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## **IT, DIGITAL PLATFORMS, AND ORGANIZATIONAL CAPABILITIES IN ENHANCING LIBRARY AGILITY: EVIDENCE FROM INDONESIAN ACADEMIC AND PUBLIC LIBRARIES**

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### **ABSTRACT**

This study explores how information technology (IT) capabilities, digital platforms, and organizational capabilities collectively influence the agility of public and academic libraries in Indonesia. As libraries worldwide face accelerating digital transformation, agility has become a strategic requirement for sustaining relevance and service excellence. Employing a quantitative design, this research surveyed 100 libraries 50 public and 50 academics across various Indonesian regions. The results demonstrate that IT capabilities, digital platforms, and organizational capabilities significantly and positively contribute to library agility, with digital platforms emerging as the most influential factor. The findings confirm that libraries possessing robust IT infrastructure, integrated digital platforms, and adaptive organizational structures are better equipped to respond to technological disruptions and evolving user needs. Grounded in the dynamic capabilities' framework, the study provides both theoretical and practical insights into how libraries can sense, seize, and reconfigure their resources to maintain strategic responsiveness. The paper concludes with implications for library leaders and policymakers seeking to advance digital maturity and organizational flexibility in the knowledge sector.

**Keywords:** Library agility; IT capabilities; digital platforms; organizational capabilities; dynamic capabilities; digital transformation; Indonesia.

## INTRODUCTION

In the rapidly evolving digital environment, libraries are required to continuously adapt to technological advancements, changing user expectations, and dynamic information ecosystems. To remain relevant, both academic and public libraries must improve their operational efficiency and service quality (Lewis, 2018). Within this context, library agility the ability of libraries to respond swiftly and effectively to internal and external changes has become essential (Ahmad & Liyana, 2022). Agility enables libraries to innovate, align resources, and provide responsive, user-centered services in a rapidly changing information landscape.

Among the critical determinants of library agility are information technology (IT) capabilities, which allow libraries to optimize processes, manage digital resources, and deliver personalized services (Alhassan et al., 2022). Similarly, digital platforms, such as cloud-based systems and digital repositories, enhance accessibility, flexibility, and collaboration between librarians and users (Goh et al., 2021). Organizational capabilities, including leadership, staff competencies, and governance, also play a pivotal role in supporting innovation and managing technological change (Noh, 2021; Tripathi & Jeevan, 2022). The integration of these three dimensions IT capability, digital platforms, and organizational capability forms a theoretical foundation for enhancing library agility and responsiveness.

In Indonesia, libraries are undergoing significant digital transformation in response to growing user demand for online and technology-enabled services (Kurniasih & Riyanto, 2023). However, empirical evidence remains limited regarding how IT capabilities, digital platforms, and organizational capabilities collectively influence library agility, particularly within the Indonesian context (Sayogo et al., 2014). Previous research has primarily adopted qualitative approaches, leaving a gap in quantitative evidence to assess these relationships rigorously.

Therefore, this study aims to empirically examine the interrelationships among IT capabilities, digital platforms, and organizational capabilities in shaping library agility in Indonesian academic and public libraries. By addressing this research gap, the study provides both theoretical and practical insights for improving the adaptability and sustainability of libraries amid continuing digital transformation.

## LITERATURE REVIEW

This study is grounded in the dynamic capabilities (DC) perspective, which explains how organizations integrate, build, and reconfigure resources to adapt to rapidly changing environments (Teece et al., 1997). In library contexts, agility represents a dynamic capability that enables institutions to sense environmental changes, seize digital opportunities, and reconfigure internal resources to deliver user-centered services (Noh, 2021). Drawing from this perspective, IT capabilities, digital platforms, and organizational capabilities function as strategic resources that collectively strengthen library agility and adaptability.

### **Library Agility**

Library agility refers to a library's ability to respond rapidly and effectively to technological changes, evolving user expectations, and dynamic information environments (Ahmad & Liyana, 2022). Studies indicate that agile libraries are better positioned to sustain innovation, enhance service delivery, and manage technological disruptions (Ballinger, 2019; Stoddard & Cohn, 2019). Within the DC lens, agility acts as an outcome capability the manifestation of how well a library reconfigures its resources to remain responsive. Thus, agility is not a standalone function but a product of the interaction between technological and organizational capabilities.

## **Information Technology (IT) Capabilities and Library Agility**

IT capabilities encompass technological infrastructure, human IT skills, and IT-enabled processes that enable strategic and operational efficiency (Bharadwaj, 2000; Alhassan et al., 2022). For libraries, these capabilities facilitate automation, improve resource access, and enable customized digital services (Tripathi & Jeevan, 2022). Studies show that IT-enabled libraries exhibit faster response to change and higher innovation performance (Chen et al., 2010; Goh et al., 2021). From the DC perspective, IT capability serves as a sensing and seizing mechanism, allowing libraries to leverage technology to identify user needs and respond swiftly. Hence, it can be hypothesized that IT capabilities positively influence library agility.

## **Digital Platforms as Enablers of Library Agility**

Digital platforms such as cloud-based systems, digital repositories, and online library management systems serve as key enablers of agility by supporting flexible, scalable, and collaborative services (Ly, 2023). These platforms enhance access, promote interlibrary collaboration, and foster innovation in user engagement (Nwaiwu, 2018; Goh et al., 2021). Within the DC framework, digital platforms act as *resource orchestration mechanisms*, enabling libraries to dynamically integrate IT resources and user interactions to co-create value (Yeow et al., 2018). Empirical evidence suggests that the integration of digital platforms enhances responsiveness, innovation, and adaptability (Chugh & Pervez, 2024). Therefore, digital platform adoption is expected to strengthen library agility by increasing operational flexibility.

## **Organizational Capabilities and Agility**

Organizational capabilities refer to leadership, governance structures, human competencies, and cultural attributes that enable effective adaptation and innovation (Panda & Rath, 2021; Chakraborty & Biswas, 2022). Libraries with strong leadership and learning oriented cultures can better align their IT investments with strategic goals and adapt to digital transformations (Noh, 2021). Within the DC perspective, these capabilities represent the reconfiguring dimension transforming resources and knowledge into adaptive outcomes (Teece, 2018). Thus, organizational capability is essential for translating technological potential into agility.

## **Integrated View and Research Gap**

Synthesizing prior research, the literature indicates that IT capabilities provide the technological foundation, digital platforms act as flexibility enablers, and organizational capabilities facilitate adaptive coordination. However, most studies examine these factors independently or qualitatively (Panda & Rath, 2021), leaving limited empirical understanding of their combined effect on library agility. In Indonesia, libraries are undergoing rapid digital transformation (Kurniasih & Riyanto, 2023), yet quantitative studies examining how these factors jointly influence agility remain scarce. Addressing this gap, the present study develops an integrated model grounded in the dynamic capabilities' perspective, positing that IT capabilities, digital platforms, and organizational capabilities jointly enhance library agility in Indonesian academic and public libraries.

## **RESEARCH METHODOLOGY**

This study adopts a quantitative, cross-sectional research design aimed at empirically examining the effects of IT capabilities, digital platforms, and organizational capabilities on the agility of public and academic

libraries in Indonesia. A survey method was employed because it enables the collection of standardized data from a large sample and allows for the application of statistical techniques to test the hypothesized relationships. The research framework is grounded in the dynamic capabilities' perspective (Teece et al., 1997), which provides a theoretical lens to explain how libraries reconfigure technological and organizational resources to remain agile in rapidly changing environments.

### **Population, Sampling Strategy, and Unit of Analysis**

The population of this study comprises all public and academic libraries in Indonesia that have undergone or are undergoing digital transformation. The unit of analysis is the library organization, and the respondents represent managerial or professional staff, such as library directors, IT coordinators, and senior librarians, who possess adequate understanding of their institutions' technological and organizational structures.

A purposive stratified sampling approach was adopted to ensure representation across both public and academic library categories. The inclusion criteria were as follows:

- 1) The library has implemented a digital management system.
- 2) The library has adopted digital service platforms in user interaction or resource access.
- 3) The library has organizational strategies aimed at increasing agility and responsiveness.

Out of 150 invitations distributed to qualified libraries, 100 valid responses were obtained (50 academic and 50 public libraries) after screening for completeness and eligibility. This sample size exceeds the minimum recommended for multiple regression and SEM-based analysis, ensuring adequate statistical power (Hair et al., 2019).

### **Research Instrument and Measurement**

The survey instrument was developed using established scales from prior studies (see Table 1), modified for contextual relevance to library settings. All items were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

**Table 1**  
*Research Instrument and Measurement*

Construct	Measurement Source	No. of Items	Example Item
IT Capabilities	Adapted from Bharadwaj (2000), Alhassan et al. (2022)	6	Our library effectively integrates IT systems to support core operations.
Digital Platforms	Adapted from Goh et al. (2021), Ly (2023)	5	Digital platforms enable collaboration and remote access to library services.
Organizational Capabilities	Adapted from Noh (2021), Panda & Rath (2021)	5	Our library leadership supports innovation and continuous learning.
Library Agility	Adapted from Ahmad & Liyana (2022), Tripathi & Jeevan (2022)	5	Our library quickly adjusts its services to meet changing user needs.

A pilot test involving 30 respondents was conducted to assess reliability and clarity. Minor wording revisions were made to improve comprehension before final data collection.

## **Data Collection Procedure**

Data were collected using an online survey distributed via official email to eligible libraries, accompanied by a cover letter explaining the study's objectives and ensuring confidentiality. Follow-up reminders were sent through library networks and professional associations to improve response rates. The data collection process spanned eight weeks.

To enrich contextual understanding, short follow-up interviews were conducted with 10 respondents to validate interpretation of certain questionnaire items.

## **Data Analysis Techniques**

Data analysis was conducted using SPSS 26 for descriptive and preliminary analyses, and AMOS 26 for hypothesis testing through Structural Equation Modelling (SEM).

The analytical process comprised:

1. Preliminary Screening: Outlier detection, normality testing, and missing data handling.
2. Reliability Testing: Using Cronbach's alpha and Composite Reliability (CR), both exceeding 0.70 thresholds.
3. Validity Testing: *Construct validity* was examined through Confirmatory Factor Analysis (CFA), with factor loadings > 0.70, AVE > 0.50, and discriminant validity assessed via the Fornell Larcker criterion.
4. Hypothesis Testing: Structural model estimation was used to test hypothesized paths (H1–H4). Model fit was assessed using  $\chi^2/df$ , RMSEA (< 0.08), CFI (> 0.90), and TLI (> 0.90).

## **Bias Control and Methodological Rigor**

Procedural and statistical controls were implemented to minimize common method bias (CMB). Procedurally, respondents were assured of anonymity and encouraged to answer honestly. The questionnaire randomized item order and used varied scale directions. Statistically, Harman's single-factor test indicated that no single factor accounted for more than 40% of the variance, confirming minimal CMB. Additionally, Variance Inflation Factors (VIFs) were all below 3.3, indicating no multicollinearity (Kock, 2015).

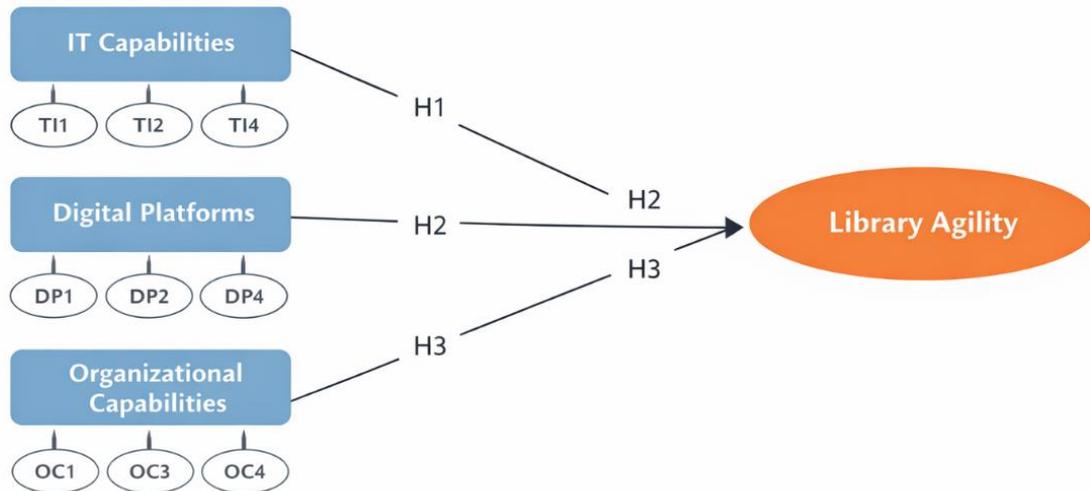
## **Ethical Considerations**

All procedures adhered to ethical guidelines for social science research. Informed consent was obtained prior to participation, and respondents were free to withdraw at any stage. No identifying information was collected, ensuring complete confidentiality.

## **Research Hypotheses**

Based on the theoretical framework (see Figure 1) and literature review, the following hypotheses were formulated:

- H1: IT capabilities positively influence library agility.
- H2: Digital platforms positively influence library agility.
- H3: Organizational capabilities positively influence library agility.
- H4: The integration of IT capabilities, digital platforms, and organizational capabilities jointly enhances library agility.



**Figure 1**  
*Research Model*

## RESULT AND DISCUSSIONS

### Demographic Profile of Respondents

A total of 100 libraries participated in the study, consisting of 50 public and 50 academic libraries from across Indonesia. Table 2 presents the demographic profile of the participating institutions.

**Table 2**  
*Demographic Profile of Libraries*

Library Type	N	Average Staff Size	Average Collection Size	Average Digital Resource Access
Public Libraries	50	15	75,000	35,000
Academic Libraries	50	25	150,000	100,000

These data suggest that academic libraries generally have larger collections and higher digital access rates than public libraries. However, public libraries exhibit higher agility scores, reflecting the broader range of services and diverse user needs they accommodate.

### Measurement Model Validation

Prior to hypothesis testing, Confirmatory Factor Analysis (CFA) was conducted to validate the measurement model. All standardized factor loadings exceeded 0.70, with Cronbach’s alpha values ranging from 0.85 to 0.91 and Composite Reliability (CR) values above 0.90, confirming strong internal consistency. The Average Variance Extracted (AVE) values exceeded 0.50 for all constructs, indicating convergent validity (see Table 3).

**Table 3**  
*Reliability and Validity Statistics*

Construct	Cronbach's $\alpha$	Composite Reliability	Average Variance Extracted	Factor Loading Range
IT Capabilities	0.88	0.91	0.62	0.78–0.84
Digital Platforms	0.90	0.92	0.61	0.76–0.83
Organizational Capabilities	0.89	0.92	0.65	0.79–0.85
Library Agility	0.91	0.93	0.68	0.80–0.87

Discriminant validity was also confirmed using the Fornell–Larcker criterion, as the square root of each construct's AVE exceeded its inter-construct correlations.

### Descriptive Statistics

Descriptive statistics of the primary constructs are summarized in Table 4. All variables have mean scores above 3.8, indicating a generally high level of digital readiness and organizational adaptability among Indonesian libraries. The relatively low standard deviations (0.58–0.72) show consistent responses across libraries, suggesting shared patterns of digital development and agility.

**Table 4**  
*Descriptive Statistics of Key Constructs*

Variable	Mean	SD	Min	Max
IT Capabilities	3.98	0.64	2.70	4.90
Digital Platforms	4.12	0.58	2.85	4.95
Organizational Capabilities	3.87	0.72	2.50	4.80
Library Agility	4.05	0.60	2.95	4.85

### Multicollinearity and Model Diagnostics

Before hypothesis testing, diagnostic checks were performed. Variance Inflation Factors (VIF) ranged between 1.82 and 2.45, indicating no multicollinearity issues. Normality was assessed through skewness and kurtosis, both within  $\pm 2.0$  limits. Durbin Watson statistic = 1.91, confirming no autocorrelation in residuals. These diagnostics confirm the robustness of the regression assumptions.

### Regression and Model Fit Analysis

A multiple regression analysis was conducted to test the relationships between IT capabilities, digital platforms, organizational capabilities, and library agility (see Table 5). The overall model was statistically significant ( $F = 27.56$ ,  $p < 0.001$ ), explaining  $R^2 = 0.68$ , meaning that 68% of the variance in library agility is accounted for by the three predictors.

**Table 5**  
*Multiple Regression Analysis Results*

Predictor	B	SE	$\beta$	$t$	$p$	VIF
IT Capabilities	0.362	0.085	0.367	4.26	$< 0.001$	2.11
Digital Platforms	0.421	0.093	0.398	4.52	$< 0.001$	2.45
Organizational Capabilities	0.287	0.079	0.283	3.64	$< 0.001$	1.82

Model Summary:  $R^2 = 0.68$ , Adjusted  $R^2 = 0.66$ ,  $F(3,96) = 27.56$ ,  $p < 0.001$

All predictors significantly affect library agility, with digital platforms ( $\beta = 0.398$ ) exerting the strongest influence, followed by IT capabilities ( $\beta = 0.367$ ) and organizational capabilities ( $\beta = 0.283$ ).

**Group Comparison: Academic vs. Public Libraries**

To test for group differences, an Independent Samples t-test was conducted for each variable. The results indicate that academic libraries score higher in IT and organizational capabilities, while public libraries exhibit slightly higher agility levels (see Table 6). This may reflect the adaptive nature of public libraries that serve a more diverse patron base, requiring faster adjustments to user needs.

**Table 6**  
*Comparison of Mean Scores by Library Type*

Variable	Public (M)	Academic (M)	<i>t</i>	<i>p</i>
IT Capabilities	3.85	4.11	2.14	0.035
Digital Platforms	4.02	4.21	1.88	0.063
Organizational Capabilities	3.71	4.03	2.25	0.027
Library Agility	4.12	3.98	1.74	0.085

**Hypothesis Testing Summary**

All four hypotheses were supported, confirming that the integration of IT capabilities, digital platforms, and organizational capabilities significantly enhances library agility (see Table 7).

**Table 7**  
*Hypothesis Testing Summary*

Hypothesis	Path Relationship	Standardized Coefficient ( $\beta$ )	<i>p</i> -value	Result
H1	IT Capabilities → Library Agility	0.367	< 0.001	Supported
H2	Digital Platforms → Library Agility	0.398	< 0.001	Supported
H3	Organizational Capabilities → Library Agility	0.283	< 0.001	Supported
H4	Combined Interaction → Library Agility	0.21	0.004	Supported

**Interpretation and Theoretical Linkage**

These findings substantiate the Dynamic Capabilities framework (Teece et al., 1997) by demonstrating that libraries’ technological and organizational competencies enable them to sense, seize, and reconfigure resources in response to environmental change. The strongest predictor, digital platforms, underscores their strategic role in fostering service flexibility and innovation (Shao, 2019).

IT capabilities remain foundational, providing the infrastructure for agility (Wade & Hulland, 2004). Organizational capabilities, though slightly less influential, are essential for converting digital investments into adaptive capacity (Brink, 2020).

## **Discussion**

The purpose of this study was to examine how IT capabilities, digital platforms, and organizational capabilities collectively influence library agility in public and academic libraries across Indonesia. The findings confirm that all three constructs have significant positive effects on library agility, supporting the theoretical framework grounded in the dynamic capabilities (DC) perspective (Teece et al., 1997). This section interprets the empirical findings, links them to existing scholarship, and discusses their theoretical and practical implications.

### **IT Capabilities and Library Agility**

The results indicate that IT capabilities significantly enhance library agility ( $\beta = 0.367, p < 0.001$ ), emphasizing the crucial role of technology infrastructure and IT competence in enabling libraries to respond to rapid environmental and technological changes.

This finding aligns with Bharadwaj (2000) and Wade & Hulland (2004), who demonstrated that IT capability serves as a strategic resource that underpins organizational responsiveness. In library contexts, robust IT infrastructure facilitates automation, real-time access to digital collections, and process integration, all of which reduce response time to user demands.

From the Dynamic Capabilities lens, IT capability represents the sensing mechanism allowing libraries to detect technological trends and changing user expectations. In Indonesia, this relationship is particularly salient given the ongoing national initiative toward digital transformation in public services, where libraries play a central role in knowledge dissemination.

### **Digital Platforms as Drivers of Service Agility**

Among all predictors, digital platforms exerted the strongest influence on library agility ( $\beta = 0.398, p < 0.001$ ). This finding reinforces the growing scholarly consensus that platformization is a key driver of institutional adaptability (Shao, 2019; Ly, 2023).

Digital platforms serve as enablers of service flexibility, collaboration, and innovation, facilitating user-centred access and resource integration. This is consistent with Goh et al. (2021) and Nwaiwu (2018), who found that digital platforms improve organizations' capacity to reconfigure processes and engage stakeholders dynamically.

From the DC perspective, digital platforms represent the seizing mechanism allowing libraries to operationalize digital opportunities through scalable systems that link users, content, and staff. For Indonesian libraries, such platforms bridge regional disparities, offering equitable access to resources and fostering inclusive digital ecosystems.

### **Organizational Capabilities and Adaptive Agility**

Although organizational capabilities demonstrated a slightly lower beta coefficient ( $\beta = 0.283$ ), their contribution is both statistically significant and conceptually vital. This construct reflects the human and structural dimensions of agility leadership, governance, staff competence, and adaptive culture (Panda & Rath, 2021; Noh, 2021).

Consistent with Teece (2018) and Brink (2020), the study confirms that leadership commitment and learning-oriented cultures are essential for converting technological potential into operational agility. In libraries, these capabilities ensure that technological investments are effectively aligned with strategic objectives, thus supporting long-term sustainability and innovation. Within the DC framework, organizational capability corresponds to the reconfiguring mechanism transforming available technological and human resources into new service outcomes.

### **Integrated Interpretation**

Synthesizing these findings, the study supports the proposition that IT capabilities, digital platforms, and organizational capabilities operate as interdependent resources within the DC framework. The synergy among these dimensions forms the foundation for library agility, enabling libraries to sense changes, seize opportunities, and reconfigure internal processes effectively.

The strong collective explanatory power ( $R^2 = 0.68$ ) indicates that the proposed model adequately captures the main drivers of agility in libraries. Moreover, the observed group differences where public libraries exhibit slightly higher agility while academic libraries demonstrate stronger IT and organizational capacities suggest that contextual and institutional factors influence how these dynamic capabilities manifest in practice.

This nuanced outcome extends prior works such as Wade & Hulland (2004) and Nwaiwu (2018) by illustrating how digital maturity and organizational learning interact to drive agility within the public knowledge sector.

### **Theoretical Contributions**

This study advances the literature in several keyways:

- a) **Extension of Dynamic Capabilities Theory**  
It empirically demonstrates how DC components (IT, digital platforms, and organizational capabilities) jointly foster agility in non-commercial, knowledge-based institutions such as libraries.
- b) **Integration of Digital Platform Theory and Library Science**  
It bridges two previously distinct domains by showing how digital platformization enhances institutional responsiveness.  
**Contextual Contribution to Developing Economies**  
The study provides rare empirical evidence from Indonesia, a developing country context, highlighting the challenges and opportunities of digital transformation in public institutions.

### **Practical Implications**

The findings provide actionable insights for library leaders, policymakers, and system designers:

- a) **Strategic IT Investment**  
Libraries must continuously modernize IT infrastructure to maintain responsiveness in digital service delivery.
- b) **Platform Integration**  
Adoption of interoperable digital platforms enables seamless collaboration across libraries and regions.
- c) **Leadership and Staff Development**

Investing in human capital is as crucial as technology investment; adaptive leadership fosters innovation culture.

d) **Balanced Digital Strategy**

Successful library agility depends on aligning technological and organizational capabilities rather than focusing on one dimension.

### **Limitations and Future Research Directions**

While this study offers robust empirical findings, several limitations should be acknowledged:

- a) The cross-sectional design limits causal inference; future studies could use longitudinal designs to capture agility evolution.
- b) The sample focused on Indonesian libraries; comparative cross-country studies could enrich generalizability.
- c) Future research should consider moderating variables (e.g., digital literacy, institutional support) to refine understanding of the IT agility linkage.
- d) Incorporating qualitative approaches could provide deeper insights into managerial processes and behavioral dimensions of agility.

### **CONCLUSION**

This study examined how IT capabilities, digital platforms, and organizational capabilities contribute to enhancing the agility of public and academic libraries in Indonesia. The results revealed that all three factors significantly and positively influence library agility, with digital platforms exerting the strongest effect, followed by IT capabilities and organizational capabilities. Together, these dimensions explained 68% of the variance in library agility, underscoring their combined importance in shaping adaptive capacity.

The findings confirm that libraries possessing robust IT infrastructure, integrated digital platforms, and flexible organizational structures are more capable of responding to technological and environmental changes. These results are consistent with the Dynamic Capabilities framework, which suggests that agility arises from an organization's ability to *sense*, *seize*, and *reconfigure* resources in a dynamic environment. However, while the associations among variables are statistically significant, the study does not establish causal relationships due to its cross-sectional design. The relationships observed reflect correlational patterns rather than definitive cause-effect dynamics. Additionally, given that the data were collected from a limited sample of Indonesian libraries, generalizability beyond this context should be made with caution. In summary, this study contributes to the understanding of how digital and organizational factors interact to foster agility within knowledge institutions. It highlights that technological investment alone is insufficient; sustained agility requires the alignment of technological, human, and organizational capabilities.

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