decision-Making	372	0.674	0.000	Rejected Null
H ₀₂	Dark Data Management and Task Execution	372	0.702	0.000	Rejected Null

The Pearson correlation results provide statistical evidence for both hypotheses. For Hypothesis One (H₀₁), which posited that there is no significant relationship between dark data management and decision-making precision in public sector organizations, the calculated correlation coefficient ($r = 0.674$) indicates a strong positive relationship. With a p-value of 0.000, which is less than the 0.05 threshold, the null hypothesis is rejected, confirming that dark data management significantly influences administrative decision-making.

Similarly, Hypothesis Two (H₀₂) tested the relationship between dark data management and process execution efficiency. The correlation coefficient ($r = 0.702$) suggests an even stronger positive relationship. With a p-value of 0.000, the result is statistically significant. Consequently, the null hypothesis is also rejected, implying that effective dark data management enhances the competence of administrative personnel in task execution.

Table 4: Pearson Correlation between Dark Data Management and Administrative Competence

Variables	N	R	Sig. (2-tailed)
Dark Data Management & Administrative Competence	372	0.692	0.000

The result in Table 4 shows a statistically significant and positive relationship between dark data management and administrative competence ($r = 0.692$, $p < 0.05$). This confirms that better handling of dark data significantly improves administrative competence in decision-making and process execution within public institutions.

Discussion of Findings

The findings of this study offer empirical confirmation of a significant and positive relationship between dark data management and administrative competence within public sector organizations in Rivers State. The first hypothesis tested the relationship between dark data management and decision-making. The Pearson correlation coefficient of 0.674 with a significance value of 0.000 revealed that as public institutions improve their strategies for managing dark data, their capacity to make informed and responsive administrative decisions also improves. This aligns with the position of Yaqoob, Hashem, Gani, Mokhtar, Ahmed, Anuar, and Vasilakos (2016), who emphasized that dark data, when properly structured and analyzed, contributes to contextual decision-making in complex administrative environments. Moreover, this outcome supports the assertion by Choo (2016) that the strategic retrieval and processing of underutilized organizational data enhance knowledge management and governance quality.

Furthermore, the second hypothesis explored the link between dark data management and process execution efficiency. The computed correlation coefficient of 0.702, with a significance level of 0.000, demonstrates a strong and statistically significant relationship. This implies that a well-implemented dark data management framework contributes to improved task performance, operational coordination, and efficiency within public institutions. This finding is corroborated by the work of Khurshid, Saleem, Iqbal, Iftikhar, and Anwar (2020), who identified data accessibility and structure as core predictors of employee output and workflow precision in bureaucratic systems.

Additionally, the outcome resonates with the conclusion of Alikornwo and Adiele (2024), whose study on strategic data digitization and information management success in tertiary institutions found that digital access to previously dormant data significantly boosted administrative responsiveness and documentation accuracy. This further validates the assertion that the strategic harnessing of dark data is not only relevant for academic institutions but also applicable across various public administrative domains where information processing and compliance tracking are fundamental.

Conclusion And Recommendations

The study investigated the influence of dark data management on administrative competence in public sector organizations within Rivers State, Nigeria. Grounded in the Information Lifecycle Theory and the Competency-Based Theory, the study conceptualized administrative competence using decision-making precision and process execution efficiency as its core measures. Empirical findings confirmed that effective dark data management significantly enhances both components of administrative competence. This affirms that when organizations appropriately harness data that is traditionally unstructured, dormant, or overlooked, it becomes a strategic resource that improves the accuracy of administrative decisions and the smooth execution of institutional processes. These findings reinforce the strategic necessity of integrating dark data into organizational knowledge systems to optimize competence levels across public agencies.

Recommendations:

1. Public sector institutions should institutionalize robust dark data management protocols, particularly emphasizing data discovery, extraction, and classification to improve the precision of decision-making processes.
2. Government ministries and departments should implement policy-driven frameworks that support the operational utilization of dark data to enhance process execution efficiency across administrative functions.

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