



## Examining Absorptive Capacity in the Adoption of Digital Health Technology in Indonesian Hospitals (a Theoretical Review and Implementation Perspective)

Teguh Setiawan Wibowo<sup>1\*</sup>, Mochamad Fatchurrohman<sup>2</sup>

<sup>1</sup> Prodi Magister Manajemen, STIE Mahardhika, Surabaya

<sup>2</sup> Prodi Bisnis Digital, STIE Mahardhika, Surabaya

email: [teguh10setiawan@gmail.com](mailto:teguh10setiawan@gmail.com)

\* corresponding author

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### ABSTRAK

Penelitian ini bertujuan untuk mengkaji konsep kapasitas penyerapan dan relevansinya dengan adopsi teknologi kesehatan digital di rumah sakit Indonesia. Melalui tinjauan literatur yang menggunakan analisis konseptual dan sintesis teoretis, artikel ini menelusuri perkembangan yang menghubungkannya dengan karakteristik organisasi perawatan kesehatan. Tinjauan tersebut menunjukkan bahwa keberhasilan adopsi teknologi digital tidak cukup dicapai melalui tahap akuisisi saja tetapi menuntut kemampuan berkelanjutan dalam mengasimilasi, mengubah, dan mengeksplorasi pengetahuan. Analisis mengidentifikasi empat faktor kontekstual yang mempengaruhi kapasitas penyerapan rumah sakit: struktur organisasi, budaya profesional, sumber daya, dan peraturan pemerintah. Artikel ini menawarkan kerangka konseptual yang mengintegrasikan tiga tingkat analisis: individu, tim, dan organisasi dengan dinamika proses melingkar yang menciptakan lingkaran bajik atau lingkaran setan. Implikasi implementasi termasuk pergeseran dari pendekatan berbasis proyek ke proses berkelanjutan, konfigurasi ulang peran manajemen, penguatan kolaborasi lintas profesional, pengembangan instrumen pengukuran kontekstual, dan membangun ekosistem pendukung di tingkat makro.

### ABSTRACT

#### Keywords

Absorptive Capacity,  
Digital Health Technology,  
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This study aims to examine the concept of absorptive capacity and its relevance to the adoption of digital health technology in Indonesian hospitals. Through a literature review employing conceptual analysis and theoretical synthesis, this article traces the development connects it to the characteristics of healthcare organizations. The review indicates that the successful adoption of digital technology is not sufficiently achieved through the acquisition stage alone but demands sustained capabilities in assimilating, transforming, and exploiting knowledge. The analysis identifies four contextual factors influencing hospital absorptive capacity: organizational structure, professional culture, resources, and government regulation. This article offers a conceptual framework integrating three levels of analysis: individual, team, and organization with circular process dynamics that create either a virtuous cycle or a vicious cycle. Implementation implications include a shift from a project-based approach to a continuous process, reconfiguration of management roles, strengthening cross-professional collaboration, developing contextual measurement instruments, and establishing a supporting ecosystem at the macro level.



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## INTRODUCTION

The digital revolution has transformed the landscape of various sectors, including healthcare. Digital health technologies such as electronic medical records (EMR), telemedicine, artificial intelligence for diagnostics, and integrated management information systems have become key pillars for improving the quality, efficiency, and accessibility of global healthcare services. The World Health Organization (WHO) promotes the use of digital technology as a key instrument for achieving Universal Health Coverage and strengthening the resilience of national health systems (World Health Organization, 2021). These technologies promise improved diagnostic accuracy, reduced medical errors, and significant operational efficiency (Agarwal et al., 2020; Kraus et al., 2021). However, beneath this potential lies a critical phenomenon: technology adoption often fails to achieve its goals due to complex non-technical factors (Schwalbe et al., 2020; World Health Organization, 2021).

Data from the Indonesian Ministry of Health as of October 2025 shows that out of 3,239 hospitals, 3,138 have implemented EMRs, but 495 of these do not yet cover six essential core services. Furthermore, out of 34,463 healthcare facilities integrated with the SATUSEHAT platform, the utilization of data for clinical and managerial decision-making remains very low (Ministry of Health of the Republic of Indonesia, 2025). Many hospitals possess a Hospital Management Information System (SIMRS) merely to fulfill administrative reporting obligations, not as a strategic tool for service improvement (Setyawan & Suryanto, 2022). This situation is exacerbated by resistance from healthcare workers, who often perceive the technology as incompatible with established workflows and deeply ingrained cultures (Alami et al., 2020; Greenhalgh et al., 2017).

The gap between massive technology investment and tangible impact indicates a more fundamental problem than mere infrastructure availability. Approaches focusing on technical and policy aspects have proven insufficient to explain why two hospitals with similar investment levels and regulatory support can achieve vastly different adoption success rates (Cresswell & Sheikh, 2013; Ross et al., 2018). This is where a theoretical framework capable of capturing the essence of an organization's ability to absorb, integrate, and utilize the knowledge embedded in technology is needed: the theory of Absorptive Capacity (ACAP). ACAP theory was first introduced by Cohen and Levinthal (1990) as an organization's ability to recognize the value of new external information and knowledge, assimilate it, and apply it to improve performance. In the hospital context, this new knowledge encompasses current clinical practices, patient management methods, and innovative service models (Radaelli et al., 2017). Zahra and George (2002) distinguished ACAP into potential absorptive capacity (acquisition and assimilation) and realized absorptive capacity (transformation and exploitation). Lane, Koka, and Pathak (2006) enriched understanding by emphasizing ACAP as a three-stage learning process: exploratory, transformative, and exploitative.

Applying ACAP in the healthcare sector is increasingly relevant given the complexity of hospitals as multidisciplinary entities with various professions possessing different knowledge paradigms (Ferneley & Sobreperetz, 2017). Ashoor et al. (2021) affirmed that ACAP is a critical routine for knowledge and innovation adoption in healthcare organizations. Research by Gupta and George (2024) indicates that digital transformation in healthcare requires appropriate organizational culture and strong top management support. Nabukenya et al. (2023) concluded that absorptive capacity needs integration at the team level with individual and organizational levels.

Although ACAP is widely used in strategic management and industrial innovation, its application in the Indonesian healthcare sector remains limited. Most studies on technology adoption in hospitals utilize the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and Use of Technology (UTAUT), which focus on individual factors (Rahimi et al., 2018; Wati & Kurniawan, 2022). In reality, the successful adoption of digital health technology heavily depends on an organization's ability to manage collective learning and fundamentally alter organizational routines (Yildiz et al., 2023; Gkeredakis et al., 2021). Research by Nurhasanah and Hidayat (2024) in Indonesia found that digital adoption capability positively influences hospital performance, mediated by ICT literacy and digital leadership.

Based on the above, this article aims to provide a theoretical review and implementation perspective regarding absorptive capacity in the adoption of digital health technology in Indonesian hospitals. Through a systematic literature review, this article examines how the ACAP concept can be contextually adapted to hospital organizations. It is expected to identify key factors shaping hospital absorptive capacity at individual, team, and organizational levels, and how these factors interact to determine the success of technology adoption.

## LITERATURE REVIEW

### The Fundamental Concept of Absorptive Capacity: Evolution and Theoretical Development

The concept of absorptive capacity was introduced by Cohen and Levinthal (1990) in their seminal article in *Administrative Science Quarterly*. The initial definition encompassed three main components: an organization's ability to recognize the value of new external information and knowledge (recognize), assimilate that knowledge (assimilate), and apply it for commercial purposes or performance improvement (apply). The revolutionary idea was that the ability to absorb external knowledge is largely determined by the level of prior knowledge, creating a cumulative effect: the more one knows, the greater the capacity to learn new things (Cohen & Levinthal, 1990, p. 128). Absorptive capacity is not merely an individual attribute but a collective phenomenon emerging from interactions among individuals.

The reconceptualization by Zahra and George (2002) in the *Academy of Management Review* divided absorptive capacity into two main dimensions: potential absorptive capacity (PACAP) and realized absorptive capacity (RACAP). PACAP encompasses the ability to acquire (acquisition) and assimilate (assimilation) knowledge, while RACAP encompasses the ability to transform (transformation) and exploit (exploitation) knowledge. This division implies that merely having access to new knowledge is insufficient; organizations must be able to transform that knowledge into something implementable (Zahra & George, 2002).

Lane, Koka, and Pathak (2006) criticized the absorptive capacity construct as being overly "reified" and losing its theoretical roots. They proposed defining it as an organization's capacity to

perform three sequential learning processes: exploratory learning (recognizing the value of external knowledge), transformative learning (integrating new knowledge with existing knowledge), and exploitative learning (utilizing knowledge to achieve organizational goals). These three processes form a sequence where success in the initial stage influences the smoothness of subsequent stages (Lane et al., 2006).

Todorova and Durisin (2007) critiqued Zahra and George's model by reintroducing the "recognize" dimension, which had been omitted. They argued that when new knowledge does not align with existing schemas, organizations can undergo transformation directly without prior assimilation (Todorova & Durisin, 2007).

### **Microfoundations and Levels of Analysis in Absorptive Capacity**

Lewin, Massini, and Peeters (2011) in Organization Science demonstrated that absorptive capacity routines are rooted in individual actions and interactions, which then aggregate into the collective capability of the organization. Yildiz, Murti, and Zander (2023) in Technological Forecasting and Social Change introduced the concept of team-level absorptive capacity with four dimensions: identification (ability to identify who knows what within the team), harmonization (ability to coordinate diverse perspectives), improvisation (ability to act spontaneously under resource constraints), and consummation (ability to package knowledge for end-users).

Lowik, Kraaijenbrink, and Groen (2017) developed the concept of individual absorptive capacity, encompassing an individual's ability to recognize, assimilate, and apply new knowledge. Volberda, Foss, and Lyles (2010) emphasized a multilevel approach to understanding absorptive capacity, highlighting how capabilities at the individual, team, and organizational levels are interconnected.

### **Factors Influencing Absorptive Capacity**

Jansen, Van Den Bosch, and Volberda (2005) identified that organizational structure, coordination mechanisms, and socialization capabilities have different effects on PACAP and RACAP. Flatten, Engelen, Zahra, and Brettel (2011) developed a measurement instrument confirming the role of cross-functional interfaces and participation in decision-making. Lane and Lubatkin (1998) introduced the concept of relative absorptive capacity, emphasizing that an organization's ability to learn from a partner is determined by the similarity of knowledge bases, organizational structures, and dominant logics. Lichtenthaler (2009) added that competitive pressure influences an organization's orientation toward absorbing external knowledge.

### **Absorptive Capacity in the Healthcare Sector Context**

Ferneley and Sobrepez (2017) identified characteristics of hospitals: they are multidisciplinary with differing knowledge paradigms, possess strong professional systems with high autonomy, and operate under strict regulations. Radaelli, Lettieri, and Masella (2017) showed that absorptive capacity in healthcare involves transferring both technical knowledge and practical knowledge embedded in clinical routines. Ashoor, Qureshi, and Shamsudin (2021) conducted a systematic review identifying that absorptive capacity in healthcare organizations encompasses the

dimensions of knowledge acquisition, assimilation, transformation, and application, with leadership, learning culture, and top management support as primary determinants. Braithwaite, Churrua, Long, Ellis, and Herkes (2018) emphasized that innovation adoption in hospitals depends on the organization's ability to absorb and integrate new knowledge.

Schwalbe, Wahl, and Song (2020) identified infrastructure limitations, digital competency gaps, and weak support systems as major barriers to adopting digital health technology in low- and middle-income countries. Nabukenya, Ssemugabi, and Kyeyune (2023) added the necessity of integrating absorptive capacity at the team, individual, and organizational levels simultaneously.

### **Adoption of Digital Health Technology from a Management Perspective**

Kraus, Schiavone, and Pluzhnikova (2021) provided a typology of digital health technologies, including EMR, telemedicine, AI for diagnostics, IoT, and clinical decision support systems. Agarwal, LeFevre, and Labrique (2020) added that digital health technologies have unique characteristics because they deal with patient safety and involve multiple stakeholders. Greenhalgh et al. (2017) developed the NASSS (Non-adoption, Abandonment, and Challenges to Scale-up, Spread, and Sustainability) framework, explaining that adoption success is determined by the complex interaction between technology characteristics, condition/illness, organizational context, individual adopter factors, and the wider system.

Cresswell and Sheikh (2013) identified organizational factors such as leadership, change management, and resource support as more critical determinants of success than technical factors. Gkeredakis, Swan, and Powell (2021) demonstrated that digital transformation in healthcare requires an organizational learning-based approach. Yildiz et al. (2023) affirmed that in the context of technology adoption teams, the abilities of identification, harmonization, and consummation are key to success.

### **RESEARCH METHOD**

This research constitutes a library study employing a qualitative approach based on theoretical analysis. The study does not involve primary data collection but relies on critical examination of various literary sources analyzed to generate new scientific perspectives. This approach aligns with the characteristics of conceptual research aimed at developing theoretical understanding and offering new frameworks for thought (Creswell & Creswell, 2018; Snyder, 2019).

Data sources are entirely derived from relevant library materials. Primary data sources consist of scientific articles from reputable national and international journals discussing absorptive capacity theory, digital health technology adoption, hospital management, and healthcare sector innovation. Secondary data sources include textbooks, official reports from government agencies and international health organizations, conference proceedings, and relevant dissertations or theses. Selection criteria prioritized high-credibility publications such as journals indexed in Scopus or Web of Science, as well as books from leading academic publishers. The primary timeframe focused on the last two decades, with particular attention to theoretical developments post-reconceptualization by Zahra and George (2002) and Lane, Koka, and Pathak (2006), and recent articles following the COVID-19 pandemic (Kraus et al., 2021; Yildiz et al., 2023).

Data collection was conducted through systematic literature searches using academic databases including Scopus, Web of Science, Google Scholar, PubMed, and ScienceDirect. The search strategy employed combinations of keywords: "absorptive capacity," "organizational learning," "knowledge transfer," "digital health," "health information technology," "technology adoption," "hospital management," and "healthcare innovation." A snowballing approach was also implemented by tracing the reference lists of discovered articles (Wohlin, 2014).

Data analysis utilized qualitative content analysis and theoretical synthesis methods. Content analysis was performed to identify, code, and categorize various concepts, dimensions, and findings from the literature (Hsieh & Shannon, 2005; Krippendorff, 2018). The process began with reading all literature sources, followed by open coding, axial coding, and selective coding (Corbin & Strauss, 2015; Saldaña, 2021). Theoretical synthesis was conducted using a narrative approach to integrate findings into a new conceptual framework (Baumeister & Leary, 1997; Wong et al., 2013).

Validity and reliability of the analysis were maintained through source triangulation using diverse literature from various disciplines (Flick, 2018; Patton, 2015), an audit trail with systematic documentation of the entire process (Lincoln & Guba, 1985; Nowell et al., 2017), and researcher reflexivity, acknowledging the influence of academic background and perspective (Berger, 2015; Finlay, 2002). The research stages consisted of: formulating the focus of inquiry, searching and collecting literature, selecting and evaluating literature, analyzing and synthesizing, and developing perspectives and drawing conclusions (Jesson et al., 2011; Ridley, 2012).

## DISCUSSION

### Conceptual Model of Absorptive Capacity in Digital Health Technology Adoption in Hospitals

The theoretical synthesis in this article aims to build a conceptual bridge between absorptive capacity theory and the reality of digital health technology adoption in hospitals. Hospitals possess characteristics distinct from typical business organizations: they are multidisciplinary with differing knowledge paradigms, have strong professional systems with high clinical autonomy, operate under strict regulations, and have dual orientations toward efficiency and patient safety (Ferneley & Sobreperez, 2017; Radaelli et al., 2017). Mapping the dimensions of absorptive capacity onto the stages of technology adoption is a crucial initial step.

The first mapping connects the dimensions of recognition and acquisition to the initial adoption stage. Recognition, according to Cohen and Levinthal (1990), is the organization's ability to recognize the value of new external information and knowledge. In a hospital, this ability is reflected in the extent to which management and healthcare workers identify technologies relevant to clinical and operational needs, rather than merely following trends. Recognition ability is heavily determined by the organization's prior knowledge (Cohen & Levinthal, 1990). Acquisition, according to Zahra and George (2002), is the capacity to acquire external knowledge. At this stage, the hospital establishes mechanisms to acquire the knowledge embedded in the technology through formal training, vendor consultations, or benchmarking studies. However, many hospitals in Indonesia become trapped at this stage: technology investments are made without adequate efforts to build internal capacity to understand the technology being adopted.

The second mapping connects the dimension of assimilation to the integration stage. Assimilation is defined by Zahra and George (2002) as the organization's ability to understand and process acquired external knowledge. The integration stage is a critical phase where the knowledge

embedded in the new technology begins to be absorbed and aligned with existing routines. This integration is not merely a technical process but a complex social process because it involves various professions with different ways of thinking and language. Physicians tend to evaluate technology based on diagnostic accuracy, nurses on workflow efficiency, while management focuses on regulatory compliance and cost efficiency (Ferneley & Sobreperez, 2017). Effective assimilation is characterized by collective learning where various perspectives are dialogued and integrated.

The third mapping connects the dimension of transformation to the adaptation stage. Transformation in Zahra and George's (2002) framework is the organization's ability to develop and refine existing routines by integrating new knowledge. At this stage, the hospital does not simply adopt the technology as-is but makes modifications and adaptations to suit the specific context of each unit. Todorova and Durisin (2007) offer the perspective that in situations where new knowledge does not fit existing schemas, organizations can undergo transformation directly without prior assimilation. This perspective is relevant to the Indonesian context, where technology is often designed in developed countries with different contexts. The ability to transform both the technology and work processes becomes key to successful adaptation.

The fourth mapping connects the dimension of exploitation to the stage of sustainable utilization. Exploitation is defined by Zahra and George (2002) as the organization's ability to apply knowledge that has been acquired, assimilated, and transformed into valuable outputs. This stage represents the ultimate goal of adoption: how technology is optimally used to improve clinical performance, operational efficiency, and service quality sustainably. Unfortunately, many hospitals that have adopted SIMRS have not been able to optimally exploit data. The system is often used merely to fulfill administrative reporting obligations, not as a strategic tool for quality improvement (Setyawan & Suryanto, 2022). This phenomenon reflects that realized absorptive capacity has not been fully established, even though potential absorptive capacity may exist (Zahra & George, 2002).

This mapping demonstrates that the successful adoption of digital health technology heavily depends on how hospitals execute the entire sequence of absorptive capacity processes thoroughly and continuously. This process is not simply linear but circular, where each stage influences the others, and the results of exploitation provide feedback that enriches prior knowledge for the next cycle. In this perspective, technology adoption is not a project with a clear beginning and end, but an ongoing organizational learning process. The implications are significant: resource allocation should not focus solely on the acquisition stage but must be distributed across all stages, with particular attention to developing assimilation, transformation, and exploitation capacities, which have often been neglected.

This mapping also opens space to accommodate recent developments in absorptive capacity literature emphasizing the importance of the meso or team level of analysis. Yildiz, Murti, and Zander (2023) identified four specific dimensions: identification (ability to identify who knows what within the team), harmonization (ability to coordinate diverse perspectives), improvisation (ability to act spontaneously under resource constraints), and consummation (ability to package knowledge for end-users). These four dimensions serve as important complements because they capture dynamics at the operational level where knowledge absorption truly occurs. By integrating a multilevel perspective, understanding of absorptive capacity in digital health technology adoption becomes more comprehensive and contextual.

## Factors Influencing Hospital Absorptive Capacity

Organizational structure is a fundamental determinant shaping hospital absorptive capacity. Research by Jansen, Van Den Bosch, and Volberda (2005) shows that the characteristics of organizational structure have different effects on PACAP and RACAP. A centralized structure, where strategic decisions are made at top management levels, tends to excel in acquisition and assimilation because it enables rapid decision-making, integrated coordination, and targeted resource allocation. However, a centralized structure can hinder transformation and exploitation because adapting technology to the specific context of units requires flexibility and autonomy that may be limited in rigid hierarchical structures.

Conversely, a decentralized structure, where service units have significant autonomy, excels in transformation and exploitation due to the freedom to customize technology to local contexts. However, without strong coordination from the center, implementation can suffer from fragmentation and inconsistency. This dilemma calls for a hybrid approach: centralization regarding standard policies and basic infrastructure, but decentralization regarding adaptation and innovation at the unit level. The success of this approach depends on the quality of coordination mechanisms bridging the center and units, as well as the capacity of middle management to act as boundary spanners, capable of translating central policies to local contexts and vice versa.

Organizational culture is another important factor. Ferneley and Sobreperéz (2017) identified that hospitals possess a strong professional culture, particularly among clinical professions like physicians. This professional culture is formed through lengthy educational processes, intensive professional socialization, and reward systems based on peer recognition. A consequence is resistance to knowledge from outside the profession, including managerial and information technology knowledge. High professional autonomy means healthcare workers tend to evaluate technology based on their own professional standards rather than organizational standards. The tension between clinical autonomy and managerial control becomes a conflict field affecting every stage of absorptive capacity, especially assimilation and transformation.

Learning culture plays a critical moderating role. Hospitals capable of building a culture where cross-professional learning is valued where doctors are willing to learn from management perspectives, managers understand clinical realities, and all parties are open to new knowledge; tend to have higher absorptive capacity. This learning culture requires leadership that consistently models openness, mechanisms facilitating cross-professional dialogue, and reward systems that appreciate collaboration and collective learning.

Organizational resources, particularly human capital and social capital, form the foundation of absorptive capacity. Lowik, Kraaijenbrink, and Groen (2017) developed the concept of individual absorptive capacity, showing that an individual's ability to recognize, assimilate, and apply new knowledge is the foundation for the organization's collective capability. Healthcare workers' prior knowledge, digital literacy, experience with information systems, and technology problem-solving abilities are primary determinants of the ability to recognize and assimilate new technology. However, the reality in Indonesia shows that the limited number of healthcare workers with dual competencies (clinical and IT) is a significant structural barrier. Health education curricula still have limited integration of digital competencies, so graduates possess limited prior knowledge.

Social capital, such as relational networks and trust across units and professions, is also crucial. Yildiz, Murti, and Zander (2023) demonstrate that identification and harmonization heavily depend on the quality of social relationships. Hospitals with strong social capital; open communication networks,

high cross-professional trust, deeply rooted norms of cooperation have an advantage in identifying expertise and aligning perspectives. Conversely, weak social capital hinders identification and harmonization. Middle-level leadership is a critical resource bridging top management policies with the realities of service units.

An equally important external factor is government regulation. The mandatory EMR policy and standardization through the SATUSEHAT platform create significant external pressure that drives rapid technology acquisition. This pressure has positive aspects: it creates momentum to accelerate adoption, prevents investment delays, and encourages common standards for interoperability. However, overly rigid regulations that do not consider the heterogeneity of hospital capacity can create compliance-oriented adoption: hospitals meet minimum requirements without undertaking deep transformation and exploitation.

Unclear regulations regarding health data ownership, cybersecurity, and legal responsibility for using digital technology create uncertainty that hinders full exploitation. Management hesitates to optimally utilize EMR data due to concerns about the legal implications of data breaches. Incentive and disincentive policies also influence the priorities and speed of each stage of absorptive capacity. Incentives focused on the "presence or absence" of systems, without considering the quality of utilization, encourage compliance-oriented behavior. To encourage deep transformation and exploitation, incentives that measure the impact of implementation on clinical quality indicators, operational efficiency, or patient satisfaction are needed. These four perspectives: structural, cultural, resource, and regulatory are interconnected in shaping hospital absorptive capacity. Improvement efforts must be undertaken holistically, considering all factors simultaneously, not partially.

### **Implementation Implications for Indonesian Hospitals from the Researcher's Perspective**

First, a paradigm shift from a project approach to a continuous process is needed. The project-based approach, which is dominant in Indonesia, has the following characteristics: a clear start marked by technology procurement, implementation bounded by deadlines, and an end marked by system handover. This approach ignores the essence of absorptive capacity as a continuous process that does not stop at acquisition but continues through assimilation, transformation, and exploitation. Management must shift the paradigm from "completing an implementation project" to "managing an ongoing organizational learning process." Technology is viewed as a learning catalyst that opens opportunities for experimentation, reflection, and continuous improvement. The implications are that budget allocation should not only be for procurement but also for capacity building, continuous mentoring, and iterative evaluation. Success evaluation should use indicators of learning processes and performance improvement, not merely administrative compliance.

Second, reconfiguration of the roles of top and middle management. An imbalance in roles has been identified: top management is too focused on acquisition (procurement), while middle management, department heads, ward coordinators are the most impacted by implementation but are not equipped with adequate authority and resources. The success of absorptive capacity is heavily determined by middle management acting as boundary spanners. Top management needs to grant sufficient autonomy to middle management for local adaptation, create two-way feedback mechanisms, and measure success based on tangible performance improvements at the unit level. Middle management needs to be equipped with digital leadership competencies, including understanding the potential and limitations of technology, leading teams in adaptation, managing resistance empathetically, and creating a conducive climate for collective learning.

Third, strengthening cross-professional collaboration mechanisms. The biggest obstacles in assimilation and transformation are the weak cross-professional collaboration mechanisms that bridge differing knowledge paradigms. Communication has tended to be one-way and top-down: policies set by top management are socialized to units without space for negotiating meaning and collaborative adaptation. Institutionalizing cross-professional collaboration forums as venues for dialogue, negotiation, and shared learning is necessary. Forums can take the form of clinical governance committees, digital transformation teams, or user groups. Within the absorptive capacity framework, these forums serve functions of identification, harmonization, and consummation. Collaboration mechanisms should be designed as permanent structures, not ad hoc, because the challenges of technology adoption will never be completely resolved.

Fourth, development of contextual measurement instruments. Existing instruments (Flatten et al., 2011) were designed for the manufacturing and general service sectors and do not capture the specificities of hospitals. Instruments reflecting the unique characteristics of Indonesian hospitals are needed, with three dimensions receiving special attention: identification (ability to map technological expertise among various clinical professions), harmonization (ability to manage conflicts between knowledge paradigms), and improvisation (ability to act under time pressure and resource constraints). Developing such instruments would enable more accurate evaluation of hospital readiness and identification of priority intervention areas.

Fifth, structuring the supporting ecosystem at the macro level. Hospital absorptive capacity cannot be separated from the supporting ecosystem. Three components require serious attention: the health worker education system (curricula need to substantially integrate digital competencies), government policy (needs to develop policies that not only encourage adoption through mandatory regulations but also support absorption capacity through mentoring, training, and incentives based on quality indicator improvements), and the health technology industry ecosystem (collaboration among hospitals, universities, and industry needs to be facilitated to create a collective learning ecosystem).

### **A Conceptual Framework of Absorptive Capacity for Digital Health Technology Adoption in Indonesian Hospitals**

The conceptual framework is developed on three main pillars: integration of multilevel perspectives, understanding of circular process dynamics, and identification of mediating and moderating roles. First, integration of three interconnected levels of analysis. At the individual level, prior knowledge, digital literacy, and healthcare worker motivation form the most fundamental foundation. Prior knowledge determines the extent to which an individual can recognize the value of technology and how quickly they can assimilate new knowledge (Cohen & Levinthal, 1990). Digital literacy enables not only operating the technology but also evaluating its reliability and finding solutions. Motivation differentiates proactive individuals from those merely fulfilling organizational demands.

At the team level, the collective capabilities developed by Yildiz, Murti, and Zander (2023) become the primary vehicle for knowledge absorption. Identification is the ability to know who among team members possesses specific expertise in a particular aspect of the technology. Harmonization is the ability to coordinate often conflicting perspectives into a coherent whole. Improvisation is the ability to act spontaneously and creatively under pressure. Consummation is the ability to package acquired knowledge for use by other users.

At the organizational level, structure, culture, and leadership act as contextual factors that facilitate or hinder the aggregation of capabilities from the individual and team levels to the organizational level. Structure determines the distribution of authority and information flow. Culture determines the extent to which learning and innovation are valued. Leadership, especially at the middle level as boundary spanners, bridges strategic policies with operational realities.

Second, understanding of circular process dynamics. Absorptive capacity is not a linear process from acquisition to exploitation but circular, where exploitation outcomes become feedback that enriches prior knowledge for the next cycle. This circular nature aligns with the perspective of Lane, Koka, and Pathak (2006) on three interconnected learning processes. Each adoption cycle has the potential to strengthen or weaken absorptive capacity for the next cycle. Successfully navigating all stages creates a virtuous cycle: experience enriches prior knowledge, healthcare workers become more familiar with technology, management better understands critical factors, routines become more adaptive. Failure to undergo deep transformation and exploitation creates a vicious cycle: healthcare workers become cynical due to negative experiences, management becomes reluctant to invest, routines become more rigid.

Third, understanding of the mediating and moderating roles in the relationship between technology investment and hospital performance. Potential absorptive capacity (PACAP) acts as a mediator in the relationship between technology investment and performance. Technology investment alone will not yield performance improvement if not accompanied by the ability to acquire and assimilate the embedded knowledge. However, the mediating role of PACAP does not occur automatically; it is moderated by realized absorptive capacity (RACAP). Even if a hospital possesses acquisition and assimilation capabilities, benefits to performance only materialize if it also possesses the ability to transform and exploit knowledge into actual practice.

The relationship between PACAP and RACAP, as well as the relationship between RACAP and performance, is moderated by contextual factors. Digital leadership, learning culture, and social capital strengthen the relationship between potential and realized absorptive capacity. Effective digital leadership translates acquired knowledge into a clear direction for transformation. Learning culture creates a climate for experimentation and continuous improvement. Social capital facilitates knowledge transfer from those who have mastered it to those still learning.

### **Limitations of the Analysis and Future Research Agenda**

The first limitation pertains to the theoretical approach. This study is based on a selective literature review with a primary focus on the development of absorptive capacity theory from strategic management and organizational perspectives. Two perspectives with potential to enrich understanding but not yet deeply integrated are actor-network theory (ANT) and institutional theory. ANT offers a viewpoint where technology adoption is not merely knowledge transfer but a translation process where technology undergoes meaning transformation through interaction with other actors. Institutional theory offers understanding of how institutional pressures; regulative, normative, and cognitive—shape organizational behavior.

The second limitation relates to the generalizability of findings. The characteristics of Indonesian hospitals vary widely based on type (A, B, C, D), ownership status (public vs. private), and educational affiliation. Each category possesses different structural, cultural, and resource characteristics influencing absorptive capacity dynamics. This analysis has not been able to specifically

capture the differences in dynamics across these categories. Based on these limitations, three pressing empirical research agendas are identified. First, quantitative research to empirically test the relationship between dimensions of absorptive capacity and the performance of digital health technology adoption. Testing requires valid measurement instruments and adequate samples for multivariate statistical analysis. Second, qualitative research using case study or ethnographic approaches to deeply understand the processes of identification, harmonization, improvisation, and consummation occurring within hospital teams. In-depth case studies across several hospitals with different characteristics would provide rich understanding of practice variations and contexts. Third, longitudinal research to capture absorptive capacity dynamics over time. Long-term observation could follow the technology adoption journey in several hospitals, observing how each adoption cycle influences the next.

Before these three agendas can be implemented, there is a pressing methodological prerequisite: the development and validation of an absorptive capacity measurement instrument specific to the hospital context. The top priority is adapting the four dimensions of team-level absorptive capacity (Yildiz et al., 2023) into indicators reflecting practical realities within service units. A valid and reliable instrument would enable more accurate measurement, identification of priority intervention areas, and more precise evaluation of the effectiveness of capacity-building programs.

## CONCLUSION

This article has conducted an in-depth examination of absorptive capacity theory and its relevance to digital health technology adoption in Indonesian hospitals. Through a literature review employing conceptual analysis and theoretical synthesis, it has elaborated how theories developed by Cohen and Levinthal (1990), Zahra and George (2002), Lane, Koka, and Pathak (2006), and Yildiz, Murti, and Zander (2023) can be adapted to understand technology adoption phenomena in healthcare organizations.

The discussion yields several main findings. First, mapping the dimensions of absorptive capacity onto adoption stages shows that success is not sufficiently achieved through acquisition alone but demands sustained capabilities in assimilation, transformation, and exploitation. Second, critical analysis reveals the complex interaction between organizational structure, professional culture, resources, and government regulation. Centralized structures excel in acquisition but hinder adaptation. Strong professional culture creates resistance to knowledge from outside the profession. Regulation focused on administrative compliance risks creating compliance-oriented adoption.

Third, the researcher's perspective offers five implementation implications: a paradigm shift from a project approach to a continuous process; reconfiguration of top and middle management roles; strengthening cross-professional collaboration mechanisms; developing contextual measurement instruments; and structuring the supporting ecosystem at the macro level. Fourth, the synthesis results in a conceptual framework integrating three levels of analysis: individual (prior knowledge, digital literacy, motivation), team (identification, harmonization, improvisation, consummation), and organization (structure, culture, leadership). The framework captures circular dynamics with cumulative effects creating either a virtuous cycle or a vicious cycle.

Fifth, future research agendas include quantitative research to test causal relationships, qualitative research to understand processes in depth, and longitudinal research to capture dynamics over time. An urgent priority is developing a team-level absorptive capacity measurement instrument specific to the hospital context.

Policy implications for digital health transformation in Indonesia include: the government needs to shift policy focus from merely encouraging adoption through mandatory regulations towards a more balanced approach that includes absorption capacity support; reform of the health worker education curriculum is an urgent necessity; hospitals need to reorient their technology adoption strategies from a project approach to a continuous process; strengthening the role of middle management through granting autonomy and developing digital leadership competencies; and institutionalizing permanent cross-professional collaboration forums.

Ultimately, digital health transformation in Indonesia will not succeed if it focuses only on technical and infrastructural aspects. Success heavily depends on the ability of hospitals to absorb, integrate, and utilize the knowledge embedded in digital technology; a capability that must be built consciously, systematically, and sustainably.

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